The Origin of the *Indo-Iranians*

Elena E. Kuz'mina

Edited by J.P. Mallory

LEIDEN INDO-EUROPEAN ETYMOLOGICAL DICTIONARY SERIES

BRILL

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Leiden Indo-European Etymological Dictionary Series

Edited by

Alexander Lubotsky

VOLUME 3

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LEIDEN • BOSTON
2007

Translated by S. Pitina and P. Prudovsky.

With support of the Russian Institute for Cultural Research, Moscow, and Harvard University.

This book is printed on acid-free paper.

ISSN: 1574-3586
ISBN: 978 90 04 16054 5

PRINTED IN THE NETHERLANDS

Dedicated to the blessed memory of my teachers Mikhail and Igor D'yakonov.
Their methods of research, broad-minded historical approach,
strict objective evaluation of facts, constant adherence to principles,
and their benevolence were a guiding star for me.

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INTRODUCTION

In the middle of the 2nd millennium BC Egyptian civilization reached its zenith under the pharaohs of the 18th dynasty, the Hittite kingdom arose in Asia Minor, the Achaeans created the Mycenaean civilization in Greece, the Monteoru culture flourished along the Danube, central Europe was occupied by tribes of the Únětice culture, the early farmers of the Anau culture were erecting their citadels in western Central Asia, the rulers of the Shang dynasty established their power in China, and in India the Harappan civilization was in decline. But what was happening at this time in the vast expanses of the Eurasian steppes that spread unbroken from the Danube to the Great Wall of China? Here, in the middle of the 2nd millennium BC, two gigantic cultural spheres were formed with no parallels in the Old World: in the west the Timber-grave (Srubna) culture stretched from the Danube to the Ural, and in the east the Andronovo culture extended from the Ural to the Yenisei (Map 1). And in the Near East the Indo-Iranians, a branch of the Indo-European language family, are mentioned for the first time.

The time when Indo-Iranians are first recorded in cuneiform texts, the 16th(?)-15th centuries BC, provides a *terminus ante quem* for the separation of the Indo-Iranians from the other Indo-European peoples. Proper names of the dynastic rulers of the Hurrian kingdom of the Mitanni in northern Mesopotamia and Syria are mentioned in written documents of the 17th-16th centuries. In the 14th century BC Prince Šativasa with a Mitanni detachment escaped from Arrapcha to the Hittite king Supilluliuma and concluded a treaty. This was guaranteed by an oath to the Hittite and Hurrian gods where four ancient Indo-Iranian gods—Indra, Varuṇa, and the Nāsatya twins—are also mentioned. The Mitanni Kikkuli wrote a treatise on training stallions to be harnessed to chariots, in which the terms connected with horse-breeding and training were Indo-Iranian.

This treatise was translated from the Hurrian language in the Hittite kingdom and Assyria. This has prompted some scholars to assign a special role to the Indo-Aryans in the dispersal of horse-breeding and chariots in the Near East (D'yakonov 1956; Kammenhuber 1961; Mayrhofer 1966, 1974; Salonen 1955-1956; Thieme 1960; Ivanov 1968). According to A. Kammenhuber and M. Mayrhofer the Arya arrived in Mitanni apparently somewhat before the middle of the 2nd millennium BC (rather than the mid-16th century BC). The question of what branch of Indo-Iranians the Near Eastern Arya belonged to has been a matter of debate. The point of view expressed by P. Thieme, M. Mayrhofer, and V. V. Ivanov prevails: the Arya of Mitanni were already separated Indo-Aryans or bearers of a special Aryan dialect, although their movement probably involved related Proto-Iranians. I. M. D'yakonov (1995: 129) suggested that they could be a third group of Indo-Iranians, the Dards and Nuristani. This evidence shows that, in the first place, before the middle of the 2nd millennium BC, Indo-Iranians had not only separated from other Indo-Europeans but also formed a community of separate dialects; in the second place, a special role in Indo-

Iranian culture belonged to horse-breeding and chariot tactics in battle, i.e., the period of the last contacts between Indo-Iranians in their homeland is set before the 16th-15th centuries BC by the spread of chariots in the Old World and, consequently, the area of Indo-Iranian dialect contacts should fall within the region where we find developed horse-breeding and chariots.

Two centuries have passed since W. Jones (1799) and A. Schlegel pronounced on the relationship between the ancient Indians, Greeks and Romans and proposed an Indo-European language family. The original homeland of the Indo-Iranians was localized variously in India, Central Asia, the Pamirs, the Arctic, on the Danube, the north Pontic steppes, Iran and the Near East. The published criticism of these various hypotheses in the works by E. A. Grantovsky (1970), B. G. Gafurov (1972), J. P. Mallory (1973; 1998a; Mallory and Mair 2000), and E. Bryant (1999) makes a detailed review of these different points of view unnecessary. We may simply note that both in linguistics and archaeology there are two major competing hypotheses under serious discussion concerning the origins of the Indo-Iranians.

T. V. Gamkrelidze and V. V. Ivanov (1972: 19-25; 1979: 33-37; 1980a: 64-71; 1980b; 1981a: 11-33; 1981b: 80-92; 1984) have proposed a new reconstruction of the Indo-European proto-language which emphasized the kinship between Proto-Indo-European and the Kartvelian and Semitic languages, a reconstructed economic and cultural vocabulary more advanced than previously proposed, names of southern flora and fauna, and a homeland in a mountainous landscape. This and other linguistic evidence provided the basis for their transferring the Indo-European homeland from Europe to the Near East and they localized it in the 4th millennium BC before its disintegration in northern Asia Minor, whence Hittite-Luvians and Greeks made a short move to the west, Proto-Indo-Iranians advanced slightly to the east, to the northern part of the Iranian plateau, and from there some Indo-Aryans moved to the west into Mitanni, while others migrated east to India. They also argued that the Tocharians and the bearers of the ancient European dialects (Italics, Celts, Germans, Balts, Slavs and later also early Iranians) moved in subsequent waves during the 3rd and 2nd millennia BC through Central Asia into the northern Caspian and further west to the Volga and north Pontic. At the end of the 3rd millennium BC they spread across Europe from the area of the Pit-grave (Yamnaya) culture and again appeared in the Near East (the migration of the so-called "Sea Peoples"). The last to take the same route from the territory of Iran through Central Asia were the Eastern Iranians (Scythians and Sarmatians).

V. V. Ivanov and T. V. Gamkrelidze's proposals are now a focus of discussion (D'yakonov 1982; Merpert 1985; Kuz'mina 1980b; 1994; Lelekov 1982; Grantovsky 1998; Mallory 1998a). J. Nichols (1996) locates the Indo-European homeland in Central Asia (Bactria), from whence she proposes a migration to the north Pontic took place. But the evidence of archaeology excludes such a movement of Indo-Europeans (Mallory 1998).

The other major theory presumes an Indo-Iranian homeland in Europe. European linguists at the beginning of the 20th century proposed that the Indo-Iranians had separated at the end of the 3rd / beginning of the 2nd millennium BC, and their partial withdrawal from the homeland was through the Eurasian steppes in Central Asia, and further to the south, to India and Iran. However, a number of

authors admitted that some Iranians, ancestors of the Scythians and probably the Cimmerians, remained in Europe. Others have suggested that the Scythians returned to Europe from Kazakhstan in the 1st millennium BC. Opinions differ also about the route of Indo-Iranian migration from a south Russian homeland or (at least partially) through the Caucasus (P. Kretschmer, E. A. Grantovsky, K. Jettmar, W. Brandenstein, R. Ghirshman, M. N. Pogrebova, P. Bosh-Gimpera) or through Central Asia. This point of view was held by W. Geiger (1882), O. Schrader (1901), E. Meier, V. Bartold, E. Benveniste (1966), V. Pisani, G. Cameron, A. Meillet (1938), A. Christensen (1943), E. Herzfeld (1947), and such specialists in Indo-European and Indo-Iranian languages as V. Georgiev (1958), G. Morgenstierne (1973), W. Porzig (1964), Th. Burrow (1973; 1976), W. Brandenstein (1948; 1962), H. Bailey (1955; 1957), R. Hauschild (1962), R. Frye (1972), M. Mayrhofer (1966; 1974), M. Boyce (1975), J. Harmatta (1981), and A. Parpola (1973; 1988). Various views were expressed by the Russian scholars V. V. Struve (1955), I. M. D'yakonov (1956; 1958; 1995; 1996), I. Aliev (1960), M. M. D'yakonov (1961), I. M. Oransky (1963; 1979a; 1979b), V. I. Abaev (1965; 1972; 1981), G. M. Bongard-Levin (Bongard-Levin and Iljin 1969; Bongard-Levin and Grantovsky 1983), E. A. Grantovsky (1970; 1998), T. Ya. Elizarenkova (1972; 1989; 1995; 1999), B. G. Gafurov, (1972), M. A. Dandamaev (Dandamaev and Lukonin 1980), and until recently V. V. Ivanov (Ivanov and Toporov 1960: 10-22; Ivanov 1963: 11-18). V. Georgiev (1958: 280-282) proposed that the earliest Indo-Iranians could be associated with the Pit-grave culture. M. M. D'yakonov (1961) placed the Indo-Iranian homeland in south-east Europe to the east of the Tripolye culture. E. A. Grantovsky (1960: 351-357) held that "the epoch of the Pit-grave culture can correspond to the common Aryan period." V. I. Abaev (1965: 134-135) thought the Timber-grave culture to be Iranian. M. M. D'yakonov (1961: 40-42, 64) and E. A. Grantovsky (1970: 359-360) directly connected Iranians or Indo-Iranians with the Timber-grave and Andronovo cultures but I. M. D'yakonov (1956: 124; 1960), W. Brandenstein (1962: 3), Th. Burrow (1973: 126), and M. Boyce (1975) connected them only with the Andronovo culture. I. M. D'yakonov (1970: 126; 1995; 1996), moreover, proposed that the Indo-Iranians left no later than in the second quarter of the 2nd millennium BC.

The conclusions of these linguists are accepted by the majority of archaeologists who specialize in the cultures of the Eurasian steppes and Central Asia of the 2nd millennium BC. They are S. P. Tolstov (1948: 68; 1962: 59), A. N. Bernshtam (1957: 18-19), S. S. Chernikov (1957; 1960: 112), K. F. Smirnov (1957b: 8-14;1964; Smirnov and Kuz'mina 1977), V. M. Masson (1959: 116-117), M. A. Itina (Tolstov and Itina 1960; Itina, 1979: 232-236), N. Ya. Merpert (1961: 172, 173; 1966: 149-160; 1974: 14), B. A. Litvinsky (1962: 291-295; 1963: 127-133; 1964; 1967: 122-126; 1981: 160-162), E. E. Kuz'mina (1963b: 155-158; 1971a, 1971; 1972a; 1972b; 1974a, 1974b; 1981a; 1987a; 1988c; 1994; 1995; 1999; Smirnov and Kuz'mina 1977), K. V. Sal'nikov (1965: 347), A. M. Mandel'shtam (1966a: 258; 1968, ch.5, 6), K. A. Akishev (1973), V. F. Gening (1977b; 1985), M. N. Pogrebova (1977a: 133-140, 170), N. L. Chlenova (1980: 66-67; 1983a; 1984; 1986), S. S. Berezanskaya (1982: 206-209), G. B. Zdanovich (1992; 1995; 1999), and I. B. Vasil'ev *et al.* (1995). They hold that the archaeological evidence of the Bronze Age cultures of the Eurasian steppes does

not contradict this linguistic hypothesis and it is supported by the archaeologically established genetic connections between the Iranian-speaking Scythians, Sarmatians and Saka and the earlier Timber-grave and Andronovo cultures.

Other cultures have been mentioned within the context of Indo-Iranian origins and expansions, e.g., the Abashevo culture (Pryakhin 1977: 134-7) and the Catacomb culture (Klein 1980; 1984: 32-5). N. F. Guseva (1977: 27-51; 1987: 46) assigned the Indo-Iranians to the Timber-grave and Abashevo cultures, and later the Andronovo, and stressed their connection with the Slavs. A. M. Mandel'shtam (1968: 131-141) conducted a systematic analysis of the funeral practice of the Bishkent (Vakhsh) culture and demonstrated specific correspondences with Indo-Aryan practices. He viewed the Bishkent culture as cattle raising, coming from the north-west in transit to India, and he noted its similarity to the Andronovo culture. B. A. Litvinsky (1964: 158; 1967: 122-126) connected this culture with the Nuristani languages and showed its analogies in Swat. E. E. Kuz'mina (1972 a: 134-143; 1972b: 116-121; 1974: 188-193; 1975: 64-7) emphasized the Indo-Iranian attribution of the culture, its connection with Swat and Gomal and the participation of the Zamanbaba and Andronovo components in its formation. C. Silvi Antonini (1986) spoke against this, justly mentioning the absence of catacombs in Swat, but new discoveries in Tadzhikistan now confirm the correctness of this hypothesis (Vinogradova and Kuz'mina 1986: 199). This does not, by any means, exclude connections between Swat and the agricultural cultures of Bactria (Sarianidi 1987) and Iran (Stacul 1970; Pogrebova 1977a: 145).

Some specialists in Iranian archaeology have suggested that the Indo-Iranian homeland was on Iranian territory. Some suggest that the makers of grey ware ceramics in the last quarter of the 2nd millennium BC were Indo-Iranian speakers. This oft-discussed ware is supposed to have originated in western Iran and Central Asia, and there is a continuity of ceramic tradition from the 3rd millennium BC (Hissar-III, Shah-Tepe). But the origin of the groups of Iranians, the Saka, Sarmatians and Scythians in the steppes, the Bactrians, Sogdians, etc. in Central Asia, is in general indisputable. This hypothesis is shared by L. Vanden Berghe (1964: 37), C. Young (1965: 72; 1967), R. Dyson (1965; 1967), J. Deshayes (1969), K. Jettmar (1956: 327-342), who initially considered Andronovans Indo-Iranians but later regarded them to be Finno-Ugrians following V. N. Chernetsov.

The association of Iranians with grey ware has been repeatedly criticized by A. M. Mandel'shtam (1964: 192-194), E. E. Kuz'mina (1975c: 650), V. G. Lukonin (1977: 13-15, 18), M. N. Pogrebova (1977a: 8,16), G. Cleusiou (1982), I. N. Medvedskaya (1977: 169-175; 1978: 7-9, 14-18), and especially by E. A. Grantovsky (1981: 245-272; 1998: 37-123). These critics have shown that, first, grey ware was not continuous through all the periods of its existence; second, grey wares are not identical in their various local variants, and they are met in different archaeological contexts; and, finally, grey wares dominate in those areas of Iran, which, according to written sources, were populated by non-Iranians: Hurrians, Kassites, Gutians, Lullubi, and Elamites. Thus, it remains highly disputable whether the phenomenon of grey ware is directly connected with Indo-Iranian populations. This hypothesis incidentally contradicts the Gamkrelidze-Ivanov model as it proposes that Iranians migrated from east to west.

R. Ghirshman (1977) placed the Indo-Aryan and Iranian homeland in south-east Europe, but proposed that the unity collapsed in the 4th millennium BC when the Indo-Aryans migrated to Mesopotamia and Iran. He dated the arrival of the Iranians from their homeland only at the turn of the 2nd-1st millennia BC, connecting the Iranians with different cultural complexes (Sialk-A and B, Yaz 1) and sites of ancient Dahistan. (For a critical analysis of R. Ghirshman's statements see Lelekov 1978: 220-226; for objections to claiming Iran and south Central Asia as the center of the appearance of the chariot see Kuz'mina (1980a: 28)). I. N. Khlopin (1970a: 94-112; 1970b: 57-58; 1970c: 8-89; 1983: 125) categorically insisted on the agricultural character of the Indo-Iranian economy, and admitted the existence of the Indo-Iranians in Iran and in south Central Asia already from the 4th millennium BC. He connected the genesis of the Andronovo culture with the Anau culture, wherein the Andronovans were outcasts forced to move to the north where they had to adopt a primarily cattle-breeding economy. In this way they introduced agriculture, metallurgical skills and the Iranian language to native hunting populations (Khlopin 1970c: 95, 98-99). This approach was opposed by Andronovo scholars (Kuz'mina 1972a: 137-142). V. I. Sarianidi (1977: 113, 143-150, 158; 1990: 95-102) connects the Iranians not with the grey ware culture(s) but with the ceramic complex of Bactria. He holds that Iranian-speaking tribes migrated to the east and north from Iran in the 2nd millennium BC (where the supposedly eastern-Khorasan culture has not yet been discovered) and he strongly rejects the ascription of the Andronovans to the Indo-Iranians (1977: 149). He also suggests that bearers of the Tillya-Tepe painted pottery experienced a secondary migration; the question of the homeland of the Saka-Scythians is not addressed. V. I. Sarianidi's statements were opposed by A. A. Askarov (1977: 156), who suggests, after V. M. Masson, that the creation of the agricultural culture of Bactria was the result of migration from south Turkmenistan. In his more recent work V. I. Sarianidi (1999), following T. V. Gamkrelidze and V. V. Ivanov, has traced some connections between the Bactria-Margiana Archaeological Complex (BMAC) and both the Aegean and Anatolia, localizing the Indo-Iranian homeland in the latter, and proposing Bactria as the homeland of Zoroastrianism. This hypothesis has been severely criticized (Mallory 1998b). The recent work of S. A. Grigor'ev, another proponent of the Gamkrelidze-Ivanov hypothesis, titled (in Russian) *The Earliest Indo-Europeans. An attempt at historical reconstruction*, Chelyabinsk, 1999, is beyond scientific criticism as it has serious methodological mistakes in the analysis of the archaeological material.

Thus, the hypotheses that both the grey ware and the Bactrian ceramics of the 2nd millennium BC are connected with the Iranians is neither proved nor generally accepted. Comparison of the wheel-made pottery of Achaemenid Iran with ceramics of south Central Asia shows a different genesis of ceramic traditions (Kuz'mina 1969; 1971c: 171-178; 1972a: 143-146; Sarianidi 1977: 116, 151; Cattenat and Gardin 1977: 225-246), and it may be concluded that wheel-made pottery (as opposed to hand-made pottery) cannot be considered as a true ethnic indicator.

Thus, no single hypothesis from the competing linguistic and archaeological solutions to the location of the Indo-Iranian homeland has been proved at present. Consequently, the task before us is a thorough comparison of the linguistic

and archaeological data and an assessment of the ethnic attribution of the Andronovo culture. But prior to this we need to analyze the material itself: while the Andronovo culture was identified more than 80 years ago it has never been the subject of a monograph. A second aim of this book then is partially to fill this gap by compiling a complete database drawn from the whole Andronovo area and to reconstruct its material culture, economy and cultural type.

The Eurasian steppes of the 2nd millennium BC witnessed the process of the final establishment of a pastoral economy. The third most important task of research is to explain the specific features of the steppe economy and the dynamics of its development. Without resolving these issues one cannot understand the reasons for the transition of the steppe population to mass nomadism at the beginning of the 1st millennium BC, the processes of ethnic migrations during the 2nd millennium BC, and the accompanying processes of assimilation and integration that define the origins of ethnic groups and the whole process of ethnogenesis not only in the steppes but also in neighboring regions of the Old World that may provide clues to the solution of the Indo-Iranian homeland problem.

The approach to ethnic reconstruction utilized in this book draws from a number of different sources.

1. Written evidence and linguistic data concerning the material culture of the ancient Indo-Iranians

The evidence of the Indo-Iranian languages, including toponyms and onomastics as well as the earliest written tradition—the Iranian Avesta and the major Indian Sanskrit texts of the Rigveda, Atharvaveda, Yajurveda, and Śatapatha-Brāhmaṇa—provide a basis for reconstructing Indo-Iranian material culture. The use of these texts is rather complicated as they were compiled, in the first place, after the Indo-Iranians had left their homeland and they do not contain contemporary cultural descriptions but only reminiscences of the homeland and ancestral culture obscured by their mythological context. Secondly, the creation of the texts themselves was separated by several or more centuries from their surviving written form, which has led to later interpolations, additions and lacunae. Thus, such sources require subtle analyses, a delicate handling of the information presented, and by no means do the sources permit a direct extrapolation of memories of the ancestral homeland culture carried in later Indo-Iranian tradition. General works on the history of India, Iran and Central Asia as well as works on specific categories of the material culture of the Indo-Iranians by W. Rau (1971; 1972; 1973; 1974; 1975; 1977; 1983), T. Ya. Elizarenkova (1972; 1989; 1995; 1999b; Elizarenkova and Toporov 1995), F. B. J. Kuiper (1991), the important studies on the Avestan society by Zaehner (1961) and especially by V. I. Abaev (1956) and M. Boyce (1987 a,b; Boyce, Grenet 1991) have been invaluable.

In this work I have used the translations of the *Rigveda* and *Atharvaveda* of T. Ya. Elizarenkova; in some cases the editor has employed other translations, especially those of W. Doniger O'Flaherty. The Avestan texts have been reproduced in translations made by S. N. Sokolov, V. A. Livshits, V. I. Abaev, I. M. Steblin-Kamensky, and I. S. Braginsky. I have also availed myself of the translations of J. Darmesteter. Other data employed in this work have been

drawn from later sources such as the *Mahābhārata*, *Shahname*, Narts (the epics of the Ossetes), and evidence from classical authors.

2. Archaeological sources for studying the material culture of the Indo-Iranians
The Indo-Iranian material culture reconstructed on the basis of linguistic data and written tradition must then be compared with the material culture of two zones of the Old World—southwest Asia/India and the Eurasian steppe—in order to establish the Indo-Iranian homeland. Special attention is paid to the Andronovo culture, the creators of which are viewed by many linguists and archaeologists as the earliest Indo-Iranians. Comparative analysis permits us to verify the attribution of the Indo-Iranians to the Andronovo culture. However, as the Andronovo culture has never been the subject of a monograph, a preliminary collection and systematization of Andronovo materials was necessary.

3. Archaeological sources on the material culture of Iranian-speaking Sarmatians and Saka
These sources are thoroughly reviewed in the works by A. A. Iessen (1953), S. I. Rudenko (1953), K. A. Akishev and G. A. Kushaev (1963), K. A. Akishev (1973), A. I. Melyukova (1964; ed. 1989), K. F. Smirnov (1964), M. K. Kadyrbaev (1966a); B. N. Grakov (1971; 1977), B. A. Litvinsky (1972), V. A. Il'inskaya and A. I. Terenozhkin (1983), M. G. Moshkova (ed. 1992), L. T. Yablonsky (1996), M. A. Itina and L. T. Yablonsky (1997; 2001), A. Yu. Alekseev (2003), etc. and they constitute the basis of the present research.

4. Ethnographic sources for studying the material culture of the Iranian and Indian peoples
The author is acquainted with ethnographic sources not only from the literature but also by taking part in ethnographic expeditions to the Pamirs in the 1950s, to Ossetia in the 1970s, and to Iran, Afghanistan, India, Sri-Lanka in the 1980s, where long isolation has preserved some rather archaic cultural features of the Indo-Aryans.

Research on the peoples of northwest Hindustan was of special interest because there, in conditions of isolation, we find different Indo-Iranian tribes which, according to G. Morgenstierne (1973), left the homeland early, settled in the mountainous valleys and avoided the influence of the Harappan culture. They have preserved archaic features in language, mythology, folklore, way of life and handicrafts (Jettmar 1975; Fussman 1977; Rye and Evans 1976).

5. Anthropological sources
To verify the ethnogenetic conclusions, the results of anthropological research have also been applied. These have included the general works of V. P. Alekseev (1981; 1986; 1989; 1990), V. P. Alekseev and I. I. Gokhman (1984), T. K. Khodzhayov (1983), and V. A. Dremov (1997).

Acknowledgements

This book is a completely revised edition of the monograph "Where do Indo-Aryans come from?", which was completed in 1992 and published in 1994 in

Russian. The book presents a summary of the Andronovo pastoralists of the 2nd millennium BC, whose representatives have been regarded by many scholars as the earliest Indo-Iranians. This hypothesis has been demonstrated on the basis of a detailed comparison of archaeological data and Indo-Iranian sources.

Much new material has recently emerged in connection with the origins of the Andronovo culture, its metallurgy development, and its use of horse-drawn chariots. There is also new information about the migration of early Andronovo tribes to the south, into Central Asia, and their contacts with the Anau, Oxus, and Sarazm cultures, whose population belonged to the early farming cultures of the Near East.

The use of calibrated radiocarbon data raises the question of setting the beginning of the Andronovo culture to the borderline of 3rd / 2nd millennium BC.

The book has been considerably recast, new paragraphs and material have been added, because I considered it necessary to include the new data. However, some details and particulars, which may not be of interest for a foreign reader, have been excluded. As a result, this edition has been considerably extended.

The scientific edition of this book would have been impossible without Prof. J. P. Mallory, who bravely volunteered to perform this huge task. I have been inspired by his priceless, useful, productive, and stimulating ideas on the genesis of Indo-Europeans.

I would also like to express my heartfelt gratitude to Prof. Alexander Lubotsky, who suggested publishing my book in his prestigious series.

I am also grateful to Proff. Vladimir Livshits and Tatyana Elizarenkova who kindly checked the transliteration of Indo-Iranian words used in the book.

I am very much pleased to express my gratitude to V. V. Ivanov, my guru during many years, whom I respect most deeply in spite of the difference of our conceptions.

A. M. Mandel'shtam and M. P. Gryaznov, the first readers of my book, should be also mentioned with gratitude, as well as M. N. Pogrebova, the editor of the first edition. Their advice and, what is more important, moral support in a difficult period of my life have been very important for me.

The publication of this book has been realized after Catheryn Linduff and Karin Rubinson generously offered financial support. I express my gratitude to them. I am equally thankful to Peabody Museum, Harvard University, and Prof. Carl Lamberg-Karlovsky for their financial aid for the translation. I also want to express my gratitude to the director of Institute for Cultural Research, Kirill Raslogov, who found the possibility to sponsor my work in the period of a reduction of funding for the institute.

I would like to express my sincere thanks to my son Alex Kuz'min for his constant financial and moral support, invaluable advice, patience, and courage.

Dr. Natalia Krikova and especially my pupil Dr. Aleksandra Ippolitova performed a lot of technical work preparing the text. All these people graciously helped me, and my heart-felt thanks go to them.

Finally, I would also like to mention all my colleagues, museum and library staff all over the world who helped me work with new materials and books on archaeology.

Dr. Svetlana Pitina and P. Prudovsky have kindly translated the book.

PART ONE
THE ANDRONOVO CULTURAL ENTITY

CHAPTER ONE

HISTORY OF RESEARCH ON THE ANDRONOVO CULTURE

Andronovo sites extend over 3,000km across the steppe and forest-steppe, from the western slopes of the Ural mountains as far east as the Yenisey; in the north the Andronovo culture reached the borders of the taiga zone and in the south it extended up into the high mountainous regions of the Tian-Shan and the Pamirs and penetrated the deserts and oases of Central Asia as far as the left bank of the Amu-Darya (Oxus).

One can discern four stages in the development of Andronovo studies: 1) Pre-revolutionary; 2) 1920s – 1947; 3) 1947 – beginning of the 1970s; 4) Modern.

In 1825 S. B. Bronevsky uncovered individual burials that were later assigned to the Andronovo culture of Kazakhstan; in the 1850s A. N. Zyryanov was opening burials in the Urals; in 1862 V. V. Radlov conducted the first scientific excavations near Karkaralinsk. At the end of the 19th / beginning of the 20th century, Andronovo graves were being studied in western Siberia, Kazakhstan, and in the Urals. One should especially note the works of N. K. Minko, V. Y. Tolmachev, and Yu. P. Argentovsky. Collections of metal objects were made, including a large one assembled by the Beloslyudovs.

The second stage of research dates from the 1920s to 1947. In S. A. Teploukhov's report to the Russian Museum the Andronovo culture was singled out as a special culture of the Minusinsk region and was named after a cemetery near the village of Andronovo near Achinsk, which was studied in 1914 by A. Ya. Tugarinov (Teploukhov 1929a: 43-44, 58; 1929b). In 1929 M. P. Gryaznov outlined for the first time the chronological and territorial borders of the Andronovo culture, situating it in western Siberia, the Urals and Kazakhstan, and he synchronized the culture with the Timber-grave and Seyma periods.

The establishment of Marxist methodology in archaeology directed research toward the study of the productive forces of the peoples of the USSR who had no written history. This led to the organization of expeditions to Kazakhstan, Siberia, the Tian-Shan, and Central Asia, and the excavation of settlements, houses and industrial complexes which were extremely important for the study of the history of production. This form of economic archaeology became the most important contribution of Soviet scientists to the development of archaeological thought. Excavations of the Alekseevka settlement and the cemetery by O. A. Krivtsova-Grakova (1948) must be especially mentioned, as she investigated the economy, way of life and ideology of an early group of people. Research into ancient mining and the settlements of metallurgists in Kazakhstan, undertaken by S. S. Chernikov (1939, 1948, 1949), made it possible to discuss for the first time the question of the organization and technology of the metal industry. This was accomplished at a time when much debate revolved around outdated models of migration (where Gustav Kossina's approach had been adopted by the

Nazis) and N. Ya. Marr's theories strengthened the ideas of autochthonous (stadial) development. Both of these trends downgraded research into ethnogenetic questions.

The year 1947 saw the beginning of the third stage. The 'First Urals Archaeological Conference' and publication of the monograph by O. A. Krivtsova-Grakova *The Alekseevka Settlement and Cemetery* and a number of works by S. S. Chernikov (1948, 1949) on the history of mining were dedicated to studying ancient economic systems. The work by S. V. Kiselev *The Ancient History of Southern Siberia* (1949) viewed the Andronovo culture for the first time against a wider background of synchronous cultures of the Old World, summed up prewar Andronovo culture studies, and was a major event in Andronovo research. S. V. Kiselev tackled questions on the origin, cultural relationships, historical fate, specific character of the economy, role of farming, and social differentiation in the Andronovo culture. Generalizing works by S. P. Tolstov (1948) and A. N. Bernshtam (1949; 1950; 1952) were also published. They revealed the centuries-old development of culture in Central Asia involving it in the world historical process. These pioneer works were highly appreciated by the leader of European archaeology, V. Gordon Childe, who contributed so much to establishing the historical method in archaeology.

The 'First Urals Archaeological Conference' raised questions on the classification and realization of regional and chronological differences of various Andronovo sites. K. V. Sal'nikov (1951) suggested his own division of the Trans-Urals Andronovo culture and proposed three stages: 1) Fedorovo (15th–13th centuries BC); 2) the genetically connected Alakul' (11th–9th centuries BC); 3) Zamaraevo (8th–7th centuries BC), which provided the basis for the culture of the Iranian-speaking Scythian-Sauromatian tribes.

V. N. Chernetsov opposed K. V. Sal'nikov's scheme (1953; 1963). Expert in Finno-Ugrian folklore and ethnography, a specialist on the forest cultures of the Urals and western Siberia, he suggested a genetic connection between the Ugrian population of the Trans Urals and the Andronovo culture which he held to be the descendants of the local Neolithic population related to the Kelteminar culture; his evidence was the similarity between the ornament on Andronovo and Ugrian material and their closeness with earlier Neolithic ceramics. He proposed dividing the Andronovo culture into two genetically unrelated cultures: the Fedorovo, related to the forest cultures of the Trans-Urals, and the Alakul', connected with the southern steppe regions and the Timber-grave culture of the Volga.

A special role in the debate was played by O. A. Krivtsova-Grakova (1948: 149-153, 161). Starting from the well-developed classification of the Timber-grave culture she outlined two stages: a late Alekseevka, dating from the end of the 2nd / beginning of the 1st millennium BC, and an early Kozhumberdy, synchronous with the Fedorovo in Siberia, where its evolution was interrupted by the intrusion of the Karasuk tribes.

Thus in 1948 three different points of view on the chronology and historical fate of the Andronovo culture took shape. All subsequent researchers studying Andronovo problems adhered to one or other of the earlier hypotheses.

Taking into account the heterogeneity as well as the continuity of Andronovo sites, A. A. Formozov (1951b) introduced the notion of the "Andronovo cultural unity".

The 1950s and 1960s were marked by the rapid development of field studies of the Andronovo culture. The accumulation of a wide body of new material made it possible to divide it into separate local variants. In 1966 the Kazakhstan sites were classified according to K. V. Sal'nikov's scheme: Fedorovo (Nura), Alakul' (Atasu) stages; sites of the Final Bronze Age were designated the Begazy-Dandybay culture (Margulan *et al.* 1966). A. Kh. Margulan's monograph (1979) was extremely important for resolving problems of the Final Bronze Age as it systematized material from the Begazy-Dandybay culture (12th–9th centuries BC).

The Andronovo culture of eastern Kazakhstan was studied by S. S. Chernikov (1960). He divided it into four chronological stages: 1) Ust'-Bukon, where ceramics possessed some affinities with the Afanas'evo and Okunevo cultures; 2) Kanay (16th–12th centuries BC); 3) Malokrasnoyarka (11th–10th centuries BC); and 4) Trushnikovo (9th–8th centuries BC).

M. N. Komarova (1962), following K. V. Sal'nikov's scheme, divided all Andronovo sites into Fedorovo and Alakul' types, and distinguished local variants. She maintained that only ceramics of the Fedorovo type were present in western Siberia, and only ceramics of the Alakul' type were represented in western Kazakhstan and Kustanay.

The works by S. V. Kiselev (1960; 1962) and N. Ya. Merpert (1962) on changes in chronology, and the earlier dating of the Bronze Age cultures of the Eurasian steppes based on a wide ranging chronology—from China to Western Europe—were extremely important for resolving problems of the chronological position of the Andronovo culture. The establishment of a longer chronology demanded corrections to be made to the Andronovo schemes as well. The chronology of the Alakul' phase was extended because of new discoveries of metal objects in the Bliznetsy (15th–12th centuries BC) and Emba burials (Kuz'mina 1961b: 90-93, fig. 32.4.6.10; 1963a: 136).

Because of the discovery at Bliznetsy of an Alakul' vessel typologically close to that of the Fedorovo phase, E. F. Fedorova-Davydova (1960; 1964) accepted V. N. Chernetsov's hypothesis and acknowledged that the Alakul' and Fedorovo types were synchronous local cultures. These ideas were supported by M. F. Kosarev (1965: 243).

To improve the chronology I set about to study the Elenovka micro-region in the southern Urals. Applying for the first time aerial-photography fifty settlements, adjoining burial grounds, and a number of mines were discovered. Their chronology has been established on the basis of the first statistical approach applied to the classification of Andronovo ceramics. It is possible to discern three types of settlements and corresponding burial grounds and transfer the Elenovka model to other sites of the Orsk variant.

The study of sites in a micro-region, applying the latest methods of research —aerial-photography, dendrochronology, the spectral analysis of metals, compositional analysis of ceramics and the investigation of adjacent mines—also made it possible to pronounce on the issues of Andronovo demography, exchange, and domestic architecture (Kuz'mina 1962a; 1963b; 1963g: 133-138; 1965a).

The works by E. N. Chernykh (1970), who singled out an Elenovka-Ushkatta group among the metal types of the Eurasian steppes, were important for the

study of Andronovo metallurgy. V. I. Tsalkin (1972b) investigated the characteristics of Andronovo stock-breeding.

Great attention to the Andronovo culture was raised by K. V. Sal'nikov (1967: 315-325) in a generalizing work discussing questions of the development and interrelationship of the cultures of the Urals. He dated the Fedorovo stage to the 18th–16th centuries BC, the Alakul' to the 15th–12th centuries BC, and the Zamaraevo to the 12th–8th centuries BC.

V. S. Stokolos sharply criticized K. V. Sal'nikov's scheme (1967; 1972). He concluded that the Alakul' monuments are more ancient than the Fedorovo and belonged to a different culture. The work by V. S. Stokolos was in turn subjected to sharp criticism due to numerous mistakes. Although considerable progress had been made, the 1960s did not result in a single conception of the Andronovo culture.

The fourth stage of Andronovo studies has been characterized by more active research on the periphery. Successive surveys have been undertaken in central Kazakhstan (Kadyrbaev 1969; 1972; 1974; 1983), especially in the Karaganda region (Evdokimov 1979; 1980; 1983; 1984; 1987). Intensive research was also carried out by an expedition from Sverdlovsk University. G. B. Zdanovich (1975, 1988) published his research on the north Kazakhstan expedition. He studied multi-layer sites, reliably established their vertical stratigraphy, and identified the Petrovka type of sites, preceding and genetically connected with the Alakul' ones. The Petrovka type is dated to the 15th century BC, the Alakul' to the 14th–13th centuries BC, the Fedorovo and mixed Amangel'dy to the 12th–11th centuries BC.

The scheme for the Final Bronze Age of the northern Kazakhstan Bronze Age was formulated by S. Ya. Zdanovich (1974b; 1979), who defined a separate Sargary culture (other scholars assigned the sites to the Alekseevka type), dating it to the 9th–7th centuries BC. The Zdanovichs' scheme was an important contribution to the study of the Andronovo culture but their absolute chronology required verification.

The discovery of early burial complexes in 1973 in the Urals in kurgan 25 of the Novokumak cemetery by K. F. Smirnov (1973: 175-176) and in the Sintashta cemetery by V. F. Gening and L. I. Ashikhmina (1973: 132-133; Gening 1975: 144-147; Gening 1975a: 94; Gening, 1977) opened a new page in the study of the Andronovo culture. The examination of the Novokumak burial assemblage, based on a wide comparative and historical background, led to the definition of a chronological horizon comprising the Sintashta and Petrovka type monuments of the Urals and western and northern Kazakhstan. This stage is dated to the 17th–16th centuries BC on the basis of the discoveries of metal objects and bone disc-shaped cheek-pieces with analogies in the Ukraine, the Danube and Greece no later than the 16th century BC (Smirnov and Kuz'mina 1977). The formation of the Andronovo culture was viewed as a result of a western impulse and migration from Eastern Europe of the bearers of the Poltavka, Abashevo, and Multi-roller ceramic cultures (late Catacomb). Their assimilation led to the formation of the Andronovo culture, whose bearers were acknowledged as Indo-Iranians (Kuz'mina and Smirnov 1976; Smirnov and Kuz'mina 1977; Kuz'mina 1981a). V. F. Gening came to the same conclusion (1977) while comparing the burial rite at Sintashta with Vedic data.

N. A. Avanesova (1979) suggested a periodization of the Andronovo culture on the basis of the typology of metal objects. She accepted the unitary nature of the Andronovo culture and regarded it impossible to divide it into independent Fedorovo and Alakul' cultures. She suggested a pre-Alakul' stage (17th–16th centuries BC); Alakul' (15th–14th centuries BC); Kozhumberdy (14th century BC); Fedorovo (end of 14th–13th centuries BC); and Zamaraevo-Begazy culture (12th–9th centuries BC). From my point of view, ignoring the burial rite and ceramics in her analysis led N. A. Avanesova to a number of erroneous conclusions.

M. P. Gryaznov (1969) and G. A. Maksimenkov (1978) presented important summaries of the critical evidence from Siberia that bears on the Andronovo problem. G. A. Maksimenkov stresses the unity of the Andronovo culture, and the early date of the Fedorovo sites presupposes an arrival of Andronovo tribes in Siberia from the west.

Important discoveries leading in many cases to a new understanding of the ancient history of Siberia are connected with the research of V. I. Matyushchenko (1961; 1969a; 1969b; 1970; 1973a; 1973b; 1975; 1978; Matyushchenko and Lozhnikova 1969; Matyushchenko and Sinitsina 1988). He discovered spectacular cultural material from the settlements at Samus' and Rostovka, and the Elovka cemetery, with its richly represented metal objects; these discoveries raised the question of contacts with the pre-taiga zone.

Problems concerning the cultural interaction between hunter and fisher tribes with southern pastoralists are the focus of M. F. Kosarev's works (1965; 1970; 1974; 1981; 1983), which traced the influence of the Andronovo culture on the forest zone.

New material bearing on these questions and the problems of the ethnogenesis of the peoples of southern Siberia arose from the research on the Preobrazhenka 3 and Sopka 2 complexes (Molodin 1973; 1974; 1975; 1977; 1979; 1981; 1983a; 1983b; 1985), and Fedorovo-type sites in the Altai, whose creators Yu. F. Kiryushin (1980; 1983) considered to be Iranians. A. V. Matveev (1995) carefully investigated the chronological problems, and placed the Novokumak horizon between the 22nd and 18th centuries BC according to the evidence of radiocarbon dating.

Specialists studying Siberia with their historical method of study, their wide diachronic approach and focus on ethnogenetic issues universally recognize the alien character of the Fedorovo tribes in Siberia and the absorption of their culture by local tribes under powerful Andronovo influence. Considerable success has been achieved in studying the so-called Andronovoid[1] cultures of the taiga natives under Andronovo influence (Obydenov and Shorin 1995; Obydenov 1997; Potemkina *et al.* 1995).

Of special value are those studies that have concentrated on the relationship between the Andronovo culture and the cultures of western Central Asia. Sites combining Andronovo ceramics and metal with vessels of the Bishkent (Vakhsh) and farming culture of the Namazga VI stage have been recorded for Turkmenia, Bactria and Margiana (Mandel'shtam 1960; Litvinsky 1964; Kuz'mina 1963; 1980; 1984; 1988; 1990; 1993; 1994; Vinogradova and Kuz'mina 1986; 1996;

[1] Editor's note: clumsy but probably better English than Russian 'Andronoid'.

Francfort 1981; 1989; Lyonnet, 1996; P'yankova 1986; 1990; 1998; Avanesova 1996).

CHAPTER TWO

METHODOLOGICAL ASPECTS OF ETHNOCULTURAL RECONSTRUCTION

Archaeological taxonomy comprises a number of key concepts for the classification of archaeological material. These include 'archaeological culture' and 'archaeological cultural unity' which relate to such basic notions of theoretical ethnology as 'economic and cultural type' and 'historical and ethnographic unity'.

The initial archaeological category is the notion of the 'artifact', i.e. "any material object produced or modified by man in the past performing a certain cultural function" (Bochkarev 1975: 35). The totality of artifacts comprises a complex, i.e., the empirical basis of archaeology.

The first level of interpretation of archaeological material will be the classification of artifacts according to types. Oscar Montelius introduced the theoretical basis of archaeological classification, commonly understood as the typological method. However, there is still no unity of understanding as to what precisely an archaeological 'type' means. Some view the type as an actual existing and historically conditioned phenomenon (Sher 1966; Gryaznov 1969; Kamenetsky 1970); others (Ford 1962; Fedorov-Davydov 1970) understand this category as purely gnoseological, a purely subjective instrument of research. It seems that, as a rule, the artifact type was understood by its creator as a real entity within a culture. This is proved by differences in settlement inventory and related cemeteries (the presence of ritualized and non-ritualized artifacts), and by the fact that archaeologically distinguished artifact types have independent names in the language of a culture.

Typological classification consists of the isolation of peculiarities of artifacts, but it also takes into account the interconnection of characteristic features. This permits one to reconstruct historically existing types within a culture and not *a priori* classes of artifacts.

The second level of interpretation of archaeological materials is connected with the typological classification of complexes, i.e., with distinguishing the types of sites according to Yu. N. Zakharuk (1981: 20-21). The site type is "a universal unit of classification both for defining within some small territory genetic connections and for discerning synchronous groups." Systematization at this level is built on the correlation of the elements of burial rite with the basic categories of material culture, primarily ceramics. Then domestic settlement wares are compared with mortuary ceramics. Site types outlined according to a set combination of principles are then mapped. Their relative chronology is established on the basis of stratigraphical data, transparent typological series and mutually associated types within closed complexes. The absolute age of every site is defined on the basis of imports and such chronological indicators as bone

cheek-pieces and metal objects. Finally, according to the accepted definition of archaeological culture type, the chronological stages and local variants of the archaeological culture are evaluated and the degree of similarity between sites and with foreign cultures is determined.

The third level of archaeological analysis consists of distinguishing archaeological cultures or an archaeological cultural unity. This involves a transition from strictly archaeological research to historical interpretation. The archaeological culture is an open, dynamic, statistically stable system of different types of sites that occupy a continuous (though sometimes changing through time) territory with an objectively established unity of interconnected types, which develop uniformly over a long time period and vary in space in a limited manner, distinguishing this system markedly from other systems (i.e., archaeological cultures) (Kamenetsky 1970; Kovalevskaya 1988; Kuz'mina 1988d).

Sometimes divergence in the territorial aspect is such that some environmental zones exhibit independent lines of development. They do not coincide in everything; quite often sites of different types are situated like strip-farming.

In some cases where there is no satisfactory criteria for defining an archaeological culture according to the strict definition of recurring principles that occur uniformly in time and within a restricted area we may still discern a chain or lattice of interconnected site types that sharply differ from foreign ones. In these cases there is also reason to unite these sites into a cultural and historical unity. Sites of these archaeological 'unities' may have constrained time–space limits and are united according to one but differentiated according to other features. What is especially important is that they can be sharply distinguished from other sites. The notion of the archaeological cultural unity (or cultural region) was first introduced by A. A. Formozov (1951b; 1959b) and N. Ya. Merpert (1968; 1985) with respect to the Andronovo, Pit- and Timber-grave sites.

What is the historical reality of an archaeological culture or cultural unity? Some ethnologists and archaeologists are sceptical of identifying the archaeological culture with the ethnos (Foss 1952; Arutyunov and Khazanov 1978; Klein 1978, Clarke 1978; Renfrew 1977). Others see the archaeological culture as a reflection of an ethnos in terms of a social unit (Gorodtsov 1927; Bryusov 1956; Formozov 1959a; Zakharuk 1964; 1981; Artamonov 1969; Gryaznov 1969; Tretyakov 1969; Gening 1970; 1976; Kamenetsky 1970; Kuz'mina 1976a; 1988d; Bromley 1983; Merpert 1985; Alekseev 1986; 1989; Kovalevskaya 1988). Of decisive importance for resolving the problem of the relationship between archaeological culture and ethnos is the concept of cultural tradition. S. A. Arutyunov (1989) demonstrated that a cultural tradition is revealed first of all in language and meta-cultural communication (art, family ritual and burial rite). 'Cultural tradition' is a stable combination of an interrelated and uniform system of elements of material and spiritual culture as well as the very ways of transferring information from generation to generation. This system is capable of preserving and sustaining itself with a high degree of regularity through stages of cultural development, retaining its stability over a long period of time in order to reproduce an ethnos in a certain ecological niche.

Traditional culture includes the type of settlement, architecture, tools, everyday objects, dress, attributes of cultural activity, works of art, techniques of production, especially functionally irrelevant methods of production and artistic styles that are specific to a given ethnic group and serve as certain ethnic indicators. It also includes norms of behavior, etiquette, dance, certain ornamental motifs and pictorial art, images and compositions of decorative art and the whole complex of spiritual culture, including mythological ideas, epics, and other forms of folklore in more developed societies.

Traditional culture comprises an integral complex where all things and actions carry a semantic load connected with the mythological system and the self-consciousness of a given ethnic group; this contrasts with modern culture which distinguishes between the material and spiritual. Ethnically important axiological directives and ideological and aesthetic ideas provide an ethnic tradition.

Cultural tradition is transferred to the next generation by instructing it in the form of ritual actions, etiquette, dances, and the artistic performances and images of mythological and epic narrative. Language is the main channel of communication (Arutyunov 1989; Arutyunov and Cheboksarov 1972). A common language is not only the main sign but also the main condition for forming and preserving a traditional culture. The unity of a language within a culture is, as a rule, ideologically fixed in a common native name and self-consciousness, which is a characteristic sign of the ethnos and one of the conditions of its reproduction.

In cases where there is ethnic and linguistic divergence involving the dispersion of a group into different territories, the notions of a former kinship of the separated groups are firmly fixed in the ideological sphere in the form of legends about a common primary ancestor and the familial relationship between separate tribes. But in cases involving the amalgamation of two ethnic groups into a new culture, ethnographers have shown that after a bilingual period, one language dominates and a mythologized notion of a common origin is created. Thus, an archaeological culture is a direct reflection of a living ethnographic culture and it must also be characterized by the linguistic unity of its representatives.

The archaeological culture or cultural unity meets the requirement of an historical and ethnographic region (Levin and Cheboksarov 1955) and it represents a certain stage of the development of the ethnos or meta-ethnos (Bruk and Cheboksarov 1976; Bromley 1983). Research supports the correspondence between actually existing ethnoses, attested from written sources, and archaeological cultures.

A. A. Formozov (1959b) posed the question of the correlation between the archaeological cultural and an actual ethnic and social unity. He introduced the notion of ethnic and cultural unity that meets the requirements of an historical and ethnographic region according to Levin and Cheboksarov.

So an archaeological cultural unity is a dynamic system of closely related (due to either a common origin or the process of the consolidation of different ethnoses) interconnected sub-ethnoses, forming a continuous chain or network within a limited natural habitat (probably changing in time). In this network there is a coincidence of the majority of ethnic markers. This does not exclude possible local and temporal variability within this unity, including differences in

the history of the most distantly separated sub-ethnoses in the network, but it does presuppose a unity of the main categories of culture and their membership in a single language family. Tribes constituting a cultural unity may speak different dialects of one language or already separated languages of a single language family, thus maintaining linguistic continuity.

Taking into account the fact that the site type is defined by the totality of a cultural unity, and that sites are territorially grouped, the sub-ethnos of a tribe or group of closely related clans can be assumed. At the same time the site type is the main structural unit of an archaeological culture which one naturally likens to an ethnos (such as a tribe). The site type is also the basic unit of the archaeological cultural unity, but the size of the natural environment and considerably greater variety within the unity directs us to compare the archaeological cultural unity to a meta-ethnos and not an ethnos.

Economic activity and the corresponding economic structure condition the existence of the ethnos. Following Leslie White (1959) I acknowledge the considerable influence of ecological factors on the development of an ethnic culture (Kuz'mina 1996). The basis of White's thesis is the concept of culture as the extra-somatic adaptation of human groups to environmental influence. He acknowledges that necessity to overcome crisis stimulates cultural innovation. At the same time a great role is attributed to the increasing thermal or pyrotechnic potential of society, which is viewed as a major factor in human history.

In the context of this work the definition of ethnic culture is based on the approaches developed by E. S. Markaryan (1973a; 1973b), S. A. Arutyunov (1989), and V. P. Alekseev (1993). Along with White they see ethnic culture as a combination of non-biologically devised mechanisms that are interconnected and transferred from one generation to another to provide an adjustment to a certain ecological niche in order to reproduce the ethnic group.

Economic development is defined by a number of factors: the productivity of the environment, the presence of minerals, natural forces, including climatic changes and humidity, anthropogenic factors such as the destruction of natural resources, soil exhaustion, salinization, and desertification of soils as a result of extensive farming and cattle-raising, and, finally, population growth that exceeds the resources of the environment.

Progress in production undergoes a basic evolutionary process. Innovations are present in any traditional society, but their number is not large, and their dissemination is slow. But in periods where many unfavorable factors conspire together, this leads to a crisis of the traditional economy. The crisis might result in the entire abandonment of a territory by the whole population or a part of it through migration, or a major shift in the form of the economy.

Crises forced the search for solutions, they stimulated invention, created conditions for intellectual development and enhanced the opportunity for innovation. Innovations and an increase in productivity provided the surpluses that allowed for more time for intellectual activity. Cultural innovations were ideologically incorporated by being given roots in the mythological system and were depicted in art, all of which led to a fundamental transformation of the whole cultural image. That is why it would be unjustified to speak in terms only of social and economic progress in some periods rather than the intellectual and

economic development of society. The defining role of ideology and intellectual activity for the development of society has not been sufficiently evaluated.

The concept of economic and cultural type (ECT) was introduced by M. G. Levin and N. N. Cheboksarov (1955) and developed further (Andrianov 1968; Andrianov and Cheboksarov 1972; Chesnov 1970; 1982; Vaynshtein 1973, Bromley 1973; Alekseev 1979). It is connected with the problem of the adaptation of the ethnos to the environment. The adaptation to a similar ecological environment conditions a similar character of economic activity and the formation of similar features of material culture for different ethnoses, including economy, foodstuffs, tool types, domestic architecture, and costume. The culture complex comprises two main groups: practically all the components of the ECT form the first group while specific features of culture that are not directly related to the economy and adaptation to the type of environment constitute the second group. The analysis of parallel economic and cultural types and the evolution of the ethnos reveals that the ECT, at least in ancient times, has important ethno-differentiating and ethno-integrating properties (Chesnov 1982). Some signs characterizing the ECT are ethnically specific, although they originate under the influence of ecological factors—foodstuffs, house type, dress, industrial technology of the various components of material culture, especially ritualized. They can be preserved in the culture of the ethnos for a long period of time, even over the course of migration, change of environment and type of economy. In this case they become ethnic indicators (Kuz'mina 1981a; 1986b). Ethno-diagnostic signs are peculiarities such as the form and ornamentation of ceramics, functionally unconditioned ways of production, and some types of weapons, details of burial ritual, etc. Only by viewing the interrelationship of these characteristics that reflect the systemic character of the archaeological culture (or cultural unity) as an ethno-social organism can one form a correct image of the archaeological culture and cultural unity.

In order to define an archaeological culture or cultural unity it is required to accumulate the following evidence (Kuz'mina 1985a): 1) a complete collection of material within the entire natural territory to create both a resource base and to undertake a critical evaluation of the completeness and quality of the sources; 2) a complete list of all those traits that are required to describe the numerous sites of a territory and a typological classification of all sites according to a consistent combination of indicators; 3) cartographic analysis of all sites in question; 4) the establishment of a relative chronology of the sites on the basis of stratigraphy and the construction of a continuous typological series, and the establishment of an absolute chronology of every site by imports and synchronization with dated sites of other cultures using a single chronological scale as well as critically evaluated radio-carbon analysis; 5) an evaluation of the results by introducing criteria for establishing the degree of similarity between sites, stages, local variants or separate cultures, i.e., a definition of site types within their chronological stages and/or local variants or ultimately separate cultures, each of which is described according to a set of consistent criteria that distinguishes the archaeological cultures under review from others; and 6) verification of the results against newly discovered archaeological complexes within the culture area (cultural unity).

While the archaeological culture (cultural unity) corresponds to a certain ethnic and social entity, the first and main stage of historical interpretation of an archaeological culture (cultural unity) is paleo-economic reconstruction because economic and cultural type (ECT) is directly reflected in the archaeological record.

The analysis of material culture reveals the dynamics of production not only through the study of the tools themselves but also the character of production. That is why technological principles are at the foundation of any suggested classificatory scheme. The technology of production governs to a considerable extent the specific form of an object. I have applied this method of correlating technology and object form in my classification of metal objects, bone cheek-pieces and ceramics (Kuz'mina 1966; 1980a; 1985a; 1986a; 1986b).

The study of the technology of production and the implements themselves establishes the whole complex of material culture as an integral system that includes elements conditioned by an ECT, which has adjusted to a specific environment, as well as functionally unconditioned elements and production techniques that constitute the traditional culture. However, as indicated above, the archaeological culture (or cultural unity) reflects an ethnic and cultural unity that is defined not only by the ECT but by culture in general. In approaching culture as an integral system, there are two main subsystems: the material culture that is directly reflected in the archaeological record and the spiritual culture that includes social organization and ideology.

The spiritual culture and some of its components can be recovered from archaeological materials only with the help of reconstruction. That is why the historical interpretation of an archaeological culture (unity) and its ethnic attribution can be based only on the analysis of material culture and an investigation of spiritual culture cannot be the initial stage in the creation of an ethnic hypothesis.

As the decisive component of an ethnic culture is realized in language unity, ethnic attribution is impossible without systematic and complex usage of philological data alongside archaeological and ethnographic materials. To this may be added folk traditions of modern ethnic groups which convey the cultural traditions of their former linguistic groups. Anthropological data are also significant in ethno-genetic reconstruction as has been shown by V. P. Alekseev (1986).

Generally, there are two methods of ethno-genetic reconstruction and ethnic attributions that may be employed. The first consists in demonstrating a continuous sequence and succession of archaeological cultures on a specific territory until the emergence of historically known ethnic groups. This method is a variant of a more general retrospective method, the leading role of which is rather widely accepted in ethno-genetic construction at present. The second method employs the evidence of functionally unconditioned ethnic markers whose connection with the economic and social dimensions of a society are so minimal that they preclude independent convergent origin in different ethnic groups (Formozov 1959b). Each of these methods has limitations and only a combination of the two makes ethno-genetic reconstruction or ethnic attribution sufficiently reliable (Kuz'mina 1981a; 1986c).

We have argued that there is no division in traditional culture between spiritual and material. Ceramic production, house building, textiles are seen as repeating in micro-space the act of creation employing specific rituals. Objects themselves possess certain semantics. The material culture outlined in this study is conditional and presupposes that only material culture can be objectively reconstructed from archaeological data in contradistinction to an existing ethnographic culture of an actual ethnos. The reconstruction of spiritual culture and social structure depends considerably on the ethnic attribution of the archaeological culture taken by the researcher. Different peoples vary in their interpretations of similar cultural practices. For example, a grave gift might be interpreted as payment for the ferryman Charon (Greeks) or as gifts for the ancestors (Chinese) or as gifts of the living to the dead (Africans). This is why the main components of spiritual culture can only be described in terms of archaeological materials in historical reconstruction.

Employing the results of such reconstruction at the stage of creating a hypothesis of ethnic attribution, either through retrospective analysis or through the use of ethno-diagnostic criteria, is methodically incorrect as different ethnic traditions can interpret one and the same archaeological factor as different cultural phenomena. Thus, the reconstruction of spiritual culture largely depends on explicitly or implicitly assumed ethnic hypotheses. But coordinating the different aspects of reconstructed spiritual culture on the basis of ethnic attribution, generated from an analysis of material culture, can and must be one of the main instruments of verifying suggested ethnic attributes.

The suggested methodology of ethnic attribution of an archaeological culture (unity) requires a systematic and complex approach to the following data: 1) language (including toponymics); 2) written tradition; 3) ethnography; and 4) anthropology. It can be reduced to the following:

1. Establishing by the retrospective method the genetic connections of a culture with a subsequent one, whose ethnic identity is known from written sources. This is accomplished by constructing from each category of material culture a typological sequence of development of interrelated features that traces the evolution of those features that serve as ethnic indicators.

2. The use of the combination method (employing the evidence of language and written sources) to establish by independent means the ascription of a certain ECT to an actual archaeological culture or cultures.

3. The verification of the ethnic attribution of a culture (cultural unity) on the basis of migrations involving the culture (unity) in its natural habitat and adjoining regions.

4. The verification of the ethnic attribution of an archaeological culture (unity) by anthropological materials.

5. Testing the validity of an ethnic attribution by comparing it to data concerning putative ethnic contacts (groups of ethnoses) and bearers of other languages.

6. Testing the validity of an ethnic attribution by superimposing an archaeological map on a map of toponyms and hydronyms.

7. Testing the validity of an ethnic attribution by assessing the spiritual culture reconstructed from archaeological data (burial rite, rituals, images and

compositions of art, social structure) in the light of the suggested ethnic hypothesis.

The problem of ethno-genetic reconstruction is closely connected with the ethnic attribution of archaeological cultures (cultural unities). In the first place, the true ethnic attribution of a series of archaeological cultures makes it possible to establish a sequence of ancestral cultures and to trace the main stages of ethnic history. The evidence of language and written tradition makes it possible to reconstruct the type of economy, social structure and ideological beliefs of the speakers of the given ancestral language (group of related languages); isoglosses and borrowed words can reveal contacts with other language groups. However, linguistic data do not reveal when and where the reconstructed phenomena took place. It is only by correlating linguistic data with the archaeological record that one can establish the chronology and ethnic history of a pre-literate period. Some key peculiarities of the reconstructed ECT, ideology and social structure help provide chronological indicators for reflected linguistic phenomena.

To resolve the problem of the homeland and localization of migration routes it is necessary to clarify the correlations of the reconstructed ECT and the circle of archaeological cultures reconstructed on the basis of linguistic data. If we take the Indo-Iranian homeland as an example, then this methodology presupposes the following:

1. A definition of the cultural complex of the most ancient Indo-Iranians on the basis of linguistic data and tradition and the establishment of a correspondence between the ECT and actual archaeological cultures of a specific region.
2. Establishment of the time and direction of any migrations.
3. Analysis of the different migration types reflected in the archaeological data and in the different cultural and economic zones.

The suggested methodology will be pursued as follows. The separate categories of Andronovo material culture will be reconstructed on the basis of data drawn from the whole Andronovo area. They will be shown to correspond to the Indo-Iranians as reconstructed from linguistic data and historical tradition reflected in written texts. They will then be assessed against two zones: Central Eurasia and the Indo-Near-Eastern. The succession of cultures of the Early Iron Age will be traced and ethnographic parallels will be revealed. In order to achieve objective conclusions the analysis of each category of material culture will be conducted independently and the results obtained will only be combined at the final stage of this attempt to locate an Indo-Iranian homeland.

CHAPTER THREE

CLASSIFICATION OF SITES AND THE PRIMARY FEATURES OF ANDRONOVO UNITY

According to the methodology introduced in chapter 2 the author assembled an archaeological data bank. The work was conducted in the following sequence. The data bank was supplied with materials from 400 cemeteries and settlements of the entire area, of which about 100 sites derived from different regions in the Urals and Kazakhstan, were examined and of these, 25 were excavated by the author (Maps 2, 3). In addition, there are more than 100 sites from Central Asia (Map 4; 30 investigated and excavated with the participation of the author).

A considerable part of the data is the result of the author`s research, which began in 1958.[2] From 1959 the author led an expedition to the Elenovka group of

[2] Other excavated materials as well as hoards and chance finds were studied from the museum collections of the State Historical Museum, the State Museum of the East, the Museum of Anthropology of the Moscow State University, the Department of Prehistoric Cultures and department of Central Asia in the Hermitage and the Museum of Ethnography in St Petersburg. Other sources were historical and regional museums, archaeological laboratories of the various universities and pedagogical institutes in Orenburg, Orsk, Chelyabinsk, Troitsk, Syktyvkar, Perm', Izhevsk, Ufa, Nizhny Tagil, Ekaterinburg, Tyumen', Tobol'sk, Omsk, Barnaul, Kemerovo, Krasnoyarsk, Novosibirsk, and in the Institute of Archaeology and Ethnography of the Siberian Department of the Russian Academy of Sciences, in the Ethnological and Archaeological Museum of Tomsk University, in the museums of Aktyubinsk, Ural'sk and Emba, in the Central Museum of Kazakhstan in Almaty, in the Museum of Art and the Institute of Geology of the Kazakhstan Academy of Sciences, in museums and archaeological laboratories at Karaganda, Petropavlovsk, Semipalatinsk, Ust'-Kamenogorsk, Dzhambul, Chimkent, and Bishkek, in the History and Art museums of Kirgizstan, the Institute of History and Archaeology of Kirgizstan, in Przheval'sk, in Tashkent, in the History and Art museums of Uzbekistan, the Department of the History of Geology of the Central Asian State University in Samarkand, in the Museum of History of Uzbekistan, Afrasiab, the Institute of Archaeology of the Uzbekistan Academy of Sciences, in Bukhara, Nukus, Khiva, Termez, Fergana, in Dushanbe in the museums of History and Ethnography, in the Institute of History, Archaeology and Ethnography of Tadzhikistan, in Asgabat—in the museums of Turkmenistan History and Art, the Institute of History, Archaeology and Ethnography of Turkmenistan, and in the History Museum in Merv. Other collections consulted were the Ukrainian Historical Museum, the Ukrainian Institute of Archaeology in Kiev, the Institute of History, Archaeology and Ethnography of Tatarstan in Kazan', the pedagogical institutes, universities and regional museums in Samara, Saratov, Simbirsk, Volgograd, and finally some collections of school museums and private collections. (I find it a pleasant duty to express my deepest gratitude to all the museum workers who assisted my work and also to colleagues who regularly provided me with new unpublished materials). Outside the former Soviet Union, the author consulted the Siberian and Central Asian collections in the Helsinki Historical Museum, in the Louvre, Saint-Germain, and Chernuschi in Paris, the Metropolitan Museum in New York, in the British and Victoria and Albert museums in London, the Bode Museum in Berlin, the Turkish Historical Museum in Ankara and the National Museum in Istanbul. Certain work was conducted in the museums of Iran, Afghanistan, India and Sri-Lanka. Materials from the archives of the IA AS, LOIA, IIMK,

the Orenburg region in its investigation of more than 50 sites in the Elenovka microdistrict of the southern Urals, including the Elenovka and Ushkatta mines and workshop complexes, settlements, and burials.[3] Once the material recovered from the Andronovo sites had been assembled, it was necessary to systematize the data according to criteria that would be applicable to the entire territory. Taking into account the classification of East European and Siberian cultures established by V. A. Gorodtsov and S. A. Teploukhov, the burial rite was deemed the most significant feature for the purposes of cultural and ethno-historical reconstruction. The following features were recorded: 1) type of surface construction; 2) type of grave pit and evidence of recutting; 3) orientation; 4) cremation or inhumation and posture of the deceased; 5) other ritual features; 6) grave goods; 7) animal sacrifice; and 8) funeral feast (Figs. 1; 57).

The analysis of the technology of hand-made pottery largely comprises vessel form, technique of manufacture and decoration, and ornamental motifs; these are also very important ethnic indicators and are used as the basis for defining cultures, stages, local variants and types. The following analytical approaches have been employed in this work: 1) vessel manufacture and form according to the system of the author (Figs. 2, 11-13); 2) analysis of tempering/opening material; 3) surface treatment; 4) construction of ornament according to the system of S. V. Ivanov (1963) and S. V. Zotova (1965); 5) elements of ornament after M. N. Komarova (1962); 6) organization of decorative elements within zones and their combinations; and 7) the technique of figuring ornamentation (Figs. 12; 13).

The analysis was based on closed complexes of burials over the entire Andronovo area. These were classified within a single system, then the burial rite and ceramics were correlated, and then those sites with a stable assortment of features were united into types. The funerary ceramics were compared with the ceramics from the settlement and the latter were divided into types. We follow the definition of type employed by Yu. N. Zakharuk (1981) who regards it as a "universal unit of classification both for establishing within a small territory their genetic sequence over time and for establishing synchronous groups of sites on the territory of a single archaeological culture." Sites of every type were mapped and local variants were defined.

IIA AS of Kazakhstan and a number of museums, personal archives of O. A. and B. N. Grakov, M. P. Gryaznov, S. S. Chernikov, V. S. Sorokin, A. N. Margulan were also employed. These sources were especially valuable in cases where the originals were now lost or exported.

[3] Excavations were made on some settlements (Ushkatta 1, 2, 7, 9, Kiimbay, Kupukhta, Baytu, Shandasha, Tursumbay, and cemeteries at Ushkatta, Ataken-say, Baytu 1, 2, Kupukhta, Shandasha 1, 4, Tursumbay, etc. (Kuz'mina 1962a; 1963b; 1964a; 1964b; 1965a, etc.). Surveys were also conducted in western Kazakhstan, the Orenburg, Chelyabinsk and Kurgan regions in the Urals where we discovered or made secondary investigations of about 100 sites, and excavated cemeteries at Emba, Kozhumberdy, Tuktubaevo, Kinzerskiy, and Alakul', and the settlement of Chernorech'e (Kuz'mina 1961b; 1969; 1973a; etc). From 1961 we began conducting research expeditions in Central Asia, in Tadzhikistan headed by M. M. D'akonov and A. M. Mandel'shtam; in Uzbekistan headed by Yu. G. Gulyamov, in Turkmenistan headed by A. M. Mandel'shtam, A. A. Marushenko and V. I. Sarianidi. The author also became acquainted with the excavations conducted by G. B. Zdanovich in the Urals, G. B. Zdanovich and M. K. Kadyrbaev in Kazakhstan, P. N. Kozhemyako in Kirgizia, N. G. Gorbunova in Fergana, B. A. Litvinsky in Tadzhikistan, M. A. Itina in Khorezm, etc.

The relative chronology of each type was defined on the basis of: 1) stratigraphic evidence of cemeteries and settlements; 2) series exhibiting continuity of typological development; 3) type co-occurrence; and 4) synchronization with stages of other cultures according to imports in closed complexes and assessment of the absolute age of every site within the single long chronological system developed for the steppes by S. V. Kiselev (1960), N. Ya. Merpert (1961a), A. I. Terenozhkin (1965) and V. S. Bochkarev and co-ordinated with the European schemes of H. Müller-Karpe (1959; 1960; 1980) and W. A. von Brunn (1959), with the long chronology of China, and with that of south Central Asia according to V. M. Masson (1956; 1959) which is based on Hissar 3. The radiocarbon sequence for Andronovo is a matter of heated debate due to the wide variability in the range of dates (see Appendix I).

I completed my classification of the sites in 1981 (Kuz'mina 1982; 1986a, b; 1994) which was published in the monograph (in Russian) "Earliest Cattle-Breeders from the Urals to the Tian-Shan" (Kuz'mina 1986b). Great attention was paid in it to the analysis of metal objects that accompanied cheek-pieces (see chapter 8) as support for the chronological scheme.

Since 1981 many new sites have been excavated and these have provided an opportunity to verify the proposed scheme. The major site types presented in the analysis comprise the Sintashta, Petrovka, Alakul', Fedorovo, and a large number of Timber-grave and Andronovo sites which were found around Magnitogorsk, the southern Urals and in Central Asia.

Petrovka

Sites of the Petrovka type are found in the southern Urals, and northern and central Kazakhstan (Map 5, Figs.14, 78). These comprise the following cemeteries: Novy Kumak, Ibragimovo, Stepnoe I, Troitsk, Tsarev Kurgan in Kurgan, Chaglinka, Grafskie Razvaliny, Raskatikha, Nikolaevka II, Petrovka, Bakteniz, Aksayman, Kenes, Novonikol'skoe, Ulyubay. The Petrovka sites are Nurtai, Satan, Ak-Tobe I, II, Krasnaya Krucha, Zvenigorodka, and the settlements of Semiozernoe, Kulevchi III, Zhelkuar, Konezavod III, Petrovka II, Bogolyubovo, Novonikol'skoe I, Amangel'dy I, Kenotkel V, Ikpen' I (Lentovsky 1929; Formozov 1951a, 120-121; Semenov 1956a; Matveeva 1962; Stokolos 19662b; Sal'nikov 1962a, 41; 1967, 33; Potemkina 1969; 1983a; 1983b; 1985; Zdanovich 1973a; 1973c; 1974b; 1975; 1976a; 1983; 1988, 22-57, 71-86; 1989; 1992; Zdanovich G. and S. Zdanovich 1980; Smirnov and Kuz'mina 1977; Evdokimov 1980a; 1984; Vinogradov 1982; 1983; Ivanov and Ismagilov 1981, 133; Tkachev 1987; 1991; 1993; Kalieva *et al.* 1992).

The cemeteries are of three types: children's graves, flat-grave cemeteries (Raskatikha, Petrovka) and cemeteries of a small number of rather low earthen kurgans with one or two central pits and sometimes with adult and children burials in individual small pits in a circle (types 1.1 and 1.2 [Fig. 1]). Graves are large, sometimes with a step and wooden constructions, often covered with clay, and traces of fire; in central Kazakhstan there are burials in stone cists. The deceased are positioned on the back with knees raised or on the side slightly flexed; orientation is variable, more often westwards and north-westwards but

also eastwards and north-eastwards. There are animal bones in the grave, on the covering or in a sacrificial complex. There is also a group of graves with chariot burials, harnessed horses (sometimes bridled), a rich set of weapons, and the skulls and feet of cattle and sheep (Figs. 35: 1; 68).

Stratigraphically, the Petrovka complexes follow the Sintashta ones, which are based on the Catacomb (Novy Kumak) culture(s), and these are followed by the Alakul' complex (Tsarev Kurgan, Novy Kumak, Stepnoe I, Kenes, Grafskie Razvaliny, Novonikol'skoe, Petrovka II, Kulevchi III) or Fedorovo (Novonikol'-skoe, Ikpen' I) burials. They date to the 16th century BC according to the finds of cheek-pieces that are analogous to those recovered at Mycenae (Figs. 36, 37). Archaic cheek-pieces and forms of pre-Seyma metal types (Figs. 29, 30, 33, 39) plead for a date in the 17th century BC.

Petrovka knives/daggers, adzes, and open-socketed spears derive from Sintashta and Abashevo and they typologically precede Alakul'. Similar to Abashevo are the single-bladed knives, bone rod with plug (Fig. 39: 23) pendants with one and a half spirals, bracelets with open ends, glass-like pendants, and headgear consisting of chains of beads, single beads, and perforated pendants and plates. Bronze warty beads from Sintashta, Alabuga and Grafskie Razvaliny have correspondences in the northern Caucasus and the late Catacomb Don area (Bratchenko 1976). Axes with a butt in the shape of a firing pin from Sintashta and Berezovka are similar to those from Malinovka that are assigned to the Zajmishche stage of the Pre-Kazan' culture of the 16th century BC according to A. Kh. Khalikov (1969). Stone arrowheads with truncated base derive from the Catacomb (Bratchenko 1989) culture(s) and are known in the Abashevo and early Pre-Kazan' complexes. A stone axe from Krasnaya Krucha (Fig. 39: 21) is archaic in form and close to those found in Fatyanovo (Krainov 1972: 57) and Catacomb (Bratchenko 1976: fig. 72, 16), a burial in Khashchevoe (Kovaleva *et al.* 1979; fig. 3, 2), and Abashevo (Podkletinskiy burial, Shilovskoe settlement) (Pryakhin 1976: fig. 9, 25; 1977: fig. 8,1) and partially early Timber-grave (Podstepki, Kordon Derkul'skiy) (Agapov 1977, fig. 1; Rykov 1927b: fig. 17) cultures, which establishes its date as not later than the middle of the 2nd millennium BC. Stone maces and arrows have a wide range of occurrence, but do not contradict the dating suggested here.

The Petrovka site type includes related Potapovka complexes of Bashkiria (Almukhametovo), the Volga area (Alekseevka II, Potapovka, Utëvka VI) and the Don area (Vlasovskiy, Pichaevskiy and Kondrashkinskiy) (*AO* 1977: 150, 198; 1980: 133; Potemkina 1983a; Vinnikov and Sinuk 1990; Moiseev 1990; Pryakhin 1992; Vasil'ev *et al.* 1992; 1994; 1995).

Alakul'

The Alakul' type is situated in the Chelyabinsk and Tobol'sk regions (the cemeteries of Alakul', Chernyaki I, II, Isakovo, Kurgan 15, Tsarev Kurgan, Baklanskoe, Churilovo, Kamyshnoe, Verkhnyaya Alabuga, Subbotino, Alekseevka, Pereleski, Evgen'evka, Chistolebyazh'e, Khripunovskiy), in Uysko-Uvel'ka (Chernoozer'e I, Berezovskiy, Stepnaya Kommuna, Biryukovo), in Magnitogorsk (Tamerlane Tower), in north Kazakhstan, in the steppe zone

(burial at Kokchetav, Efimovka, Borovoe, kurgan 1, Nurmambet) and in the forest steppe (Semipalatnoe). We distinguish pure Alakul' burials in western Kazakhstan from the Kozhumberdy ones (burials in Orsk, Nikel, Ulke I, Aktyubinsk Poligon and Ptitsefabrika, Emba), in central Kazakhstan from the Atasu type which were formerly viewed by Kazakhstan archaeologists as a local variant of Alakul' (Batkin Paek, Egiz-Koytas, Bylkyldak III, Karasay, Begazy, Ograda I, Karabie, Tash-bulak, Algabas, at Kirov Sovkhoz stone circle). A. A. Tkachev (1987; 1991) assigned the cemeteries in Sary-Arka to the Alakul' type, i.e., Kopa, Kopa I, Achshi-Ozek, Nurken, Tashik, Shapat, Maitan and to the late Alakul' were assigned Bozingen and Izhevskiy I. It is difficult to draw a firm conclusion before complete publication, but the existence of Fedorovo and mixed types of vessels from the sites, as well as the presence of annexes to the enclosing fence of the kurgans and instances of cremation suggest that at least part of these sites belong to the Atasu type according to my periodization. The most eastern Alakul' site is the Ermak cemetery near Omsk.

Alakul' sites contain up to several dozen constructions: in the forest-steppe zone we find kurgans with subsoil burial chambers; in the steppe zone the kurgans are surrounded with a stone ring (cromlech) constructed from vertically set stone slabs (types I_1, I_2; IIa, IIIa). In the center of the construction there is a large burial pit; in the forest-steppe we sometimes encounter children burials as secondary additions surrounding the main burial or inserted into it (I_2); in the steppe there is sometimes a child grave within a stone circle. A cemetery of children buried in subsoil graves is known from Baklanskoe.

The graves are rectangular in shape. The material of construction varies: in the forest-steppe they are subsoil chambers, often constructed with a timber framework or faced with split timber logs; in the steppe stone cists are more often found. The tombs are roofed with layers of wood or planking which are absent from the steppe burials where roofing was effected with stone slabs. In general, inhumation burials are flexed on the left side and only rarely on the right. The orientation was generally to the west, more rarely to the south-west; exceptions to the general rule are noted: at Chelyabinsk the burials are oriented to the south or follow no obvious rule; in Magnitogorsk orientation is to the north; in Tobol'sk and Sol'-Iletsk it is eastern, a reflection of the influence of the Timber-grave rite. Paired male and female burials are known, more rarely are paired burials unisex or involve mother and child. At the head of the deceased there are two vessels, rarely more, and sometimes a single vessel in a child's grave.

Women are often buried in ceremonial attire: a dress sewn with plates, shells, claws, bronze and paste beads, with bracelets and finger-rings, beads sewn on boot-straps, temple ornaments or earrings, and decorations for braided hair (Fig. 33). A bronze knife and weapon (socketed spear, stone, bone and bronze arrows, stone or bronze axe, mace or adze) accompanied the male burials (Fig. 39, 40).

A characteristic ritual feature was the sacrificial placement of a horse skull and legs (head-and-hooves), more rarely an ox or ram, on the roof of the grave or in the kurgan mound. Burials of dogs are known (Alakul', Chistolebyazh'e, Chernyaki). In Alakul', Khripunovskiy and Maitan there are pairs of chariot harnesses; in Maitan there are also cheek-pieces. Some vessels and animal bones constitute a funeral feast.

Marked differences between Alakul' sites are conditioned by: 1) their particular environmental zone which influenced domestic architecture and then the burial constructions that imitate them (e.g., the presence of stone constructions in the steppe); 2. substrates and neighboring cultures whose influence can be seen in deviations from standard grave orientation and ceramics (tempering agents, form, methods of ornamentation). A combination of these features account for the peripheral regional variants, i.e., Chelyabinsk, Tobol'sk, Uysko-Uvel'ka, Magnitogorsk, north, west and central Kazakhstan (Fig. 4).

Monuments of the Alakul' type derive from the Petrovka, sharing with them basic defining cultural features—burial rite, technology, ceramic form (Fig. 4)—that prove their direct genetic succession (Fig. 3) as well as ECT features: economy, architecture, metal objects, cheek-pieces, and finally, ornament. There is a large group of transitional complexes: Pyatimary, Gerasimovka I, Berezovskiy, Stepnoe, Kulevchi VI, Raskatikha, Alabuga, Chistolebyazh'e, Kenes, Ulke I, Orsk, Krasnaya Krucha, Nurtai with transition-type vessels, including vases with a rib under the rim, archaic types of knives (Ulke I, Nikel, Krasnaya Krucha (Fig. 30)) and axes of bronze (Berezovskiy) and stone (Krasnaya Krucha, Kokchetav, Pyatimary) (Fig. 39).

The chronology of the Alakul' type is established on the basis of:

1. The stratigraphy of a) burials: in Tsarev Kurgan, Grafskie Razvaliny and Kenes where the main graves are of the Petrovka type and are cut by Alakul'; b) settlements: at Novonikol'skoe, Petrovka II and Kulevchi III, Alakul' constructions cut the Petrovka layer, and the first two sites were then covered by a Final Bronze layer.

2. Synchronization between the Timber-grave and Alakul' cultures. This is based on burials of the Timber-grave and Alakul' in the contact zone (Novobelogorka, Gerasimovka I, II, Burdygino, Spasskoe I, II, Agapovka II, Maly Kizil I, II,); and the discovery of Alakul' vessels and their imitations in Timber-grave burials of Stage 2 (Novo-Baskakovo, Komsomol'skiy III and IV, Bikeshevskiy IV, Pestrovskiy, Tavlykaevo III and IV in Bashkiria, Staroivanovka, Zolotaya Niva in the Samara Volga (Morozov and Pshenichnyk 1976, figs. 3: 2, 3; 4: 1-3, 9; 5: 2, 6-10; Zudina 1981, figs. 2: 2, 4; 3: 2, 4; 6: 5, 6; Kuz'mina 1987b; Rutto 1989).

3. Securely dated metal artifacts recovered from closed complexes of Alakul' burials. These include wide axes with a broad butt (Fig. 40: 1) (Tsarev Kurgan, Evgen'evka, Bozingen), adzes (Orsk, Emba), spears (Orsk), double-edged socketed knives (Tsarev Kurgan, Evgen'evka, Alabuga, Khripunovskiy, Chistolebyazh'e, Pereleski, Subbotino, Orsk, Borovoe, Semipalatnoe, Maitan, Bozingen), knives with soldered handle (Chernyaki, Nurmambet) assigned to the Seyma chronological horizon and that are both typologically and technologically (mainly cast in bivalve forms) derived from Petrovka and prototypes of Final Bronze Ages forms (Figs. 29, 30, 32, 39, 40). They date to the 15th–14th centuries BC on the basis of analogies with East European cultures. Alakul' plate and disk shaped cheek-pieces without tenons from Alakul' and Novonikol'skoe are dated to the 15-14th centuries BC, and are comparable to cheek-pieces from the Danube of the Toszeg and Vatina type (Figs. 37, 39).

Fedorovo

The Fedorovo type is represented in the Urals (Fedorovo, Nurbakovo, Novo-Burino, Bol'shaya Karabolka, Smolino, Sosnovskiy, Sineglazovo, Sukhomesovo, Solntse-Talika, Isakovo—kurgans 2-8, Tuktubaevo, Urefty, Kinzerskiy, Urazaevo), in north Kazakhstan (Borovoe, Obaly, Biyrek-Kol', Kalachevskiy, Burluk, Pavlovka, and probably Koshkarbay, Kenotkel', Sokolovka), in central Kazakhstan (Burgulyuk I, Kanatas, Sangru II, Akshatau, Baybala I, Kosagal, Botakara, Dzhamantas, Myrzhik, Alypkash, Dandybay 2-8, some of the burials at Zhilandy), in east Kazakhstan (Maly Koytas, Marinka, Karausek, Sarykol I, II, Zhanazhurt, Barashki, Berezovskiy, Kyzyltas, Betkuduk, Belokamenka, Dzhartas, Predgornoe, Semipalatinskie Dyuny and probably some of the graves found at Kanay, Karadzhal, Oblaketka, Kyzyltau), in Pavlodar near the Irtysh (Akmola, Lebyazh'e), on the Upper Ob (Zmeevka or Krasny Yar, Khomutinka, Shipunova, Ikonnikova, Blizhnie Elbany 12 and 14, Ordynskoe, Novoaleksandrovka, Nizhnyaya Suetka, Elunino, Gryaznovo, Kytmanovo, Ur, Elovka 2, Vakhrushevo, Mikhaylovka, Preobrazhenka 3, Sopka 2, Bol'shepichugina, etc.), on the Upper Yenisey (Andronovo, Orak, Uzhur, Pristan, Solenoozernaya, Sukhoe Ozero, Novaya Chernaya II, III, Yarki I, II, Ust'-Erba, Kamenka II, III, Lanin Log, Podkuninskiy, Ashpyl, Kadat, etc.), in the Tian-Shan (Arpa, Prigorodnoe, Issyk-Kul'), in the Pamirs (Kyzyl-Rabat, Kokuybel'su, Yuzhbok) and in the interfluvial region of Central Asia (burial at Tandyryul, settlement and collections at Kirov Sovkhoz (Fig. 83), Dzhilikul', Karabura, and Saksanohur (Maps 2-4, Fig. 19-21, 41).

Cemeteries contain from ten to several dozen burial structures (sometimes as many as 150). These include kurgans, often enclosed by a circular or square fence; chambers built of dry-stone walling or, more rarely, as cists from upright slabs; fences (types I, IIa, IIb, IIIa, IIIb, IV) and also multiple chambers covered with kurgans and enclosed by fences (types V-VIII); there are also flat cemeteries (Ob). Children burials are known (Yarki, Sukhoe Ozero 1a), including both flat graves (Elbany, Zmeevka) and special kurgans (Novaya Chernaya III, 24).

In the center of the construction is one large square or rectangular flat grave constructed as a cist, timber-construction, block facing, within a stone fenced enclosure, rarely with a stone cist.

The burial rite comprises cremation (where the burning was not carried out in situ) and inhumation. Cremation dominates in the Urals; in central and northern Kazakhstan the cemeteries are bi-ritual; in eastern Kazakhstan and south Siberia inhumation prevails; children are mainly inhumed. The general Andronovo burial orientation is western, sometimes south-western. Paired male and female burials and mother and child burials are known in the east. There are two vessels in the grave (rarely more; in children graves there is sometimes only one vessel); in the Urals a dish is often found. Ornaments comprise temple rings with a narrow return or funnel-shaped opening and single round plates (Fig. 33); other goods are extremely rare except in some late cemeteries on the periphery of the Andronovo culture.

Ritual features attending the burials includes placing ribs, more rarely the shoulder-blade, of a horse (sometimes the shoulder-blade is of an ox or ram);

head-and-hooves combinations are rare. Dog burials are also known (Fedorovo, Sukhomesovo, Kinzerskiy, Sukhoe Ozero, Ust'-Erba).

The Fedorovo type is divided into a series of local variants according to certain specific features. These variants comprise the Urals, central, northern, eastern Kazakhstan, the Ob, the Yenisey, and Central Asian (Fig. 6). The further one moves from central Kazakhstan the frequency of the complex diminishes and substratum elements increase; they are especially marked in the Yenisey region (Ust'-Erba, Sukhoe Ozero, Novaya Chernaya) where Okunevo cultural traditions can be seen in fences, constructions surrounding graves, square vessel forms and ornaments.

K. V. Sal'nikov saw the sites of the Fedorovo type as an early stage of the Andronovo culture while N. A. Avanesova and G. B. Zdanovich placed them in a late stage. We have been able to classify them into two temporal groups (Fig. 5).

There is no stratigraphic correlation between the Fedorovo and Alakul' types excepting the possibility of some stratigraphy from the settlement at Kipel'. At the settlement site of Novonikol'skoe the Fedorovo layer lies over the Petrovka and under the Alekseevka, and according to T. S. Malutina (1991) there is a synchronous mixing of Fedorovo-Alakul'; at Atasu, Ust'-Kenetay, Rodionovka and others, Fedorovo is found under Alekseevka; in Korchazhka V Fedorovo is under Irmen; in Ikpen' (Fig. 80), the lower part of an ash-pit contained late Petrovka vessels, the middle of the pit held Fedorovo remains, and the upper Alekseevka (Tkachev 1991). There are also unstratified findings of Fedorovo vessels on Petrovka type sites such as Petrovka, Kulevchi and Sintashta, that hint at an early dating of the Fedorovo sites. At Sintashta there are vessels that may be seen as proto-Fedorovo with their vase-like profiles, oblique triangle ornament, and hanging festoons. An Afanas'evo sherd was found in the fill of a Fedorovo grave at Ust'-Erba; there is a Fedorovo pot in a Karasuk grave. In Sukhoe Ozero a Fedorovo cist was covered by a secondarily used Okunevo stela; at the settlement of Itkul the Fedorovo layer was covered by Samus' material; in Preobrazhenka III Fedorovo graves cut the Krotovo layer and were covered by kurgans of the Irmen group. In Siberia, therefore, the Fedorovo type follows the Afanas'evo, Okunevo, Krotovo, and Samus' cultures, and is covered by the Karasuk-Irmen complexes.

Early Fedorovo sites date to the 15th–14th centuries BC according to the evidence of: 1) the technology and typology of a few metal objects—grooved knives, analogous to types found in the Alakul' and Timber-grave groups (Urefty, Koytas, Semipalatinskie Dyuny), flat spiral bracelets, with analogs in Alakul' (Subbotino), forged temple rings and plates (Fig. 33); 2) Fedorovo ceramics that have been found associated with celts (Fig. 31), knives, spears with sleeves that were produced by Fedorovo metallurgists of eastern and central Kazakhstan and found in pre-Andronovo sites of the west Siberian Samus' and Krotovo cultures (Samus', Preobrazhenka III, Sopka II, Elunino; Fig. 41); 3) finds at Karluga of a three-hole rodlike cheek-piece analogous to those found in the Toszeg and Ottomani cultures (Müller-Karpe 1980: tables 290: A26, 291: A21); 4) the discovery at Korkino of a unique stone shaft-hole axe with a blade combining features of axes I and IV from the Borodino hoard (Fig. 39); 5) the participation of Fedorovo tribes in the formation of the Tazabagyab and Vakhsh

cultures of Central Asia; 6) Fedorovo cremation graves found under the fill of contemporaneous Alakul' and Timber-grave-Alakul' kurgans and the presence of Fedorovo vessels in closed complexes of Alakul' graves and vice versa (Chernyaki II, 1/3,4;4; Subbotino 2/4, 3; Urefty, Nurbakovo 2; 3; Isakovo 1, 2, 4, 5; Myrzhik, Semipalatnoe, Sukhomesovo 3; Sosnovskiy 1; Kinzerskiy 1, 32; Priplodny Log, Burluk, Alypkash, Spasskoe I, 1;2/5; 4; Spasskoe II,1; Agapovka 2/5; 4/1; 7). The discovery of Fedorovo vessels and their imitations in graves of stage II of the Timber-grave culture (15th–14th centuries BC) of the south Urals, Volga, Don, and Ukraine regions; and 8) the presence of Fedorovo pottery on the Shortughai settlement in Afghanistan in the post-Harappan layer.

For late Fedorovo cemeteries we have Tuktubaevo, Smolino, Urazaevo II, the periphery of Kinzerskiy, Priplodny Log, Biyrek-Kol', Sangru II, Barashki, Berezovskiy, Zevakino, Predgornoe, Elovka II, Blizhnie Elbany, Suetka, Kytmanovo, and the cemeteries on the Yenisey. Typical here are elongated kurgans and enclosing fences (types V, VI, VII, VIII) containing several successive burials; sometimes in the east the graves are narrow and shallow, sometimes burial chambers erected at ground level are in the form of cists with buttresses (Fig. 1); the vessels are of type II with disrupted and changed proportions and bulging and swollen body, the zonal decoration has been replaced and is absent from the lower part of the vessel and is sometimes executed in two zones (Figs. 5, 11); pots of the second type have a wide base, narrow neck, are poorly decorated or undecorated; sometimes in the peripheral areas there is a rich selection of grave goods.

Late Fedorovo sites date to the 13th century BC and later. This can be argued on the basis of: 1) their stratigraphic position below the Final Bronze Age layer on settlements; 2) Fedorovo pottery in a Karasuk grave (Ust'-Erba); they correlate with a later intrusive grave or added fences: Karasuk (Orak, probably Kytmanovo), Elovka-Irmen (Elovka, Elunino), and the Early Iron Age, with knives of 8th–7th centuries BC (Zevakino) that serve as a *terminus ante quem* for Fedorovo; 3) metal objects that represent a Fedorovo development in technology (high-tin bronzes, cast in bi- and tri-valve molds), and types with analogies in the Karasuk culture and Final Bronze Age hoards: knives with a rhomboid cross-section, with a ridge or linear rib (Zevakino, Elovka), single-bladed knives (Elovka; Fig. 30), arrows with a short socket (Smolino, Biyrek-Kol', Elovka), plates with a loop (Elovka, Orak, Sukhoe Ozero), mirrors with a loop (Sukhoe Ozero, Buguly, Elbany), notched spears and flanged sickles (Predgornoe), bracelets with spiral cones (Sangru, Aleksandrovka, Kytmanovo, Elovka, Suetka), octogonal plates (Elovka), cast temple rings (Elovka, Orak), etc.; 4) associations with Cherkaskul' vessels (Tuktubaevo, Priplodny Log); 5) the influence of the Begazy culture on the construction of burials (Priplodny Log); 6) presence of Fedorovo material in a layer of a late Timber-grave settlement of stage IV on the Volga; and 7) synchronization with farming complexes of the late (Mollali) stage of the Namazga VI culture; late Fedorovo and wheel-made ceramics were found together in north Kazakhstan on the settlement of Pavlovka and in Central Asia in cemeteries at Tandyryul, Kumsay and Dashti-Kozi and on settlements at Kangurt-Tut and Teguzak (Fig. 48).

Classification of the material has led to the definition of two clear site types—Alakul' and Fedorovo—and it has established their contemporaneity over

the main part of their distribution. The main distinctions are in burial constructions (kurgans with stone kerb versus cisted enclosures without a kurgan), graves (timber-built chamber versus stone cist); burial (inhumation versus cremation); animal sacrifice (horse burials or their skins with skull and legs versus only ribs) and, what is especially important, the technology of production, form and principles of ceramic ornamentation (ceramics built from the outside versus those built from the inside; ribbed shoulder versus rounded shoulder; ornament applied on a square lattice versus an oblique lattice; even and large toothed stamp versus small toothed stamp (Fig. 2.11-13). We thus we do not see the Alakul' and Fedorovo types as two genetically connected stages of a single culture. The ethnographic importance of two different ceramic traditions and burial rites leads us to see them as two independent lines of development that reflect two genetically different population groups. However, we cannot agree with V. N. Chernetsov and his followers who view them as ethnically distinct, one Iranian and the other Ugrian, but rather as closely related groups of a single ethnic unity; this is demonstrated by the integrity of the majority of ethnically meaningful features: the similarity of many of the types of burial constructions, western orientation of the graves, tripartite structure of pottery, three-zone decoration, common ornamental elements, etc.

Numerous complexes are distinguished over a large part of Andronovo territory in which the Fedorovo and Alakul' traditions are found in different combinations. We view them as the product of integration and assimilation, occuring at different times and in different territories and leading to different results; this view contrasts with that of K. V. Sal'nikov, N. A. Avanesova and G. B. Zdanovich who cite mixed monuments of the Kozhumberdy type as a proof of a transitional phase from one stage to another. Syncretic sites are distinguished by marked local peculiarities that permit their typological classification.

Sol'-Iletsk

The Sol'-Iletsk type of the Alakul' line of development is localized in the southern Urals (the cemeteries of Uvak, Mechet-say, Pyatimary, Bliznetsy, Krasnopartizanskiy, Vetlyanka, Vetlyanka IV, Dolgoe, Peshchanoe Ozero; Map 2, Fig. 24). Here we find subsoil kurgans with large central graves, covered by stone slabs or layers of wood; inhumation is with the head to the west, rarely south-west. In Mechet-say and Vetlyanka IV there are also two instances of cremation. Vetlyanka is a subsoil burial with a large grave in the center and numerous graves on the periphery; this along with its north-east orientation reflects Timber-grave influence. In Uvak, in kurgan 15 there are 19 burials, mainly children, under one mound. Now and then there are sheep and cow bones and at Vetlyanka IV there are the remains of a horse with a chariot (?) (Gorbunov, Denisov and Ismagilov 1990). The fabric of the ceramics reveals an admixture of shell and sand; incised surfaces reflect Timber-grave influence. The pots are often with a narrow neck (variant B), with or without a ribbed shoulder; ornament is over the rim, neck and shoulder (absence of decoration on the neck is rare); the ornament is arranged over a square lattice; a specific ornament is a band with connecting rhombuses (Fig. 24). The type emerged very early which is

indicated by vessels with hanging rim and graves with a bench; it is dated to the 15th–14th century BC according to a stone axe of the Borodino type (Pyatimary), an archaic knife and Seyma-type spear (Bliznetsy), a knife, flint arrows, stone and bronze ones with rolled up socket, bone bead (Uvak), a knife, flint and bone arrows (Vetlyanka IV; Figs. 30, 32, 39).

Kozhumberdy

The Kozhumberdy type of the Alakul' line of development is found in western Kazakhstan (the cemeteries of Tursumbay I, II, Elenovka II, Shandasha I, II, Kupukhta, Baytu I, II, Ataken-say, Ushkatta, Tasty-Butak, Buget II, Kozhumberdy, Kirgil'da I, II, Tulaykin Aul, Novy Akkerman, Khabarnoe I, II, Kunakbay-say, Ural-say, Pochtovy Post, Baturasay, Ilek, Rossovkhoz, Kuagash, and the settlements of Dzharly and Elenovka microdistricts, Tasty-Butak). The kurgans are characterized by having a stone circle (types IIa, IIIa) and in later kurgans by adjoining fenced enclosures (type VIIa). Graves are subsoil and in cists. Burial is by inhumation with head to the west, rarely south-west; charcoal is present. There are combinations of animal skulls and ribs. Ceramic technology is syncretic with textile patterns and applied bands; pots both with and without a ribbed shoulder; ornament may be over a square or oblique lattice with necks void of decoration; specific ornamental technology involves oblique ornamental bands and the use of large-, medium- and small-toothed stamping (Fig. 23a, b, 24). The type evolves over a long time and can be divided into an early Ushkatta and later Shandasha stage (Kuz'mina 1963d; 1965a). The type is dated from the 16th century BC, and its main floruit is from the 15th through 13th centuries BC. This can be demonstrated by the knives (Kozhumberdy, Kumak, Kupukhta, Bayturasay, settlements of Ushkatta and Shandasha), by arrowheads (Tasty-Butak), by cheek-pieces (Tasty-Butak; Figs. 30, 39) and by ceramics and ornaments from Timber-grave complexes of the II and III stages in the Volga area (Kuz'mina 1987b) and from the Tazabagyab settlements of Kokcha 15, 16, Dzhanbas 34 (Itina 1977, figs. 24, 39, 40, 57, 59).

Atasu

The Atasu type is found in central Kazakhstan (cemeteries: Atasu, Ayshrak, Ak-Mustafa, Koyshoku, Bylkyldak I, II, Shet, Murza-Shoku, El'shibek, Aksu-Ayuly, Zhilandy, Zhaman-Uzen II, Lisakovskiy, Bes-Oba, Altyn-Tyube, Nurken, in the Irtysh area Balakty). A. A. Tkachev (1991) assigned the cemeteries of Bozingen and Izhevskiy I to the late Alakul' stage; E. F. Usmanova (1987) assigned the Ayshrak and Belakty burials to the Alakul' type as there were no clear Fedorovo features in these complexes. Large cemeteries are characteristic of the Atasu type. They contain up to several dozen constructions (Ayshrak—100) and are enclosed by round, oval and rectangular fences (IVa, VIIa, VIIIa), often with two or more stone cists in the center. Burial is by inhumation, head to the west or south-west; there are several instances of cremation. There is a combination of two ceramic traditions: vessels in the Alakul' style built from the

base upwards with bands of clay on the outside and the Fedorovo method, with the bands built up from the interior and a footed base. Vessel types are numerous: with or without a ribbed shoulder, with wide or narrow neck (variants A and B), often with a high rim and sometimes with a footed base. Ornament is on the rim, neck and shoulder; it is arranged over a square lattice or, more often, an oblique lattice. There are various ornamental motifs and combinations; ornamental bands are horizontal. This type dates to the 15th–13th centuries BC according to: 1) the stratigraphy of the settlement at Kopa, where the Atasu layer is covered by a Final Bronze Age one; 2) the technology and typology of the knives (Bylkyldak, Altyn-Tyube (Fig. 30), arrows (Ayshrak, Zhaman-Uzen II, Koyshoku, Shet, Karasay II), bracelets with protruding spirals (Ayshrak), that directly preceded Final Bronze Age ones; paw-shaped pendants (Aksu-Ayuly, Koyshoku) analogous to those found in the Karasuk culture; ornaments of round plates (Fig. 39) imitating Bactria and Margiana seals. A spade-like pin from Ayshrak ties the Atasu type with the farming cultures of south Central Asia.

The Fedorovo complexes of central Kazakhstan are purely Fedorovo while individual Fedorovo elements are known from late Petrovka and Alakul' sites. The Bronze Age complexes of central Kazakhstan are extremely numerous and reflect different combinations of Fedorovo and Alakul' components (which sometimes makes their classification difficult), unlike the more homogenous Sol'-Iletsk and Kozhumberdy sites. This probably indicates that the assimilation process in the southern Urals and in western Kazakhstan finished early (by the end of 16th century BC on the basis of Sintashta type sites?) and a newly formed population evolved in the 15th–13th centuries BC. In central Kazakhstan the active interraction of different groups of populations took place for a long time, leading to various forms. This historical situation was probably preconditioned by the rich copper resources of the region, especially tin, which attracted many tribes there. In any case, new materials in central Kazakhstan, previously the far eastern border of the interaction of Fedorovo and Alakul' tribes, provides conclusive support for the different geneses of these two groups of populations.

Amangel'dy

The Amangel'dy type of the Alakul' line of development is situated in north Kazakhstan (cemeteries: Amangel'dy, Petropavlovsk, Aydabul, Kuropatkino). Burial was in earthen kurgans, sometimes with an enclosure and adjoinging fences (types Ia, IIa, Va); there are also timber-constructions. Inhumation burial was with the head to the west. Burials were accompanied by the skulls and legs of animals. Pots had ribbed or rounded shoulders; the neck was often without ornament; the ornament was often over an oblique lattice, rarely over a square lattice; vessels were with or without shoulder ridges; ornament: bands are horizontal and were made by continuous impressions from a smooth comb and medium- and small-toothed stamping; specific ornament includes high triangles and zigzags on the neck. The type dates to the 15th–13th centuries BC on the basis of a cheek-piece (Aydabul; Fig. 39) and arrows (Amangel'dy).

Tautary

The Tautary type belongs to the Fedorovo line of development and is localized in south Kazakhstan (Tautary, Kuyukty). Burials are surrounded by square, rectangular, and sometimes round enclosures (types VI, VIII, III). Burial is in subsoil graves, usually cremation, rarely inhumation. There is a combination of two ceramic traditions (Fig. 27): pots may be with or without a ribbed shoulder; the ornament is applied against a square or oblique lattice; specific traits include negative filling of the ornament and degraded ornament. The type dates to the 12th century BC and later according to the presence of a cist lying on a clay foundation (Kuyukty), characteristic of the pre-Begazy architecture, a Karasuk paw-shaped pendant (Tautary), and vessels imitating pottery of the late Namazga VI stage.

Semirech'e

The Semirech'e type is syncretic and is found in Semirech'e and Fergana (Map 4, Figs. 26; 73a, b). The type emerged out of a crossing of Fedorovo (Arpa, Prigorodnoe, Issyk-Kul') and Alakul' (the site at the Belovodsk citadel). To the early stages belong the Kapal cemetery where Alakul' features prevail in ceramics while Mynchunkur III and IV, Talapty I and II, Kuygan II and Kara-Kuduk display Fedorovo features (cists, bi-rituality, presence of vessels without ribbed shoulders, footed vases, and wide-necked basin-like pots). In the Mynshukur burial there was found a temple ring, typical for the Fedorovo type, with a pair of horses which have analogies in the Seyma horizon (Fig. 68). This helps date the type to the 15th century BC. There are no grounds for assigning these monuments to a special Semirech'e culture (Karabaspakova 1991: 13-14).

A late group of Semirech'e sites are Tash-Tyube II, Tash-Bashat, Besh-Tash, Dzhazy-Kechu, Dzhal-Aryk, Kul'an-say, Alakul', Talapty, Kuygan, Tamgaly II, IV, VI, Kul'say, Uzunbulak, Kara-Kuduk, Vuadil', Arsif, Karamkul', Yapagi, Kashkarcha, and the settlement of Dzhal-Aryk. Graves are surrounded by fences with annexes (types VII, VIII) and the outlining of the pit with small stones is typical. The graves are subsoil, with stone boxes, small stone settings and cists with a clay coating. The burial ritual involves predominatly cremation but also inhumation. The ceramic technology is mixed: there are late Fedorovo pots with an expanded body and sometimes pots with ribbed shoulders; the decoration is not according to zones and is only found over the rim or shoulder; it is accomplised by a smooth, rarely large-toothed stamp; the greater part of the vessel is without ornament. The early type dates to the 15th–13th centuries BC while the late group dates to the 12th–9th centuries BC according to the evidence of the use of clay coating on the graves (analogous to Begazy); findings of a single-bladed knife (Tash-Tyube), arrow with a concealed socket (Vuadil') characteristic of the Final Bronze Age and the mutual occurence of the Chust culture which is dated by Iranian parallels.

Two groups of north-east Semirech'e comprise a local variant (Karabapakova 1987; 1989): Group I: Bigash, Aksay, Sagandy with square and trapezoidal boxes of the Begazy type, inhumation predominates, vessels are of Begazy form

with poor ornamentation; a plate with a loop was found at Sagandy; Group II: burials at Arsan and Bien 13. There are graves with a dromos. Pots have globular bodies with collared rims and poor ornament: applied rolls, nails impressions, nets, beads, applique knobs, characteristic of the Begazy and Dongal complexes. Imported wheel-made pottery is found on the Bien settlement. The complex dates to the 10th–8th centuries BC and reflects the strong influence of the immigrant Dandybay (Karasuk by origin) population in the pre-Saka period.

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The classification of Andronovo material reveals complex historic processes of autochthonous development, migration and integration. It is probable that a migration of the Alakul' people in the second quarter of the 2nd millennium BC, from western into central Kazakhstan caused part of the Fedorovo migration to eastern Kazakhstan and south Siberia. Another part of the Fedorovo people was assimilated by the Alakul' people, and as a result of this integration, syncretic complexes were formed. Moreover, the Sol'-Iletsk and Kozhumberdy types formed very early: in central Kazakhstan long contacts were of different character, which conditioned the mixed character of the Atasu type; the Semirech'e type was probably formed rather late, as a result of population migration from central Kazakhstan.

A review of the numerous sites of these syncretic types, united in an integral chain across the major part of Andronovo territory permits one, following A. A. Formozov, to speak about the existence of an Andronovo culture unity.

The Andronovo materials surveyed so far provide a database for the analysis of the material culture of the Andronovo tribes. Of central importance in the development of the stockbreeding cultures of the steppe ECT was the transition to a nomadic type of economy, the most basic innovation of Old World culture. That is why the study of the ECT of this region is of primary interest for examining its paleo-economic development and revealing the processes involving the emergence of mountain pastures and then the creation of nomadic stockbreeding in Eurasia, which explains the dynamics and intensive assimilation of new territories. A. J. Toynbee, who dedicated his *A Study of History* to the philosophy of history and who greatly influenced the development of modern historical schools, expressed the opinion that steppe peoples were a catalyst of all the processes in the history of civilization. Similarly, the head of the French "Annales" school, F. Braudel (1969) considered the Eurasian steppe as a flashpoint that saw the explosion of steppe pastoralists from Germany to China who punctuated the slow process of cultural evolution in the Old World.

Finally, the separate categories of the material culture of the Andronovo tribes and their comparison with language data and historical traditions of the ancient Indo-Iranians will help resolve the problem of locating their homeland, reject speculative constructions, and give the floor to the Aryans themselves.

CHAPTER FOUR

SETTLEMENTS AND DOMESTIC ARCHITECTURE

Settlements and houses

Numerous ethnographic and historical studies have firmly established that house type is conditioned not only by ecology and economy but also by the specific building traditions that might be preserved by certain ethnic groups over a long time. That is why the study of domestic architecture is of interest not only for economic reconstruction but also for investigating archaeological cultures and establishing their ethnic background.

The discovery of the sites of the Sintashta type (Fig. 58) that belong to the early period of the formation of the Andronovo culture has been one of the great success stories of Russian archaeology (Map 12). The traditional chronology sets them to the 17th–16th centuries BC while radiocarbon dating places them earlier to the 20th–18th centuries BC (Smirnov and Kuz'mina 1976; 1977; Kuz'mina 1984; 1998; Gening 1977; Anthony and Vinogradov 1995).

It was I. M. Batanina (1995; Zdanovich and Batanina 1995; 1999) who, after examining military aerial photographs, discovered about twenty fortified settlements, the so-called "land of towns", that were situated about 40-70km from one other. They were found in the southern Urals in the basins of the European and Asian rivers, the Uy, the Ural, and the Tobol, in an area that runs 400km from north to south and 100-150km from east to west. These settlements are on small river banks, usually on promontories; they are oval, round or rectangular and are surrounded by defensive walls and ditches; in Ol'gino and Alandskoe the outer banks were strengthened by stone slabs. Associated cemeteries have been discovered near the settlements of Sintashta and Kuysak. The cemetery of Solntse II belongs to the settlement of Ust'e while Bol'shoy Karagan is associated with Arkaim. The sites are in areas rich in oxidized copper ores, malachite and azurite deposits that are easy to exploit. The Vorovskaya Yama mine belongs to the settlement at Kuysak and Kisenet is associated with the Ust'e settlement.

Archaeologists have excavated the settlements of Malokizil'skoe, Sintashta, Arkaim, Ust'e, Kuysak, Alandskoe, etc. (Gening *et al.* 1992; Zdanovich (ed.) 1995b; 1997; Zdanovich G. and D. 1995; Vinogradov 1995a; Malyutina and Zdanovich 1995).

At the settlement of Malokizil'skoe, over an area of 5,000 square meters, there was found a ditch, 1.1-1.4m wide and 1.4m deep, and part of a shallow rectangular house with post-holes and hearths/fireplaces. A child cremation burial was found in the house, executed victims and the burnt remains of people were found both on the square and in the ditch, and sacrificial deposits of cattle and pottery were found in the ditch (Sal'nikov 1967: 19-20, 35-38, fig. 3: 1-8). The settlement was probably destroyed by fire. Malokizil'skoe is the only settlement

in the "land of towns" that is assigned to the Abashevo culture; all others belong to the Sintashta-Petrovka types.

The fortification and layout of the settlements were deliberately planned in advance, taking into account the natural relief. Sites are surrounded by a ditch, 2.5-5m (Sintashta), 4.5m (Ust'e), and 5-7m (Kuysak) and 1.3m deep, with two rows of defensive walls, 1.7m and more thick, made of clay blocks and vertically erected pine logs 0.4-0.5m in diameter (Ust'e). Walls were also made of timber frameworks filled with earth; there was probably a timber palisade above them. The ditch was cut in steps and reinforced by logs.

The inner square of the fortresses revealed regular planning and was divided by radial and perpendicular roads, along which a cart or a chariot could pass. The roads led to entrance gates. The houses were situated between the inner and outer walls; they were rectangular or trapezoidal in form with sides measuring 20m x 13m x 17m (Kuysak) or 15.5-20m x 5-7m x 7.9m. Houses abutted the outer wall and shared a common roof with a pitch towards the center; entrances faced the central square; the house walls were indicated by post-holes. Wells and round surface hearths were found inside the houses. There are traces of slag and copper beads in every building (Grigor'ev 1994). For metal working, they employed furnaces, 0.5-0.9m in diameter and 0.3-0.6m deep, that were connected by a narrow trench, 0.3m wide and 0.7-1.2m long, leading to the well (Kuysak).

There were numerous ritual burials of children, dog, cattle, sheep and goat, especially kids' sacrifices; vessels are found in defensive ditches. Traces of massive fires and destruction, apparently caused by warfare and demanding the rebuilding of the settlement, have been found on many sites.

The settlement at Kuysak is an irregular rectangle of outer walls, 122 x 96m, surrounded by a wide ditch. Inside the site there is an oval-shaped wall measuring 64 x 58m. The outer and inner walls are connected by three walls forming segments around a central square. In each segment were 6 to 9 houses (Malyutina and Zdanovich 1995).

Partially inundated by the river and covered by constructions of Alakul', Fedorovo and Alekseevka types, the Sintashta settlement was originally of circular form, 136-147m in diameter, and surrounded by an earthen wall girded by a ditch. Habitations were of trapezoidal form that only partially adjoined the outer wall. There was probably a second badly preserved wall that surrounded the central oval, 60-65m in diameter (Gening *et al.* 1992).

The settlement of Arkaim presents a most impressive view (Fig. 58: 5). The area of settlement comprised 20,000 square metres and formed two concentric walls, composed of clay blocks, enclosing a central square, surrounded by a ring of habitations that adjoined the first defensive wall (85m in diameter). There was a circular street and outer circle of habitations abutting the more formidable outer wall (Zdanovich 1989: 181-182; 1997: 48-50, fig. 3). The diameter of the outer wall measured 143-145m and was 3-3.5m thick. It was composed of wood and clay with added lime; it was faced on the outside with clay blocks. There was a timber-faced ditch some 1.5-2m deep. The whole construction was divided by radial streets, which probably led to the gates. The western gates were 5-6m wide, others were labyrinthine. Logs and blocks were used to construct the trapezoidal houses. They consisted of a timber frame filled with soil. The habitation

area measured 110-180m and 0.4-0.5 deep. Wells and furnaces connected with metal working were found in the habitations.

Numerous traces of metal production have been discovered in all the fortified sites of the 17th–16th centuries BC. That is why we agree with those who have suggested that the fortresses were constructed by early metallurgists to guard areas of copper deposits. The defensive nature of the forts and the traces of burning horizons and reconstruction indicates the unstable situation in the steppes of the Sintashta period.

The origin and chronological correlation of early Andronovo sites are based on stratigraphy. On the Kuysak settlement ceramics with Pit-grave/Poltavka and Abashevo features were recovered from the earliest levels of the ditch. It indicates that these cultures participated in the formation of the Sintashta type of site (Smirnov and Kuz'mina 1976; 1977; Gening 1977). The early settlement built by the Pit-grave/Poltavka and Abashevo tribes was burnt, then it was rebuilt in the Sintashta period only to be fired again. All of this reflects the extremely tense atmosphere in inter-ethnic relations (Malyutina and Zdanovich 1995: 104-105).

The stratigraphic correlation of the Sintashta and Petrovka types is indicated at the Ust'e settlement where the early Sintashta settlement was circular and the houses were trapezoidal. In the Petrovka period the settlement was rebuilt in a rectangular form with extended rectangular houses, 160 square meters in area; the adjoining walls were divided by a main street (Vinogradov 1995). Similar planning has been discovered on Petrovka-type sites in the Urals and in north Kazakhstan that chronologically follow Sintashta sites.

What place do the Sintashta sites occupy in the Eurasian cultures of the Early Bronze Age? Large fortified settlements of this period were long known in the western steppe. These include Kamenka in the Crimea, and Karataevka and Liventsovka in the Don region (Bratchenko 1976: 119-122). The Liventsovka fortress is a semicircular promontory fort, 20-24m high, enclosed by a double semi-circle of massive stone walls and surrounded by ditches, 2-6m wide and 2-3m deep. The walls consisted of an inner and outer course of large stones with the inner space filled with small crushed stones. The habitations were located between the two walls as in Arkaim and were also of trapezoidal form. A large quantity of (presumably enemy) arrowheads was found outside the fort. The Crimean and Don forts are close to the Multi-roller Ware culture that chronologically follows the Catacomb culture.

Defensive constructions are also associated with the Abashevo settlement (Pryakhin 1976: 23-24). It possesed a ditch, 2.2-2.8m wide and 0.4-0.5m deep. It enclosed a palisade indicated by a double row of post-holes, standing 2m from each other in a row; the width of the main entrance was 4m, the gate to the river was 1.5m.

Further west defensive banks and ditches are well known on Bronze Age settlements of the Danube area in the Monteoru and Füzesabóny cultures (Mongayt 1974: 68, 86). In the Balkans we have circular fortified settlements from the end of the 4th to the beginning of the 3rd millennium BC at sites such as Ploskata Mogila and Ezero. It is possible that the spread of this type of monument can be traced back to Anatolia where it originated already in the 6th–5th millennia BC (Haçilar) through Troy which has been culturally tied with the

Balkans. N. Ya. Merpert (1995) has examined the Balkan sites and regarded this hypothesis questionable. He suggested the "polycentric character in the development of this architectural tradition" which could have appeared in the Balkans under the influence of central and east European cultures, including the Tripol'e culture. I might suggest that the formation of fortified settlements in the Eurasian steppes was based on the principle of the defense of a military camp. We might look for its origins in the concept of the circle camp of kibitkas, consisting of covered wagons (with their rear-ends facing outside) forming a shelter for the cattle, women and children in the center. Such an idea could only arise on the steppes, among people travelling in wagons. Such defensive tactics was used by steppe peoples over the millennia: it is attributed to the Vedic Aryas (Rau 1983) and later it is found among Turks, Mongols and Cossacks till the 19th century AD.

Both Liventsovka and Arkaim exhibit spatial plans that resemble that of the Koi-Krylgan-kala temple complex of the 5th century BC in Khorezm that recalls an idea of S. P. Tolstov (1948: 77-82) about "towns with inhabited walls," which he compared to the idealized settlement of the ancient Iranians described in the *Avesta*, the *vara*, which was built by their legendary ancestor and first king, Yima.

Yima Xšaēta kneaded "clay with his feet, divided it into pieces with his hands… and made the Yima vara, a horse run long (nearly 800m) on all four sides. He brought seed of sheep and goats, horses, dogs, birds, fires, red and burning. And made Yima this *vara*… house for people… shed for cattle. He led water there along the route for the length of a *hāθra*; he built a house there, vault, yard-place closed from all sides" (Vidēvdāt 2.33 and further).

V. A. Livshits (1963: 145) regarded the *vara* as a fortified settlement to shelter people and cattle during wartime.

There was also the Old Persian term *didā* which M. M. D'yakonov (1961: 67, 365), following E. Herzfeld, derived from "(knead) clay". This word denoted a defensive wall, the fortified settlement of a clan. The Vedic Aryas knew several terms to denote a fortified place: fortress, rampart (Elizarenkova and Toporov 1995: 512). However, even in the Achaemenid period, the Persians did not know of the town proper: Pasargadae and Persepolis were only residences and cult centers.

In this respect W. Rau's interpretation (1983: 11) of the Sanskrit term *grāma* is of major importance: later it denoted village, but initially it denoted a small tribal group of shepherds migrating in wagons. Wagons were put in a circle every evening, forming a peculiar fortress on wheels, with the cattle inside (Elizarenkova and Toporov 1995: 490).

K. Jettmar (1981) and V. Brentjes (1981) interpreted the Bactrian plans of cult centers such as Dashly III and Dzharkutan, discovered by V. I. Sarianidi (1977) and A. Askarov (1977), as models of a *vara*. The latter, dated to the 14th–13th centuries BC, have neither sources nor parallels in the Near East, and they repeat the architectural plans found at Arkaim, which presupposes the influence of the northern steppe culture on the architecture of Bactrian farmers. This conclusion is supported by Andronovo ceramics and decoration on temple vessels found on a sacred altar of the Dzharkutan temple (Askarov 1989).

Of great importance is also the fact that the same planning principle was preserved in the steppe during the Scythian period in the construction of the royal kurgans, e.g. Arzhan (Gryaznov 1980) and Tagisken (Tolstov 1962: 21, 81-86). This prompted K. Jettmar (1981) and L. A. Lelekov (1972) to return to the problem of the Avestan *vara*. The *vara* was not an actual town but, as the late Avestan Vidēvdāt text would have it—a model of the universe or micro-cosmos. But the mythologeme itself could only have originated in a society where there already existed the prototype of a 'celestial town', i.e., in the culture of the population of the Eurasian steppes at the beginning of the 2nd millennium BC.

I. V. P'yankov (1999) supported K. Jettmar's comparisons of the *vara* with the Bactrian cult centers and like him regarded Arkaim as a cult center. But this is unlikely as the architectural plan of Arkaim is typical of the other Sintashta monuments that indicate not only a ritual but also a production center. He remarked that the Yima-Imra cult occupied a central place in the mythology of the third group of Indo-Iranian peoples, the Nuristani, who preserved recollections of the *vara*-type construction.

I. M. Steblin-Kamensky undertook very interesting research into the *vara* problem (1955: 166-167). According to him, the *vara*, which was erected in the legendary homeland of the Iranians in the *ariianəm vaējō* by the first mortal and the first shepherd-king of Iranian mythology Yima, had a round and not a rectangular form. It was oriented "to all four sides of the world" and it consisted of three concentric circles of clay walls with 9, 6 and 3 passages. The *vara* plan thus corresponds to the round settlements of the Arkaim type.

Of considerable importance here is I. M. Steblin-Kamensky's observations about the borrowing of the cult of Yima, who is recalled in Indic mythology as Yama, King of the Dead, by Finno-Ugrian peoples. The latter adopted the cult of the god Jumula in Finnish or Joma in Komi, the word *vara* (cf. Hungarian *vár* 'fortress' and *város* 'town'), and the two golden symbols of power presented to Yima by Ahura-Mazdāh: a shepherd's horn and a stick with sharpened end for goading animals. The Shepherd-king expands the lands of the Aryans to the south, which "can indicate the direction of Aryan migration".

It seems significant that already in the Sintashta and Petrovka periods the ditches surrounding settlements were used for ritual purposes: on their bottoms archaeologists have recovered sacrificial complexes in the form of several vessels, and the skeletons and bones of animals. This sacral function consequently may have carried over as the circle and square components of a temple and royal burials which would have been constructed as microcosms of the universe.

The fortifications of Sintashta make it possible to return to the question of forts among the Vedic Aryans. There were two terms in the Indo-European languages to denote fortified settlement: 1) *burg* lost in Indo-Iranian, Tocharian and Latin, and 2) from the Aryan-Greek-Baltic area, Greek *pólis*, Lithuanian *pilìs* and early Indian *pūr*, ultimately derived from a root 'precipice, steep slope' (Gamkrelidze and Ivanov 1984: 744-746). M. Wheeler (1984), S. Piggott (1950: 261) and many researchers after them have identified the *pūr* as the Harappan fortresses, destroyed by Indo-Aryans and, once reduced to ruins, they became the *arma* or *armaka,* where Aryans gathered ceramics for fire-clay necessary for the manufacture of Aryan utensils. W. Rau (1983) suggested that the *pūr* was not a

fortress of aboriginal enemies but a small settlement of Aryans proper, enclosed within an earthen or stone wall to defend cattle, and the *arma* denoted a deserted Aryan site. However, in the numerous Rigvedic texts (IV, 30,20) analyzed by A. Parpola (1988: 208-212) Indra, the main god of the pantheon, has the recurrent epithets "destroyer of *pūr*" and "victor over the *Dāsas*". *Dāsa* implies both demons and the dark-skinned aboriginal population (Bongard-Levin and Gurov 1988; 1990; Elizarenkova 1989: 433; Alekseev 1990; Bailey 1959: 107-115). The *Rigveda* (2.20.7) directly mentions the destruction of *Dāsa* fortresses; moreover, their kings do not appear to have Indo-European names (Parpola 1988: 212). Indra destroys 99, 100 and 101 *Dāsa* towns; Agni burns them with fire. Despite the opinion of a number of scholars that there was a chronological break between the collapse of the Harappan towns and the arrival of the Indo-Aryans, these texts demonstrate that the Aryans did participate in the destruction of the towns of the Indus Civilization. At the same time the term *pūr* itself, common in Greek, was also in use in the Indo-Iranian homeland where it would have been applied to fortified settlements of the Liventsovka and Arkaim type (in this respect the ideas of S. S. Berezanskaya (1971) on similarities between the stone architecture of the North Pontic area and Achaean Greece are of interest). However, by the mid 2nd millennium BC, the tradition of constructing fortifications declined due to the stabilized situation on the Eurasian steppes. Pastoral tribes did not follow the path toward urban development that had begun in the 17th–16th centuries BC but rather turned to the extensive development of their economy by migrating and mastering new territories.

House-plan

The settlements and houses of the later stages of Andronovo cultural development have been rather well studied. Houses have been discovered on more than 200 settlements in different regions, some of which have been excavated. The most fully studied are Spasskoe, Alekseevka, Sadchikovo, Kipel', Zamaraevo, Sarafanovo, Duvanskoe 17, Uk 3, Mirny 3, 4, Tasty-Butak, Ushkatta 1, 2, 8, Shandasha, Yazevo 1, Kamyshnoe 1, 2, Pereleski, Zagarino, Semiozernoe, Chaglinka, Bishkul' 4, Bogolyubovo 1, Petrovka 2, 4, Novonikol'skoe 1, Pavlovka, Yavlenka, Sargary, Atasu, Buguly 1, 2, Akbaur (Akkauzen), Myrzhik, Shortandy-Bulak, Tagibay-Bulak, Karkaralinsk, Ikpen' 1, Entuziast, Mayorovka, Kent, Dongal, Tashik, Kanay, Trushnikovo, Malokrasnoyarka, Shlyapova (Krivtsova-Grakova 1948: 73-100; 1951: 153-177; Sal'nikov 1951: 102-105; 1954a; 1957; 1959a; 1967: 242-248; Sal'nikov and Novichenko 1962; Margulan 1959: 16-27; Margulan 1979: 163-254, fig. 119, 124, 128, 130, 132, 137, 143, 146, 154, 167, 169-171, 185; Margulan *et al.* 1966: 197-255; Chernikov 1960: 26-35, 40-44; Sorokin 1962a: 51-60; 1966: 61; Kuz'mina 1962a: 88-91; 1962b: 9-11, fig. 1; 1964b: 101-104, fig. 29; 1986b: 42-55; Fomina 1964: 207; Zdanovich 1970: 147; 1973a: 113-118; 1973b: 40-51; 1973c: 21-43; 1974a: 61; 1974b: 61-62; 1975; 1980c; 1982; 1983; 1987; 1988: 19-60; Zaybert *et al.* 1974: 71-75; Evdokimov 1971: 65-67; Chemyakin 1974: 50-55; 1972: 288-289; 1978: 201; Chebakova 1975: 92-97; Potemkina 1976a: 10-16, 23; 1982: 15-49; 1983; 1985: 30-145; Gusentseva *et al.* 1972: 204; Zdanovich S. 1978; 1979; Orazbaev

1970: 129-146; 1972: 109-114; Kadyrbaev 1983; Kadyrbaev *et al.* 1992: 146; Korochkova 1984; Korochkova and Stefanov 1983; Koryakova *et al.* 1991; Malyutina 1990; 1991; Varfolomeev 1987; 1988; 1991; Tkachev 1987; 1989; 1991; Kurmankulov 1988).

Area	*Settlement*	*Number of houses*
The Urals	Bakhtinskoe	7
	Low Bakhtinskoe	10
	Low Spasskoe	10
	Zamaraevo	10
	Tribiyak	13
	Barmino	15
	Chernigovskoe	17
	Bely Kamen'	19
	Talovskoe	20
	Kipel'	20
	Konezavod	6
	Pereleski	10
	Kulevchi 3	5
Northern Kazakhstan		
	Sargary	13
	Chaglinka	16
	Petrovka 2	16
	Novonikol'skoe	15-20
	Atasu	22
	Obaly	24
	Shandasha	2
	Ushkatta 2	2
	Tasty-Butak	6
Western Kazakhstan		
	Atasu 2 (Ak-Mustafa)	49
	Atasu 1	23
	Buguly 1	100
	Buguly 2	30
	Shortandy-Bulak	38
	Suukbulak	12
	Tagibay-Bulak	6
	Aynakol'	8
	Sorkuduk	18
	Myrzhik	37

Table 1: Number of houses per Andronovo settlement
The table is selective rather than comprehensive as there are no data about many settlements in the literature, and many have been partially destroyed.

Andronovo settlements were usually situated on the banks of small rivers, on grounds defended from wind by rows of hills or riverside rocks. In the Urals they are connected with river valleys with large floodplains; very often they are in the

very floodplains inundated in modern times. In west, north and central Kazakhstan settlements are usually situated on the first river terrace.

Apart from permanent settlements temporary sites appear in the Final Bronze Age near mines (Mungly, Akzhal, Milykuduk) or on desert pastures far from rivers, where they were dependent on artificial wells.

Andronovo settlements are divided into two types according to area: small settlements with only a few houses and large settlements with 10-20 structures. Small settlements with only 2-6 houses are typical of the western region (Shandasha, Ushkatta 2, Tasty-Butak). They resemble neighboring Timber-grave and Tazabagyab settlements. In the Urals and in north and central Kazakhstan the large settlement of 10-20 houses predominates (Table 1). In the Final Bronze Age even larger settlements with several dozens of structures are known (Shortandy-Bulak, Buguly 1,2, Akbaur, Kent, Myrzhik).

Viewed chronologically, we can observe the dynamics of Andronovo house types, tracing them through the Bronze Age as they gradually adjusted their houses to local conditions and obtained the skills that allowed them in the Final Bronze Age to pass over to nomadic cattle-breeding and master the deserts and mountains of Central Asia.

Settlements of the Petrovka type of the 16th century BC derived directly from the Sintashta type, with which they were genetically connected. In the Urals and northern Kazakhstan we find traces of fortifications on Petrovka sites: Petrovka 2, Novonikol'skoe 1, Bogolyubovo 1, Kulevchi 3, Semiozernoe, Konezavod and the Andronovo settlement of Chernoozerje on the Irtysh that yielded Fedorovo ceramics. Archaeologists have uncovered ash-filled ditches, 1.5-2.5m deep, 1.2-3.5m wide, with inner and outer banks measuring 0.4m high and passages 2-2.5m wide. At Bogolyubovo and Semiozer'e the ditch cut the promontory from the field side; in Novonikol'skoe it enclosed a rectangular area 95 x 60m; in Petrovka 2 the inner ditch divided an inner area, 70x120m, into two parts; in Chernoozer'e the ditch, 75m long, adjoined a high river terrace enclosing a rectangle on three sides. Post-holes have been discovered along the outer wall, probably from a palisade in Chernoozer'e (Zdanovich 1975: 7-10; 1988: 133; Zdanovich and Gening 1985: 151; Viktorova and Borzunov 1974: 19-20, fig. 1; Potemkina 1982: 52, fig. 1; Vinogradov 1982: 97).

According to the evidence from northern Kazakhstan, there the houses were arranged randomly; they were small, 40-50 square meters in area, surface or semi-subterranean (0.15-0.3m deep, rarely 0.6-0.8m); they were of post-built construction (in every house 20-30 post-holes are found), and they had hearths from 0.5-1 to 1.5m in diameter and 0.2-0.5m deep, sometimes faced with stone and the floor coated with clay. Ash-pits adjoined the houses (Zdanovich 1975: 9, 21; 1976b: 63; 1973a: 115; 1988: 19-60; Vinogradov and Zdanovich 1979: 161-162; 1980: 138; Vinogradov 1982: 94-99).

Continuity from the architecture of Sintashta is seen in both the tradition of fortification and in the predominance of slightly subterranean houses. But the Petrovka settlements already reflect a somewhat different ethno-political and economic situation.

The next stage in the development of Andronovo house building is seen in the settlements of the mature Bronze Age. In architectural form, the houses are genetically connected with the Petrovka structures. In the Orsk region and in the

Urals a large number of settlements with a pure Alakul' or Kozhumberdy layer has been discovered (among them 20 settlements are in the Elenovka micro-district, including Elenovka 1, 2, Kiimbay 1, 2, 3, Ushkatta 1, 2, 8, Shandasha, Tasty-Butak, Tanalyk, Starikovskoe, Kamyshnoe 1, Kambulat, etc.

Settlements with a frequent Fedorovo layer are known in the Urals (Duvanskoe 17), in northern Kazakhstan (Bishkul' 4, Pavlovka), in central Kazakhstan (Ikpen' 1, middle layer) and in the east of the area, in west Siberia (Shlyapova, Klyuchi, Bateni).

A pure layer from the Final Bronze Age is seen in northern Kazakhstan in Chaglinka, Sargary (Fig. 86: 1-9), in eastern Kazakhstan in Malokrasnoyarka and Trushnikovo, in central Kazakhstan in Shortandy-Bulak, Karkaralinsk, Tagibay-Bulak, Suukbulak, Kent, and Myrzhik. A majority of the settlements has a mixed cultural layer, which points to continual re-occupation of the same site (Alekseevka, Sadchikovo, Kipel', Zamaraevo, Novo-Burino, Chernorech'e, Yazevo, Kamyshnoe, Petrovka, Novonikol'skoe, Yavlenka, Atasu, Buguly 1, 2, etc.; Fig. 86).

As a rule Andronovo settlements are of regular construction, houses are oriented similarly and they are situated parallel to each other, taking into account the topographic conditions: entrances face the river or are on the leeward side (Fig. 7). There are three types of settlement plans:

Type I settlements find their houses situated in a single line along the river (Ushkatta 1-8, Zamaraevo, Chaglinka, Konezavod, Sorkuduk, Karkaralinsk 2, Tagibay-Bulak).

Type II settlements have houses that are built along the river in two parallel rows, divided by a street 7-10m wide (Alekseevka, Sadchikovo, Shandasha, Atasu 3, Marzhan, Myrzhik).

Type III settlements date to the Final Bronze Age and are found in central and northern Kazakhstan. The settlement, extended along a river, is almost rectangular or oval in plan with a large square in the center which was devoid of buildings; it served for keeping cattle (Zhabay-Karasu, Novonikol'skoe 1, Vinogradovka 6, Shortandy-Bulak, Akbaur 2, Buguly 1) (Margulan *et al.* 1966, fig. 100-102, 105; Margulan 1979, fig. 137, 145, 149; Zdanovich S. 1979: 8). Sometimes houses are situated close to each other over the whole settlement area (Atasu 1, Sargary, Kent, Dongal).

In Alekseevka, Sadchikovo, Atasu, and Akbaur there are traces of wooden palisades around the settlement or fences to enclose part of the settlement like Kazakh *boskets* made of wood, earth or stone which serve to guide cattle or protect them from wind and snow (Krivtsova-Grakova 1948: 97-99; Margulan 1959: 19).

The existence of large ash-pits, 0.5-1m and more deep, associated with a domestic hearth cult, is a particular feature of Andronovo settlements. Three types of ash-pits have been recorded: 1) large deep pits adjoining a house wall (Sadchikovo, Zamaraevo, Mirny 4, Atasu, Malokrasnoyarka); 2) an elongated trench along a river bank or edge of settlement (Kamyshnoe 2, Obryv, Ushkatta 2, Shandasha, Mirny 4, Kanay); 3) a mound adjoining the house (Alekseevka, Obaly, Chaglinka, Atasu). This type may probably be considered the most recent, serving as a transition to the ash-pits of the Scythian period (Grakov

1971). In addition, the foundation slots of abandoned houses (Alekseevka) or trenches (Novonikol'skoe) were used for ash-pits.

There are two categories of buildings known from Andronovo settlements: semi-subterranian and surface structures.

House Type I

The first category of Andronovo house is long-term semi-subterranean structure, set 0.6-1m (rarely 1.2-1.6m) deep in the earth (Fig. 8).

The construction technique of the Andronovans is revealed through the study of both houses and burials. Grave and house foundation ditches were dug with a pick-ax or adze with a narrow blade (8-13.5cm); traces of tool marks are found on the walls of a house at Sadchikovo and the Uvak grave. Earth thrown up from the foundation ditch was placed outside to form a breastwork which raised the height of the house approximately 1m. A mixture of clay, sand and stones was used in central Kazakhstan (Margulan 1959: 21, 22). In other regions the breastwork was covered by a layer of clay (Kuz'mina 1962; Malyutina 1990).

Settlement	*Size (meters)*
URALS	
Duvanskoe XVII	10.5 x 5
Kipel'	11 x 10
Spasskiy Most	14 x 6
Verkhnealekseevskoe	12 x 7
Bely Kamen'	30 x 20, 11 x 5
Bakhtinskoe	27 x 16, 19 x 11
Zamaraevo	26 x 11
Alekseevka	15 x 9, 19 x 16, 26 x 15
Sadchikovo	17 x 11
Mirny III	18.3 x 9
Mirny IV	12 x 8.5, 13 x 12
Kambulat	27 x 10-23
Zagarinka	24.8 x 12
Kamyshnoe I	12.8 x 7.5, 11.5 x 7.5, 12.0 x 10.0
Kulevchi III	24.5 x 8.5-10.5, 14 x 4-5.5, 4 x 6.2, 14-15 x 11-12, 12 x 7- 8.5
Yazevo I	16.5 x 12.0, 14.6 x 7.2, 14.5 x 12.5, 14.0 x 8.0
NORTH KAZAKHSTAN	
Chaglinka	15 x 5, 10 x 8, 16 x 14, 30 x 10
Il'inka	23 x 12
Novonikol'skoe I	22.0 x 12.0, 25.0 x 10.0-12.0, 19.0 x 10.0-12.0, 18.0 x 13.0, 17.0 x 13.0, 14.0 x 6.0-8.0, 13.0 x 10.0, 14.0-8.0
Petrovka II	24 x 8.5, 20.0 x 9.0, 26.5 x 10-12.5, 12.0 x 12.0, 16.0 x 13.0(?)
Petrovka IV	13.5 x 12, 16.5 x 15.0
Pavlovka	18,0 x 11.5, 16.0 x 10.0

	WESTERN KAZAKHSTAN
Ushkatta I	20 x 10
Ushkatta II	25 x 9
Ushkatta III	20 x 8
Ushkatta VIII	16 x 16
Shandasha	11 x 7
Tasty-Butak	18 x 8, 20 x 10
	CENTRAL KAZAKHSTAN
Atasu	10 x 8, 12 x 11, 13 x 12, 15 x 11, 20 x 15, 18 x 12
Tagibay-Bulak	from 88 to 375 sq m.
Shortandy-Bulak	16 x 10, 15 x 10, 25 x 15, 20 x 20
Suukbulak	14 x 8
Karkaralinsk	20 x 12, 18 x 4
Baybala	11 x 10
Akbaur	22 x 12, 30 x 11
Buguly	32 x 7
Sorkuduk	12 x 8
Kulman	12 x 8
Kent	6.5 x 5.7, 7.3 x 5.5, 5.0 x 6.2, 7.5 x 6.8, 7.5 x 6.5
Domalaktas	14.4 x 9.0
Dongal	10.2 x 7.2, 10.1 x 8.0, 11.7 x 5.7, 9.3 x 8.4
Tashik	15.5 x 9.0
Upais	10.2 x 7.5
Ikpen' 1	11.0 x 10.0, 24.0 x 9.5-12.5
Ikpen' 2	18.0 x 7.0

Table 2: House dimensions
The table has been compiled selectively. Not all houses excavated have data published. Data of special workshops of Central Kazakhstan are not included in the table.

Andronovo houses are usually rectangular in form and are distinguished by their large dimensions (areas from 80-100 square meters to 200-300 square meters; Table 2). A frequent peculiarity of Andronovo house building is the tradition of connecting two neighboring buildings with an underground passage, resulting in what would appear to be a figure-of-eight structure on the surface. In the Final Bronze Age the underground passage system could unite several neighboring structures in a single block (Atasu, Sargary, Petrovka 3, Pereleski, Chaglinka). The houses of the Alakul' and Kozhumberdy groups often exhibit various out-houses which produce their own complex configuration (Kambulat, Ushkatta).

The pinacle of house-building technique is found in the Final Bronze Age of central Kazakhstan. Here we find a type of strictly planned, multi-chambered dwelling, rectangular in form and built from massive, well-polished stone slabs. Such multi-chambered houses, uniting 5-7 rooms, have been discovered at Buguly I, II, III and Akbaur (Margulan 1959: fig. 10, 11; 1979: 187). Domestic and industrial buildings are connected with the house, thus, the whole complex of structure 17 at Buguly covers 530 square meters; house 22 occupies 660 square meters and house 28 reaches an extraordinary 1500 square meters. These

are the largest houses known in the Eurasian steppes during the Bronze Age of this region (Margulan 1979: 187-189, fig. 140-142). The main house and household annexes are on a single axis or at a right angle to one another.

Andronovo semi-subterranean houses are divided into two types in terms of construction: type 1) with wooden constructions; type 2) with stone. The first type is represented in the forest-steppe area of the Urals, northern Kazakhstan and in the heavily forested regions of central and eastern Kazakhstan. Houses here have a timber-frame construction with posts along their walls. These held horizontally fitted rows of beams or blocks (Kipel', Zamaraevo, Chaglinka, Pereleski, Kulevchi 3, Yavlenka 1, Petrovka 1, Pavlovka, Ikpen' 1, etc.) or wattling covered with clay (Alekseevka, Chaglinka, Kanay). There is a large number of post-holes in the center of the house that supported the roof; there are also inner partitions, wooden flooring and tables. Within a single house there might have been anywhere from several dozens to 200 or even 300 posts. Similar post constructions are known at Alekseevka, Sadchikovo, Kipel', Zamaraevo, Mirny IV, Zagarino, Pereleski, Yazevo, Kamyshnoe I, II, Petrovka II, Il'inka, Yavlenka, Bishkul' IV, Pavlovka, Chaglinka, Novonikol'skoe, Karkaralinsk, Suukbulak, Shortandy-Bulak, Malokrasnoyarka, etc. In some settlements there is evidence for only a few or no post-holes; here there was probably a timber framed construction (Spasskiy Most, Kambulat, Novoburino).

The Andronovans employed as building materials birch, pine and cedar (Siberian pine), rarely other species. There are sharp axe marks on logs which measure 0.25m, sometimes 0.4m and even 0.8m in across. Judging from the wooden constructions of Andronovo houses and especially graves (Sal'nikov 1951b; 1952b; Kuz'mina 1973a) which were, in effect, miniature versions of houses, the Andronovans were familiar with: 1) false framework – a layer of logs set on each other in several rows of beams without fastening the corners; 2) walls built from whole logs or blocks split in half that were turned with their flat sides to the interior and fastened to the walls by post-uprights set at certain intervals; this was the commonest system of construction. Sometimes a layer of logs was set between two rows of poles, corners are butt-joined (Fedorovka, Sosnovskiy, Verkhneozernoe, Borovoe); 3) timber-frames with bond jointing: in the lower timber rank the longitudinal logs are long, and then butt-ends are short; in the next timber rank the longitudinal logs are short and the butt-ends are long (Tuktubaevo); 4) timber-frames where the logs are joined by inserting one log into a groove of the lower log (= American Lincoln log system); 5) timber-frames where the upper log is joined to the lower by mortise and tenon (Tuktubaevo, Fedorovo).

There was a variety of ways of constructing a roof or cover from poles, logs or blocks placed along the longitudinal axis of the pit, across it, resting on a horizontal log placed atop a post inserted into the center of the grave (Sintashta I, II, Sineglazovo, Tursumbay) or on two or four posts on the corners of the pit (Sintashta II, Sosnovskiy, Verkhneozernoe, Fedorovo); there are also overhead covers consisting of two layers laid perpendicular to each other (Alakul', Kinzerskiy).

Semi-subterranean houses of Type 2 are found in treeless districts where stone was used in architecture. We can divide these into various sub-types. Subtype IIA consists of large stone slabs, 0.3-0.5m wide, 0.75-1.4m long, sometimes

reaching 1.55 x 2m, that were set vertically on edge to a depth of 0.2-0.4m. The slabs were stacked dry without mortar; they were often placed in two rows 'in bond'. Natural outcrops of flagstone near settlements served as quarries. Houses with stone walls have been examined in the Orsk region (Ushkatta I, II, VIII, Shandasha, Tasty-Butak) (Kuz'mina 1962a: 88-91; 1962b: 9-11, fig. 1; 1964b: 207, fig. 29; Sorokin 1962a: 51-60) and in central Kazakhstan (Atasu, Buguly, Akbaur, Baybala, Sorkuduk, Karatomar, Tagibay-Bulak). On the Final Bronze Age settlements of Buguly II, Akbaur and Kent we find sub-type IIB: the use of a stone cist construction, sometimes employing clay mortar. In Tagibay-Bulak the space between the two rows of slabs was filled with rubble (Margulan 1959: 16-27; 1979: 163-254, fig. 137, 140-143, 146-8, 169-171; Varfolomeev 1991: 7).

The presence of stone or wooden architecture depended solely on local building resources.

Sometimes there are post-holes from the uprights that supported the roof in the center of a house with stone walls (Atasu, house 17). In other cases post-holes have not been found (Spasskiy Most; Novoburino, house 2; Tasty-Butak, Shandasha, Atasu, house 20) or a house may reveal only several small post-holes without any discernable pattern (Ushkatta, Kambulat) which suggests the erection of a roof covering without posts.

The evidence suggests several types of house roof (Fig. 9):

A roof with two sloping surfaces supported by a longitudinal log (ridge) lying on supporting posts inserted along the center of the longitudinal axis of the house (Zamaraevo, Buguly 2, Suukbulak) (Sal'nikov 1954a: 246; Margulan *et al.* 1966: 253, fig. 113). A parallel to this can be seen in the Timber-grave settlement at Moechnoe Ozero (Merpert 1958: 117-118; Trubnikova 1958: 186-187, fig. 3; Sinitsyn 1949: 199).

A roof with two sloping surfaces supported by two rows of posts erected along the longitudinal axis of the house and covered by two beams supported by cross beams (Malokrasnoyarka) (Chernikov 1960: 41). The Timber-grave settlement at Suskan offers parallels to this technique (Sal'nikov 1952b: fig. 19; Merpert 1958: 109-110, fig. 13).

A roof consisting of four sloping surfaces supported by a square frame in the center of the house; the frame was supported by four posts inserted around a central hearth with a smoke-hole for draught (Alekseevka, Kipel', Chaglinka, Shortandy-Bulak, Suukbulak) (Krivtsova-Grakova 1948: 77-81; Sal'nikov 1951b: 107; 1954a: 246; Orazbaev 1970: 142; Margulan *et al.* 1966: fig. 126; Margulan 1979: 202, fig. 152).

Pyramidal-stepped vault. The existence of this type is indicated by the discovery of rectangular frames measuring 1.8 x 1.3m and a burnt covering at Bishkul' IV and Pavlovka; it is also seen in stone from a house at Shandasha in which the roofing slabs were placed along the walls with a lap joint towards the center (Kuz'mina 1964: 104; Zdanovich 1988: 22; Malyutina 1990: 111, fig. 2). This method was developed in the Final Bronze Age in the cemeteries of Begazy and Sangru (Margulan 1979: table 15, fig. 70, 71, 76, 94).

Reconstructions of how the stepped vault was erected have varied. V. S. Sorokin (1962a: 53, 55) suggested that there was a tent-like roof at Tasty-Butak, analogous to the one reconstructed for Lyapichev Khutor by M. P. Gryaznov (1953: 144, fig. 63): here the house area was divided into squares, each square

covered by a pyramidal log frame-work, laid parallel to the house walls with a hole left above the hearth. A. Kh. Margulan (1959: 24, table 4), on the basis of the layout of post-holes at Atasu, argued that the house was divided by two longitudinal rows of posts into two bays; side naves were covered by a cross layer and the central nave was covered by a pyramidal-stepped construction built from rectangular log frames. The author (Kuz'mina 1964b: 104) has suggested that the post-less houses from the Shandasha settlement could have been covered according to the *chor-hona* system: beams forming the stepped framework of the vault were set at diagonal angles, then the beams of the next layer were again laid diagonally on a rectangular or hexagonal frame forming a square for the next row and so on; a hole was left above the hearth. This system greatly economized on the use of wood and such a light covering was widely used in Central Asian house architecture and in cult constructions in Kazakhstan (Voronina 1951b; Pisarchik 1954: 271-273, fig. 23; Andreev 1958: 436-441; Basenov 1959: 97-101, fig. 13, 19).

O. A. Krivtsova-Grakova (1948: 81) and A. M. Orazbaev (1970: 138) suggested that in Alekseevka and Chaglinka the inhabitants used a conical vault similar to that of a yurt. The framework of the roof was covered everywhere with *baira*—a layer of reeds (found on the settlement of Kanay) or with layers of poles covered with clay (Zamaraevo, Pereleski, Atasu, Kanay, Ushkatta 2, Pavlovka) and they placed soil or ash on top which is typical of the Timber-grave culture (Krivtsova-Grakova 1955: 75, 100).

The entrance to the Andronovo house was from the leeward rear-end side; sometimes it faced the river and formed a narrow corridor, 1-2m from the inside to 0.8m from the outside, 2-3m long (rarely as much as 5m), which descended to the floor of the house like a *pandus*, sometimes with several steps and a threshold 0.15-0.2m high (Shandasha, Ushkatta). The steps and threshold at Shortandy-Bulak were covered with slabs. A step to which the door was fastened was found at Alekseevka. At Petrovka 2 three post-pits from the door construction were discovered. In the forest regions the post-holes of the corridor posts could be traced; in the steppelands the entrance was formed by strong polished tetrahedral pylons (Atasu, Ushkatta II, Shandasha). The house often had from one to four additional exits into corridors, 0.8-1.5m wide and from 2 to 12m long, that led to neighboring houses or ash-pits.

The floor of an Andronovo house was earthen with a cup-like depression in the center as a result of trampling. In some cases, especially when the ground was sandy, the floor would be covered with clay, 0.05—0.3m thick (Atasu, Karkaralinsk, Novonikol'skoe 1, Ikpen', Dongal, Shandasha), and sandstone slabs (Sorkuduk) and probably with wood flooring (Alekseevka, Zamaraevo, Petrovka IV).

The interior plan of the Andronovo house has been insufficiently studied. In some cases the house was divided into two sections by a partition wall formed by left-over earth; one section might have its floor deeper and only in this place was there a hearth. Gryaznov suggested that this compartment was for people to live in while the other part was for keeping cattle in winter time (Gryaznov 1953: 144,147). Division of the house into male and female sections is known in Iranian ethnography. Sometimes a space would be divided into compartments by partitions (Ushkatta 2, Shortandy-Bulak). The Pavlovka excavation uncovered

slots with traces of upright posts that formed squares, the central one measuring 9 x 9m (Malyutina 1991: 151).

Andronovo houses were heated and illuminated by hearths of various types. Type 1 had an open round or oval fire-place, 0.7-3m in diameter, sometimes floored with stone. Such fires, that met both domestic and industrial needs, are found both inside and outside of houses. This type of hearth (*gulkhan alou*) is known in Central Asia, first of all among the Iranian Tadzhiks and Pamiri, and is to be found in communal houses for men where it originated from early Iranian houses of fire (Pisarchik 1982: 72). Type 2 hearths comprise a shallow round or oval pit, 0.5-0.8m in diameter, sometimes more, 0.15-0.4m deep, and often covered with flat stone slabs on the bottom (Fig. 10). This is the most widespread type of hearth and served for cooking, heating and lighting; it is similar to the Central Asian type of hearth known as the *chakhlak* or *chagdon* (Pisarchik 1982: 78, 79, 109).

This hearth is described in ancient Indian texts as the domestic fire *gārhapatya-* 'fire of the master of the house' (Mandel'shtam 1968: 126). Such hearths were used for ritual purposes: a bride would go around it, a widow would perform a funeral dance, people jumped over it during a feast. The *gulkhan* (hearth) from *gul-* 'heat' is preserved in the Iranian and Indian languages (Pisarchik 1982: 74-77, 105, 106).

The third type of hearth has a rectangular form, from 0.7 x 1m to 1.5 x 2m, and was made of closely adjusted rectangular stone slabs inserted into the ground on their narrow ends. Such hearths were found in the center of a house, kept clean, and it is likely that they had a ritual function (Atasu, Buguly, Shandasha, Ushkatta II, Spasskiy Most, Kent, Tagibay-Bulak, Dongal).

This type of hearth corresponded to the early Indian special cult hearth *āhavanīya* (Mandel'shtam 1968: 126). Rectangular and round hearths have parallels in ancient Rome where the round hearth used for cooking was dedicated to the goddess of the domestic hearth Vesta; the square hearth was dedicated to male gods and the ancestors (Dumézil 1954).

Type 4 is a two-chambered industrial hearth, consisting of a shallow pit to which a larger and deeper chamber is adjoined; sometimes a large vessel is placed there (Ushkatta II, Tursumbay, Kiimbay I, Sarafanovo) or we find a three-chambered hearth, sometimes covered and divided into three pits (Atasu, Shortandy-Bulak, Myrzhik, Entuziast, Upais, Ikpen', Tashik).

Type 5 consists of shallow long slots extending along the longitudinal axis of the house, sometimes covered with stone and filled in with slag and ash (Bakhtinskoe, Kulevchi, Alekseevka, Tasty-Butak, Shandasha, Il'inka, Pokrovka III, Yavlenka, Atasu, Shortandy-Bulak, Tagibay-Bulak, Entuziast, Ikpen', Kent, Novonikol'skoe I, Petrovka II, IV, Yazevo, Kamyshnoe II). In Bakhtinskoe, Entuziast, Shandasha, and Atasu the slots or trenches were connected to the hearth and filled with coal, ceramics or metallurgical slag; they were sometimes covered by stone slabs; in Shandasha and Atasu openings for the nozzles of bellows led to a furnace, which indicates the industrial function of the hearth. They have analogues on Tazabagyab, Abashevo and Timber-grave settlements (Pryakhin 1976: 57, fig. 12; Gryaznov 1953; fig. 59, 60; Itina 1977: 202).

Type 6 comprised an oven, probably with a dome made of clay bricks with an admixture of straw; they were rectangular, conical and round, and decorated

with lines, circles and crosses (Sal'nikov 1951b: 131, fig. 17: 4). Such ovens served as a primitive furnace at Kipel', Shortandy-Bulak, Barmino, Yazevo, Kamyshnoe I, II, in Alekseevka, Yavlenka, Il'inka. Their analogues are known in the Timber-grave and Trzciniec cultures (Krivtsova-Grakova 1955: 76, 123; Berezanskaya 1974: 58-62).

The number of hearths in a house ranged from one to eight. Wood, compressed dung and animal bones, which provided a high even temperature, were used as fuel judging from the finds of charcoal, burnt bones and dung.

The interior of an Andronovo house was modest. At Tasty-Butak, Sadchikovo, Atasu, Kanay, and Kamyshnoe I there was found a two-meter wide bench along the walls forming a raised place for sleeping (Sorokin 1962a: 54; Potemkina 1985: 105; Maximova 1959: 93; Margulan 1959: 23). Analogues are known from Timber-grave and Tazabagyab settlements (Sinitsyn 1949: 199; Krivtsova-Grakova 1955: 75; Itina 1977: 200). In other houses there existed wooden plank beds (Alekseevka). Wooden tables are also known. In northern Kazakhstan there was sometimes a raised place built of clay near the hearths similar to a *silon*, the master's seat in a Pamir house (Andreev 1958: 461).

In Arkaim, Tasty-Butak, Chaglinka, Petrovka II, Ikpen', Atasu, and Mirny III wells were found in the houses. They are pits about 1.5-2m in diameter, narrowing deeper to 1m, and reaching the water table at a depth of 3-5m. The walls of the shaft were strengthened by wattling, layers of stones or by planks fastened by stakes (Zdanovich 1988: 183; Sorokin 1962a: 55; Orazbaev 1970; 1972: 154-162; Chemyakin 1978: 201; Margulan 1979: 174). The same wells, covered by sandstone slabs, have been found in the miners' quarters at Dzhazkazgan, Milykuduk, Sorkuduk, and Aynakol' (Margulan 1979: 268). The technology of making wells, learned by the Andronovans of Kazakhstan in the Petrovka stage, permitted the population of the Eurasian steppe to move off from the river valleys and master the deep waterless steppe, semi-deserts and deserts of Central Asia.

The Andronovo house is comparable with houses of other cultures of the Eurasian Final Bronze Age over the vast territory of the steppe and forest steppe, from central Europe to western Siberia. The construction technique and planning decisions are universal over this whole zone. Those peculiarities that characterize individual archaeological cultures are seen only in terms of some secondary details. In the west, in central Europe we find post-built houses with a roof with two sloping surfaces, more rarely with four, erected as surface dwellings and smaller than Andronovo houses. These are known in the Unetice culture, in burials of the Tumulus culture, in the Füzesabóny-Ottomani culture, and they are preserved in the Hallstatt culture of the Early Iron Age, its variants being connected with different groups of Indo-Europeans: Celts, Illyrians, Thracians (Mongayt 1974: 52, 57, 63, 86, 87, 180, 192, 195). This house type is called by common Indo-European term: Slavonic *domъ*, Sanskrit *dám-*, Avestan *dəmāna-*, Latin *domus*.

Along the Danube the Middle Bronze Age log houses combine the use of wattling with daub as in the Eurasian steppes (Kovacs 1977: fig. 6). The same peculiarity is traced in the Trzciniec culture in Poland (Kukharenko 1969: 49) and in the Ukraine (Berezanskaya 1972: 46-55; 1974: 22-42, 57-74: fig. 6-11, 17-21). A semi-subterranian house with post-frame construction is typical of the

Multi-roller Ware culture (Berezanskaya 1960: 27; Bratchenko 1976: 110-111). Similar also is the house type of the Abashevo culture from the Urals to the Don (Pryakhin 1973: 19-25; 1976: 11-24, fig. 2, 18) and Pre-Kazan' culture on the Volga (Khalokov 1969: 244, 257, 259). To the southeast of Andronovo territory are the similar houses of the Tazabagyab culture of the Aral region (Itina 1977: 195-204, fig. 1,5-12, 30, 31). These derive from the migration of Timber-grave and Andronovo populations. (Peculiarities of the Tazabagyab house include its smaller area, hearth-pit with horseshoe-shaped side of pisé and the semicircular floor before the entrance-*aivan*).

The closest analogues to Andronovo settlements and houses have been found in the Timber-grave culture of the Urals (Morozov 1989; Gorbunov 1989; 1992) and along the Volga (Sinitsyn 1949: 199, fig. 4; Krivtsova-Grakova 1955: 74-76; Merpert 1958: 104-118, fig. 13; Trubnikova 1953; 1958: 183-187, fig. 3) and along the Don (Gryaznov 1953; Pryakhin 1973: 45; Sharafutdinova 1967) and in the Ukraine where defensive walls have been discovered on the settlements of Kapitanovo, Il'ichevka and Usovo Ozero (*AUS* 1985: 463-465).

The most precisely reconstructed houses are known from the settlements at Suskan (Merpert 1958), Moechnoe Ozero (Trubnikova 1958) and Lyapichev Khutor (Gryaznov 1953). The area of the Timber-grave houses is somewhat smaller than that of the Andronovo. The houses are of timber-frame construction with a pitched roof supported by posts inserted along the center of the house in one, two (Suskan) or three (Moechnoe Ozero) rows; houses lacking evidence of posts are also known (Lyapichev Khutor). The entrances are corridor-like. The hearths comprise both open fires and large deep hearth pits, sometimes covered with stones; ovens have a brick dome. Along the Volga the houses were sometimes connected by passages. In the Ukraine, at Razdolnoe and Vovnigi there were stone socles formed from vertically inserted slabs along the walls of the house. Stone architecture began to emerge in the Final Bronze Age (*AUS* 1985: 489-490; Leskov 1970; Sharafutdinova 1982).

We can see then that the steppes and forest-steppes of Eurasia constitute a single zone according to settlement and house type of the cultures dating from the 17th to 9th centuries BC. Settlements are situated in similar topographic conditions along the banks of small rivers. The social function of such houses was to serve as a living place of a large, probably patriarchal, community with a common economy.

Within the Eurasian zone Andronovo settlements and houses differ in some respect from other cultures. These differences include: 1) as a rule settlements exhibit regular planning and often have a large number of structures (as many as 60-100); 2) the houses usually occupy a large area suggesting large family units and a high density of Andronovo population; 3) special ash-pits are found in the squares of settlements that suggest cults of fire and of the domestic hearth; 4) Andronovo houses often have walls covered with stone slabs; 5) a stone monumental multi-chambered house of regular rectangular form appears at the end of the Bronze Age in central Kazakhstan, which reveals the apex of architecture achieved by Eurasian populations in the Bronze Age; 6) Andronovans built special structures and annexes for industrial purposes; 7) the hearths of the Andronovo culture are numerous with respect to both type and function: they are divided into kitchen, ritual, and industrial, which reflects a

higher level of craft development, especially metalworking, and a more developed domestic hearth cult; 8) special wells are sunk in Andronovo houses.

The Andronovo house is then characterized by a stable combination of characteristics, uniform over the whole vast region of the Andronovo culture; in some aspects it differs distinctly from houses in other cultures. As domestic architecture is an important ethnographic trait, its homogeneity shows the cultural unity of the Andronovans themselves and serves as a significant criterium for defining Andronovo cultural unity.

At the same time Andronovo unity according to settlement and house type should be viewed as a part of a larger Eurasian unity, stretching from central Europe to western Siberia. Settlements and houses of the various cultures of the Eurasian steppe and forest-steppe in the Bronze Age display uniform social functions, architecture, planning decisions and building techniques. It reflects in the first place a similarity of the economic level of development, and in the second place, a unity of house building traditions stemming from the Neolithic. Their origins are traced back to the early farming cultures of Europe, the Linearbandkeramik, which was concentrated in Central Europe from Hungary to Germany. Settlements, protected from animals by bank and ditch, consisted of small semi-subterranean and large surface rectangular houses measuring up to 27 x 6m with post-construction and two sloping roof surfaces that are well reconstructed according to the evidence of excavation, e.g., Bylany. A model of a house with a pitched roof is known in Greece from Sesklo (Childe 1952: 103f.). In the Tripol'e and related cultures rectangular surface houses with a framework covered with daub and having a pitched roof dominated, which is affirmed by house models from the settlements of Gumelnița (Denev) and Tripol'e (Kolomiyshchina) (Passek 1949: 79-106). But in the Tripol'e culture they also built semi-subterranian timber-framed houses and roofs seen at Luka Vrublivetskaya (Bibikov 1953: 20-77). A long-term semi-subterranian house is known from settlements of the Sredniy Stog culture of the Dereivka type, where Dmitry Telegin excavated part of a house 10m long with an entrance-corridor and open hearth (Telegin 1973: 39). The spread of subterranian dwellings with wooden constructions across the steppe is indicated by the character of the burial chambers of the Pitgrave culture which included roughly hewn logs (Gorodtsov 1905: 199, 302).

An essentially different house type is known from the Kelteminar culture of Central Asia and the Ust'-Narym in eastern Kazakhstan: oval in shape, surface, short-term post-built cabins (Tolstov 1948: 61; Gulyamov *et al*. 1966: 26-28, fig. 8,9; Vinogradov 1981: 148-150, fig. 59; Chernikov 1970: 12-14; Chalaya 1971: 13). In Kazakhstan, in the Neolithic-Eneolithic period, there was another type of house—a small rectangular or round semi-subterranian dwelling, with a conical roof made from poles and skins (Borubas, Damsy, Botai, Kozhai (Margulan 1959: 13-14; Zaybert 1993: 21; Kalieva 1998: 225)). This type of house is characteristic of hunter-gather-fisher societies. Only in the late Neolithic settlement of Vishnevka in north Kazakhstan does one encounter a house which is similar to the Andronovo house type involving a semi-subterranian area, 18 x 7m, with log walls, supporting posts, pitched roof over the center and a stone-covered hearth (Zaybert 1973: 106, fig. 39).

The settlement and house type of the steppe and forest-steppe zone of Eastern Europe and the Urals approaches that of the Central European type but differs

fundamentally from the houses of Near Eastern farming communities. Our evidence of the Near Eastern house type derives from its Neolithic and Eneolithic cultures. From the 7th and 6th millennia BC we find a type of house with walls built of pisé and rarely of stone; the flat roof dominated everywhere. As the house evolved, it showed a tendency toward increasing the number of rooms, the enclosure of the building around a central square, and residences forming a continuous block building divided by narrow streets. Such houses, consisting of a main room 9-12 square meters, and some storage or domestic annexes 2-3 square meters, with a flat roof, and pisé-built domed ovens are known already from Jarmo, Hassuna and Yarym-Tepe in Mesopotamia (Braidwood 1952; Lloyd and Safar 1945; Oates 1976; Childe 1952: 170, 177; Afanas'eva and D'yakonov 1970; Masson 1976b; Ivanova 1981; Rapoport 1966; Kuz'mina 1988a). From the Halaf period (5th millennium BC) there appeared round tower-like tholos structures, 4-7m in diameter, with a dome-shaped roof. From the 4th millennium BC two-storied houses and monumental buildings constructed from sun-dried brick and mortar appeared in Mesopotamia. Multi-room houses built of clay with a flat roof are also known from the Neolithic and Eneolithic periods in Anatolia (Çatal Höyük) (Mellaart 1967), Syria-Palestine (Jericho, Ras-Shamra) (Kenyon 1960), Iran (Sialk 1, 2, Shahr-i-Sokhta) (Ghirshman 1938; Tosi 1969) and in northern India in the settlements of the pre-Harappan and Harappan cultures (Sankalia 1974). Single-room surface houses, pisé-built, that accommodated a small family appeared in the Jeitun period in the south of Central Asia (Berdyev 1969; Masson 1971: 103-104; 1976b: 117-119) and in the Eneolithic period at Kara-depe and Geoksyur these were replaced by tholoi and multi-room houses with a flat roof and inner yards (Sarianidi 1962; Khlopin 1964: 67-87; Masson 1962: 157-175; 1976b: 119-120) that were used for a residential unit of several small families. This type of house survives unchanged to the present time (Amir'yants 1981). These houses and type of settlements with continuous quarters of buildings are characteristic of central and western Asia, Iran and India, and are fundamentally different from the houses of the pastoral tribes of central Eurasia.

Difference between the two traditions is observable in all cultural traits. There is no Near Eastern influence on the traditions of house building in the Eurasian steppes during the 3rd to 1st millennia BC. This observation is significant when considering the hypothesis advanced by V. V. Ivanov and T. V. Gamkrelidze about the mass migration of the ancestors of Indo-Europeans from the Near East through the Central Asian deserts into Eastern Europe. The evidence of domestic architecture does not support this hypothesis nor those of J. Nichols (1997) and V. Sarianidi (1998).

We can see then that Eurasia exhibited two house types for the Eneolithic and Bronze Age: an Indian-Near-Eastern (pisé- or brick-built, multi-room house with small rooms, flat roof and a built oven) and a Central Eurasian (wooden post-built single-room dwelling, sometimes with clay covered walls, pitched roof and open hearth).

Ecological conditions preconditioned both main house types: the abundant precipitation in Europe and the presence of forests led to the creation of a timber-built house with a pitched roof; in Asia the lack of precipitation and the absence of forests allowed people to build clay houses with a flat roof. House size and

interior plan came from social and economic conditions. The large patriarchal family survived for a long time in the steppes and led to a common household, requiring a large single-room house, but in the Near East there were small families utilizing small rooms. Once the house type had been developed in the Neolithic, these building traditions remained as features of various cultures and were carried into new regions over the course of migrations.

In the Near East and in India the multi-room house, built of pisé or brick, and with a flat roof dominates from the Eneolithic onwards. Here the appearance of an alien house type with pitched roof is associated only with the Indo-European peoples: in cult constructions of Phrygia and Lydia (Akurgal 1961) and in the architecture of the Greek *polises* of Asia Minor. It is an important marker of the alien character of the Phrygians, Lydians and Greeks in the Near East and indicates their migration from Europe. Within the ethnographic record, the type of house with a pitched roof and timber-post construction is known among different Iranian-speaking peoples of Iran and Afghanistan, and among some Indic-speaking groups of India.

A direct continuation of the building traditions of the Timber-grave/ Andronovo cultures can be seen in the culture of the Iranian nomads such as the Saka, Sarmatians, and Scythians, the likely descendents of the Bronze Age pastoral tribes in the Eurasian steppes. Despite a shift to nomadic pastoralism, monumental architecture continued in the steppes in the early Iron Age. According to the evidence from Kamenskoe, Bel'skoe, Pasterskoe, Matroninskoe, Nemirovskoe, Tarasovskoe and other settlements, the Scythians surrounded their settlements with defensive walls, constructed large semi-subterranian houses with stepped corridor-*pandus* and surface houses of ground-post-built construction whose ridge-pole rested on posts along the longitudinal axis. Miniature house models with a pitched roof have been recovered from a burial in the kurgan at Zhurovka. As in the Timber-grave and Andronovo houses, the walls were constructed from longitudinally laid logs or poles fixed by vertical posts (rarely from posts inserted near each other); wattle and daub is also rare. They seldom used stone in construction, e.g., on the Bug. Hearths were made as before in the form of fire pits and ovens from clay bricks. A large ash-pit might be found in the square of the settlement (Grakov 1971: 61, 62, 123, 124, 136, 138, 141, 146, 147, 152, 153, figs. on pages 62, 63, 122, 137, 155, 158).

The settlements of the Asian steppes are poorly known and our knowledge of house construction derives largely from the evidence of structures in kurgans. In Arzhan there was discovered a magnificent construction in the form of a round platform, 80m in diameter and 3m high, built around the central framework of the royal grave. It consisted of 70 timbers and was covered with flat logs and surfaced with stone slabs (Gryaznov 1980: 10, 14, 15, fig. 4-7). There was a mound, 110m in diameter, which was surrounded by a stone kerb of upright slabs.

At Pazyryk the royal burials were placed in timber-frame constructions, covered by flat logs supported by post uprights; the roof was covered by bark and branches. In kurgan 5 a *kibitka* of felt (the upper covering of a wagon) was discovered, placed on a vehicle (Rudenko 1963: 78-80, tables 2-9). In Besshatur-skiy kurgans 1 and 6 the chambers were made of horizontally laid logs, fixed in place by vertically inserted posts; the logs were of Tian-Shan fir. There was a

door and narrow entrance corridor floored by logs with reed mats and a large piece of felt on top; the mound with its encircling stone ring was 52m in diameter and 8-9m high (Akishev and Kushaev 1963: 31-40, 49, fig. 10-26, 33-48). Just like the Andronovans, the Saka also used stone widely. In central Kazakhstan they made graves covered with stone slabs (Margulan *et al.* 1966: 311). The same construction methods were employed by the Sarmatians. In their graves there was a timber frame or a layer of wooden planks and then on top were placed large pieces of felt, reed, bast and birch bark. In the Pokrovskiy kurgan horizontal logs of a timber frame were held by timber uprights. In Leninsk and Alebastrovaya an oak roof was supported by upright posts. In Usatovo, Boaro, and Pyatimary, graves contained rectangular timber frames of oak or birch. In Preobrazhenka and Tarabutak round timber constructions were discovered. These structures "imitated the rectangular surface dwellings of the Timber-grave houses and round tents" (Smirnov 1964: 85-89). Sarmatians as well as Saka used stone such as round kerbs and slabs for roofing graves (Smirnov 1964: 85, 89, 90). Both the domestic architecture and grave-type of the Andronovans survived among the Pamir Saka. In Tegirman-say, Kyzyl-Rabat and Vorukh they buried the dead within stone circles that enclosed stone cists, which were set in a pit and covered by stone slabs (Litvinsky 1972: 134-135). This rite is preserved in some districts of Afghanistan, in Ishkashim, Vahan, Darvaz and in Yagnob among Iranian peoples of the mountainous regions of Tadzhikistan (Andreev 1927: 53; Andreev and Polovtsev 1911: 17-18; Rakhimov 1956: 69).

A house form that is very close to the Scythian prototype is preserved among the descendants of the Scythians—the Ossetes of the Caucasus. The Ossetic house differs considerably from the *saklya* of the neighboring Caucasian peoples. In South Ossetia there is an archaic type of house—a large rectangular semi-subterranian *nykkænd* divided into two parts, a cattle shed and a living place with a hearth in the center (Kaloev 1971: 153). E. A. Kaloev rightly compares Ossetic semi-subterranian houses with those of the Scythians. Research indicates that the formation of this house type is several thousand years old and can be connected with Timber-grave and Andronovo house-building traditions. Surface houses are more wide-spread in Ossetia. Wood, stone, and rarely clay, are used as construction materials. The houses are timber-framed with walls made of vertical logs and wattle and daub. The houses often consist of a single large rectangular room (*xæʒar*), built for a large patriarchal family. The floor of the *xæʒar* is earthen; there is an open hearth coated with stones which is a sacred place for the family. The hearth divides the house into two: the right part for the men and the left for the women. A small dark larder (*k'æbits*) adjoins the women's section. The Ossetic house roof is pitched, supported by walls and posts; the main post is the *astæwykkag saǵynʒ*; it stands in the center of the house and has cult significance. The roof consists of a main ridge pole that extends over the long axis and that is supported by the central post of the ridge beam (*astæwykkag axarag*). Rafters rest on the beam and then brushwood, straw, especially reeds, are placed on them; everything is often covered with earth or coated with clay from above. There is a smoke hole (*erdo*) in the roof (Kaloev 1971: 145-163, fig. on pages 148, 151, 159). Sometimes a pyramidal-stepped dome is constructed of the *chorhona* type; a house with such a roof is called an *erdojali-saxli* (Pchelina 1930: 19; Il'ina 1946: 11, fig. 2). This type of roof has been borrowed by the Georgians

and Armenians from the Ossetes along with the Iranian construction terms (Mamatnazarov and Yakubov 1985: 199). In some cases the entrance is long, with an overhead cover supported by posts (Kaloev 1971, fig. on page 151). Plank beds are made along the walls, which are covered with skins and carpets. Horns of wild goats and rams and sacrificed horse skulls are placed at the entrance. Sometimes separate rooms for newly-weds (*wat*) are built as annexes to the *xæʒar*. V. I. Abaev traces the etymology of this word from early Iranian (Kaloev 1971: 152). *Wat*s are connected with the *xæʒar* along the same axis, resulting in a long rectangular house (*dargxæʒar*), analogous in plan to the long Andronovo house with annexes. Near to or separate from the *xæʒar* may be a guest-room (*wazægdon* 'friends' room'). Each house belongs to a large patriarchal family. In a settlement, sometimes in the whole valley, the kinsmen share a single cemetery and sacred place (*ʒwar*). In an Ossetic settlement the houses are not built close to one another as in Caucasian auls. They are dispersed, each house having its own wattle-fenced yard (*kært*) with timber-framed stores. Scholars have noted that the Ossetic *xæʒar* is quite similar to the large house described in tales of the Narts (Abaev 1949: 55; 1965: 130; Kaloev 1971: 150). Comparison with houses of the Timber-grave and Andronovo cultures indicates that the origin of this type of house dates back to the middle of the 2nd millennium BC. The *xæʒar* is analogous to the Timber-grave/Andronovo house in terms of its social function (place for a large family); in plan (large single chamber rectangular house, sometimes with annexes along the same axis); in construction technique (timber-frame ground post-built construction, pitched or pyramidal-stepped roof); in hearth type; and in interior layout (hearth in center and plank beds along the walls). All this leaves no doubt that there is a direct genetic connection between the modern Ossetic house and the dwellings of the Timber-grave and Andronovo cultures.

Andronovo architectural traditions developed on the eastern end of the Eurasian steppes among the Iranian peoples of Tadzhikistan. Their houses differ greatly from the classical Near Eastern dwellings. Tadzhiks in the mountainous regions of Tadzhikistan and in Afghanistan build single-room rectangular timber-frame houses (*hona*), and often make semi-subterranean houses with wooden or stone walls. Sometimes the house consists of two chambers: a deeper winter chamber and a higher-ceiling summer chamber. Pisé beds (*sufa*) are arranged along the walls (Andreev 1927; 1958; Voronina 1959; Pisarchik 1970; Logasheva 1981a: 124-134).

Houses of the Pamir type in Afghanistan, Badakhshan, Nuristan, north-west India and districts of Pamir (Fig. 9: 6, 8-10) are of special interest (Huf, Vahan, Shugnan, Rushan, Vanch, Yazgulem, Ishkashim, Karategin and Darvaz) (Kislyakov 1936: 131; 1939: 166; Voronina 1951a: 256-271; Andreev 1958: 267-273, 420-480, fig. 22, 95-97, 102, 103,111-114, 116-122; Pisarchik 1975: 159-168; Mamatnazarov and Yakubov 1985: 183-202; Logasheva 1981a: 132-134). These regions were settled by peoples speaking relict Iranian languages and archaic dialects such as Vahan, Shugnan, Rushan, etc. (Gryunberg and Steblin-Kamensky 1974: 277-279) and the Indo-Iranian population of Chitral in Pakistan where such a house type was described by Aurel Stein (1912: fig. 20). The Pamir house is a large rectangular building (*chod*), at Huf from 35 to 75 square meters in area, and at Vanch and Vahan up to 120 square meters. A

peculiarity of the Pamir house is its distinctive roof (*chor-hona*). A square wooden frame is placed above the center of the house on four supporting posts, and a succession of ever smaller timber frames overlap one another to the top. As the frames are laid on each other diagonally they form a stepped vault with a light-smoke opening in the center; the opening is called a *day-ruz* and it is closed at night (Andreev 1958: fig. 22, 57, 58). As mentioned above, this type of roof was already known in the Timber-grave and Andronovo house. It is preserved in the ritual architecture of Kazakhstan (Basenov 1959: fig. 13,19) and in the domestic architecture of Central Asia it has survived till the present time (Voronina 1951b; Pisarchik 1954: 273; 1975: 159-168; Zhilina 1982: 161, fig. 5). In Afghanistan and eastern Turkestan this construction technique was translated from wooden architecture into stone: the Buddhist cave temples of Bamiyan exhibit skeuomorphic ceilings cut into rock in their sacred places in imitation of the *chor-hona* roof type (Godard and Hackin 1928; Hackin and Carl 1933; Pugachenkova 1963: 69-70) as also in the cave temples of Kizil in Turfan (Le Coq 1925).

The Pamir house is semi-subterranean with an earthen floor, earthen beds and a stone socle, made of stones laid without mortar; in Rushan the stones are set on edge (Andreev 1958: 432-434). Then posts are erected, beginning with the main post, the king post or *ha-setan*, on the main beds, then central posts supporting the overlapping layers of the *chor-hona*, and other posts along the axis of the house, in the corners and along the walls supporting the roof beams. The timber-frame *chor-hona* is constructed above the center of the *poga*; the remaining roof is constructed from beams and poles (*behm*) which are first covered with grass and reeds and then covered with earth. A closed corridor (*dalidz*) leads into the house, the floor level is higher there than the *poga* floor in the house. There is a summer room (*vuzhra*) and a guest room (*kush-hona*) near the *dalidz*. Beds (*noh*) rise above the floor; they are divided by special short stone or wooden partitions into special functional sections. At the entrance there is *varguht*, a room for lambs, *gau-hona*, room for a cow; along the long house wall there are beds with an open hearth where women cook, and adjoining beds (*chirezak*) with a quern and vessels containing food; opposite the hearth there is the ceremonial part of the house with the main post and beds (*sar-tek-noh*), where guests are met and the head of the family lives, and adjoining beds were in the past the place of the bridegroom. A two-tiered hearth is open, the main pit is coated with stones and clay; it is oval and it rests on bedding. There is a shallow pit for the ashes on the floor in front of it (this house type is also known from Andronovo houses).

The hearth is the domestic center of ritual where sacrifices are made. A clay platform with a stone near it serves as the master's seat. In the center of the floor there is a sump (*ob-hin*) into which liquids are poured. The interior of the house is decorated with skins and carpets on plank beds. Mountain goat horns hang at the post; sometimes the main post of the house is covered with plant ornament which symbolizes the tree of life.

The Pamir house is constructed by a group of relatives and the construction is accompanied by sacrifices of a ram, rarely a bull, and feasts at the laying out of the foundations of the house, the erection of the walls, the raising of the main post (*ha-setan*) under which the leg of a sacrificed lamb is placed, at the raising of the roof beam over which the blood of a sacrificed ram was poured. Finally,

when the family moved into the new house, blood was poured on the threshold, races were held, there were shooting matches (*sar-asna*) and the slaying of a goat (Andreev 1958: 432, 437, 443, 445). Sacrifices also accompanied the construction of an Andronovo house: bulls and ram skulls and legs have been recovered inserted at the entrance or under a post and the walls on many settlements. A large patriarchal family of 40 to 80 people inhabit a Pamir house (Kislyakov 1936; Andreev 1958: 431).

Pamir villages contrast with those of the Near East by having their houses dispersed as among the Andronovans. Sometimes temporary houses were built near the main house for summer use: this included a pitched-roofed annex (*chapkand*), a pitched tent *chodar*, a raised platform of branches (*kappa*), a fenced enclosure (*dikon*) and open hearths. Stone-built sheds for cattle are made on summer sites. Traces of such constructions are also attributed to the Timber-grave and Andronovo settlements.

Pamir and Ossetic settlements and houses present, in the first place, a more complete picture of the life of the Andronovans, the planning of the interior of the house, the hearth and the ritual role of the supporting post, etc. In addition, the similarity between these modern houses and those of the Timber-grave and Andronovo cultures attests the genetic continuity of house-building traditions. The domestic architecture of other of the smaller Iranian-speaking peoples differs considerably from the classic Near Eastern type which demonstrates the alien character of their house. The winter house of the Kurds, Iranian pastoralists in Asia, is a one-room rectangular subterranian dwelling with stone walls and timber uprights along the longitudinal axis; the posts support a stepped roof constructed from square timber frames with an opening for light and smoke in the center. The surface of the roof is covered with branches, earth, and clay. On the earthen floor in the middle of the house is an open hearth pit lined with stones. Sometimes storehouses are built as annexes to the house (Aristova 1981: 78-79). In the Gilyan and Mazanderan provinces of Iran, people have sub-terranian and surface ground-post timber houses with a pitched roof covered with reeds and bark (Logasheva 1981b: 106-107). Wooden architecture dominates in Nuristan as well. As in an Andronovo house the walls are made of horizontally laid logs held in place by timber uprights and a roof supported by timber posts (Vavilov and Bukinich 1929: 119; Robertson 1906: 487, 489; Logasheva 1981b: 134-136). The Iranianized Jemshids of Afghanistan have pisé house walls, but in terms of planning and the pitched roof they preserve early house building traditions that are not of Southwest Asian origin (Gafferberg 1948: 131).

Thus, in the farthest reaches of Iran and Afghanistan, Iranian-speaking pastoral nomads preserve planning decisions and construction techniques that are alien to Near Eastern traditions of domestic architecture. They have no local sources in the Neolithic or Bronze Age of Iran and Afghanistan but they do have analogues in the Eurasian steppes, which prove the northern genesis of their creators.

The origin of north-central Indian building traditions is probably the same. Here we find a single-storey rectangular structure, sometimes single-roomed with a timber frame and a simple or double-sectioned roof; the ridge beam is supported by posts along the longitudinal axis (Fig. 9: 7). The roof is covered with straw, reeds and other roofing materials (Guseva 1981: 153-158). There is a

large room for men and guests in the house (*baithak, chkho pal* or *chaupal*), sometimes this 'friends' room' is a separate building. In multi-room houses of the *rajput* there is a large common room or *pol*. Rooms for individual small families and cattle sheds are sometimes annexed to the house under the same roof. Cattle are sometimes kept in a shed (*vara*). Such houses are for a large patriarchal family. They are dispersed and isolated from the houses of the lowest castes. Such houses are especially typical of the north-west and central states: Gujarat, Rajastan, Uttar-Pradesh, Madhya-Pradesh, Bihar and Maharashtra. In other districts of India quite different domestic architecture obtains that is similar to the Near Eastern pisé or brick house with a flat clay roof. Ground-post-built houses and pitched roofs have no analogues in the Neolithic and Bronze Age architecture of India. Houses in the Dekkan and along the Ganges exhibit round and rectangular huts with a conical or pyramidal roof; they are found in Tekkalakot, Navasa, Navdatoli, Chandoli, Inamgaon, Saipai and Nagda (Sankaliya 1974: *passim*, Shchetenko 1968: 32, 137; 1979: fig. 11, 37, 38). In northwest India there were houses of the Indo-Near Eastern type already in the pre-Harappan period (Kot Diji); in the Harappan towns, however, multi-chamber brick houses with flat roofs made up regularly planned quarters of continuous buildings (Makkay 1951: 40-51, tables 1-4). Building techniques and planning decisions worked out by Harappan architects have survived in India to the present in the house of Indo-Near Eastern type. As the house type of northern and central Indian coexists everywhere with the Near Eastern type house and because it is built in different geographical zones, its specific character is probably preconditioned not by ecological factors but by the domestic architectural traditions alien to the creators of the Harappan culture and brought from the outside. The isolated nature of the northern and central Indian house type in South and Southwest Asia and the presence of its analogues and prototypes in the pastoral cultures of the Eurasian steppes lead us to conclude that such a house type was brought to India by groups of Aryas who migrated from their homeland. The distribution of houses belonging to the central Eurasian type within India suggests two waves of Aryan migrations into India from the north-west: 1) through the north-west regions of the country, and 2) along the Gangetic plain. An important proof of this hypothesis is the fact that the houses of north and central Indian type are connected with quite specific ethnic and social circles. They are built by representatives of the higher castes, sects and ethnic groups within which the institute of a large patriarchal family is preserved: rajputs, gujars, kankan brahmans, djats, etc. The majority of scholars accept that these groups are ethnically and genetically connected with the arrival of the Vedic Aryas in India or with later waves of Central Asian tribes related to the Aryas. Variants of the northern and central Indian house type are also characteristic of the pastoralist Ahirs who migrated from the north, of the Meo, the ethnic and caste group who arrived from Central Asia in the Kushan period and the Pashtuns of Afghanistan (Guseva 1981: 159). All this connects the appearance of the ground-post-built house with pitched roof with the house building traditions of the Eurasian steppe pastoralists.

Thus, an analysis of the Andronovo house helps to establish its Central Eurasian origins, its genesis in the steppe zone is traced from the Eneolithic, and the tradition is further reflected in the cultures of the Saka, Scythians and

Sarmatians as well as among Indo-Iranian peoples of the present. There is no influence of the Near Eastern architectural tradition, neither in construction technique nor in planning, in the steppe zone of the Bronze Age. Consequently, the evidence of the Andronovo house does not suggest a migration of the Andronovans from the Near East nor does it contradict their attribution to the Indo-Iranians. The latter is supported by some linguistic data. The word for 'house' in the Indo-Iranian languages is the common Indo-European term: Sanskrit *dám-,* Avestan *dəmāna-*, Slavonic *domъ*, Sanskrit *dám-*, Latin *domus*, Greek *dómos* (Burrow 1976: 98; Elizarenkova and Toporov 1995: 512). The word for 'house' in other Indo-European languages is applied to the house type of central Eurasia with its pitched roof from which it follows that the house of the ancestors of the Indo-Iranians also belonged to this type. The word for 'door' is common Indo-European: early Indian *dvár-* 'door' and synonymous with 'house', Avestan *dvar-* 'gate, door', Latin *fores*, etc. The word 'fence' is also common Indo-European: Sanskrit *gr̥ha-*, Avestan *gərəda-*, Slavonic *gradъ*, Lithuanian *gardas*, English *yard* (Gamkrelidze and Ivanov 1984: 744). With respect to locating the Indo-Iranian homeland, it is significant that this word was borrowed from Indo-Iranian into the Finno-Ugrian languages.

There is another common Indo-European term in the Indo-Iranian languages to denote 'fence, stone wall' (Abaev 1979 III: 114). An important Indo-European word used to denote 'cattle shed' is Sanskrit *sthāna-*, Russian *stan* from the Indo-European stem **stā-* 'stand'. Russian *stan* denotes not only 'nomad camp' but also 'residence'. The name of the Persian capital, Persepolis, originates from *parsa-stāna-* 'nomad camp of the Persians'. Later the word *stāna-* was borrowed into the Turkic languages of Kazakhstan, Turkestan, etc. (Abaev 1979 III: 153; Elizarenkova and Toporov 1995: 512).

The word *skambhá-* is of common Indo-European heritage (Renou 1939: 49). T. Ya. Elizarenkova and V. N. Toporov (1995: 512) showed that in the *Rigveda* it meant 'support, pillar, column', in the Iranian languages—'supporting beam'. In the *Rigveda* (4.13.5; 9.74.2; 9.86.46, etc.) we find the metaphor of a 'sky column'. In the *Atharvaveda* (10.7.8), *skambhá-* is deified as a creature who supports the universe, sky and sun—the equivalent of the 'world tree'.

The Indo-Aryan (and not Iranian) form, in the meaning 'pillar' and with the mythologized associations with a sacred 'column', was borrowed into the Finno-Ugrian languages. The image of the magic Sampo mill, an analogue of the world tree in Finnish mythology, originates from it (Erdödi 1932: 214-219). A common Iranian name for 'house' originates from the verb *kan-* 'to dig', i.e., it reflects a semi-subterranean type of house (Abaev 1956; Herzfeld 1941; Oransky 1976: 163). Benveniste suggested that the early common Iranian verb *vi-dā-* 'to build a house' has the prefix *vi* and the root *dā-* 'to create' (Benveniste 1955: 301; 1958: 65). This term is found in the *Avesta*. Its ancient meaning is preserved in Shugnan *wiδun* (from Old Iranian **vidāna-* 'ceiling, overhead cover'). The *chor-hona* roof of the Pamir house, which originates in the Andronovo culture, is denoted by this word. The *chor-hona* construction is a most important labor-consuming stage in the building of a house (Andreev 1958: 441).

V. A. Livshits analyzed the data concerning the house as described in the *Avesta* (1963: 141, 505; 1998: 271). This house had a post construction with a roof supported on posts; their Avestan names are *mit-* and *stūna-* and these have

correspondences in Vedic (Elizarenkova and Toporov 1995: 512). Derived from *stūna-* are the Persian and Tadzhik *sutun* and Shugnan *setan*, which is applied to columns and pillars, to the supporting posts of the Pamir house in particular (Andreev 1958: 445). The house was illuminated through a light opening in the roof (*raucana-*, cf. Tadzhik *ruzan*, Shungan *rəz*). This term is used in Pamir houses for the light-and-smoke opening in the *chor-hona* roof (Andreev 1958: 437). In addition to timber, clay (*ištya-*, cf. Tadzhik *hisht*) was used in house construction. In modern Central Asian architecture this term also denotes 'brick' (Pisarchik 1954: 223), but in ancient times it was applied only to clay. In Pamir and Ossetic houses clay is used in wall plastering and in the roof covering (Andreev 1958: 434, 440, 441; Kaloev 1971: 153). The interior of the Avestan house included the *gātu-* 'bed'; according to V. A. Livshits (1963: 141) this was a clay *sufa*. Thus, the house of the ancestors of the Iranians was a large semi-subterranian ground-post-built construction that supported a roof with a light opening through it, and which contained a hearth and *sufa*.

In the *Avesta*, in the Ardvīsūr Yašt (5.101), dedicated to the goddess Anāhitā, it is said: "At every stream there is a solid built house, it is light, with a hundred of light openings, well-made, with a thousand pillars, firm, with ten thousands of supporting pillars." From all the various house types that are archaeologically attested in Eurasia during the 2nd millennium BC this description of Anāhitā's house is closest to the large Timber-grave/Andronovo house. A reconstruction of a large house from the settlement of Atasu, suggested by A. Kh. Margulan (1959: table I), illustrates this description.

The evidence for the Vedic house is also of great interest. In the *Atharvaveda* (3.12.1) there is a spell dedicated to a protector-deity of the house Vāstoṣpati:

1. Just here I fix a firm house
   Let it stand in peace, sprinkling fat!
   Let us enter you, oh house,
   With healthy men, with beautiful men, with unharmed men!
2. Just stand here firmly, oh house,
   Rich in horses, rich in cows, rich in joys…

9.3

11. He who fixed you, oh house,
    Gathered forest trees,
    He made you for descendants...
13. ...Homage to cows, horses,
    To the one born in the house!
14. You cover fire inside,
    People together with cattle.

In the text (9.3) props, supports, overhead covers, a sacrificial place, a fire hearth, a place for women are mentioned (9.7). T. Ya. Elizarenkova translates the term *śālā-* as 'hut', but the text alludes to a timber construction built for men and cattle; that is why I accept L. Renou's translation 'dwelling, house'. Renou (1939) analyzed the early Indian texts connected with house building. His research was continued by R. Pandey (1965), H. Bodewitz (1977/78; 1979) and

W. Rau (1983). The Indo-Aryans chose a good place before building a house, drew on the ground a Puruṣa, the legendary first man who was sacrificed. Then they measured a rectangle from the Puruṣa, marking with a furrow the borders of the future house oriented according to the quarters of the world. The house length is 12-16 paces, its width is 10-12 paces (which would yield a general area of approximately 100 sq meters which could hardly be described as a hut). Then they dug a foundation ditch, pressing the excavated soil over the edges. The next action was to dig knee-deep pits in the floor for the wooden support posts (*sthūṇā-* or *skambhá-*) that were erected vertically in the center or along the perimeter. The text speaks of 'many pits', 'a large number of pillars'. Then they put the overlapping crossbeams on the supporting posts at right angles to each other, and finally they set the rafters of the pitched roof resting on the *stū́pa-* or 'roof ridge' – this term later came to denote a ritual construction (Renou 1939: 187, 198). W. Rau (1983) suggested that the *stū́pa-* originally referred to the supporting pillar, but according to the context this is not correct. In the Brāhmaṇas it is said that the builders set the overlap of the two sides of the pitched roof of the house on a central beam-ridge (Rau 1983). Four central supporting posts that support the rectangular overlapping log frame, as in the Pamiri house, are mentioned; moreover, one of the pillars is called 'king's post'. A light opening, bed, seat, and mats are also mentioned. Wood is the only building material; neither brick, *pakhsa*, nor stone are mentioned in the texts. Stones are used only for the construction of the altar and hearth. Twigs, brushwood, reed, mats (only in later texts straw) are used as roofing material. The door (*dvár-*) turns on two supports in front of the door. There are two types of open hearths in the house: a round domestic hearth for the women and a rectangular cultic hearth for the men. There are light household structures, a kitchen, a shed for the chariots near the house (Renou 1939: 491; Rau 1983: 20-59). Some terms denote cattle shed or sty (*ūrvá-, gotrá-*) (Elizarenkova and Toporov 1995: 512). Thus, according to both texts and the lexicon, when the Vedic Aryas arrived in India they constructed large rectangular semi-subterranean houses of post-built construction that were analogous to those of the Andronovo culture.

The rituals accompanying house construction were also similar. The building of an Andronovo house began with a solemn ritual: two to three vessels of milk were offered, more often a bull or ram was sacrificed. Their meat was eaten by the participants at the ceremony, the head and legs with skin symbolizing the dead animal and the vessels were ritually deposited in important places of the future house—under the corner support post, under the entrance threshold or at the hearth. Until recently the Iranian Mountain Tadzhiks in the Pamirs and the Ossetes in the Caucasus had the same rite.

There are also examples of human sacrifice, often of small children, buried under the floor or in a special annex, that are known from the Andronovo culture. This rite can be explained in terms of the early Indians' belief that the universe was composed of the parts of the body of the first man (Puruṣa). The whole house is then a microcosm, a model of the universe in miniature. It means that the construction of a house requires the same type of sacrifice. The Vedic Aryans in India rejected this bloody rite. They simply drew a Puruṣa on the place of the future house. But the rite of ritual killing was preserved for the construction of temples and royal palaces in some parts of South Asia to the 20th century.

The most important and most difficult moment in construction was the raising of the roof. In the *Atharvaveda* (3.12.6) there was a special spell associated with the act:

'Climb the pillar correctly, rafter!'

In modern India a feast is held with the raising of the roof ridge (*pashita*) as it is also done in Ossetia and in the Pamirs where the beam is sprinkled with the blood of a sacrificed ram. The supporting 'king's post' is also important. It is symbolic of the *axis mundi* that, according to the early Indo-Iranians, connects the world of men with the sky, a tree of life providing prosperity for the family. Both in India and Ossetia this support post was deified; the house god Særyzæd was associated with him (Abaev 1979 III: 91). In memory of old beliefs this pillar was often covered with rich plant ornament in Ossetia, the Pamirs, and the Hindukush; on spring holiday of the New Year *Nouruz*, it is decorated with dog rose flowers. The patriarch usually sits at the pillar; on wedding days the bride and bridegroom are seated there.

Moving into a house was also accompanied by special rituals common to different Indo-Iranian peoples. The housewife was the first to enter the house: she brought vessels filled to the brim, then the hearth was solemnly lit from a fire taken from the previous house, and spells were pronounced:

'Homage to the moving fire,
Homage to your Puruṣa'
(*Atharvaveda* 9.3.12)

The domestic hearth was a sacred place for the family: the dead were carried round it before the funeral; a bride was taken round it when bringing her into the house; a solemn oath was said above it; and a threat to ruin the hearth is still the most terrible in Ossetia. The master and mistress of the house made sacrifices at the hearth in honor of the gods and ancestors. At the feast of Fravardin in remembrance of the dead, the Avestan people sacrificed to the ancestors and invited them to the feast.

In the *Avesta* (Yasna 62.3-7; Vidēvdāt 18.18-22) it is said that the domestic hearth and ashes are sacred, and every morning it is prescribed to take ashes with special ceremonies to a particular place (Dhalla 1922: 66, 67, 155). In India the phrase 'to set a fire' denotes the separation of a son from the family of his father to build his own house. In the 'Laws of Manu' the throwing of the ashes of the hearth into the wind is proscribed and they must be gathered into a pile. This Indo-Iranian tradition explains the construction of special ash piles found within Andronovo and Scythian settlements.

In general, a comparison of the archaeological and linguistic data about the monumental house supports the ascription of the Andronovans to the Indo-Iranians.

The word 'house' in the Indo-Iranian and other Indo-European languages denotes not only dwelling but also the family and its property. According to the *Avesta* a large patriarchal Iranian extended family, as with a Greek *oikía*, lived in the house. The patriarch was at the head of the family (like the Roman *pater*

familias, Vedic *dámpati-*, Avestan *nmānō.pati-* 'master of house' and his wife *nmānō.paθnī-* 'mistress of the house'). They undertook religious functions and made sacrifices. A group of close relatives on the father's side constituted the *nāfa-*, an agnatic group whose patronymy united up to a hundred adult males and was connected with common pasture and land and a custom of mutual help. Not less than 15 houses/families made up a *vīs-*, a clan and the settlement of the clan ruled by an assembly headed by an elected *vīspati-* (D'yakonov M. 1961: 60-61; Livshits 1963: 140, 143, 504; Gafurov 1972: 54-55). The name *vīspati-* comes from Indo-Iranian *patí-* 'husband, master' (< Indo-European **potis*); it is found in Sanskrit, Avestan and Lithuanian (Burrow 1976: 25, 98), and the word *vīs-* has correspondences in Slavonic *vьsь*, a village with its areas of economic significance. Survivals of this ancient organization have survived among the Mountain Tadzhiks and Ossetes. In the Pamirs a large family of 40-80 members might live in one house. In Vanch a family of 55 members lived in a house 121 square meters in area (Kislyakov 1936: 755-788; Andreev 1958: 431). Related families occupied one settlement or valley, helped each other and participated in common rituals. People speaking one language occupied one or several neighboring mountain valleys. Such a structure is well represented in the ethnography of the Ossetes: a large patriarchal family lives in one house, uniting from 20-40 to 100 people headed by a *xæʒaru-xicaw* 'head of the house' and his wife or *æfsin* 'mistress of the house'. Kinsmen sharing a common sacred place and cemetery and the same surname are members of one patronymy or kin group and live in a settlement. Sometimes the whole valley belongs to one kin group. Kinsmen own land together, they are interconnected by a custom of mutual assistance and they constitute an assembly (Kaloev 1971: 133-136, 191-193, 203-205; Magometov 1962: 968).

The next unit in the Avesta is the unification of the clans into a *zantu-* 'tribe', a name which also has Indo-European correspondences, e.g., Latin *genus*.

If we take such ethnographic data into consideration when examining the distribution pattern of Andronovo sites, we may suggest that the larger groups of Andronovo sites constitute local variants, which can correspond to the ancient tribe that occupied a territory and was separated from other tribal territories by a largely unoccupied zone. Densely populated micro-districts situated along small rivers and included within a local variant belong to individual clans; the settlement unites a patronymy that shares a common cemetery and common sacred place (a large settlement can belong to the whole clan). The individual house provided the habitation for a large patriarchal family, numbering 30-50 or more people. The ascription of such a number of family members is independently confirmed by comparison of the number of burials in a cemetery and the number of houses in a settlement where the average life span of the Andronovo people is estimated at 33 years (Kuz'mina 1974c).

House Type II

Type II houses are light timber-frame constructions, rectangular, polygonal or rounded in plan (Fig. 10). The number of such types of construction increases in late Andronovo settlements. In central Kazakhstan at Atasu there were

workshops and houses of oval or round form, surface or slightly subterranean, with light timber-frame walls (Margulan *et al.* 1966: 208; Kadyrbaev 1983: 137; Kadyrbaev and Kurmankulov 1992: 25, 44, fig. 19). Analogous houses are found in Myrzhik; in Buguly I house 22 was round (Margulan 1979: 187; 1992: 58). Oval houses were found at Ikpen' (Tkachev 1991: 10). At Suukbulak the walls of wooden house 1 are of irregular rectangular form. A. Kh. Margulan reconstructs it as polygonal (Fig. 10: 5; Margulan *et al.* 1966: 248, fig. 126). Surface houses of oval and rectangular form and measuring 50-100 square meters in area have been discovered at Novonikol'skoe I and Petrovka II in north Kazakhstan (Zdanovich 1975a: 9, 10; 1988: 36, 37, 44, 45; Zdanovich S. 1979: 9; Malyutina 1991: 142). In the Urals, at Yazevo there is an oval house, 10.8 x 4.2 square meters and 0.2-0.3m deep (Potemkina 1985: 38). At Dangal in central Kazakhstan a round house, 70 square meters in area, is surrounded by slabs inserted into the ground (AO 1983; 1985: 507). In Semirech'e at Bien, round houses, 31-70 square meters in area, are set into the ground and surrounded by a ring of stones on a clay foundation (Karabaspakova 1987: 95, 96). The best studied houses are those from the late Andronovo settlement at Chaglinka (Fig. 10: 7, 8; Orazbaev 1970: 134, 136-139). House 9 is a round semi-subterranean structure with timber-frame construction; the walls consist of horizontally laid blocks and vertical posts on which the timber frame of a conical roof rested. House 13 is two-roomed and slightly subterranean: one chamber has timber-frame construction, the other is oval with uprights forming a twin wall with wattling; the light conical roof was supported by walls and by raised posts from which pits remain (probably a square frame was placed on the posts and used as smoke opening). House 14 was also two-chambered with rounded corners (perhaps octagonal) and timber frame construction. On the settlements of Kipel', Alekseevka, Zamaraevo, etc., post pits and narrow slots were preserved as also traces of the light surface constructions of wattled walls or pailing.

Several slightly sunken round houses without posts and with a sand bank around the floor and a hearth in the center were discovered on the late Andronovo site of Dzhanbas 34 in Khorezm (Itina 1977: 105-106). Light timber-frame houses were also constructed in the western steppe. On the eastern Trzciniec settlement of Pustynka there were surface houses consisting of vertically erected posts and wattling (Berezanskaya 1974, 43, 51, tab. X, XI: fig. 15). Post pits and clay daub with wattle imprints from light surface constructions are also known from settlements of the Pre-Kazan' culture (Kalinin and Khalikov 1954: 198). At the late Timber-grave settlement at Seragoz there were two surface yurt-like round houses, 8m in diameter with stone foundation walls and pisé-built hearths (Boldin 1981: 232). Thus in the late Bronze Age across a wide zone of steppe and forest-steppe there was spread a type of light timber-frame construction, vertically divided in two, many sided or round in plan, either surface or slightly sunken, and with a light conical roof.

The origin of this type of house is connected with the evolution of the large rectangular semi-subterranean house; a number of structures (e.g., at Chaglinka) indicate transitional forms. The invention of a light house in the late Bronze Age was the major innovation in the culture of the Eurasian steppes and provided for the transition to pastoral nomadism.

The light timber-frame Andronovo houses of the late Bronze Age can be compared to the tents of the modern Iranian-speaking nomads of Iran, Afghanistan and the Near East. The most primitive type of house has remained among the Afghan-Durrani and partially among the Toimen and Charaimak tribes. This is a tent or *gidzhi* (Logasheva 1981a: 142-143; Ferdinand 1969: 131-135). Several vertical poles are erected over a rectangular base, 6m x 3-5m in area. The central poles are higher than the side ones; they are covered with felt or cloth, resulting in a conical roof; the walls are tightened over, the floor is covered with felt. The similar but larger *gedan* is spread among the Baluchi in Iranian Baluchistan and Iranian and Afghanistan Sistan. The poles (*achag*) are erected in three rows, five in each row, over an area of 10m x 3.5m; the central pole is the highest. Felt sections are drawn over the poles, forming a conical upper part. The sections making up the side walls are fastened to its sides. An entrance is covered with cloth (Gafferberg 1964; Ferdinand 1964: 197; 1969: 129). The same principle is characteristic of the house of the Iranian Kurds, who migrated through the Near East, and part of the Charaimaks, who are territorially quite distant from them and move about in Afghanistan. Their house also consists of vertically driven poles, arranged in rows, but differing from the *gedan* because all the poles of the central row are higher than the side ones, so that the roof becomes pitched (Aristova 1965; 1981, 78-82; Vilchevsky 1958: 195-196; Feilberg 1944: 85, 179; Ferdinand 1969: 131-133; Logasheva 1981a: 143).

Another variant of the timber-frame house is found partially among the Kurds, Baluchi, migrating in Baluchistan and in south Afghanistan, and among Iranianized Jemshids and Khazaris in Afghanistan. This is the *kappa* house or in its more developed form, the *chappari*. In comparison with previous houses they are round in plan. Their timber-frame consists of poles driven into the ground, the tops of which are bent and bound together; in the *chappari* they are fastened to an upper wooden hoop that carries the conical vault which is covered with a large piece of felt. The lower part of the *chappari* walls are covered by reed wattling (Gafferberg 1948: 131-140; Logasheva 1981a, 1981b: 118, 139, 143; Barth 1965; Feilberg 1944).

Some maintain that the Iranian tents derive from the Bedouin type (Aristova 1981: 81). It is difficult to agree with this conclusion. The tent among the Semitic-speaking nomads of the Near Eastern Bedouins is a one-part dwelling. A large rectangular section is fastened to four poles, a space with flat roof is constructed which is trapezoidal in section; one part of the tent remains open, the opposite part is covered with a curtain. Sometimes the tent is stretched across two supporting props in the form of an irregular trihedron (Amir'yants 1981: 71-72; Fielberg 1944). The types of houses of Iranian-speaking nomads in Iran and Afghanistan are basically different in construction from the Bedouin tents of the Near East. Bedouin tents are on two or four poles, Iranian tents utilize many poles driven in rows in a rectangle or circle. In structure Bedouin tents are without a separate roof section and are single-chambered; Iranian tents are double-chambered, they have vertical walls and a separate roof. With respect to roof form, Bedouin tents have either a flat top or a single slope; Iranian tents are pitched, pyramidal or conical. In terms of roofing method, Bedouin tents employ one panel in making up the roof and two walls; Iranian tents have one panel for the roof and side walls made of separate large pieces of felt, mats, etc.; all of this

speaks for a quite different genesis for the black tents of the Semitic-speaking Bedouins and the houses of the Iranian nomads. In spite of considerable differences in form, Iranian tents have basically a similar post construction, and are vertically divided into two sections. Their prototypes are the light Bronze Age houses of the Eurasian steppes. Both are two-chambered, consist of vertical walls and sloping roof, have timber uprights as their foundation, walls of wattling or other light materials, a roof supported by wall supports and a central supporting post, sometimes set on a rectangular open frame and simultaneously serving as both a light and smoke opening (the burnt frame of such a house was found on the Andronovo settlements of Bishkul' IV and Pavlovka). The three-row arrangement of supporting posts of the *gedan* of the Baluchi and especially in the tent with a pitched roof among the Kurds and Charaimaks repeats the plan of the Timber-grave/Andronovo house of the Moechnoe Ozero type (Trubnikova 1958, fig. 3) and its lighter surface variant at Pustynka. Only the character of the roof differs as it is made of felt and not of wood. The round Iranian tents or *chappari* can probably be connected with the late Andronovo round surface houses.

The similarity in construction of the light surface houses of the Eurasian steppe belt in the late Bronze Age with the tents of Iranian-speaking pastoral nomads of Iran and Afghanistan suggests that these nomads came to the south from the Eurasian steppes, bringing with them the type of house that was established in the south Russian steppes beginning with the Eneolithic. This similarity suggests the probable time of the Iranian migration at somewhere between the 13th and 10th centuries BC.

This conclusion is confirmed by linguistic data: the early Proto-Iranians meant by *vi-dā-* 'to build a dwelling of the Andronovo subterranian type'; however, in the Middle and Modern Iranian languages *vi-dā-* only denotes a 'tent, awning, marquee' (the name of the tent, *qidan*, among the Baluchi nomads originates from it, cf. Benveniste 1955: 301; 1958: 65; Kuz'mina and Livshits 1987). It follows that the house building traditions of both settled and nomadic Iranian-speaking peoples originate from a common source and they can be traced back to the Bronze Age Andronovo culture.

Light surface houses, household and ritual structures were known to the Vedic Aryans as well (Elizarenkova and Toporov 1995: 491). In the *Atharva-veda* (9.3) and in the later *Jaiminīya-Brāhmaṇa* (1.70-72), in the *Gṛhyasūtras* and *Śrautasūtras*, short-term collapsible constructions are described (*Atharvaveda*, commentaries by T. Ya. Elizarenkova 1976: 383; Renou 1939: 484-491; Pandey 1965; Bodewitz 1977/78; 1979: 77-82; Rau 1983). They are modest in size (7-9m x 4.5m x 7m), they are of rectangular or round form and they are made of poles tied at the top and mats bound with ropes. While transported, they are untied and carried in a vehicle. Terms for their construction, derived from the root *mā-* 'measure', 'build', are not quite clear; 'support', 'upper part', 'cover fastening', 'rafter', 'binding ropes' and 'mats' are all mentioned.

In an *Atharvaveda* spell (9.3.4ff.) we read: "…We unbind everything at the thatching and around the fastenings… we unbind everything bound… we unbind your loops… straw covered hut… you stand on earth… I unbind everything bound to your mat." "Oh Hut, we shall carry you as a bride wherever we wish".

These texts refer us once more to the question of the origin of the yurt. A. M. Orazbaev (1970: 142-146) made a detailed comparison of the polygonal timber-frame and round house construction on a Chaglinka settlement with the construction of a modern Kazakh house (*shoshala*) and with a nomadic *yurt*, and he concluded that the "prototype of the modern yurt … could be the house construction of tribes living in the late Bronze Age". This conclusion was affirmed by K. A. Akishev, M. K. Kadyrbaev (1977: 222) and by S. Zh. Narynov (1980: 170-173). The Timber-grave/Andronovo traditions of house building continued to develop among the Iranian Scythians, Sarmatians and Saka. The Saka constructed lighter buildings as well. The invention of felt was an important contribution of the Andronovo period. Its usage was known in Pazyryk and Besshatyr. It is important that in Pazyryk felt was used for vehicle covers, tent walls and floor coverings (Rudenko 1953: 78-80); in Besshatyr the roof was covered with a large piece of felt (Akishev and Kushaev 1963: 58). Timber-frame construction is preserved among the Sarmatians (moreover, in Preobrazhenka and Tarabutak round structures were found, cf. Smirnov 1964: 85-89). According to K. F. Smirnov these burial constructions "imitated the rectangular surface timber-frame houses and round tents". The Scythians had two types of light houses: rectangular and round in plan. Walls for both house types consisted of vertically erected poles or posts across which was set a wattle and daub fence, a mat or a large piece of felt. There was sometimes a support post in the center of a round tent, which supported the light conical roof. Kurgan #1 at Kostromskaya provides a brilliant illustration of such a rectangular structure. Four main posts were erected at the corners. Vertically placed logs provided a timber-frame on which was set horizontally lain beams. Leaning against this framework were posts which met at the center to form the outline of a pyramidal roof (Artamonov 1966: table 5).

Another type is seen in a light temporary dwelling represented in a painting in the burial chamber at Anfesterios (Fig. 10: 3). This is a house of pyramidal form with two high raised central posts (Rostovtsev 1914: 170-173, table ci). According to S. I. Vaynshtein (1976: fig. 6, 3,4) it can be reconstructed as a truncated pyramid; in the upper third of it there is a border in the form of a rectangular wooden frame; above this is a rectangular frame connected to the poles of the roof part which simultaneously served as a light and smoke opening. L. G. Nechaeva (1975: 11-13) justly considers this frame to be a prototype of the *shangrak* of a yurt whose genesis can be related to the light-smoke openings of houses with a pyramidal-stepped vault of the Timber-grave and Andronovo cultures. L. G. Nechaeva (1975: 13) did not examine the Bronze Age evidence, but she studied in detail Scythian houses and came to the conclusion that they can roughly be called primitive yurts. A. M. Khazanov (1975: 271) stated that the Scythians "definitely knew the yurt", but S. I. Vaynshtein (1976: 43) argued that the Scythian tent cannot be called a yurt because it probably did not have folding lattices which make up a characteristic feature of the modern yurt.

The yurt is the primary and most perfect house type of the Eurasian steppes nomads (Fig. 10.9). It is used by all Turkic-speaking and Mongol peoples, as well as among the nomads of Afghanistan—Iranian-speaking Tadzhiks, Firuzkukhs, north Taimens and Iranianized Jemshids and Khazari (Kharuzin 1896; Gafferberg 1948; 1953; 1964; Vilchevsky 1958; Aristova 1965; 1981;

Logasheva 1981a; 1981b; Ferdinand 1960; 1964; 1969; Barth 1965). The name for yurt in Iranian is *alachik* or *chador*, Khazari *khanai khyrga*, Turkish *oi, gara-oi*. Its walls are made of separate folding lattices (in Turkish *tarem*, *kanat*), plaited from twigs, reed or strips of wood (*sagana*), bound with straps. A vertical round wall (*kerege*) is made of several lattices. The roof is made of poles or slats (*uk*), their sharpened ends (*kalam*) are set in a wooden hoop (*shangrak*) which is fixed from above. At the sides they attach the *kerege* to the forks of the poles in such a way that there appears a cylindrical vaulted framework. A *shangrak*, 3-5m in diameter, is used as a light-smoke hole. The diameter of a yurt is 9-15m. The *kerege* walls are covered with pieces of felt, the vault is covered separately, the floor is covered with felt and carpets, and the door is curtained or made of wood (Margulan 1964: 1-12). An advantage of the yurt, which consists of several folding lattices, is that it is convenient to transport and easy to install.

The time and place of the origin of the yurt and its prototypes have not been settled yet. The first researcher of nomad dwellings N. N. Kharuzin (1896: 46) believed that the yurt had a long evolution, its present form being established only in 17th century, and that the Siberian *chum* was its prototype. S. I. Vaynshtein (1976: 51) concluded that the prototype of the yurt was the hemispherical cabin (*shalash*) of the Huns, with a frame made of twisted willow twigs (Vaynshtein 1976: 45, fig. 6, 7). B. Kh. Karmysheva (1956: 23) believed that the proto-type of the yurt was the same construction as that of the Karluks. This point of view has been widespread. Many scholars believe that the yurt developed in Central Asia among Turkic tribes. It was then borrowed from them by the Mongols (Kyzlasov 1975: 173) and Iranian-speaking nomads of Iran and Afghanistan (Logasheva 1981b: 112; 1981a: 138-139). At the same time it is thought that many-sided houses originated among the Turks not long ago when they made the transition to settled life (Vaynshtein 1976: 50-51). The opposite opinion has been expressed by investigators of the nomads of the Eurasian steppes (Orazbaev 1970; Purveev 1982; Kuz'mina and Livshits 1987).

To settle the question of the origin of the yurt one should compare the house types of the modern nomads of Asia, construct a typology and compare them with the yurt. The Siberian *chum* is a single-section dwelling, its framework formed by poles conically converging at the top (Fig. 10.2). The cabin or *shalash* of the Huns is also vertically a single-section dwelling. Its framework is formed by arches which converge hemispherically at the top, or it is woven from twigs in the same hemispheric manner. The 'black tents' of the Bedouins are also a vertically single-section dwelling consisting of two or four poles covered by rectangular panels to form an irregular trihedron or truncated pyramid (Amir'yants 1981: 71-72, fig. 10.1). Iranian nomads have quite different houses. They are bi-partite and consist of vertical walls and a separate roof.

The Iranian tent, including that of the Scythians, is closest to the construction of the yurt and can be viewed as its prototype. Both the yurt and the Scythian tent are vertically bi-partite dwellings with vertical walls and separate roof. In the Scythian tent one can find the most important parts of the yurt: 1) framework wall construction consisting of a base of vertical poles; 2) walls filled with wattling or mats; 3) a truncated-conical or pyramidal roof element supported on the upper edges of the wall and by a frame above; 4) a framework construction used as a light and smoke opening which provides a point of fastening for the

roof; 5) presence of a door; 6) felt covering; and 7) felt and pile carpets in the interior.

The only invention left to the creators of the yurt was to transform the unfolded wattle sections to folded lattices or *tarem*. This innovation could be introduced only by a people acquainted with the Scythian tent. Its construction developed in the south Russian steppes from the Eneolithic; in the early Iron Age together with the Scythian triad (horse-riding, weapons, and animal art style) it probably reached Central Asia and was adopted by local Turkic tribes. The earliest dated image of a yurt-like dwelling with conical roof is a painting from Great Boyarskaya dating to the 2nd century BC (Devlet 1976: 9, tables 5-7). But the painting is too schematic to draw conclusions about the presence of folding lattices in this dwelling. The earliest known yurt image with folding lattices and edges is a Zoroastrian ossuary of the 4th–5th centuries AD in the Samarkand museum (Vaynshtein 1976: 49, fig. 3, d, e). This type is quite analogous to the yurt *khanai-khyrga* with conical top found among the modern Iranian-speaking Khazari of Afghanistan (Gafferberg 1953).

Early Indian texts, the *Atharvaveda* (9.3) in particular, indicate that the Vedic Aryans were already well-acquainted with the type of folding transportable dwelling constructed from poles and mats, close to the Scythian and modern Iranian nomad tent.

These data prove that it was Indo-Iranian peoples who created dwellings of the proto-yurt type.

House Type III

The third type of Andronovo house comprises *kibitkas*, large covered vehicles on solid wheels. According to Hertel (1925) such covered vehicles represented the sky palaces of the gods, *vimāna* (see section "Transport"), described in Vedic literature. This vehicle was the main house-type of the Aryas in the Vedic period (Rau 1977, 1983; Elizarenkova and Toporov 1995: 488, 490, 511; Elizarenkova 2000).

Thus, the evidence of the history of the Andronovo house confirms its identification as Indo-Iranian and supports the opinion of linguists who argue that the Indo-Iranians migrated to India and Iran from the Central Asian steppes.

CHAPTER FIVE

CERAMICS

A large body of ethnographic research in various parts of the world has shown that the technology of ceramic production differs according to ethnic group where the traditions of domestic production are transferred to and regularly preserved within related groups (Franchet 1911; Cardew 1969). For this reason ceramics are considered to be one of the most diagnostic ethnic indicators that permit one to establish the genetic relationship between population groups, even after distant migrations and large chronological breaks between complexes; ceramics also help to reveal the process of assimilation of different ethnic groups.

The analysis of ceramic production is critical because ceramics constitute the bulk of archaeological material and provides the classificatory basis of Andronovo sites; the technology of pottery manufacture defines to a certain degree the form of a vessel and serves as an important indicator of the ethnic group.

V. A. Gorodtsov (1922) and M. V. Voevodsky (1930; 1936) demonstrated that the pottery of the Neolithic and Bronze Age East European cultures was produced by the coil technique by building up strips of clay coils, 4-6.5cm long, or by constructing spiral coils or subsequent courses of entire rings, or employing existing pots as a model. This was evident from the analysis of Andronovo and Kayrak-Kum ceramics (Krivtsova-Grakova 1948: 142-143, fig. 29; Sal'nikov 1951b: 132, 133; Litvinsky 1962: 234, 235). M. P. Gryaznov established that the Begazy Dandybay vessels of central Kazakhstan were produced by a different technique of beating out the form from a single block of clay. E. F. Teplovodskaya also studied the ceramic technology of central Kazakhstan (Kuznetsova and Teplovodskaya 1994). M. N. Komarova (1962) identified the main types of ornamentation on Andronovo vessels and traced their distribution over various zones. S. V. Zotova (1964, 1965) established two different principles of creating Andronovo decoration over either a straight or oblique grid (Fig. 12).

I have analyzed the vessels of the whole Andronovo period according to a single system. Acquaintance with the different methods of ceramic production based on ethnographic trips in highland Tadzhikistan (1951-1953), the ceramic centers of Gidzhuvan and Rishtan in 1958, and study of pottery-making skills in a Samarkand workshop under the supervision of D. Dzhurakulov helped to inform my analysis. The basis of my classification of Andronovo ceramics was closed burial complexes. A single program of analyses was utilized for the examination of every vessel. These comprised:

1. The composition of the clay and the character of any admixture in the clay;
2. The technique of vessel formation with special attention to the base and the order of coil placement;
3. The form of the vessel;

4. The surface treatment which included: a) the principle of the construction of the decoration; b) the main elements of ornament; c) the placement of the elements according to zones and their combinations; and d) the technique of placing the ornament (Table 1, Fig. 2).

After the vessels were divided into groups on the basis of similar characteristics the combinations found within closed burial complexes was examined. Finally, those complexes characterized by ceramics with a stable combination of similar traits were grouped into types. Diagnostically important criteria for singling out the types proved to be the technology of production and the form of the pot-like vessels, the nature of the tempering, whether the ornament was drawn over an oblique or straight grid, and the technique of manufacture. Undecorated pots were not informative.

As a result of the analyses four pure types were singled out: Petrovka, Alakul', Fedorovo, and Alekseevka and a large group of mixed types.

Petrovka

Sites of the Petrovka type are traditionally dated to the 17th–16th centuries BC, and are situated in the west of Andronovo territory in the Urals, Tobol, the steppe and forest-steppe of western, northern and central Kazakhstan as well as the settlement of Tugai near Samarkand (Avanesova 1996; Fig. 69: 7-16). Petrovka pots are made from quite plastic clay with artificially added tempers of shell, sand, gravel, chamotte, talc and sometimes mica to permit the escape of moisture during firing (Smirnov and Kuz'mina 1977: 13-4, 17, 26; Zdanovich G. and S. 1980: 187). The ceramics from the Urals are characterized by an admixture of talc. The color of Petrovka pots ranges from ash-gray to brown and black. Vessel walls are 8-13mm thick. On the inner surface of some of the vessels there are the traces of the application of a fabric (woolen threads 8-1.6mm thick or horsehair). Another vessel served as the mold and was covered with the fabric and the base was attached to the walls from the outside. After drying, the mold was removed and the upper portion of the pot was placed on top from the inside: this resulted in a sharp edge or rib that formed where the two elements joined to form a biconical vessel.

The relation of the height of the upper part of the vessel to the lower varies from 1: 4 to 1: 6; in northern Kazakhstan vessels are squatter (1: 2-3) and have a biconical bell-shape with a flanged rib. Both their form and ornamentation employing applied rollers and bosses are similar to the vessels of the late Catacomb and Multi-roller Ware cultures (Smirnov and Kuz'mina 1977: 29-32, fig. 9).

For repelling moisture the outward surface of a vessel was sometimes given a clay slip which resulted in the slurred ornament on some vessels.

The ancient potter understood the peculiarities of constructing a two-zoned vessel and emphasized them through ornamentation: there was a separating band on the shoulder, a semantically important ornament was placed on the body while a different motif decorated the upper zone of the vessel. Petrovka ornament was made on a vertical grid, mainly by a combed stamp with large wide teeth; in northern Kazakhstan sometimes the comb was used in a rocker motion. In a few cases cord, caterpillar stamp, shell, or small spade-like indentations were used which reflect the preservation of Neolithic traditions. A large percen-

tage of Petrovka vessels were covered by fluting, horizontal wavy grooves that stood as an independent ornamental device. The predominant ornamental patterns were horizontal and vertical herring-bones, zigzags, and isosceles triangles; from time to time there was a broken-band rhombus and herring-bone divided by vertical lines over the body with a lattice or straight swastika on the bottom.

The preference for vertical and horizontal herring-bone patterns, often spread over the entire body, reflects the Neolithic tradition. It must be stressed that the transition from a Neolithic bowl to the biconical pots of the Early Bronze Age occurred similarly among the Poltavka, Petrovka and Potapovka tribes by placing an upper section on the vessel (Smirnov and Kuz'mina 1977: 34, fig. 6; compare Smirnov 1959: fig. 12.6, 28.15; Sinitsyn 1958: fig. 45). In some complexes there are Abashevo pots. Vessels analogous to Petrovka including Poltavka, Abashevo, and Late Catacomb, are found in Bashkiria at Al'mukhametovo and in burials of the Potapovka type on the Volga at Potapovka, Alekseevka 2, Utëvka 6 and on the Don at Vlasovka and Kondrashkinskiy (AD 1977: 159, 198; 1980: 133; Vasil'ev *et al.* 1992: fig. 2.2-10, 4.19, 5.1-4, 6.12; Pryakhin 1992: fig. 1.16; Vinnikov and Sinyuk 1990: fig. 28. 1,2, 29.1-4). These are similar with respect to the technologies of production, the usage of shell and sand temper, the imprinting of decoration in zones by a plain and toothed stamp, and the motifs of ornament. It reflects the genetic closeness of the Potapovka and Petrovka populations, formed simultaneously in the forest steppe from the Don to the Trans Urals with the participation of the Poltavka, Abashevo and Late Catacomb populations in their ethnogenesis (Smirnov and Kuz'mina 1977; Bochkarev 1991).

A later group of Petrovka sites (Raskatikha, Kenes, Aksayman, Satan, Nurtai, Krasnaya Krucha) is defined by the western orientation of its burials; the gradual diappearance of the Multi-roller Ceramics and Abashevo cultures, and vessels with an additional section forming a tripartite vase. This form is characteristic of early Alakul' ceramics.

Alakul'

Sites of the Alakul' type, dated to the 15th–13th centuries BC, are situated in the steppe and forest-steppe zone in the west of Andronovo territory in the same areas as Petrovka (Figs. 11-13; 15, 16).

Unlike Petrovka pots, the fabric of Alakul' pots does not contain shell temper. Gravel, large grain sand, quartz, and mica were used as tempers. In the Urals Alakul' vessels contained talc as did the Petrovka pottery from this region.

The walls of Alakul' vessels measure 7-8mm, and are thinner than in Petrovka. Many Alakul' vessels preserve distinct fingerprints on the inner surface, especially under the rim and near the base. These suggest that the vessels were made by women. Traces of textile impressions that covered the mold are often seen on the inner surface of the vessels, especially in the Urals. The fabric was placed over the firm surface of a ceramic mold, which means that Alakul' vessels were produced in the same way as Petrovka ones. Some pots were formed differently: the potter began with the base and built up the lower part of the body by applying coils (bottom start, according to A. A. Bobrinsky 1978). Sand that has stuck to the clay is sometimes seen on the base of the vessel. Apparently, the rest of the vessel was completed on a sand-covered stand. Flat stone

discs have been found in settlements which could have served as such stands. This is supported by ethnographic parallels: in the mountains of Tadzhikistan craftswomen use such a convex form of round stone stands (*tova*) or clay or pressed dung (*binniki* or *benuk*) when a pot is constantly turned on the stand (Voevodsky 1930: 67; Grigor'ev 1931: 62; Peshchereva 1959: 31, 36, 45, 46, fig. 3-5, 8, 9). In north-western Pakistan they use a wooden ring (Rye and Evans 1976, tables 1,3).

The next coil which began the inward slant was attached to a mold from above as was done in the manufacture of Petrovka vessels, and a ridge, a peculiarity of Alakul' ceramics, was also made at the place of attachment. A rim coil with an inward slant was attached to this portion from above, and an edge appeared at the place of attachment.

Variants A and B are defined according to the relation of the maximum rim diameter to the body diameter; subtypes are defined on the basis of the height of the upper part of the vessel. Alakul' pots have a standard form and proportions. Due to the additional rim section the Alakul' pot has considerably different proportions to the Petrovka pot: the relation of the upper part above the edge to the body`s height is usually 1: 2, the diameter of a rim is equal to that of the body.

After forming the surface of the pot it was smoothed with a cow rib: with one hand a craftswoman turned the vessel on the stand, with another she held a tool for smoothing the surface. Finds of such polishers are numerous on Andronovo sites. Their usage as tools for making pottery is confirmed by ethnographic parallels from Central Asia and Pakistan (Voevodsky 1930: 68; 1936: 62; Peshchereva 1959: 30-32; Rye and Evans 1976, table 20). In Tadzhikistan such bone or wooden tools are called *lisik* (from Iranian *lis-* 'lick, to make smooth').

Finally, the outer surface was consolidated and sealed against moisture by burnishing. Andronovo sites have yielded flat pebbles that were used as polishers.

Ornament was placed on the vessel when its surface was damp. The constructional peculiarities of a tripartite vessel were understood and stressed in the ornamentation of the pot: the ornament in the three zones was separated by division lines and each zone had its own specific form of ornamentation. In western Alakul' variants the neck zone was devoid of ornament while the semantically important decoration was placed on the upper part of the body.

The ornament was impressed by a medium- or large-toothed stamp, rarely with a square or rectangular cutting edge. Incized ornament is rarely met on Alakul' vessels. On many vessels two different stamps coexisted: the main elements of ornament were made by a combed-tooth stamp and the divisions were indicated by a stamp with triangular or oval teeth. Fluting was used to form independent elements but they differ from the Petrovka ceramics as they only separated the rim and especially the neck zones on Alakul' ceramics. A woman first drew the separating lines between the zones and then she filled in the ornament over each zone, from top to bottom, then from left to right. There was no preliminary setting out of the ornament within the zones, and, consequently, the rapport is broken on many vessels.

Alakul' decoration, like that found on Petrovka, was set out on a straight grid (Figs. 2; 12; 16). Hatching of ornamental bands is horizontal, and the main elements of ornament were the same as in Petrovka ceramics: zigzag, vertical

herring-bone, isosceles triangles with their apexes up, and rhombuses. There are also specific Petrovka motifs, e.g., broken bands descending from the rib (Chernyaki); herring-bone divided by vertical lines; and modeled bosses on the body. Basal ornaments are preserved on some Alakul' vessels. Typically Alakul' motifs include a pyramid, opposing large and small triangles, a triangle with a M-shaped figure at the apex, and especially a simple meander and its variations. All but the pyramid elements are characteristic of the early Timber-grave ornamental complex which indicates the related nature of both ornamental traditions and the similar direction of their development. Alakul' decoration differs from Timber-grave only with respect to its three zone division and the large variety and complexity of the combintation of elements.

The final operation in pot production was firing. Andronovo ceramics from sites in Turkmenia were fired at temperatures ranging from 500/600 to 800 degrees; in Chust—750/800 degrees (Kuz'mina and Lyapin 1980: 14, 20). Ceramics in central Kazakhstan were produced at 700 degrees (Kuznetsova and Teplovodskaya 1994: 127). As the temperature of a fire is 650/800 degrees, and in a kiln 900 degrees (Semenov and Korobkova 1983: 223, 224), it is possible to state that Andronovo vessels were fired in a deoxydizing atmosphere which conditioned its black-grey color (Avgustinik 1956: 152-153). It is quite possible that in order to obtain a beautiful black shade vessels were saturated with organic substances (e.g., a solution of flour, grass); pyrolusite and iron ore were added to the hearth (Ivanov 1979: 85). This explains iron ore finds in Andronovo settlements. From time to time Andronovans practiced oxidizing firing in an open kiln with sufficient access to oxygen so pottery would achieve a yellow-red color.

A comparison of production technology and the ornaments on Petrovka and Alakul' ceramics indicates their distinct genetic relation. However, Alakul' pots differ in their standardization, thinner walls, richness of ornamental elements and their combinations, which points at considerable progress in the pottery of the Alakul' period.

Fedorovo

Fedorovo sites, dating to the 15th–13th centuries BC, are found in the forest-steppe, steppe, semi-desert and mountain zones: of the Urals, on the Tobol, in northern and central Kazakhstan and in Central Asia, where they coexist with Alakul'; they are also found in the eastern Andronovo range in Kirgizia, in valleys of the Tian-Shan, Pamirs and Tadhzikistan, in eastern Kazakhstan and along the Irtysh, Ob and Yenisey where Alakul' sites, other than the cemetery at Jermak, are unknown. Their southern border is Shortughai in northern Afghanistan (Francfort 1989, fig. 19-21, 41). The fabric of Fedorovo pots contains admixtures of sand, gravel, mica, rarely chamotte. The use of talc for temper, a characteristic of the Ural cultures from the Neolithic onwards, is absent from Fedorovo vessels of this region which indicates the alien nature of the Fedorovo complex in this area. Inside the vessels, mainly near the base and under the rim, there are traces of a small fingerprints. Forensic scientists have concluded that these were made by women. Vessels have thin walls, usually 6-8mm. Fedorovo ceramics are of a high quality: they are well formed, both the outer and inner surfaces are well-polished. The vessels were produced by spiral

and ring building, the bands placed slanting to the outside; the shoulder of a Fedorovo vessel is rounded and sloping. Then the rim was attached. Fedorovo potters employed two methods for building a base. Where the base of the vessel was round, they were made in a pit beginning from the base (bottom start). A ring forming a ringed foot (1a) or a small flat plate (1b) was attached and flattened out. This type of base-building with a round bottom is archaic and a Neolithic survival (Figs. 2; 11-13; 19-22).

Another way of preparing a base in the Fedorovo tradition was to insert a separately modeled round bottom which was carefully attached to the walls from the inside. In this way the characteristic form of the Fedorovo vessel with its rounded shoulder and small-diameter base was a product of its ceramic-making technology. There are two types of Fedorovo pots.

Type 1 vessels strictly adhere to a set of proportions. The rim diameter is equal to the height of the vessel, while the maximum width of the body is one third of its height. The rim diameter is usually equal to the maximum diameter of the body (variant 1a); rarely does the rim have a more cylindrical form where its diameter is less than that of the body (variant 1b). The base diameter is less than half of the body diameter. The components of the vessel—body, neck and rim—are emphasized through zonal ornamentation, separated by division lines where the bands join; sometimes the foot of the base is emphasized by a flute from the outside. Pots of subtype I are characteristic of early Fedorovo sites; they date to the 15th–14th centuries BC on the basis of finds in closed contexts of the Alakul‘ and early Timber-grave (Pokrovskiy) complexes.

Pots of subtype II show deviant proportions. They are more pot-bellied: the maximum width of the body is at the middle, the rim is sometimes poorly expressed, the base is wider and without a foot. The zonal character of the ornament is broken: in some cases the ornament is present over two zones, the borders are moved below and the connection between the ornamental zones and the form of the vessel is not clear. In other cases the decoration is poorer; negative ornament is often used. Pots of subtype II are characteristic of Late Fedorovo complexes, dating to the 13th century BC according to finds from closed complexes alongside numerous metal objects of that period and Cherkaskul’ vessels.

Fedorovo potters employed a medium-sized and small-toothed stamp with rectangular, square, triangular, semi-oval or round teeth in section; comb rocker and caterpillar stamps appear in northern Kazakhstan from time to time.

Bone, clay and bronze-toothed stamps are found on Fedorovo settlements (Sal’nikov 1951b: fig. 15,6; Chernikov 1960: fig. 13, 1,2, table 14, 2-7). Smooth stamps were rarely used. Flutes were used as independent elements of decoration; they covered the whole vessel or only its upper third; more often they divided it into ornamental zones. Flutes were made with an astragalus with carved grooves.

Fedorovo ornament was made over three zones. Initially, lines of division were imprinted, then the zones were ornamented without preliminary division inside the registers which seldom resulted in a break in rapport. Ornamental bands were drawn horizontally.

M. P. Gryaznov suggested that the Andronovo ornamental system was transferred onto the pots from multicolored textile patterns. Actually, many of the variants of Andronovo patterns can be made by moving and matching two

opposite stripes with the same simple elements (Fig. 12). The original multicolor decoration was imitated on ceramics by either the background or the pattern of the lines. In modern mathematics we have several types of symmetrical compositions: mirror, axis of several orders, etc. The Andronovans knew them all. Fedorovo carpet decoration was reproduced employing an oblique grid which conditioned the specific form of Fedorovo ornamental elements: oblique triangle, oblique swastika, oblique meander and its modifications, triangular scallops and hanging triangles (Chernetsov 1948: 151, 152; Zotova 1962: 177-180). Rows of oblique notches, horizontal and vertical herring-bone, sometimes reaching the base, were widely used reflecting Neolithic traditions on Fedorovo vessels.

A comparison of Fedorovo and Alakul' pots reveals some important similarities in applying bands and similar proportions: division into three zones—rim, neck and shoulder with ornament over these three zones (Fig. 11). Almost all of the elements and most compositions of Fedorovo and Alakul' ceramics are uniform and differ only with respect to their application onto a straight or oblique grid (Figs. 12; 13). The totality of these general principles of the Fedorovo and Alakul' types makes it possible to assign them to an Andronovo unity with a ceramic complex that is different from other Bronze Age cultures of the Eurasian steppes. The difference between Fedorovo and Alakul' ceramic complexes was conditioned by different technologies of forming and ornamenting a vessel, i.e., they reflect two various traditions of production. As domestic pottery skills are transferred within a kinship group and they are an important ethnic indicator, the existence of two technological traditions proves that two different, although related, ethnic components participated in the formation of the Andronovo unity. This eliminates a direct genetic connection between the Fedorovo and Alakul' people and presupposes their different origins. As mentioned above, Alakul' ceramics are connected with Petrovka and Sintashta and originate from the Early Bronze Age steppe cultures of Eastern Europe, including the Urals. The genesis of the Fedorovo type is not clear. In western Siberia Fedorovo sites replace Krotovo, Samus', Afanas'evo and Okunevo and they are not in any way genetically close; their interaction is reflected only in the appearance of specific ornamental motifs. The creation of the Fedorovo complex in the Urals is unlikely because the specifically Ural use of talc temper is absent from Fedorovo vessels.

One working hypothesis is that the Fedorovo sites were established in central Kazakhstan on the basis of Neolithic sites such as those found by M. N. Klapchuk at Karaganda where there were stone tools, beads of ore, bones of (?domestic) animals, and flat-bottom ceramics comparable in some technological peculiarities to Fedorovo. A second possible center of formation for the Fedorovo type is eastern Kazakhstan where sites of Ust'-Bukon' and the genetically connected early Fedorovo Kanay type indicate a burial rite and ceramics with archaic features (Chernikov 1960: 16f., tables 6, 19, 3, 5; Kuz'mina 1994: 259f.). N. A. Tkacheva (1997: 16) independently came to the same conclusions.

In Kazakhstan one finds a specifically Fedorovo cremation rite. Finally, the territory of the Andronovo anthropological type, indicated in Fedorovo burials, is confined to northern, central and eastern Kazakhstan. Hence, the Fedorovo population probably migrated to the east, replacing in Siberia the genetically unconnected bearers of the native Okunevo, Krotovo, and Jelunino cultures. All of this presupposes a local Kazakhstan genesis for the Fedorovo complex.

The influence of the tradition of Andronovo Fedorovo ceramics is found in the forest cultures of the Final Bronze Age in the forest zone in the Urals and western Siberia on sites of the Cherkaskul'-Mezhovka, Pakhomovo, Suzgun, Elovka cultures, etc. (Sal'nikov 1964a; Obydennov 1981; 1986; 1997; Matveev 1985; Potemkina *et al.* 1995; Korochkova 1987; Korochkova and Stefanov 1984; Shorin 1988, 1995; Moshinskaya 1957; Posrednikov 1973; Matyushchenko 1974; Kosarev 1974; Kiryushin and Maloletko 1979). Vessels are of pot-like form with rounded shoulder, and the special band composition on an oblique grid reflects Fedorovo influence in the forest zone (see above).

Mixed types

In addition to pure Alakul' and Fedorovo sites, there are also mixed sites, dating to the 15th–13th centuries BC, in Kazakhstan and Central Asia (see chapter 1). Ceramic assemblages that combine the elements of Fedorovo and Alakul' technology, form and mainly ornament, are characteristic of mixed complexes. Alakul' features prevail in all complexes except Tautary and Semirech'e. Thus it is possible to regard these mixed complexes as part of the Alakul' line of development.

The syncretic types are characterized by: 1) a combination of vessels with rounded shoulder and vessels with a distinctly marked shoulder-join within a single complex; 2) different ways of fashioning the base; 3) a combination of ornaments over oblique or straight grids in a single complex or sometimes even on a single vessel; 4) a combination of typically Fedorovo and typically Alakul' decorative motifs (Figs. 11; 13; Map 11).

Zone		Sites	Petrovka	Alakul'	Mixed	Fedorovo	Timber-grave	Total
F S	Chelyabinsk	22	2	12	0	13	0	49
	Uy-Uvel'ka	7	4	6	0	2	3	22
	Verkhny Tobol	7	1	2	0	0	0	10
	Magnitogorsk	15	0	3	0	0	4	22
S	W. Kazakhstan and Sol'-Iletsk	20	1	6	31	0	2	60
	N. Kazakhstan	22	4	5	4	9	0	44
	C. Kazakhstan	18	0	14	22	10	0	64
	Kirgizia	1	0	0	8	3	0	12
	E. Kazakhstan and Irtysh	9	0	0	0	16	0	25
F S	Ob	11	0	0	0	24	0	35
	Yenisey	6	0	0	1	21	0	27

Table 3: Correlation of site types
Only sites with statistically analyzed ceramics have been counted. F = Forest, S = Steppe.

Such mixed ceramics originate from sites which also display a mixing of the two burial traditions as well. In syncretic complexes of the Alakul' line of development there are local peculiarities. This permits us to identify sites of the Sol'-Iletsk type (Fig. 24), Kozhumberdy in western Kazakhstan (Figs. 23, 24) Amangel'dy in northern Kazakhstan, and Atasu in central Kazakhstan (Fig. 25). In southern Kazakhstan the Tautary cemetery must be of a special type, probably along the Fedorovo line of development (Fig. 27). There is also a syncretic Semirech'e type (Fig. 26: 1-14). The distribution of mixed type sites and a rough count of the number of different types (Table 3) indicates that they are spread over all of Kazakhstan and in Kirgizia and constitute more than half of all known Andronovo complexes. Many sites of Central Asia are also of mixed character. It speaks in favor of intensive assimilation and integration of the two initial components of Andronovo unity—Alakul' and Fedorovo; moreover, the strength of links within this unity is much higher than with other cultures.

Alekseevka

Sites of this type were identified by O. A. Krivtsova-Grakova (1948) and T. M. Potemkina (1975; 1985). Vessels of the Alekseevka type are present on settlements of the 13th–10th centuries BC in the Urals, across all of Kazakhstan, the Altai and in Central Asia. Andronovo specialists tend to regard them as independent cultures: Zamaraevo, Alekseevka, Sargary, Begazy-Dandybay. K. V. Sal'nikov (1948b; 1951b) assigned all Ural ceramics of the late Bronze Age to the Zamaraevo stage of the Andronovo culture; A. M. Orazbaev (1959) and M. N. Komarova (1962) assigned them to a special Zamaraevo culture. V. S. Stokolos (1972) revealed the specific character of the Zamaraevo complex itself, and M. F. Obydennov (1986; 1997) stated that the Zamaraevo (Mezhovka) complexes originated on the basis of the Fedorovo–Cherkaskul' complexes. G. B. Zdanovich (1973a) separated the Zamaraevo and Il'inka ceramic types in northern Kazakhstan. S. Ya. Zdanovich (1974b; 1979) made an attempt to identify a special Sargary culture. The Zdanovichs believed that the Sargary (Alekseevka) ceramics were either genetically connected with Fedorovo or appeared as result of a migration of late Timber-grave tribes. V. V. Evdokimov (1975a; 1984) undertook new excavations of Alekseevka settlements, isolated out a pure Alekseevka complex, and connected its genesis with Alakul'.

T. M. Potemkina (1975; 1979; 1985) divided the pottery of the Tobol into a Zamaraevo forest group and an Alekseevka steppe group, but there are many mistakes in her classification.

The Alekseevka type of ceramics is found as far as the Altai steppe (Mogil'nikov 1976; Ivanov 1987; 1989; Udodov 1988; Kiryushin *et al.* 1990; Kiryushin and Luzin 1990) and archaeologists have suggested that the Alekseevka population came from the west. Settlements with a pure stratum of Alekseevka ceramics have also yielded imported ware of Namazga VI.

What is the origin and chronology of the Alekseevka ceramics?

The pottery contains the same tempering agents as Alakul': gravel, chamotte, large grains of sand, organic material and occasionally talc were added. The variety of inclusions found in pots on the same site (Kuznetsova and Teplovodskaya 1994: 159) reflects different technological traditions. Vessels are coil-built and

the base is wide and the walls are applied from the outside as in Alakul' pots. Sometimes a textile mold has been employed (Alekseevka, Kayrak-Kum). There are vessels from central Kazakhstan that were produced by beating out the clay, which is typical for the Dandybay culture and reflect its influence (Kuznetsova and Teplovodskaya 1994: 129). The proportions are more elongated than those of the Alakul' vessels, the shoulder is smoothed, the rim is lower, sometimes yielding a complex profile. Firing was in the open, uneven, and often yellow or red in color. Zonal decoration is broken due to the change in the proportions of the vessel: it is found in two zones—on the rim and shoulder, sometimes only on the shoulder, where the semantically important decoration has been transferred. The ornament of Alekseevka ceramics is very poor: smooth stamp and incised ornament prevail as well as nail pinching and impressions; also large-toothed stamp is preserved. Only vertical and horizontal herring-bone and isosceles triangles, rarely rhombuses and simple meanders are preserved from the whole repertoire of Andronovo decoration; cross-forms also appear (Figs. 17; 18).

The analysis of the technology and ornament of Alekseevka ceramics indicates that their origin is connected with Alakul' ceramics and mixed types on the Alakul' line of development.

A characteristic feature of Alekseevka ceramics is the predominance of applied-roller decoration at the shoulder, sometimes with drooping tendrils. In the 13th–9th centuries BC this distinctive fashion spread over a vast territory from Asia Minor: Troy VIIc (Blegen 1958: 2 : 282, 284, 285), the Danubian Noua culture and late Timber-grave sites of the Ukraine, Don, Volga as far as the Urals and Kazakhstan, south Central Asia and Iran: Giyan 1 (Contenau *et al.* 1935: 216, fig.; Kuz'mina 1967, Chernykh 1984: 246-258; Fig. 51). But this ornament was applied to vessels which universally preserve their local technology and form, thus one cannot distinguish a special 'roller ware culture'. A comparison of Alekseevka and late Timber-grave ceramics testifies to their great similarity which can be explained by the strengthening of contacts in the steppe following the transition to nomadic cattle-raising in the Final Bronze Age and the common trends in the development of two related ceramic traditions, Timber-grave and Alakul'. Their convergence was a result of the coarsening of the ceramics with the preservation of only the simplest decorative elements.

Thus, the Alekseevka type of pottery should be seen as the final stage of the Alakul' line of development where there was a succession of production traditions and the presence of transitional complexes, e.g., the Alekseevka cemetery where Alakul' pottery and one modeled vessel with applied-roller on the shoulder co-exist (Krivtsova-Grakova 1948: fig. 54,1).

The uniformity of the main forms and ornaments of such ceramics over the whole vast Andronovo region does not permit us to single out local Sargary, Trushnikovo and other cultures. All of these complexes are to be called Alekseevka according to the first site discovered. Moreover, it is not justified to combine such sites with Dandybay (Margulan 1979) or reconstruct a Zamaraevo-Begazy culture (Avanesova 1991), because Dandybay complexes are not genetically related to Andronovo complexes. The succession of Alekseevka and Alakul' and mixed Andronovo complexes is evident not only in pottery but also in burial rite, types of houses and settlements, clothes, ornaments, tools, and weapons, which prove their cultural unity.

Specialists in the Volga Timber-grave culture have created a detailed division of Bronze Age sites into periods, defining a Period IV (Ivanovka) of the 12th–10th centuries BC and a Period V (Nur) of the 9th century BC (Agapov *et al.* 1983; Kachalova 1989).

Material from central Kazakhstan can also be divided into two stages: Alekseevka and later Dongal (Evdokimov and Loman 1982; Loman 1987; Varfolomeev 1987; 1988; 1991). The primary site is the settlement at Kent where a large area was excavated yielding an outstanding material complex that securely dates the Alekseevka type (Fig. 42). There are cheek-pieces of the Subbotovo and Boriyash types, perforated spearheads, bi-facial arrows, sickles of the Sosnova-Maza type, knives with ring tops, chisels, badge (Fig. 42: 3), a pair of compasses for making circles—types well-known in closed Eurasian burial complexes and hoards of the 12th (13th)-10th centuries BC. Wheel-made pottery of the later Namazga VI stage is also encountered. Metal objects and cheek-pieces confirm the proposed chronology. A razor from Sargary is especially important as it sets the lower date of the complex to the 13th–12th centuries BC (Kozhomberdiev and Kuz'mina 1980). Thus, Alekseevka sites date to the 13th–10th centuries BC. They are synchronous with Sabatinovka in the Ukraine and Il'inka on the Volga both in respect to ceramics and other artifacts.

Alekseevka-type pottery is also found at the settlements of Atasu, Myrzhik, Buguly 2, Suukbulak, Ust'-Kenetay, Karkaralinsk, Tashik, Kopa 1, Akimbek, Upais, etc. In stratigraphy it overlays the Fedorovo and Alakul' and mainly the Atasu-type layer. Pure Alekseevka complexes are found in the cemeteries of Aydarly and Dermen; in some sites Alekseevka vessels are combined with Dandybay.

Dongal

The next stage is represented by Dongal sites (Loman 1987). These are the settlements of Dongal, Tagibay-Bulak, the upper layer of Kent, and Dzhazybay and Myrzhik.

The ceramics are characterized by degeneration and the disappearance of stamped ornament, roller ornament becomes narrower and moves to the neck. Beads and appliques on the body of the pot are characteristic. Analogous pottery was justly classified as a separate type on the Trushnikovo settlement in eastern Kazakhstan (Chernikov 1960, Tkacheva 1997) The closest analogy is found among the Nur type ceramics on the Volga. It is known also in the sites of the Trans-Caspian and south Turkmenia (Kuz'mina 1988a).

The Dongal type dates to the 9th century BC on the basis of the Trushnikovo and Kent complexes. This type fills the gap between the Andronovo and Saka-Sarmatian vessels and provides an origin for the latter. K. F. Smirnov (1964: 112-127) concluded that "there is a direct dependence of a number of forms and ornaments of Sauromatian ceramics from the late Timber-grave/Andronovan, at the same time production techniques preserve traditions of the local population of the Bronze Age." Sauromatian ceramics as well as Alakul' and Alekseevka were fashioned from clay with sand, gravel, chamotte temper (plus talc in the Urals) by the coil method of ring modeling on a wide protruding base; a join can be traced on the vessels; ornament was applied over two zones in flutes with

tooth or smooth stamps as a zigzag, herring-bone, triangle, and rarely a rhombus. Sarmatian pottery develops the Sauromatian traditions; the vessel is made from a fabric-covered block mold, ornamentation was by applied-roller with a smooth or toothed stamp in zigzags, herring-bones, triangles (Voevodsky 1930: 65-66). Alakul' and Alekseevka pottery traditions are present within other groups of Iranian tribes of the Early Iron Age: the Wusun of Kazakhstan and the Saka of the Altai (Rudenko 1963: 90-91).

Thus, the analysis of Andronovo ceramics leads us to the following conclusions:

1. With respect to ceramic technology, form of vessel, zonal and ornamental elements, and composition of fabric Petrovka ceramics are close to those of the Poltavka culture and the later Potapovka culture, i.e., the early stage of the Timber-grave type culture; the similarity of their ceramic traditions can be explained by their genetic relationship with Sintashta. The origins of this ceramic tradition are found in the Eneolithic of Eastern Europe.

2. Alakul' ceramics developed directly on the basis of the Petrovka which reflects the ethnic unity of the Alakul' and Petrovka peoples.

3. The ceramics of the Iranian Saka and Sauromatian cultures preserves the traditions of Andronovo pottery which leads us to regard the Iranian Sauromatian-Sarmatians and Saka as descendents of the Andronovans.

Dandybay

Sites of the Dandybay culture date to the very end of the 11th–9th centuries BC and they are distributed over central Kazakhstan. Individual Dandybay pots are found in the Kirgiz (Dzhail'ma, Kainda, a burial at Vorontsovo, in Semirech'e (Bien settlement), in Khorezm (Tagisken), in northern Kazakhstan (Sargary), in various sites of the northern Caspian in collections of V. D. Beletsky, A. N. Melent'ev (1972) and I. B. Vasil'ev (Vasil'ev *et al.* 1986) and from the Il'evskiy cemetery in the Volgograd region (Mamontov 1980: 158).

Vessels have a globular body with a very small flattened base and cylindrical neck, sometimes with an inverted rim. The sherds are thick, the paste contains a rather specific admixture of calcified bone and crushed granite (Kuznetsova and Teplovodskaya 1994: 128). The exterior surface is black, bright-yellow and dark-red in color and usually finely polished. Ornament is in thin, deeply imprinted tooth or smooth stamp; various figure stamps are widely used; nail impressions, relief, black and brown painting are also present. Decoration covers the whole body, the neck is without ornament or has a different decoration.

Staggered oblique rhombuses, protruding opposed triangles, inscribed angles and broken shaded bands and also lattice shaded triangle and rhombus compositions situated over a grid are popular. Neither in form, decorative motifs nor manufacturing technique is the pottery similar to Alakul' or Fedorovo. Dandybay ceramics were produced by beating a whole piece of clay with a small round stone and a small spoon (Gryaznov 1952: 147). This technique was found in the Karasuk culture which also shares some similar ornamental motifs with Dandybay ceramics which prompted M. P. Gryaznov to assign sites of the Dandybay type to the Karasuk culture. A. H. Margulan opposed this (1979: 327-333) as he believed that the Begazy-Dandybay culture represented a direct continuation of

Andronovo and was the prototype of the Saka. This conclusion is disputable. Taking into account the technological, formal and ornamental peculiarities of Dandybay ceramics and their relation to Karasuk, the Dandybay complex should be seen as a separate culture which is genetically unrelated to Andronovo.

A ceramic technique similar to Dandybay is still employed by the Turkic peoples of Siberia—the Yakuts and Shorts (Podgorbunsky 1928). Craftswomen make a clay ball, press it into a hollow shape, and then beat out the body with a small spatula or wooden spoon (Voevodsky 1930: 60-61). This is a peculiar technique and is known in Siberia only among Turkic peoples which makes this technique of beating out the clay an important ethnic characteristic relating to the Turkish language family and suggests a probable migration from Siberia or Central Asia of the Dandybay peoples.

There are two types of pottery coexisting in central Kazakhstan during the Final Bronze Age (Dandybay and Alekseevka). They are undoubtedly synchronous as they are recovered from the same closed complexes, e.g., in the cemeteries of Sangru 3 and Begazy, Aydarly, and Bola-Kulboldy (Margulan *et al.* 1966: 183-6, fig. 60,93, tables 1,19; 1979, fig. 29, 234, table 7). Aleeksevka pottery absolutely predominate on settlements of central Kazakhstan during the final Bronze Age, particularly at Kent (Varfolomeev 1991). Consequently, we see that the native Andronovo population dominated in central Kazakhstan during the 11th–9th centuries BC. It produced Alekseevka vessels, but a small Mongoloid group migrated from the east, penetrated into the area, and occupied a dominant position in the Andronovo environment. Slight traces of Mongoloid characteristics on the skulls of Europoid Saka (Ginzburg 1970: 199) are probably to be explained by the participation of a small intrusive group of Mongoloid Dandybay people who contributed to the ethnogenesis of the Saka of central Kazakhstan and Kirgizia. Huge tombs of the Begazy type were built for them, with ceremonial Dandybay pottery rarely encountered on settlements. The newcomers were soon absorbed by the Andronovans. The culture of the Saka was formed on a late Andronovan basis.

Traditions of the Saka technique of hand-made pottery survive in remote districts of Tadzhikistan. The technique of ring modeling is encountered among the Karategin and Darvaz Tadzhiks, in Khuf, on the Zeravshan, Yagnob, Vakhsh and Kafirnigan (Semenov 1903: 39; Zelenin 1927: 99-100; Peshchereva 1929: 27-28; 1959: 25-39). The author personally witnessed this method of ceramic production on the Vakhsh and Zeravshan. In Darvaz, at the settlement of Gumbulak in the Faizabad district and on the Vakhsh in Kangurt district and Baldjuan a vessel is made on an inverted pot or on a special mold of pressed dung with clay. A vessel or a block is covered with a wet cloth and the potter (female) fashions the lower part of a pot. After drying she puts the unfinished pot on a wooden dish and finishes modeling the rim (Ershov 1956: 7; Peshchereva 1959: 28-29). In other cases, the walls of the vessel are modeled on a wide protruding base placed on a stone stand (Peshchereva 1959: 251).

A vessel is made in three stages as was the case with the Andronovo ceramics: the lower part of the pot is called the *bunuk*, the body with its shoulder is the *lona* and the rim is the *moruk*. The pot is said to be made “with one wall”, the carinated body of the vessel is made “with two walls”, a tri-partite vessel with a rim is made “with three walls” (Peshchereva, 1959: 33, 35). The firing of

the vessels among the Mountain Tadzhiks has been described by Grigor'ev 1931: 3 and Peshchereva 1959: 40-43, fig. 10. Women fence in a circular enclosure, the *khumb*, with stones, then put several layers of pressed cow dung (*pur*) over an area, 1.5-3m in diameter, on which the vessels are compactly placed, inverted or on their side, and they set twigs on fire; the pressed dung covers it closely from above, and this pile is fired for an entire night. In Tavil-Dara the firing is done in a special small pit; small vessels are sometimes fired in the domestic hearth.

Similar pottery traditions are found in northwest Pakistan and Afghan Badakhshan in the settlements of those small groups who speak a relict Indo-Iranian language. The population of northwest Pakistan is descended from the first Indo-Iranians who came into Hindustan from the homeland, partially before the division into separate Indian and Iranian branches, thereby preserving archaic features in their languages and mythology (Morgenstierne 1973; Jettmar 1975; Fussman 1977). The ceramic production of these peoples also reflects very ancient traditions. Ceramics were handmade. Clay, mixed with river quartz, sand and down, is crushed with a stone, mixed with water and kneaded. Then the base is formed on a flat wooden rotating saucer or dish (Rye and Evans 1976, tables 1, 3, 34). Then a band is attached to it and after that the next band is inserted slanting inwards. The walls are made even with a rib or small spatula from the outside and with a small stone from the inside (Rye and Evans 1976, tables 20, 21), then the surface is washed and polished with a small stone or egg-shaped piece of baked clay. The pots are fired in a pit, one meter in diameter (Rye and Evans 1976, tables 5, 10, 17, 21,63); its walls and base covered with stone tiles, sometimes coated with clay; in other cases a round hearth is floored with small irregular unbaked bricks and a dome is constructed on the top resembling an oven. A brick oven from the Andronovo settlement at Kipel' was probably of similar construction. All other types of hearths in Pakistan are analogous to those of the Andronovo culture.

A similar ceramic technology was borne by the Aryas into India. E. A. Grantovsky (1981; 1998) was the first to study the ceramic characteristics as they related to the origins of the Indo-Iranians. He demonstrated that the Aryas did not know the pottery wheel in their homeland and thus disproved the hypothesis of some scholars who set their homeland in Iran.

The evidence for ceramics in Vedic literature was collected by B. P. Sinha, in Brahmanic literature by M. Pandey (Sinha 1969: 155-160, 301-313). W. Rau (1972; 1974) analyzed all the data on pottery in Vedic India. The Upanishads and the Brāhmaṇas distinguish between hand-made ceramics that were pleasing to the gods and made by those who performed Aryan sacrifices in the manner of the fathers, grandfathers (*pitar*s) and those ceramics that were made with the help of a wheel by a potter (*kúlāla-*, a *śūdra*) who was not included in the Aryan community and did not participate in their sacrifices. Wheel-made pottery was not good for the sacrifice and belonged to the Asuras, the hostile aboriginal tribes and evil gods. "Asura vessel springs from the potters' hands, it is made by a potter on the wheel" (*Maitrāyaṇī-Saṃhitā* 1.8.2-3; 2.9.5); "Some vessels are made on the wheel, some are made without. What is turned on the wheel belongs to the Asuras; what is made without a wheel belongs to the gods. Thus for the Agnihotra sacrifice a pot must be made without using a wheel" (*Kāṭhaka-Saṃhitā* 6.3; 17.13; *Kapiṣṭhala-Kaṭha-Saṃhitā* 4,2; 27,3).

Similar descriptions of vessels fashioned for Aryan rituals are to be found in the *Śatapatha-Brāhmaṇa* (6.5.1.1–6.5.4.17; 14.1.2.9-25), in four Saṃhitās of the *Black Yajurveda* – the *Maitrāyaṇī-Saṃhitā* (3.1.6-8), *Kāṭhaka-Saṃhitā* (19.5-7), *Kapiṣṭhala-Kaṭha-Saṃhitā* (30.4,5), *Taittirīya Saṃhitā* (5.1.5,6) – as well as in *Taittirīya-Āraṇyaka* (5.2.8–5.3.9), *Kāṭhaka-Brāhmaṇa* (93.13-96.13) and the *White Yajurveda*. They are the *ukhā́-, mahāvīrá-, kumbhá-, sthālī́-*, etc. A vessel would be formed on the ground, or on a high round enclosed place covered with sand (*pravargyá-*). Water was added to the clay and mixed with five substances as "earth was created initially from five substances": ground sandstone, gravel, chamotte, goat hair, parts of some plants, and, following the *Śatapatha-Brāhmaṇa*, goat milk and plant resin. Then the Aryan wife made a clay tile with her hands—a foot in size—to serve as the vessel's base. Then the Aryan himself made clay tiles decorated with three signs and formed a vessel. According to the *Śatapatha-Brāhmaṇa* he forms the flat bottom of a vessel (*ukhā́-*), "then turns up an edge. Then he puts in place the first clay band… After he presses this band and moistens it well he puts on another band", he forms a three band *ukhā́-* using the divine measures of a span in height, a span in width", "he forms the *ukhā́-* from inside and from the outside" and "polishes it with a bunch of grass". We have a detailed description of coil modeling technique from three bands begun at the bottom. The *Maitrāyaṇī-Saṃhitā* (3.1.6-8) and *Kāṭhaka-Saṃhitā* (19.5-7) also prescribe: "From three bands the *ukhā́-* is to be made". The Aryans formed the *kumbhá-, mahāvīrá-* vessels, and *tryúddhi-* cauldron (meaning "made of three bands") from three coiled bands.

Neither color-slipping nor painting the vessel is mentioned in Vedic texts. A bamboo stick (stamp) appears in the *Taittirīya-Āraṇyaka* for imprinting stamped decoration (Rau 1972: 1, 14). In the *Śatapatha-Brāhmaṇa* and other texts the ornamenting of the *ukhā́-* with modeled cones (nipples) and rolled relief is mentioned (Rau 1972: 1, 46).

The modeled vessel was sun-dried and smoked with horse dung. Then the Aryan potter dug a pit oriented to the four cardinal directions. The potter put clay tiles and fuel into it adding grass. The fire was started during the day and the vessel was removed only on the next day. Then the pot was cleaned from the ashes and filled with goat's milk for cooling. This is a description of low temperature reduction firing.

There is no doubt that the production of hand-made cult vessels and firing without a hearth could appear only among a people who produced all their wares without a wheel and whose ritual preserved memories of an ancient tradition.

However, among the Andronovans and Tadzhiks pottery was made by women and in Vedic India it was made by men. Pottery was probably also a female occupation among the ancestors of the Aryans. This is indicated by the fact that the priest's wife participated in the production of cult vessels. The Mother-Earth primogenitrix of all beings, the goddess Aditi and other goddesses, helped the Arya. "Aditi is Earth. With Aditi's help he digs the earth, not to harm it; with Aditi's help he forms the *ukhā́-*"; "Dhiṣaṇā is knowledge, the goddess… must light you in the house of Earth;" "goddesses must burn you;" "Varutrī is night and day…Varutrī—two goddesses must burn you, *ukhā́-*. They burn throughout the whole day and night;" "the wives of the gods' wives first made the *ukhā́-*" (*Maitrāyaṇī-Saṃhitā* 3.1.6-8; texts of the *Kāṭhaka-Saṃhitā* 19.5-7; *Taittirīya*

Saṃhitā 5.1.6-7 are similar). In the *Śatapatha-Brāhmaṇa* (6.5.1-4) it is said that "Great Aditi forms the *ukhā-* skillfully, with force, using two hands".

Vedic data are important for reconstructing complex ideological statements accompanying the industrial process. In the *Atharvaveda* (18.4.30) a vessel is identified with Aditi. In the *Śatapatha-Brāhmaṇa* (14.1.2.9) it is said that "clay is Earth, water is sky. *Mahāvīrá-* is made from clay and water". *Ukhā-* is compared with Earth (*Śatapatha-Brāhmaṇa* 6.5.1-4): "He makes *ukhā-* as large as this Earth was first made…", "You are Earth, the base of *ukhā-* (and the near-bottom part of the vessel – E.K.) is an earth living space" (it is connected with the Vasu gods), the second band of the vessel "is an air space" (it is connected with the Rudras), the upper band "is sky" (it is connected with the supreme gods Ādityas), the walls of a vessel are parts of the world correlated to the gods, favorable to the people". Identification of the three zones of a vessel with the three spheres of the universe is stressed in the *Yajurveda*. This idea is important for interpreting the semantics of Scythian artifacts including the Chertomlyk vase with its three spheres of the universe (Kuz'mina 1976c). The fashioning of a pot is compared to the act of creation, the production of each section is followed by a spell: "Rise! Become firm! Be big! Stand straight! You are stable, you are on a solid base". According to the *Śatapatha-Brāhmaṇa* (6.5.4.17) and the *Śukla-Yajurveda-Saṃhitā* (11,59) the applied-roller is the belt of Aditi, a cord handed by Varuṇa for sacrificing; this cord is modeled on the upper third of the body of the *ukhā-*. These are "parts of the world", from it four clay borders come down vertically and terminate in modeled bosses: "gods forming the *ukhā-*, these living spaces, milked all their wishes by these nipples, *ukhā-* with four teats—it is a cow with four teats". The vessel is Makha—sacrifice, this is a sacrificed cow, this is a victim's head. The sacrificial vessel is dedicated to the god Mitra, "Owner of peoples," "Guardian of living spaces". The priest "obtains a wealth of descendants, possession of cows, good man`s power, kinsmen" (*Śatapatha-Brāhmaṇa* 6.5.1-4). Prayers are sung while mixing the clay, burning a fire, placing a vessel. Varuṇa, Agni, Vāyu, and Savitar are mentioned alongside with Mitra—ancient, partially Indo-Iranian gods. This reflects the deep antiquity of the very formation of the tradition. In highland Tadzhikistan the production of pots was also followed by complex rituals and spells; the protectress of craftswoman was called "mother" (*momo*), cf. Aditi (Grigor'ev 1931: 2-4; Peshchereva 1959: 116-129).

The Indo-Iranian origins of Vedic pottery are also supported by linguistic data: The Sanskrit name of the vessel *kumbhá-* exactly corresponds to Avesta *xumba-*, Tadzhik *hum*, Yagnob *humb* which means "vessel" and "enclosed ground for firing ceramics", Sanskrit *kulāla-* "potter" corresponds to Tadzhik *kalal* "potter"; Tadzhik *bunuk* 'the lower part of a vessel with its base" goes with Avestan *buna-* "bottom, base" and corresponds to Sanskrit *bundhyá-* "lower world". Thus comparison of linguistic and ethnographic data with evidence from Vedic literature and archaelogical materials permits us to relate Vedic ceramic production technology with that of modern northern Pakistan and the Mountain Tadjiks and it reveals the genetic proximity with the more ancient pottery of the Andronovo tribes.

The technological process described in Vedic literature corresponds with the archaelogically reconstructed technology of Andronovo pottery. The most

important details include the composition of the clay paste and the use of tempering (quartz, chamotte, plants, down), forming the vessel on a tile stand, building from the base, the ring modeling technique, polishing with grass, applied-roller ornament, firing in tiled pit, adding grass to the fuel. The most important features are the specific ring modeling and the three-part vertical structure of the vessel that permit us to compare Vedic pottery not just with Eurasian steppe pottery in general, but specifically with Andronovo pottery.

Modeled vertical rollers and small bosses are found on Andronovo vessels; its different variants are present in the Sintashta and other Novokumak wares that are related to the Catacomb and Multi-roller ceramics (Smirnov and Kuz'mina 1977, fig. 9) and is met on 12th–9th century BC ceramics decorated by applied-roller with drooping tendrils (Figs. 17, 18). The many-sided vessels mentioned in Vedic literature are of great importance. In the *Kāṭhaka-Saṃhitā* (19.5-7), *Kapiṣṭhala-Kaṭha-Saṃhitā* (30.3-5), *Taittirīya Saṃhitā* (5.1.6,7) the *ukhā́-* is said to be made with four, six, eight or nine-edges for magic reasons "against sorcery". Such square vessels are known only in Andronovo sites of the Fedorovo type (Maksimenkov 1978: tables 9, 5, 14-16, 22, 8, 9, 2, 3; Figs. 21: 2, 13, 16). These analogies are so specific that could not originate convergently.

Ethnographers have observed that traditions of ceramic production are transferred from mother to daughter within a community (Peshchereva 1959: 20; Sayko 1982: 15). Thus pottery technology is a solid ethnic indicator. Hence the evident closeness of Vedic and Andronovo pottery, the successive character of production from modern Indo-Iranians of Pakistan and Iranian Tadzhiks back to the Iranian Wusun, Saka and Sarmatians and finally to the Andronovans are extremely important arguments in favor of their Indo-Iranian identity. When the pottery tradition reached the Eneolithic of the Eastern European steppes, this specific archaeological category (ceramics) is rather important for viewing the Indo-European problem. T. V. Gamkrelidze and V. V. Ivanov (1984) propose a hypothesis that different Indo-Europeans groups arrived from the Near East through Central Asia in the second half of the 2nd millennium BC and Iranian tribes came only in the 1st century BC. Ceramic analysis does not support this hypothesis.

There were two large regions within Eurasia during the Neolithic and Bronze Age: the zone of farming cultures of the Near East and Central Asia and the stockbreeding cultures of the Eurasian steppes and Central Europe. The culture of the ancient farmers of the Near East, Iran, India and south Central Asia developed in different ways from that of the Central European zone (Table 9). In Mesopotamia, Iran, and Baluchistan ceramic production had already progressed greatly by the middle of the 4th millennium BC: the potter's wheel was invented, and specialized craftsmen engaged in making pottery for market purposes had appeared (Sayko 1982: 92, 166). In southern Central Asia in the Anau culture this innovation belongs to the end of the 3rd millennium BC and beginning of the 2nd millennium BC, to the time of the Namazga IV/V transition (Masson 1956: 295-309; Sayko 1971: 85-90; 1982: 91), in India to the time of the formation of the Harappan civilization. In contrast, in the stockbreeding zone of the Eurasian steppes hand-made pottery without a wheel and manufactured by women survived through the entire Neolithic and Bronze Age.

Recently great attention has been paid to the pyrotechnological potential of society, i.e., ascertaining the maximum temperatures used by a given culture for their industrial processes (Ivanov 1979). The pyrotechnology of Eurasian steppe tribes who fired their ceramics and cast bronze in fires and hearth pits did not exceed 700-950° C. On the other hand, representatives of the ancient farming cultures of the Near East, Central Asia and India learned to make special two-tiered furnaces and kilns with high temperature for firing pottery in the Eneolithic. Their construction in the Bronze Age was perfect (Sarianidi 1958; 1963; Masimov 1972; 1976). It is interesting to note that in the *Avesta* there is a word *tanura-* to denote an oven for firing ceramics. According to E. Herzfeld (1941) this word is not originally Iranian but was borrowed from Sumerian through Akkadian or another Semitic language.

An important pattern in the distribution of different principles of ornamentation was already observed by M. V. Voevodsky (1936: 68-73): in the zone of ancient southern farming cultures painted ornament was universally predominant. The earliest pottery of the Near East and south Central Asia, Iran and India were as a rule color-slipped and painted (the first samples of painted wares appeared in Jarmo, Hassuna and Tepe-Sarab). The transition to mass specialized production marks the disappearance of painted wares, although locally painted or slipped wares can be found. In contrast, in the stockraising steppe zone there is no painting; here stamped decoration is to be found and in the Final Bronze Age applied-roller ornament appears as well. The percentage of ornamented pots decreases. It is necessary to note in this connection that in Vedic texts ceramics with stamped ornamentation are rarely mentioned. Andronovan ornament is preserved in clothes, in the textiles of some ethnic groups of North-West Hindustan and among the Mountain Tadzhiks in particular (Bobrinsky 1900).

Analysis has shown that in the sphere of ceramic production in the Eurasian steppes during the whole of the Bronze Age (17th [or 21st according to ^{14}C]–14th centuries BC) there is no influence of Near Eastern pottery and no break in the development of the Eneolithic tradition. On the contrary, in southern Central Asia we can trace the penetration of several groups of steppe herdsmen who brought hand-made pottery into the world of the ancient farmers. All this makes it possible to reject the hypothesis that a Near Eastern population migrated to the Eurasian steppes and claim rather that the steppe tribes moved in the opposite direction.

CHAPTER SIX

MINING, METALLURGY AND THE METAL INDUSTRY

Mining comprises the extraction and refining of ore; metallurgy involves the smelting of metal from ores; the processing of metal includes the casting and forging of metal objects.

Numerous deposits of ores of copper, gold, and cassiterite, from which tin is acquired, are known across the territory of the Andronovo culture. At some mines there is evidence for ancient workings but only a few of them can be confidently assigned to the Andronovo culture. Deposits suitable for exploitation in the Bronze Age must display two features: they must involve mineral sources that outcrop onto the surface to allow easy prospection and discovery; they must also consist of oxidized ores that were not too difficult to smelt. The mining of sulphurous ores was originally impossible as it presupposes a smelting temperature of 1300 degrees which was above the thermal potential achieved by Andronovans and became possible only in the Final Bronze Age. We attribute a mine to the Andronovo culture on the basis of Andronovo ceramics or tools in an ancient quarry or dump. There are also indirect but reasonable arguments for establishing the Andronovo age of a mine on the basis of its ore composition and the presence of ore and smelted metal on an Andronovo settlement.

Descriptions of ancient mines have been made by travellers and geologists from the 18th century. Reports of ancient mines were compiled by M. P. Gryaznov (1935) for the Altai, M. E. Masson (1930; 1930b; 1934; 1936; 1953), B. A. Litvinsky (1950) and O. I. Islamov (1955) for Central Asia, V. T. Surgay (1951) for Kirgizia. A new stage in the study of ancient mining was the work of the geologists V. A. Pazukhin (1926), B. M. Chudinov (1936), K. I. Satpaev (1941), L. P. Levitsky (1941), F. V. Chukhrov (1950), D. Khayrutdinov (1955) and especially N. V. Valukinsky (1948; 1950) in Kazakhstan. They not only described mines and collected chance finds but they also examined the settlements of neighboring miners. Their data are summarized by A. Kh. Margulan (1970: 3-30; 1973: 3-24).

S. S. Chernikov conducted important research into Andronovo mining in 1935 and 1937 in eastern Kazakhstan, and then again in 1938 in northern Kazakhstan (Chernikov 1948: 13-33; 1949; 1960: 118-136). He studied prehistoric workings and discovered the settlements of neighboring metallurgists. The large material recovered from the sites permitted him to date some of the deposits and reconstruct the process of ore extraction and processing; for the first time there were comparisons between the chemical analysis of the ores and metal artifacts.

N. P. Kiparisova (Sal'nikov 1967: 275-277, fig. 41) examined several ancient mines in the Urals in 1950-1954. In 1949 A. A. Formozov (1951a: 118-119) examined the mines at Elenovka and Ushkatta which had been discovered by geologists and the nearby miners' settlements of the Elenovka microdistrict.

From 1959 to 1967 this metallurgical center was under systematic study (Kuz'mina 1962a; 1962b; 1963a; 1963b; 1964a; 1964b; 1965a; *AO* 1966: 113-114) and settlements and related burials were excavated; numerous traces of metallurgical and metal processing were revealed.

The work of E. N. Chernykh (1970) marks a new stage in the study of Andronovo metallurgy. In 1967-1968 he examined the ancient ore sources of the Urals and studied the composition of ancient metal artifacts in comparison with ores from known deposits, defining metal groups according to their chemistry, and connecting some of them with ancient mines. I. V. Bogdanova-Berezovskaya began the study of the chemical composition of metals from Central Asia. Metallurgical and metal processing centers in Central Asia were established on the basis of typological classification of the metal objects and the composition of their metal (Kuz'mina 1966; 1967; Kuz'mina 1991).

The discovery of the Sintashta settlements of metallurgists in the Urals was a major event in Andronovo research. Two ancient mines have been found so far: Vorovskaya Yama, which provided the ore for the settlement at Kuysak (Zaykov 1993: 151; Zaykov *et al.* 1995) and Kisenet which is connected with the settlement at Ust'e (Vinogradov 1995: 18). It is likely that ore from sandstones of Tash-Kazgan was used; this contained an arsenic admixture characteristic of some of the metal objects from Sintashta. It is not clear how the Sintashta population exploited the rich deposit at Kargaly (Chernykh 1996; 1997).

The unprecedented number of copper objects in burials and evidence of metal processing in every house in the settlement reveals the development of metallurgy and metal processing. Several types of hearths were used for smelting ore: a grooved hearth, paved with stone; a two-chambered hearth and domed oven with flue connected with a pit for the disposal of ash. These constructions reveal an important advance in metallurgical development in comparison with the earlier Pit-grave period, because they raised the thermal potential of society. L. White regarded the development of thermal potential as a decisive factor in cultural history.

The miners exploited the rich oxidized ore from the upper parts of serpentine deposits (Grigor'ev S. A. 1988, 1994; Zaykov *et al.* 1999). Slag containing increased amounts of arsenic suggests not only the exploitation of the Tash-Kazgan ore deposit but also artificial copper alloying, i.e., the creation of arsenical bronze, an important innovation in comparison with the Pit-grave period. Metal-working at Sintashta preserved its community character; there was no evidence for specialized skilled craft production. A larger portion of the metal objects from Arkaim were made of pure copper, some were made of copper with arsenic. In Sintashta 48% of the artifacts were made from copper with an artificial arsenic admixture, 34% was of copper with a natural arsenic admixture. In Kuysak two objects were made of pure copper, and one knife of tin bronze (Zaykov *et al.* 1999: 194-195). East European Abashevo metallurgy stimulated the formation of Sintashta metallurgy.

Sintashta metallurgy is of a domestic nature, which is indicated by its traces in every settlement and house and the lack of any features of craft specialization. However, the volume of production was such that the Sintashta community as a whole (and not through specialized craft production), exported metal to the regions of the Volga and Don, areas poor in natural resources. Petrovka and

Alakul' metallurgy inherited and developed the pre-Sintashta traditions (Grigor'ev 1995a: 122-126).

V. D. Ruzanov (1982; 1987) studied the bronzes of the Chust culture. A. D. Degtyareva (1985) examined the bronzes of Kazakhstan and Semirech'e. The advantage of her work is in the analysis of technological processes. Detailed studies on ancient mines and settlements of metallurgists at Atasu and Myrzhik in central Kazakhstan (Alekseev and Kuznetsova 1980; 1983; Kuznetsova 1987; 1989a; 1989b; Kuznetsova and Belovodskaya 1994; Kadyrbaev 1983; Kadyrbaev and Kurmankulov 1992; Zhauymbaev 1984a; 1984b; 1987; Kurmankulov 1988) are of special importance for the study of the developed Andronovo metallurgy.

A number of Andronovo copper mines were found by geologists and archaeologists. These include Elenovka and Ushkatta (chemical group EU) in the west; their production reached 50.43% of west Andronovo metallurgy and was exported westward where it comprised 24.6% of the metal of the Timber-grave culture (Chernykh 1970: 38, 40, table 5, fig. 40). The antiquity of these ancient mines is proved, in the first place, by the discovery of Andronovo ceramics and stone tools near the quarries and working areas; in the second place, by the discovery of ore fragments, slag, beads of copper and bronze objects made from Elenovka ore according to E. N. Chernykh (Kuz'mina 1962a; 1962b; 1963a; 1963b; 1964); in the third place, by the fact that the enclosures of the Andronovo cemetery at Elenovka are made of stone excavated from the nearest quarry (Formozov 1951a: 118-119; Kuz'mina 1962a; 1962b; 1963d: 129; 1964b; Sal'nikov 1967: 275). The Andronovans also exploited the southern Urals deposits of Bakr-Uzyak at Magnitogorsk, the group of Uchaly deposits by Uy-Tash-Kazgan (chemical group TK). The deposits of the Zau group were also exploited: Nikol'-skoe, Polyakovka, Narali, Voznesenskoe, Mednaya Gora, Kichiginskoe (Ust'-Kaban). Ore from the Uvel'ka river deposit was found on the Andronovo settlement of Chernyaki 3 (Chernykh 1970: 40-45, 3, fig. 32). Andronovans also developed the Kargalinsk (Chernykh 1970: 48, 199) and Sol'-Iletsk deposits, where copper bars were found alongside Andronovo pots (Popov 1964: 262, fig. 46). Ancient ore workings at Uro-Tyube and Yashilly were discovered, along with a stone hammer and miner's pick analogous to tools from neighboring Andronovo settlements (Chernikov 1948: 20,21,28). Central Kazakhstan was the largest center of copper mining with the richest oxidized polymetal ore deposits where one can find pieces of native ore weighing several tons (Pazukhin 1926; Satpaev 1929; Valukinsky 1948; Chukhrov 1950). The exploitation of mines in Dzhazkazgan—Kresto, Petro, Zlatoust, on the Dzhezdy river, etc.—extend back to the Andronovo period where numerous stone tools and ceramics fragments are found and near which the settlements of Andronovo metallurgists such as Mily-kuduk, Aynakol', Sorkuduk, Kulman (with numerous mining tools and evidence of metal processing) are situated (Satpaev 1929a; Valukinsky 1950; Margulan 1973: 3-24; 1979: 233-254; Zhauymbaev 1984a; Kuznetsova 1989a; 1989b). The majority of ceramics in the Dzhazkazgan settlements belongs to the Alekseevka type, which dates the floruit of this center to the last quarter of the 2nd millennium BC. The exploitation of the rich Kenkazgan polymetal deposit began in the Andronovo period, which is demon-strated by the discovery of stone mining tools and Andronovo ceramics in quarry dumps and the similarity of the

chemical composition of copper from Kenkazgan ore with that of slag and metal objects from the large settlement of Atasu which lies 80km from the deposit and probably served as its base (Alekseev and Kuznetsova 1980; 1983; Kuznetsova 1987; Kuznetsova and Belovodskaya 1994; Kadyrbaev 1983; Kadyrbaev and Kurmankulov 1994). Another ore source for Atasu was the mine at Sarybulak, 20km west of the settlement. Slag, stone tools and ceramics were found near the quarry (Zhauymbaev 1984a: 114-117, fig. 1; 1984b; 1987: 109). The Andronovo age of the Altyn-Tyube deposit is unquestionable: its ore is close in composition to some imported Timber-grave objects (Chernykh 1970: 17). A settlement and Bronze Age stone enclosure lie near the Altyn-Tyube mine, where ceramics were found (Zhauymbaev 1984a: 117-119, fig. 2, 3; 1987: 109, 110). A large group of ancient mines is concentrated in the Karkaralinsk district: Meizek, Zheradur, Syrymbet, Kalmaktas, the latter of which is rich in native copper; copper blocks of 600-700kg are found there (Chukhrov 1950: 50; Margulan 1972: 5). Highly probable is the exploitation of the mines on the Tokraun river in the north near Lake Balkhash: Kenely, Sorkuduk and Kayraktas; this is demonstrated by a nearby concentration of settlements of Andronovo miners (Khayrutdinov 1955; Margulan, 1972: 18). Near Balkhash at the Tesik-Tas mine stone hammers and wedges, as well as Alekseevka type ceramics, were found (Zhauymbaev 1987: 110). Several dozens of ancient copper mines are known from eastern Kazakhstan. Andronovans extracted ore from the Karchiga deposit, where stone and bronze tools and ceramics were found (Chernikov 1949: 38-39; 1960: 118). In western Siberia, apart from the native copper deposits of the Altai, we also have the Kuznetsk Alatau deposit with large nuggets; native ore is also found in the Tom basin (Kosarev 1974: 24) but there is no proof that it was exploited by the Andronovans. Copper deposits are also found along the Yenisey where ancient mines have been discovered (Lev 1934), but definite Andronovo sites there are not known to the author. Andronovans also utilized sources in Central Asia. In the central Kyzylkum, in the Bukan-tau and Tamdy-tau mountains ancient mines have been discovered, and close to them in Beshbulak and Munbulak there are metallurgical sites with traces of copper smelting and slag, as well as Tazabagyab, Alakul' and Fedorovo ceramics, which prove that Andronovans exploited these deposits (Itina 1961: 84; 1977: 136). An important copper extraction area was in the Nurata mountains north of the the Zeravshan: Nurata, Lyangar. Polymetal and oxidized ore deposits and numerous ancient mines are known from the Karamazar mountains (Litvinsky 1963: 170): Uchkatly-Miskan, Kansay, Adrasman (a flint spear that dates from the beginning of its exploitation during the Bronze Age was found on the latter site). From the Almalyk mines (Masson 1936) native copper and polymetal ores were extracted; that this occurred during the Bronze Age is shown by the discovery of a copper knife and a flexed burial. Copper-bearing sandstones and native copper deposits in Fergana are found in Naukat. It is likely that metallurgists from sites on the Kayrak-Kum worked on these, which is demonstrated by the similarity between Kayrak-Kum bronze objects and the ore from this deposit (Litvinsky 1963: 170; Kuz'mina 1966: analysis #79). Mines with ancient workings are known in Semirech'e: on the Chu river, in the Talas valley (Aktash), near Ketmen'-Tyube, on the Issyk-Kul', in the districts of Alma-Ata and Arpa (Masson 1930a: 44; 1980b: 35; 1936: 12).

Of principal importance for the development of Andronovo metallurgy was the fact that the Andronovo culture was the main, if not the only, tin supplier on the Eurasian steppes. Cassiterite deposits for tin extraction are known in central Kazakhstan. The Atasu deposit was a tin source for the Atasu settlement, which is indicated by diagnostic admixtures in the ore (Kuznetsova 1987: 44). Ancient metal-working sites are also known at the Kalay-Kazgan mine in north Betpak-Dala (Margulan *et al.* 1966: 269; 1973: 5), on the Ishim, and in the Kokchetav mountains (Margulan 1972: 25). The richest tin mines are in eastern Kazakhstan in the Kalba and Narym mountains. The earliest site known is the mine at Mynchunkur (shown by Andronovo ceramics, a stone mold for a knife and chisel), Cherdoyak (Andronovo ceramics and stone mining tools), Karagoyn (ceramics and two knives of the late Bronze Age) and others (Chernikov 1949: 10-36, tables vii, xii, 3, 4, xiii). There are subterranian placer cassiterite deposits on the Irtysh (Chernikov 1960: 135). Several deposits of placer cassiterite were recorded for the basin of the Tom (Kosarev 1974: 24). Rich cassiterite beds are in Central Asia: in the central Tian-Shan and in the Issyk-Kul' area, in the Zeravshan ridge—Takfan; in the Zerabulak mountains near Samarkand—Changali and Kochkarly, and an especially rich deposit at Karnab west of Samarkand with many stone mining tools from the Bronze Age (Litvinsky 1950: 1954). Tin deposits permitted bronze casting to flourish among the Andronovans, helped to establish their active contacts with other tribes, and provided them with an outstanding role in the steppes.

The Andronovans also exploited gold deposits, both ore and placers. In the Urals, in Bashkiria, it was extracted from the Kuseevskiy mine where polished stone tools have been found (Sal'nikov 1967: 278-279). North Kazakhstan was immensely rich in gold (Chukhrov 1950: 17-25). Placer gold was extracted at Borovoe and there were mines in the Stepnyak area (Stalinskiy, Bes-Tyube, Aul'naya Ploshchad'). Their undoubtedly Andronovan age is shown by the fact that settlements, where we recover Andronovo and mainly Alekseevka ceramics, metal objects and stone tools, are close to the metal working sites (Chudinov 1936: 37-40; Chernikov 1948: 14-19). There are also gold veins and nuggets in central Kazakhstan. A large number of ancient mines are known here: in the Karkaralinsk district (Altynsu, Alabuga, Kyzyl-Espe, Akchagyl, Akzhal, Murza-Shoku) in the Boyan-Aul district (Altyn-Kazgan, Altyntas); in the Karaganda district (Zhosaly, Kushoku, Kenshoku); in the Ulutau mountains (Akshoku, Sorkuduk, Koskol, Obaly); in the vicinity of Lake Balkhash (Sayak) and many others (Chukhrov 1950: 4, 54; Margulan 1972: 17-18). Their exploitation by Andronovans is documented by stone tools in the mines and the location of settlements near the mines. Gold ore was extracted in eastern Kazakhstan at Kazanchunkur, placers were exploited on the Irtysh, shown by findings of numerous Andronovo bronze objects (Gryaznov 1935: 192-193; Chernikov 1960: 118-119). Central Asia is rich in gold. Placer gold was washed in the Fergana on the Sokh, Kassansay at Uzun-Akhmat (where a bronze knife was found), on the Naryn (a bronze axe was discovered in Uch-Kurgan). In the mountains near Tashkent placer gold was extracted on the Angren and Chirchik rivers. The antiquity of the gold-panning is proved by the Chimbaylyk hoard in a gold-bearing layer and the Andronovo burial at Iskander on the Chirchik near the deposit. Much gold is contained in the Zeravshan, Vakhsh and Kafirnigan rivers

that flow from the Pamirs. Written sources refer to its extraction in antiquity, but gold was probably extracted as early as the Bronze Age; from this period derives a hoard of an axe, chisel and spear found in a mine at Darvaz and the etymology of the ancient Iranian name of the Zeravshan river is "scattering gold".

The Andronovans also extracted silver and lead. They were used, for example, in Semirech'e: at Tash-Tyube silver temple rings and lead beads were found. Sometimes lead was artificially added to copper. With regard to silver-lead mines there are ancient workings in central Kazakhstan at Berkkara and Kyzyl-Espe (Margulan 1972: 29-30), but it is not known if they were used by Andronovans or not. Rich polymetal deposits with much silver and lead are in Central Asia: Lashkerek (Islamov 1960) and Karamazar, where stone mining tools including "hoes" of Andronovo type were found in the Kansay mines. A copper knife was discovered in the Dzhol-say silver-lead mine in Kirgizia (Islamov 1960: 188). There are gelenite deposits (from which lead is extracted) in Talas Alatau (Litvinsky 1954: 24-25) where a copper knife and antler pick-ax were recovered.

The Andronovans also used antimony, especially in Central Asia. It was used for ornament (a bead in Kayrak-Kumy) and in copper alloying to produce a solid alloy. Antimonite deposits for antimony production are found in the Kashka-Darya at Shut, on the Zeravshan ridge at the Marguzar lakes, in Fergana on the Sokh and Shakhi-Mardan. But the author is unaware of Andronovo objects being recovered from there.

Mining tools are found in the mines, in work stations and in miners' settlements. They are uniform along the whole natural habitat (Kuztetsova and Teplovodskaya 1994). Wedges were fashioned from rough polished stone; there were large stone hammers, weighing up to 40kg, with notches to facilitate hafting; there were so-called hoes, pick-axes, hammers, axes used for working, and numerous tools for breaking up the ore, along with pestles and mortars; light hacks for exploiting placer deposits were made from Siberian deer horn; tools for extracting soft rock were made from animal ribs and shovels were fashioned from shoulder-blades (Krivtsova-Grakova 1948: 104, fig. 28,4; Chernikov 1970: 126, tables 24, 1-3, 18,7; Kyzlasov 1965: 165-168, fig. 1-3; Margulan *et al.* 1966: 168-169, tables 23, 32, 33, 40, 43, 47, 48; 1979: 238-247, fig. 126, 160,2, 162-165, 173, 179-182; Vinogradov 1983: 13; Grigor'ev 1988: 47-51; Kuznetsova 1989b: 119). Pick-axes and picks were made of bronze.

There were open and closed mines (Fig. 28). Open mines predominated. These comprised: type 1) large quarries of round or oval form; type 2) long narrow trenches; type 3) several shallow pits. All types are synchronous, the different forms of extraction conditioned by the specific character of the ore deposit of the mine.

To the first type belong, for example, the following mines: Vorovskaya Yama which measured 30-40m in diameter, 3-5m deep (Zaykov *et al.* 1995: 158); Elenovka, which covered an area 46 x 37m, up to 4m deep; Bakr-Uzyak – 55 x 35m, 3m deep (Chernykh 1972: 77); Uro-Tobe – 32 x 17m, up to 9m deep (Chernikov 1948: 20, fig. 7); Airanbai – 45 x 50m; Petro – 16-18 x 8-10m, 2m deep; Kresto 2 – 30 x 10m, 4m deep (Margulan *et al.* 1966: 267); the Sarybulak works measured 5-35.7 x 13.9m, 2.5-3m deep; Altyn-Tyube from 17-20 x 9-10m to 20 x 20m and 27 x 15m, 1-3m deep (Zhauymbaev 1984a: 115, 117, fig. 2).

Many quarries in central Kazakhstan are much larger, e.g., the Kenkazgan quarry was 500-1000 square meters (Alekseev and Kuznetsova 1980: 4-8; Kuznetsova and Teplovodskaya 1994).

To the second type belong the Ushkatta 1 mine with a trench 130m long and 12-20m wide; Stepnyak, where trenches spread one after another along the vein for several hundred meters; the Stalinskiy mine with parallel arrangement of several narrow trenches (Chernikov 1948: 15, fig. 3, 6); Sayak with 85 oval pits spreading along 1km; Tesik-Tas with 16 oval pits arranged in a chain; Dzhazkazgan with a 4-5km chain of long trenches (Margulan 1972: 19); the Altyn-Tyube extraction site of 9-33 x 2-3m (Zhauymbaev 1984a: 117, fig. 2).

To the third type of sites belong the Ushkatta 2, 3, 4 mines, Ust'-Kaban, Bes-Tyube, Kresto 3, Yashilly Sarybulak, Altyn-Tyube (Chernikov 1948: 21, fig. 8; Margulan *et al.* 1966: 267; Zhauymbaev 1984a: 115-117).

Closed mines are typified by vertical mine shafts and closed galleries. Type 4 mines comprise gallery-pits narrowing downwards to a depth of 30m, sometimes in steps, into abruptly falling veins; these have been found on cassiterite deposits, e.g., in Kara-Goin, Mynchunkur, Alabuga (Chernikov 1970: 121, tables 20,1,3, 21,1,3). To avoid collapse the ancient miners left arches of native stone that divided a gallery into compartments. Type 5 mines comprise closed galleries—corridors set on the horizontal or inclined from the hill slope. Small galleries with a narrow manhole where it was possible to work only in a horizontal position are known from Ushkatta, Kuseevskiy, Dzhazkazgan, Petro, Zlatoust, and Altyn-Tyube. Large industrial sites of this type are at Cherdoyak, the Karagoyn mines (Chernikov 1949, fig. 2,8; 1970: 122, table 22), Dzhezkazgan, Kyzyl-Espe, Kenkazgan, and Karadzhal (Margulan 1972: 19). Column-like pillars of native rock were sometimes left; in Kazanchunkur stone support columns are known. In spite of these precautions, galleries did collapse and the skeletons of miners are often found in ancient mines (Lev 1934: 21).

To penetrate the stone Andronovo miners heated the rock and then applied water to cool it so that it cracked and was accessible to stone and copper tools (Chernikov 1948: 24). The extracted rock was sorted out near the mine. Then on the benefication grounds, on the banks of a water source, the ore was crushed and washed. Such grounds have been discovered in Elenovka, Ushkatta, Stepnyak, Stalinskiy Rudnik, Aul'naya Ploshchad', Bes-Tyube, Dzhezkazgan, Kresto, Zlatoust, etc. In central Kazakhstan, where the deposits were situated in a desert area, special stone-built dams were constructed to hold flood waters to wash the ore (Korgantas, Keregetas, Zhetumshoky, Altynsu, Sorkuduk, Taskuduk, Milykuduk, Kipchakpay; Margulan 1979: 263-270). In settlements they deposited the washed and crushed ore in pits, 3m in diameter and 1m deep, and covered them with stone plates (Chelkar, Milykuduk, Atasu; Margulan 1979; Kadyrbaev and Kurmankulov 1992).

Metal smelting took place in the settlements. Remains of smelting have been discovered on monuments of all types across the entire Andronovo region. Spectacular traces of metallurgical production were already known from the early settlements of the Sintashta and Petrovka types. Metallurgical furnaces, numerous deposits of slag, drops of copper, and stone metal processing tools are found at Sintashta, Arkaim, Kumak, Ust'e, and Kulevchi 3 (Vinogradov 1982: 97, 98; Grigor'ev 1988: 51, Zdanovich 1989: 184).

From the middle of the 2nd millennium BC the main sources of raw materials were the native deposits of the Urals and Kazakhstan, and copper was replaced by bronze. There are numerous traces of slag, copper drops, pieces of ore and other evidence of bronze casting on all Elenovka settlements. At Elenovka and Tursumbay two-chambered furnaces are found. At Shandasha casting was accomplished in a special production room, with slag and a knife mold recovered from a furnace. The furnace was connected with narrow grooves, covered with plates and filled with ash and slag; into the grooves ran narrow channels into which nozzles were inserted. Major industrial complexes (hearths, large pits filled with slag and layers of coal, two-chamber furnaces and associated fragments of ore, concentrations of slag, copper plates, sometimes crucibles and fragments of casting molds) are known from the settlements of Sarafanovo, Alekseevka, Burli, Petrovka 2, Novonikol'skoe, Malokrasnoyarka, Novoselovo 7 (Chebakova 1975: 92, 93; Krivtsova-Grakova 1948: 105, 106; Zdanovich 1988: 41, 53; Chernikov 1960: 43, 128).

The most numerous traces of bronze casting production are in central Kazakhstan. In the Alakul' settlement at Entuziast 1 a three-chambered bronze casting furnace with a stone dome was studied; nearby there were fragments of clay casting molds, ore, slag, and metal drops (Tkachev 1987: 31; 1991: 8).

The Final Bronze Age settlements of Kent, Upais, Buguly, Karkaralinsk, Suukbulak, Aynakol', Sorkuduk, and Milykuduk have yielded both production complexes and workshops with copper foundry furnaces (pit form, 1-2 to 3-4m in diameter, 0.5 to 2m deep, sometimes covered with slabs). There were hearths and concentrations of stone mining tools, casting molds, slag, metal plates including lead plates up to 5kg in Suukbulak (Varfolomeev 1991: 8,12; Akishev *et al.* 1965: 105; Valukinsky 1948; Margulan 1979: 233; Kuznetsova and Teplovodskaya 1994, 1, ch. 2). The appearance of specialized workshops reflects the great progress in metal processing in the Final Bronze Age.

The most spectacular metallurgical complexes have been investigated at the settlement of Atasu (Margulan *et al.* 1966; Kadyrbaev and Kurmankulov 1992; Kuznetsova and Teplovodskaya 1994). The whole area of the Atasu settlement is peppered with trenches and pits connected with metal processing; there is much ore, slag, copper plates and ore crushers on the surface. There are hearths in many of the houses. The production complexes are grouped in the center of the settlement. The Atasu furnaces were of various constructions, depending on function. For the preliminary heating of the ore there were large clay covered pits, 2m in diameter, 1.5m deep, with a channel for bellows. The smelting of ore took place in furnaces with deepened bottoms. Furnaces for casting metal were prepared in a pit covered by stone slabs and clay. A smoke flue comprising a channel 0.15—0.2m deep and from 8 to 12m long led to the furnace. Copper plates up to 1.5kg were found near the furnace. Two-chambered furnaces with a crucible and an air-intake chamber were employed for refining black copper oxidized ore. They are known from many Andronovo settlements, including the Elenovka micro-district, as well as in Tuva and in Khakassiya (Sunchugashev 1975).

The smelted copper flowed down, sometimes into a vessel. At Ushkatta 2, Kiimbay, Spasskoe, and Novoselovo there were vessels with copper slag attached. The metal solidified in the form of a flat round cake, 10-20cm in diameter, and weighing 3-5kg. Such plates are found at Stepnyak, Sol'-Iletsk,

Atasu, at the Kargalinsk and Berdyansk mines, at Borybas, on many Elenovka settlements and on sites of the Timber-grave culture (Krivtsova-Grakova 1948: 106) where they appeared from Andronovo metallurgists (Chernikov 1960: 129; Popov 1964: 262; Sal'nikov 1951a: 126; Margulan *et al.* 1966: 212).

To improve the quality of the metal tin was artificially added to copper, resulting in a bronze alloy with greater solidity. In Central Asia and rarely in central Kazakhstan we find alloys of antimony, lead and zinc. Sometimes cassiterite, present in the copper ore itself, was deliberately added. The molten metal was initially turned into a bar (Chernikov 1960: 130; Bogdanova-Berezovskaya and Naumov 1962: 205; Kuznetsova 1987: 44), usually composed of pure copper. Metal processing was often accomplished in the same kilns as those employed for firing ceramics.

Objects were produced by forging and casting. Stamping and chasing were also used for decoration. Single and bi-valve molds, made of stone and clay, were used. In the Final Bronze Age there were undoubtedly bronze molds, e.g., the Tomsk mold. Clay molds were used by both the Timber-grave and Samus' cultures. In the west Andronovo region and probably in eastern Kazakhstan stone molds prevailed; in north and central Kazakhstan clay molds were also employed. The latter are found especially often on sites of the Final Bronze Age (Sal'nikov 1951a: 128; Zdanovich, S. 1979: 12). Tri-partite molds appeared only at the end of the Bronze Age; a plate from the Shamshi hoard was cast in such a mold (Ryndina *et al.* 1980: 168). Each mold was intended for the casting of a single object. Matrices for producing several objects, a characteristic of Ukrainian metal working, are rare in Andronovo territory, although they are known especially in the Final Bronze Age (Kundravinskaya, Aleksandrovskaya, Malokrasnoyarka, Alekseevka) (Sal'nikov 1967: 52.15; Chernikov 1960, tables 38,1,16,1-4; Kuz'mina 1966: tables 3,10; Evdokimov 1975a: fig. 6,8).

Use of the cire-perdue technique was rare. Casting about a core was used for the production of socketed and lugged objects. Crucibles in the shape of a footed cup are known from Kipel', Elenovka, and Kamyshnoe 1, and clay or stone crucibles in the form of cups with vertical or horizontal handles have been recovered from Ushkatta 2, Kambulat 1, Alekseevka, Zamaraevo, mines on the Kurchum (Chebakova 1975: 99, fig. 4.3; Krivtsova-Grakova 1948: 106, fig. 32; Sal'nikov 1951a: 128; Maksimova 1959: 126, fig. 9). Cast tools required further processing with the sharpening of blades and the smoothing of casting seems.

Andronovo metallurgists worked out the optimum technologies of metallurgical production, taking into account the function of the object, alloy composition, and thermal and mechanical processing regimes (Degtyareva 1975: 12-16). The majority of tools was cast in bronze, containing 1-12% tin (averaging 7%), with further finishing of the whole object (20-40% reduction) and strengthening the working part by hot forging (with 70-80% reduction). Tools that had a simple form such as awls, hooks, and chisels were forged from cast blanks. For striking tools (picks) and for sickles a softer more plastic metal was needed, and so these were made of pure copper or from bronze with a low (less than 2-3%) tin presence. For cutting, piercing and chopping objects (celts, axes, adzes, chisels, awls, spears, daggers, knives and arrows) a stronger metal was required, and here we find bronzes with 5-7% to 15-25% tin content employed in their production. The blade was annealed for added strength (reduction at 20-40%). Ornam-

ents such as mirrors and plates were produced in single molds; bracelets, earrings, and beads were forged by cold casting from a cast blank. To provide the plasticity necessary in finishing tools and weapons annealing was accomplished at 700-800 degrees (Chernikov 1951: 140-161; Chernykh 1970: table 3; Degtyareva 1975: 12-6; Ryndina *et al.* 1980: 159-170; Korenevsky 1977: 49, table 2).

Metal processing technology was universal across the entire Andronovo area and flourished in the Final Bronze Age, when temperature regimes, processing methods and alloying were standardized (Kuz'mina 1966). However, in bronze casting there appear local distinctions (Table 4). The concentration of tin diminishes according to distance from cassiterite deposits (Chernikov 1948, table 3; 1960, table 48).

Region	Copper objects	Bronze objects	Among them with typical tin content	Typical tin content
E. Kazakhstan	no	100	75	12-26
Semirech'e	few	88.8	92	1-12
C. Kazakhstan	29	62	78	6-18
N. Kazakhstan	28	61.4	74	1-12

(After Degtyareva 1985)

Table 4: Composition of metal industries according to region in % of metal objects

In the western Andronovo we find tin in only 62% of the objects, and in the Volga-Ural chemical group two-thirds of the objects were made with the deliberate alloying of tin; in the Elenovka-Ushkatta group it was less than a half; it is still less in Timber-grave metallurgy where only one third of the cast objects were of tin bronze (Chernykh 1970: 16, 21, 22, 111). Only 35% of the tools were tin alloyed and made of metal from the BK group, and one third of the objects were of Elenovka-Ushkatta copper (Korenevsky 1977: 49, tables 1, 2). It proves that tin was very expensive in the west and it derived from eastern Kazakhstan and perhaps partially from central Kazakhstan and Central Asia.

In bronze casting ore from nearby deposits was mainly used. On settlements of the Elenovka microdistrict we find Elenovka ore, at Atasu the ore derives from Kenkazgan, at the Kayrak-Kum sites it came from Naukat, etc. It raises the issue of several independent local centers of metallurgy and metal processing across Andronovo territory (Kuz'mina 1966: 92-94). A center of production is indicated by: 1) the presence of copper deposits suitable for exploiting in the Bronze Age; 2) traces of exploitation of these deposits by the Andronovans; 3) proximity of the composition of the metal objects with the ore from the deposits; 4) evidence for metallurgy and metal processing on settlements; and 5) the spread within a center of a certain limited set of metal types, sometimes including specific types typical for a given center.

The ore from the Elenovka center in the Urals is characterized by the inclusion of silver, antimony and arsenic (Chernykh 1970: 22, fig. 9, 21); the ore in northern Kazakhstan contains gold but no arsenic, no or little antimony, lead and nickel; central Kazakhstan ore contains admixtures of lead, iron, manganese, also of zinc, silver, cobalt and nickel (Kuznetsova 1989: 100); the eastern Kazakhstan center is characterized by its high content of lead and especially antimony, it has no gold and nickel (Chernikov 1951: 142,150, tables 1,2); the Semirech'e center is marked by its high content of nickel, lead, arsenic and also bismuth, silver and

antimony (Kopylov 1955; Kuz'mina 1966: 109, 110; Ryndina *et al.* 1980: 154, fig. 1); Fergana is characterized by the presence of zinc along with its high content of antimony, lead, arsenic, silver and bismuth (Kuz'mina 1966: 107; Ruzanov 1982) and finally, the Andronovo objects from the center of Central Asia contain much lead, antimony and arsenic (Ryndina *et al.* 1980: 157). One will probably be able to identify metallurgical centers in Siberia, especially in the Altai, in the future. Each center is characterized by a specific assemblage of metal objects (Chernikov 1960; Kuz'mina 1966), as well as preferred production traditions (Degtyareva 1985: 18-22). In every center proposed the bronze objects reveal a chemical composition involving the presence or absence of elements corresponding to the ore from local deposits. However, even at sites near mines there are objects made from imported metal. Thus, in the Elenovka micro-district alongside the dominant Elenovka copper there is also metal of the VK and VU groups (Chernykh 1970, table 3, #1433, 1435, 1437-9, 1445, 1449, 1452). A still more varied metal composition is observed on sites situated far from mines. In the Tasty-Butak cemetery there are objects of three types of alloys and an object regarded as an Altai import (Bogdanova-Berezovskaya and Naumov 1962: 203-206, table 6). One object from the Shamshi hoard was imported (Ryndina *et al.* 1980: 154).

Thus, in contrast to pottery metallurgy was not a domestic craft among each community of Andronovans. Metallurgical production was a special craft that was not only intended to meet the demands of the local community but was also produced for exchange (Chernykh 1970: 112, fig. 30, tables 1-5). Metal from the Kargaly mine was distributed as far as the Danube (Chernykh 1996: 71). Metal from Elenovka-Ushkatta (Map 6) was utilized by related Andronovo tribes (Khabarnoe, Uvak, Mechet-say, Alakul', Chernyaki 2, 3, Kipel', Novo-Burino), mixed Timber-grave–Andronovo tribes (Gerasimovka; Fig. 59), and the bearers of other cultures: Pre-Kazan' (VII Lebedinskaya), Pozdnyakovo (Borisoglebskiy cemetery) and especially the Timber-grave tribes, where objects of Elenovka metal were spread from Bashkiria (Beregovskoe settlement) to Kalmykia (Elista), and the Don (Ilmen, Mazurka). They were especially numerous on sites on the Volga (Yablonovka, Politotdel'skoe, Atkarsk, Berezhnovka, Rovnoe, Molchanovka, Potemkino, Pokrovskiy, Skatovka, Karamysh, Chardum). N. L. Chlenova (1983a: 56) composed a map of the distribution of ore and gold objects (table 8, map 5) on the basis of our data and the analyses of E. N. Chernykh. In Timber-grave metallurgy one can discern a small group of tinned bronzes from the Altyn-Tyube deposit near Karaganda (Chernykh 1970: 17). Bronze objects of Andronovoid types are also numerous in the northern Andronovo cultures.

There are no data supporting the exchange in bar-form or ready-made objects. Probably both of them took place. The few bars and traces of metal processing on Timber-grave settlements on the Volga, and the typological closeness of Timber-grave objects, especially ornaments, with those of the western Andronovo suggest that the trade was in the form of finished objects with the Timber-grave people. In contrast, the majority of Andronovo settlements, even those far from deposits, e.g., the settlements of Kipel', Novo-Burino, Bakhtinskoe, Alekseevka (Sal'nikov 1951a: 127, 128; 1967: 337; Krivtsova-Grakova 1948: 104-107), are characterized by molds, drops of copper, slag and even pieces of ore, although not as numerous as in the micro-districts

surrounding a mine, but proving that metal processing was done by every community to satisfy its demands.

The Andronovans outstripped the neighboring Eurasian tribes in mining, metallurgy and metal production, supplying bars and ready-made objects.

Quantifying the amount of metal extracted by the Andronovans is extremely difficult as in ancient times a large amount of native copper and gold was used which is impossible to take into account; also not all deposits exploited by the early populations are known nor is the scale of mining in the Iron Age known. E. N. Chernykh (1996: 71) calculates that during the Eneolithic and Bronze Age the giant Kargaly mine yielded 1.5-2 million tons of ore. Extraction of ore in Vorovskaya Yama reached 6,000 tons of ore, i.e., 10 tons of copper (Zaykov *et al.* 1995: 161). At the Kenkazgan deposit on the basis of the Atasu settlement extraction is estimated at 800,000 tons of ore which would yield 30,000-50,000 tons of cast copper (Alekseev and Kuznetsova 1980: 4-8). More reliable are calculations for cassiterite extraction in eastern Kazakhstan because it was exploited only in the Bronze Age. S. S. Chernikov (1960: 135) estimates that 130 tons of tin ore was extracted which constitutes 130-150kg of annual tin extraction, reckoning on about 500 years of exploitation.

The organization of labor in Andronovan metallurgy is problematic. S. S. Chernikov (1960: 132-136) considered that deposits were exploited only in the summer by small clan groups of 8-10 people; moreover, child labor was used in the narrow pit-faces. However, at the large deposits of Elenovka and in central Kazakhstan, where there is evidence of settlements of whole groups of metallurgists, the scale must have been considerably larger.

G. B. Zdanovich (1989) believes that the Sintashta population, living near the Ural mines in a fortified settlement of the Arkaim type, had achieved the stage of urban civilization which is characterized by craft specialization. The success of these tribes in metal production and in military affairs secured their supremacy of the Eurasian steppes and preconditioned their society for stratification. However, one should not overestimate the level of their culture. There are no traces of social and property differentiation within the settlements, there is no evidence of communal-scale craft specialization. The specific character of their cattle-raising economy and the vastness of the steppe led to the extensive way of their culture development. Progress in metallurgy and in metal production was not based on the increase of productivity by the growth of craft-specialization and division of labor into a special branch of society, but rather by the introduction of new technologies: copper was replaced by a bronze alloy, the development of alloying methods to suit the function of the implements, the creation of optimum thermal regimes and forging methods for ready-made casting. All these innovations spread quickly across the whole Andronovo region and technological progress was realized through standardization.

E. F. Kuznetsova (1987: 44) and A. D. Degtyareva (1985: 200) suggest that metal processing in the 15th–13th centuries BC should be characterized as an independent craft, the rise of craftsmen clans in different territories (divided into miners, metallurgists-founders, and smiths); this is not confirmed by evidence from Andronovo settlements.

Considerable progress in metallurgical production was achieved in the Final Bronze Age. At that time Andronovo tribes started using not only oxidized but

also sulphide ores, which demanded additional processing stages: slag and matte, production of black copper with the required increase in temperature. It demanded improvement of the type of metallurgical furnaces, such as that discovered at Atasu. Considerable progress in metal processing is proved by new types of alloys (copper+lead+tin, copper+antimony+tin, copper+arsenic+tin) (Kuznetsova 1987; 1994), tripartite molds, new types of weapons and tools with higher efficiency. All these innovations presupposed the development of metal processing seen in the Early Iron Age: most types of metal tools, daggers, and arrows were prototypes of objects used by the Saka and Scythians. They also inherited many technological processes and methods, and the introduction of iron itself was a logical result of Final Bronze Age progress; experiments in their integration are found on many settlements of the 13th–9th centuries BC.

Considerable changes in the steppes during this period are shown by the appearance of hoards of bronze objects. There are hoards of two types: family and founders hoards (Kuz'mina 1966: 98). Family hoards (Brichmulla, Turksib, Sadovoe, Sukuluk, Issyk-Kul', Shamshi, Tuyuk, etc., Figs. 43, 114) contain various types of used objects, which were family property. The appearance of such hoards reflects the process of property stratification of the late Andronovo tribes. The concealment of hoards in the earth indicates the tense situation in the steppe, more frequent military confrontations, which is proved by the spread of numerous types of new defensive weapons and the appearance of cheek-pieces that were used by mounted warriors. All this is evidence of a uniform process connected with the transition to nomadic cattle-breeding.

The second type is the founder's hoard. They contain metal, molds, blanks and a single type of object, sometimes cast using a single matrix. Sukuluk 2 with its sickles is an example of a founder's hoard. The existence of such hoards points to metal processing involving a separate branch of craftsmen and its clan organization. However, in contrast to the Danube and north Pontic region where dozens of founder's hoards are found, the discovery of such hoards over the whole Andronovo territory is rare. Consequently, metallurgical production among the late Andronovo tribes remained mainly a communal affair, although it was highly developed and involved production for export. The character of settlements near mines shows that the extraction of ore and its processing was done by people possessing equal rights, living in non-fortified settlements in large houses, which did not differ in wealth and which belonged to large family communities. There are no data to support the existence of labor divisions between miners, metallurgists, smiths and those who fashioned ornaments. Judging by the numerous traces of metal processing, found in every settlement, in every house in the micro-districts near mines, every large family was engaged in all the operations associated with the production of metal.

On every settlement of metallurgists animal bones were found proving that cattle-raising was the leading occupation of each family; utensils of local production and traces of other domestic activities also prove that metallurgy and metal processing were not at the stage of a specialized craft.

The organization of production among the Andronovans differed considerably from what is known for other states of the Old World. Production technology was different: in the Caucasus, in the Near East, Iran and south Central Asia the lost-wax technique was employed. It demanded great effort from professional

craftsman, but resulted in the production of unique objects made to individual order. Casting in reusable composite cast molds dominated in the Eurasian steppe. This production required neither great labor effort nor high professional skills and made it possible to produce objects for export on a large scale.

The methods of organizing mining production were also different. In King Solomon's mines on Timna mountain (Rothenberg 1962: 9-43) during the 10th century BC, extractions were made to meet the demands of the Temple of Jerusalem. Several open mines, 50-300m long and 10-30m deep, with horizontal galleries were discovered there. Stone mining tools were analogous in type to the Andronovo (Rothenberg 1962: 1,12,14); processing sites near mines and hearths for ore smelting and casting in metallurgists' settlements several kilometers from the mines are also analogous to Andronovo. But the settlements were quite different. The houses were extremely poor: they were small or subdivided into small rooms by partitions; the area of the two main settlements was surrounded by defensive walls with towers for supervising the slave-miners. In the Sinai mines there were numerous interconnected galleries on different levels in which hundreds of slaves worked (Garland and Bannister 1927). Such a scale of manufacture was required for the excessive demands of the nobility and priests and was possible only in a state in which slaves worked on the Pharaoh's order. In other Near Eastern societies metallurgy was the occupation of special clans or of craftsmen isolated from the community but subordinated to the temple or sovereign. In the 3rd–2nd millennium BC there was specialization among them, and one could find miners / ore diggers, copper founders, smiths, and ornament-makers (Chernykh 1972: 183-4, 192). In the time of Hammurabi there was the *nappahu* – preparatory smith ('blowing fire in the hearth'), *gur-gurru* – copper founder, *nappah-hurasi* – copper smith. These linguistic data are in good accord with archaeological data: metallographic analysis of objects from the Anau culture of south Turkmenia, belonging to the periphery of the Near Eastern farming cultures, showed that already in the 3rd millennium BC the metal processing of the Anau people was a specialized craft, with a narrow division of labor (Terekhova 1975: 41, table 3). In Mesopotamia the narrow professional specialization of metal workers-craftsmen occurred even earlier (Maryon 1949).

The Indo-Iranians knew metal well. They knew copper (bronze), gold and silver. Indo-European names for metals relate back to color names with a further shift of meaning (Gamkrelidze and Ivanov 1984: 710-714). But there are no common Indo-European terms connected with metal processing. Indo-Iranians knew the awl, needle, some types of knives, including a knife for slaughtering animals, arrow, spear, hammer, and axe. The Indo-Aryans also knew Indra's weapon, the *vájra-*. Ornaments comprised gold earrings, bracelets, pendants, plates with holes or small loops for sewing on clothes (Rau 1983).

The Indo-Aryans were familiar with metal casting: "when Trita is blowing it (fire – E.K.) in heaven like the blower (of bellows), he sharpens (the flame) as the fire blazing from the blast of the blower" (*Rigveda* 5.9.5). But in Vedic there is no term to denote craftsman. In describing the creation of something, the verb *kr̥-* 'make' is used, in which the act of creation is viewed as a ritual (Elizarenkova and Toporov 1995: 500). The main 'maker' is the god Viśvakarman, and the main creator and inventor in Vedic mythology is the god Tvaṣṭar, who creates chariots and weapons (*Rigveda* 1.13.10; 5.42.13; *Śatapatha-Brāhmaṇa* 2,4,3).

As far as the Iranians are concerned, in the *Avesta* there is no such term as 'smith' and there are no data about a specialized craft (Geiger 1882: 388, 479, 480; D'yakonov M. 1961: 60f, 362f). The word 'craftsman' (*huti*) is mentioned once (Yasna 19.17). It proves that the crafts, including metal processing, of the Indo-Aryans, remained an unspecialized occupation in their homeland. It is interesting to note in this connection that in the Sintashta-type cemeteries of Kamenny Ambar (Fig. 60), Solntse 2 and Bestamak chariot warriors were buried with adzes for chariot making, ore, nozzles and abrasives for weapon production, combining warrior and smith functions as well as smith and carpenter, as Tvaṣṭar and Viśvakarman. The Ossetic god Kurdalagon, creator of the wheel and weapons of the Narts, corresponds with them in function.

Mythology concerning smiths is widespread among Indo-European peoples, moreover, smith-gods occupy an important place in the pantheon, equal to the other high gods, which reflects the equal position of metallurgists in the actual society of ancient Indo-Europeans. These linguistic and mythological data correspond to the Andronovo and not the Near Eastern character of metallurgical production. Arriving in an area of developed craft production the Indo-Iranians borrowed special craft terms from local craftsmen. In the *Avesta* the word *tanura-* 'oven' is borrowed from Sumerian through Akkadian (Herzfeld 1941). The word for an oven in the *Rigveda* was borrowed from aboriginal Dravidian or Munda (Kuiper 1991: 14, 21) as many other cultural terms.

Studying the question of metal processing in the context of the problem of Indo-Iranian origins it is necessary to mention Aryan loans in the Finno-Ugrian languages that were spoken in the forest zone of the Urals. These linguistic data correlate with archaeological facts about the spread of Andronovo types of bronze objects into the taiga and about the creation of Andronovoid cultures there, pointing to a steppe homeland for the Indo-Iranians.

Another direction of Andronovo metal diffusion was to the south, into Central Asia and Afghanistan, probably reflecting not only cultural ties but also the gradual migration of the Andronovans to the south.

Thus, the analysis of mining, metallurgy, and metal processing does not support a hypothesis about population migration *from* the Near East in the second half of the 2nd millennium BC and it does not contradict attributing the Indo-Iranians to the Andronovo culture.

CHAPTER SEVEN

TEXTILES AND DRESS

Andronovans employed felt, fur, leather and wool in the manufacture of their clothes. The use of fur is indicated by the recovery of bones of wolf, fox, ferret, beaver, and hare on Andronovo settlements.

Leather production skills is testified by blades and scraping implements made from the jawbones of horse and cow found at Alekseevka, Sadchikovo, Shandasha, Tursumbay, Chaglinka, Yavlenka, Atasu, Kanay, Ust'-Narym, Malokrasnoyarka, Tasty-Butak, Kipel' and other sites. According to G. F. Korobkova these objects were used for manufacturing leather (Sharafutdinova 1982: 136; Leskov 1970: 39). Andronovans used leather for the sewing of outer clothing, caps and footwear.

Wool was the main material for clothes. It was spun with wooden spindles with clay spinners as shown by their discovery in settlements, and the twisted threads themselves are preserved inside beads in burials. The simplest way of producing woolen things was knitting. In western Siberia in the Andronovo, Orak, Pristan', and Ust'-Erba burials, knitted textiles were found (Tugarinov 1926: 158; Sosnovsky 1934: 95-96; Kiselev 1949: 44, 48; Komarova 1961: 51; Maksimenkov 1978: 72). At Orak narrow strips were knit in the Tambur chain-stitch manner from rough twisted wool 29 microns wide. They were then sewn on in spirals to form a conical cap with a herring-bone pattern (Sosnovsky 1934: 93-95). At Andronovo, a conical cap was also sewn in spirals from narrow strips, not knit but twisted, from thick wool thread. In two other graves at Orak there were found narrow strips of fabric fragments from clothes and a cap, plaited in galloon weave from untwisted wool using a shuttle, the thread width being 18 and 22 microns (Sosnovsky 1934: 93-95)

Weaving also existed. At the Elovka burial cloth of 'diagonal' type woven from thin wool threads was preserved (Matyushchenko 1973a: 59). There are imprints of cloth from woven linen, made of threads 1.3-1.6mm wide, on Petrovka and Alakul' pots. Such fabric is known from imprints on ceramics and a knife from Seyma (Bader 1970: 123). Analogous fabrics of linen and diagonal weave were found in Pazyryk (Rudenko 1953: 245, table 25.4). Apparently they wove on a primitive vertical loom without shafts, using knitting needles for stretching the base and sometimes clay or stone weights. The discovery of knitting needles, weights, and a shuttle are known from Andronovo settlements (Sal'nikov 1951a: 139); a shuttle was found at Chaglinka (Orazbaev 1970: 134).

The spinning and weaving of the Andronovo culture are analogous to west European techniques that are especially well studied in Denmark (Glob 1947) and with east European textiles of the Bronze and Early Iron ages (Pislariy 1981; Gavrilyuk 1989: 84-91). Andronovo and Timber-grave spinners belong to a widespread ancient type preserved by the Ossetes and Iranian-speaking peoples

of the Pamirs (Karmysheva 1979: 250-269). A. A. Semenov and G. F. Korobkova (1983: 130-132) have shown that twisting and knitting preceded weaving. The proto-type loom comprised a wooden frame with a stretched base and then the weft was threaded with a needle or *kochedyk*. The base might also be tightened with wooden pegs that had been driven in. A primitive loom without weights is preserved among the Mountain Tadzhiks (Pisarchik 1958: 372, fig. 80-81).

Terms connected with spinning and weaving derive from the most ancient layer of Indo-European heritage. Semantic bundles of words are built from the stems **ten* and **tek* ('draw', 'twist', 'braid', 'spin', 'weave', 'thread', 'web', 'stripe', 'cloth'; Abaev 1949: 54; 1979 III: 220, 221, 302, 336, 337; Elizarenkova and Toporov 1995: 522). The names for wool and weaving share a common origin with the word for 'sheep' (Gertsenberg 1972: 56, 57, 228; Gamkrelidze and Ivanov 1984: 583, 704-705). In the *Rigveda* clothes from fur and skin are mentioned (Elizarenkova and Toporov 1995: 521). Apparently alongside wool, vegetable fibers, hemp in particular, were used (Gryaznov 1956a: 40; IK SSR: 123). Imprints of a textile hurdle from organic fibers are found on Eneolithic ceramics, for example, at Botai. In the Urals hemp processing survived till the 19th century (Sal'nikov 1961a: 139), and in the Ukraine and Ossetia it is cultivated to the present. Cloth made from hemp was found at Pazyryk (Rudenko 1953: 104). According to Herodotus (4,74) hemp grows in the country of the Scythians, where it "much surpasses flax. It grows both by itself and is tilled" (Dovatur *et al.* 1982: 127). In the Indo-European languages names for flax and hemp are of common origin: the same word is used to denote home-spun cotton fabric (Abaev 1958 I: 513; Gertsenberg 1972: 181, 183; Steblin-Kamensky 1982: 63f.).

Spinning and weaving are very frequently used in Vedic literature. Terms and notions connected with them have been studied by W. Rau (1971); some data are found in general works on the history of crafts (Rau and Chakrabarti 1975) and Indian costume (Mili Chandra 1972; Parpola 1985). Spinning and weaving were female occupations; they used primitive looms without spindles. It is described in the *Rigveda* (10.130): a base, on which a weft is used for weaving, is tightened on pegs. Vegetable fibers and woolen yarn were employed. According to the *Avesta*, Yima taught people to use the loom. The goddess Anāhitā, who appears as a weaver, is the protectress of female occupations. In Indo-Iranian tradition weaving is a ritualized process with cosmological associations.

The style of women's clothes in the Andronovo culture is reconstructed on the basis of the position of bronze and paste beads sewn on the sleeve cuffs, collar and hem. They are known from Alakul', Petropavlovsk, and Ataken-say (Sal'nikov 1951a: 140; Kuz'mina 1986b: 978). The clothes comprised a long, straight dress, over knee length, with long rather wide sleeves reaching the wrists and with a rounded neck. The front of the dress is often decorated with bronze plates. The dress was tied up with a waistband with attached amulets from perforated animal teeth. It has been claimed that in Orak and Petropavlovsk clothes were dyed red with organic dyes (Kiselev 1949: 48; Sal'nikov 1981a: 140). Red color played a great role in Aryan ideology (Elizarenkova 1995: 481f).

The costume was accompanied by ornaments. A standard set included a pair of earrings, or temple rings, one or two bracelets sometimes with spiral ends, a string of beads on the ankles and some breast plates, often of perforated shell. In

some graves of Sintashta-Petrovka, Alakul' and mixed types, women were buried in rich ceremonial dress. This consisted of a hoop-shaped diadem or pendant, several bracelets, spiral finger-rings, plaited ornaments from several layers of connected beads and belts with beads, spacers and attached plates and pendants including spectacle and cross-like shapes (Usmanova and Tkachev 1993; Usmanova and Logvin 1998; Vinogradov 1998).

Men apparently wore unfastened double-breasted clothes of caftan type and trousers (Sosnovsky 1934: 95-96; Kiselev 1949: 48; IK SSR: 123; Kuz'mina 1986b: 98, 99).

Andronovans wore boots. In burials at Orak and Pristan' in Siberia leather heelless boots with high tops, sewn with threads of tendon, tied round by a lace with stringed bronze beads, were preserved (Komarova 1961: 35, 50; Maksimenkov 1978: 14). According to numerous findings of such strings of beads on the legs of the buried, such footwear was used both by men and women across the whole Andronovo area. N. A. Avanesova's supposition (1981: 36) that women wore wide trousers has not been proved.

The headgear of Andronovans were found in female and male burials of western Siberia at Andronovo, Orak and Pristan' (Sosnovsky 1934: 95-96; Kiselev 1949: 48; Komarova 1961: 43, 44, 51, fig. 3; Maksimenkov 1978: 14, 72). They wore knitted caps with a high conical top and separately attached earflaps. At Orak the remains of a leather cap with a pointed top were also found (Sosnovsky 1934: 95-96; Komarova 1961: 51). A reconstruction of Andronovo headgear was made by M. M. Gerasimov (Krivtsova-Grakova 1948, fig. 8.63). Ceremonial headgear was decorated with beads and plates at Alekseevka, Tasty-Butak, Ulyubay (Krivtsova-Grakova 1948: 66; Sorokin 1962b: 63; Boiko Tatarintsev 1976: 72, Vinogradov 1994: 195).

The complex of Andronovo clothes was perfectly adjusted to the nature and life of Eurasian shepherds and has analogies and prototypes among the steppe cultures. The earliest evidence of this type of dress comes from certain Pit-grave culture burials in the Ukraine, namely, leather boots 0.3m high from Gradeshka (*AO* 1983: 360) and a felt cap with leather application from Aleksandrovka (*AO* 1979: 301). A cap was reconstructed from a rich Timber-grave female burial from the Zolotaya Niva cemetery on the Volga (*AO* 1976: 150). It is embroidered with bronze spacers, pendants and plates with a Mycenaean-type spiral.

The types of clothing from the Eurasian steppe of the Bronze Age developed over three millennia. The dress of Iranian-speaking Saka and Scythians is easily reconstructed on the basis of descriptions provided by Greek authors (Herodotus 6.87,88; 7.64; Dovatur *et al.* 1982: 392-394), representations by Greek artists and toreutics such as the Chertomlyk vase, the rhyton from Karagadeuakhsh, on vessels from Kul'-Oba, Merdzhany, Gaimanova, the Voronezh kurgan, on a pectoral from Tolstaya Mogila, on the comb from Solokha, plates from Kul'-Oba and other sites (Stepanov 1916: tables v, vi; Artamonov 1966: tables 147, 148, 153-155, 166-7, 174, 195-8, 201, 203, 224, 226-29, 253, 255, 318) and numerous archaeological discoveries from the Ukraine to the Altai, particularly at Issyk in Kazakhstan (Akishev 1978, fig. 62, 63; K. Akishev, A. Akishev 1980), at Pazyryk (Rudenko 1953: 111, 112) and Ak-Alakha (Polos'mak 1994: 3).

Women wore long dresses, boots and pointed caps or a *kalathos* of Greek origin with a long veil (Miroshina 1977; Klochko 1979). Across the whole area

men's clothes included trousers, unfastened jacket, boots (Klochko 1979; 1984; 1992) and a pointed cap. Herodotus (7.64) writes that the Saka "wore pointed top caps, standing straight". In the nomadic environment the cap was an ethnic attribute, and ceremonial headgear was used as the insignia of a king (Kuz'mina 1958: 124-125; 1977: 91, 92; 1981b: 46-49; Akishev 1978: 43-44; Akishev, K. and A. 1980: 14-31). These clothes are close to those of other Indo-European peoples of Eastern Europe; the Thracians, Phrygians and Hittites all wore caps.

The complex of clothes established in the steppes of the Eneolithic and Bronze Age and inherited by the Saka-Scythians has survived among the modern Ossetes (Kaloev 1971: 174-184) and Pamirs (Andreev 1958: 243-246, 416, fig. 50, 90.1), and partially among the Kurds. From the Indo-Iranians and Iranians unfastened clothes spread to their northern Finno-Ugrian neighbors, the Khanty (Prytkova 1953: 123-233; Moshinskaya 1978), and trousers to Chinese horsemen. The dress of the earliest Eurasian pastoralists greatly influenced the costume of Turkish steppe peoples, who replaced the Saka in Kazakhstan and in the steppes of Central Asia. Not only did they adopt from their predecessors the wearing of unfastened clothes, trousers, and boots, but in many cases they adopted the word for these items also, most significantly the word for the caps to which most male and female headgear are referred to (Sukhareva 1954; 1982; Zakharova and Khodzhaeva 1964).

This complex of clothing, ecologically conditioned by nature and the cattle-raising way of life in the steppes would be climatically unreasonable for farming cultures of the Near East and has neither analogy nor source there. According to imprints on seals and in toreutics of pre-Achaemenid Iran, Bactria and Margiana the men wore long, wide clothes or hip bands of a skirt-type and women wore dresses with a wide skirt, had no headgear, were barefooted or wore sandals, and had a short haircut (7000 ans…, tables 3, 19, 30: Houston 1954, Ligabue and Salvatori 136, 137, 163: 106-113; Sarianidi 1998: 11, 18, 39). Native Near Eastern peoples preserved variants of these clothes in the 1st millennium BC, which are illustrated, e.g., in Persepolis (Dutz 1971). The clothing of the Iranian-speaking peoples of Iran, Afghanistan and south Central Asia of the Achaemenid period differs sharply from Near Eastern dress and is similar to that of the Saka-Scythians.

The clothing of the Chorasmians, Sogdians, Bactrians as well as Persians and Medes themselves are well known from reliefs at Naqsh-i-Rustem, Persepolis, on objects of toreutics of the Oxus treasure, from Greek and Persian seals, and from the Pompei mosaic with a battle scene between Alexander and Darius, etc. (Sarre and Herzfeld 1910: fig. 37, 39, 54, 256; Dutz 1971: tables 7, 11, 13, 15, 17; Dalton 1964, fig. 49, tables 4, 10, 14, 15, 12; Boardman 1970: 882). The complex of clothes depicted differed only in certain details of fashion according to different tribes such as distinctions in caftan (*candiz*), trousers, boots and cap (Thompson 1965; Beck 1972). H. Bailey (1955: 7-12) demonstrated a common Indo-Iranian origins for the names of parts of clothes. Sanskrit *kūrpāsa*, Iranian *kurtak*, Russian *kurtka* derive from the word *kūr* 'neck', 'throat'. In some languages it denotes a shirt or jacket; in others a cap, for which there is a term *kulāh*. Of Indo-Iranian origin are also names for shirt, trousers, breeches. These words were borrowed by the Chinese. Another name for trousers (*shalwar*) is *sharovar* (wide trousers), which is of ancient Iranian origin, as well as the name

of the *burkha*, the Caucasian felt cloak and woman's head scarf and veil (Abaev 1949: 53; 1979 III: 26, 27, 79, 125). Words for personal ornaments also have an ancient origin: 'necklace', 'neck-band' are Indo-European while 'ornament' and 'belt' are Indo-Iranian words (Gertsenberg 1972: 25, 189, 191, 195).

There are not enough data for the reconstruction of the clothes of the Vedic Aryans. They wore outer and under clothing with names of Indo-European origin, such as the belt and gold decorations: earrings, bracelet, ring, neck (pendant) and ear (earrings); gold plates for the decoration of the breast, and, what is especially important, they wore plaits (Elizarenkova 1989: 449; Elizarenkova and Toporov 1995: 52; Parpola 1985). According to the *Avesta*, Zoroastrians wore a shirt, footwear and a belt as well as a cap made of sheep leather (Dhalla 1922: 174). Anāhitā and Vāyu had boots, and Vāyu's were golden (Yasht 5.64,78; 15.57). According to the Ardvīsūr Yašt (5.127) Anāhitā was adorned with a pendant and golden temple rings (but according to some scholars this is a later text describing the statue of the goddess, erected by Artaxerxes). Anāhitā wears a beaver fur coat and a shirt girded by a richly decorated waistband (Yasht 1.17; Yasna 9.26). A twisted belt was a sign of membership of a social group among all Indo-Iranians and it was fastened in a special way during a dedication rite (*Manusmṛti* II: 42, 43).

The attribute of an Indo-Iranian priest was his staff. It was handed to Yima by Ahura-Mazdāh. In modern Ossetia the staff is a symbol of spiritual power of a venerable old man, performing priestly functions in the sanctuary of Rekom (field notes of the author 1974).

Although the hair styling of the Andronovo male is not known, the female hair styling is reliably reconstructed from the position of decorations. Andronovan women had two plaits reaching below the waist. They plaited strings of beads with hanging oblong bronze plates (Usmanova and Tkachev 1998; Vinogradov 1998). Such ornament was already established in burials of the Early Bronze Age near Azov and at Chapaevka, in the Saratov region (*AO* 1981: 109; 1983: 159). The same hair style—two plaits with decoration twisted with laces and beads—is still worn by women in the Pamirs (Andreev 1958: 252, 414, fig. 89.3-4) and in some districts of India. According to gliptic materials, in the Achaemenid period across the whole of the Near East Iranian peoples wore plaits hanging behind their heads, namely Persian and Bactrian women (Dalton 1964: 103; Boardman 1970: 879, 880, 891, 892, 903, 964, 990; Kuz'mina 1979: 35-40, fig. 1, 2). Thus, headgear, costume and footwear were most important ethnographic indicators, sharply separating the Iranian peoples of Iran, Afghanistan and Central Asia from other peoples of the Near East for whom these clothes were entirely alien. But at the same time this dress is analogous to clothes and hair styles of Iranian nomads of the 1st millennium BC, and survivals of such a complex are preserved by the peoples of the Pamirs and Ossetia.

The dress of the Indian peoples is extremely various and reflects five millennia of the history of the subcontinent. Indian costume is highly meaningful. It characterizes regional, ethnic, caste, confessional, social, family-status, sex and age differences. Within each group there exist peculiarities of clothes, everyday, ceremonial and ritual. This conditions the extreme variety of Indian clothing types (Flynn 1971). It is more surprising that in modern India there remain strong ancient traditions regarding clothing (Maretina 1977;

Bulanova 1989; Parpola 1985). The non-Indo-Aryan peoples of southern India are descendants of a native population and are also representatives of the lowest castes of the whole subcontinent. They wear drapable clothes; males: a hip band wrapped over a skirt and *dhoti*, and females: a *sari* (Flynn 1971; Bulanova 1989). This complex of clothes goes back to the pre-Vedic epoch of the Harappan culture.

In the north-west of Hindustan, different ethno-caste groups tracing their genealogy to Vedic Aryans preserve in the main another type of dress. Its elements bear ancient Indo-Iranian names. Men wear trousers and wide trousers (*shalvar*), shirt or unfastened jacket (*kurta*) and an outer unfolded caftan; women wear a long straight dress (*kamiz*) (Maretina 1977). This dress finds analogies among the Iranian peoples of the Pamirs, the nomads of Iran and the Ossetes, and goes back to the Saka-Scythians and finally to Andronovo dress and has neither analogies nor prototypes in the Eneolithic or Bronze Age cultures of India and the Near East. These clothes are a social symbol. They are worn in central and southern India by a group attributing itself to the *kṣatriya* caste. Their dress necessarily includes trousers, unfastened caftan and a belt—the priestly cord of the twice-born. The ceremonial ritual dress of the Maharaja of Maysur who traces his origin to the legendary Rāma (field material gathered by the author in 1984) goes back to the Indo-Iranian period. The Indo-European color symbolism is also preserved: white colored clothes are symbolic of the brahman caste, and red – of the *mahārāja* and *kṣatriya*. Decorations have complex ancient semantics, e.g., the symbols of married women include the *thali* pendant and *mangalsutram* necklace.

The Meo ethnic group originating from the Saka and intrusive into India in the 2nd century BC represents Eurasian nomads with a complex of clothes depicted in the sculptured portraits of the Saka and Kushan kings in Mathura (Pugachenkova 1979, tables 236-237; Vogel 1930; Rosenfield 1967).

Taking into account the ethnographic importance of costume, and the fact that according to linguistic data some of its parts bear Indo-Iranian names, it follows that it was formed in the homeland. This dress has no source in the Near East, and its genesis is found in the Andronovo culture. These data serve as a serious argument in favor of the Indo-Iranians having a steppe homeland and assigning an Indo-Iranian ethnic identity of the Andronovans.

CHAPTER EIGHT

TRANSPORT

Wheeled transport was widespread among the Andronovans. It is attested by clay wheel models, chariot remains, bone cheek-pieces, both complete skeletons and the bones of draught animals, and also the images of vehicles and chariots on the petroglyphs of Kazakhstan and Central Asia as well as on an Andronovo vessel. Two types of vehicle are known: heavy carts with solid disc wheels and light single-axle chariots with spoked wheels.

Vehicles

At the settlements of Ushkatta 2 (Kuz'mina 1962b, fig. 3), Kambulat (Chebakova 1975, fig. 5.5), Shortandy-Bulak (Margulan 1979, fig. 159.3, 232.11) archaeologists uncovered solid clay wheels with protruding hubs. Such wheels were used for vehicle models found in the Eurasian steppes both in burials earlier than Andronovo, such as Catacomb-graves of the second half of the 3rd millennium BC (Sinitsyn 1948, fig. 13; Sinitsyn and Erdiniev 1971: 8, tables 5a, 8; Kuz'mina 1974a: 69; Häusler 1981, fig. 11; Romanovskaya 1982, fig. 4.4), and in later Scythian-Sarmatian graves, at Mingechaur (Aslanov *et al.* 1959, fig. 98-101) and at Kerch' (Artamonov 1966, fig. 1; Kozhin 1969b: 92-5; Nechaeva 1975: 11-13) which demonstrates continuity of tradition and presupposes such *kibitkas* among the Andronovans as well. This is confirmed by the image of a vehicle with four solid wheels and solid body, harnessed to a team of bulls, on a petroglyph from Saymaly-Tash. In addition to covered vehicles large open four-wheeled wagons were also employed, as can also be seen from the Saymaly-Tash petroglyphs (recorded by Yu. N. Golendukhin).

Both open and covered heavy vehicles with disc wheels originate from prototypes that appeared on the Eurasian steppes already in the late 3rd millennium BC on sites of the Novosvobodnaya and Novotitarovo cultures of the Kuban Pit-grave culture and the subsequent Catacomb culture of the early 2nd millennium BC (summary of findings and bibliography in Piggott 1969; Kuz'mina 1974a; Häusler 1981; Kozhin 1988; Izbitser 1993). E. V. Izbitser recorded about 250 burials with one or two vehicles.

All remaining early vehicles are four wheeled ones. However, in some graves there is a pair of wheels and clay models of single-axle vehicles of Kalmykia which presupposes, contrary to the opinion of E. V. Izbitser (1993), the existence of two-wheeled vehicles on the steppes. An important innovation of the Catacomb period was the appearance of the cross-bar wheel. Such wheels are known from the Near East and the image of a two-wheeled vehicle with cross-bar wheels is known from the stone covering of a cist from the Novonikolaevka cemetery (Rassamakhin 1999: 47, fig. 3, 56).

Evidence of wheeled vehicles is of great importance for resolving the Indo-European problem because there are common names connected with wheeled transport in all Indo-European languages. Terms denoting 'circle', 'wheel', 'vehicle', and 'chariot' go back to the verbs *$k^{w}el$ and *(H)ret- 'revolve'. The Indo-Iranian words 'yoke' (*yugá-*), 'axle' (*ákṣa-*), 'shaft' (*dhúr-*), and also 'way', 'movement' have Indo-European correspondences, from which derive the names of the race course and the name of the draught animal specific to each deity (*vāhana-*; Schrader 1913; Meillet 1938; Abaev 1949; Gamkrelidze and Ivanov 1984; Vasmer 1950-1957; Benveniste 1949; Brandenstein 1962). Transport terms are included in the sacred vocabulary: 'solstice', 'year circle', 'wheel-sun' (Schmitt 1967: 166-169). There also appears a large layer of common Indo-Iranian terms: 'saddle-girth', 'shaft', 'bridle', etc.

Vehicles evolved from sledges, which were known in Mesopotamia and the Tripol'e culture already in the 4th millennium BC. In the steppes the earliest examples of vehicles are found in the Kuban on sites of the Novosvobodnaya culture, with Near-Eastern connections, and the Novotitarovo culture which was in contact with both the Novosvobodnaya and the Pit-grave cultures.

Early vehicles had two axles with four solid disc wheels, 0.7-0.85m in diameter; later the standard diameter became 0.5-0.6m. The wheels were tripartite with a protruding hub, sometimes fastened with laths. They were attached to a fixed axle, 2m long; it was rectangular in section in the center, but round at the ends on which the wheels were inserted. The shaft was in the front part. Two structural forms are known: either a draught pole, 2m long, that branched into a V-shape, 1m long, or a squared beam 2m long with two perpendicular holes. The body consisted of a rectangular frame, 2m long and 1.5m wide, with a wooden floor covered with mats; the sides were vertical and often with flat or arched overhead cover made of wooden laths or bent and crossed branches as seen in models and in some Catacomb vehicles (Kozenkova 1973: 65; Romanovskaya 1982: 107) and in the carriage from kurgan 5 at Pazyryk (Rudenko 1953, fig. 26, 27); the entrance was in the front. This type of vehicle is represented by a Scythian clay model from Kerch'.

In detail of construction the steppe vehicles differed from those of the Danube (Bona 1960: 83; Bichir 1964: 67), Central Asia (Kuz'mina 1983; Littauer and Crouwel 1973b; 1974; 1977) and Harappa (Mackay 1951, table 29).

Ancient authors such as Hippocrates (On Air, Waters and Regions, 25ff), Herodotus (4.121) and Strabo (7.3.17) describe the homes of Iranian-speaking steppe nomads as wheeled houses, covered with skins or felt. J. Hertel (1925; 1931: 277, 279) believed that such large houses (*kibitkas*) of the steppe nomads served as prototypes of the *vimāna-*, the celestial houses of the Indo-Aryan gods described in Vedic literature.

The Andronovans used oxen and heavy draught horses for drawing the vehicles. V. I. Tsalkin (1972b: 72) proved that Andronovans and Timber-grave people could already geld bulls and employed large oxen 133cm at the withers for draught. Andronovans were the first in the Old World who bred special heavy draught horses, reaching 166cm and more at the withers; they were the tallest horses of the Bronze Age.

Bactrian camels were also used as draught animals. Their ritual burials are known from Aksu-Ayuly 2, Telzhan-Kuzeu, Begazy, their bones are found at

Sintashta, Alekseevka, Atasu, Ust'-Narym, Milykuduk, and a clay figurine comes from Ushkatta 2 (Fig. 55: 8; Kuz'mina 1963a; 1962b, fig. 3, 4; Margulan *et al.* 1966: 175; 1979: 258, 259; Krivtsova-Grakova 1948: 102; Chernikov 1966). Pairs of Bactrian camels harnessed to a vehicle are also seen on petroglyphs (Fig. 34) dated to the Bronze Age at Koybagar and Arpauzen in south Kazakhstan and Saymaly-Tash in the Tian-Shan (Kadyrbaev and Mar'yashev 1967: 167ff., fig. 22, 100.3; Agafonova 1977: 13; Medoev 1979, table 16; Kuz'mina 1980c: 29-30). There are numerous individual camel images on petroglyphs in Kazakhstan and Central Asia, but they are impossible to date and there are no data on their usage as beasts of burden in the Bronze Age. Outside of the natural habitat of the Andronovo culture Bactrian camels are reliably known only from the south of Central Asia (Tsalkin 1970b: 136, 157; Ermolova 1976: 111; Kuz'mina 1963a: 38-44; 1980c: 19-27, 34; 1983) and Outer Mongolia. They were probably found also in Afghanistan and east Iran (Bulliet 1975: 141, 148; Compagnoni and Tosi 1978: 87-100). In the Near East the Bactrian camel was known only at the very end of the 2nd / beginning of the 1st millennium BC (Walz 1951; 1954; Bulliet 1975: 153-159). In the documents of Tiglath-pileser I (1116-1077 BC) Assur-bel-kal (1074-1057 BC) and Ashurnasirpal I (1050-1032 BC) they speak of a two-humped camel and from Salmanasar II, we find that camels are brought from the east (Luckenbill 1927; Yankovskaya 1956). In early Assyrian texts the Bactrian camel is called a *gammālu*, a Semitic term for dromedary, but it is said at the same time that it has two humps. In the 11th century BC the term *udru* appeared, presumably borrowed from Iranian (Salonen 1955-1956: 85-87). This indicates that the Bactrian camel was alien to Near Eastern peoples and it was adopted by them from Iranians. The name of the camel, **uštra-,* is common in the Indo-Iranian languages (Schrader 1901: 405; Redard 1964: 155-162; Mayrhofer 1956: 113-114; Burrow 1976: 143) and it differs from other Indo-European languages where the term to denote camel is a late borrowing from Semitic *gammālu*. It follows from these linguistic data that the Indo-Iranians became acquainted with the Bactrian camel when they had already split from the other Indo-Europeans but were not yet separated into Indo-Aryan and Iranian branches. Palaeozoological data show that this could have happened in either Andronovo territory or south Central Asia (Anau culture). The name of the Bactrian camel was borrowed into the Finno-Ugrian and Turkic languages from Indo-Iranian (Bogolyubsky 1929: 14, 15). In Chinese mythology the Indo-Iranian cult of the Bactrian camel was accepted in the Han period; its motherland was set to the north-west within the borders of north Central Asia (Schafer 1950: 269, 275). Taking into account Chinese evidence and the localization of the Finno-Ugrians in the forest zone of Eurasia, the Indo-Iranian homeland should be placed in the Urals and Kazakhstan, and the hypothesis of a migration from the Near East should be rejected because the Bactrian camel was unknown there.

Chariots of the Eurasian steppe

Single-axle chariots with spoked wheels harnessed to a pair of horses with the help of cheek-pieces were of tremendous importance to the culture of the Andronovo people (Fig. 35).

Chariots are recognized from the imprints of wheels with spokes in the Urals, in the Sintashta cemetery, burials 5, 12, 16, 19, 28, 30 (Gening *et al.* 1992: 130, 132, 149, 153, 163, 165, 167, 183-4, 203, 205, 209-10, 214-5: fig. 56, 72, 78, 80, 91, 93, 94, 106-108, 111, 116, and maybe in burial 14 of kurgan C-1 p. 276); Kamenny Ambar, in graves 6, 8 (Kostyukov *et al.*, 1995: 162-3, fig. 9); Solntse-2 kurgans 4/1, 5/2, 11/2 (Epimakhov 1996: 26, 29, 33, fig. 4); Krivoe Ozero (Anthony 1995; Anthony and Vinogradov 1995), Vetlyanka Kurgan 14/6 (Gorbunov *et al.* 1990: 32), in north Kazakhstan, in the burials of Ulyubay, Kenes Kurgan 3/5, Berlik-2 Kurgan 2/1, 10 (Zdanovich 1998: 71-6, 138-140, fig. 29: 2-6, 31: 10-12), and in central Kazakhstan, in the Satan cemetery, kurgan 1 (Tkachev 1987: 26; 1991: 10, 11; Evdokimov 1981: 434; Novozhenov 1989: 110-122).

The diameter of the wheel with a protruding hub and ten to twelve spokes is recorded at 0.9-1m at Sintashta to 1-1.2m at Satan; the distance between the wheels (ruts) is 1.2-1.45m, the rim is 4cm wide, the spokes are rectangular and square in cross-section, from 3 x 3.5cm to 3.5 x 4.5cm. The frame measures 1.2 x 0.67m (or 1.6 x 0.6m); fragments of a rim with round spokes, protruding hub and red leather tyre fixed by bone nails has been reconstructed for Satan.

We do not have enough evidence to reconstruct the chariot type. Suggested reconstructions (Gening *et al.* 1992; Anthony and Vinogradov 1995) have been justly criticized (Littauer and Crouwel 1996: 934-939). The difficulty of reconstruction is made worse by the fact that the chamber size was not sufficient to insert a whole chariot into it; it had to be put there in parts, or only certain elements were deposited. Thus at Kamenny Ambar, in kurgan 2/8 only one wheel was found and one cheek-piece out of four was an imitation (Kostyukov *et al.* 1995: 163, 175, fig. 24; 1).

Horses, usually in pairs, heads facing one another or laid one after another may be found in the grave, but more often on the clay ground above the roof of the grave. In the Bestamak cemetery three horses were buried standing up. In some cases, according to the principle *pars pro toto*, only skins with the heads and legs or only horse skulls are found. Ritual burials of horses have been discovered in the Petrovka-type cemeteries of Troitsk, Raskatikha, Aksayman, Berlik, Ulyubay and Nurtay (*AO* 1979: 433; Zdanovich 1988: 73, 74, 78, 80, 135, fig. 29). Horse head-and-hooves burials are found at Alakul' and Kozhumberdy type sites in graves from Stepnoe I, II, Spasskoe I, Pyatimary, Orsk, Novy Akkerman, Alakul', Kupukhta, Emba, Chaglinka, Sokolovka, Semipalatnoe, Bylkyldak, etc. (Kuz'mina 1977: 30). Similar horse burials, often of the head-and-hooves type, are found in the Early Timber-grave cemeteries of the Pokrovskiy and Maevka types on the Volga and in the Ukraine (Kuz'mina 1977; Mikhaylova and Kuz'mina O. 1999). In Sintashta, Kamenny Ambar (Fig. 112: 3) and Ulyubay pairs of horses were placed together with chariots; in Sintashta and in a number of other cemeteries of the Novokumak type cheek-pieces are preserved. However, the figure displayed in Gening (1977: 66, fig. 6.1; Gening *et al.* 1992, pl. 22) is an artistic reconstruction, and the cheek-pieces were not found in situ. Cheek-pieces along with pairs of horses were also found at Alakul', Nurtai and in the Timber-grave burial at Komarovo. It follows that the horses sacrificed were intended to be harnessed to the chariots. Palaeozoologists have concluded that they were slender-legged young stallions (Sal'nikov 1951b; 1967; Tsalkin 1972b: 74-77).

A complete charioteer's complex is also known: the burial of a chariot, two horses and cheek-pieces, are known from the Urals, in Sintashta and Petrovka burials. On the Volga only a single wheel from kurgan 6/4 at Utëvka is known at present. There are burials of pairs of horses at Potapovka in the same region, but more often only horse head-and-hooves as well as cheek-pieces are found (Vasil'ev *et al.* 1995). On the Don I know of only one discovery of a wheel from the Pichaevskiy kurgan (Moiseev *et al.* 1995: 75); there are no paired horse burials, they are represented only by the head-and-hooves of animals and cheek-pieces according to the principle of *pars pro toto*. This supports the conclusion that the Urals was the center of the invention of the chariot and the associated cult.

The importance of the chariot for the Andronovans is indicated by numerous images on petroglyphs at Sary-Arka, Moinkumy, in Dzhambul city, Balkhash, etc. (Medoev 1979, fig. 31; Novozhenov 1989: 101, 102; 1987: 86), Tamgaly-Karatau in south Kazakhstan (Maksimova 1958: 108-110, fig. 30, 38; Kadyrbaev and Mar'yashev 1977: 162-170, fig. 100, 102, 104), Smagul, Moinak and Talapty 1 in east Kazakhstan (Samashev 1977: 520; Mar'yashev and Rogozhinsky 1991, fig. 1-5), Saymaly-Tash in the Tian-Shan (Bernshtam 1962; Agafonova 1977: 5-6; Sher 1978: 163ff.), Kopal (Makhmutov 1971: 66), Tekke-Tash and Akdzhilga in the Pamirs (Mandel`shtam 1961: 86, fig. 1, 4; Zhukov and Ranov 1972: 540, fig.; 1974: 62-8; Fig. 34). Chariots were harnessed to a pair of horses, with wheels of 4, 6 or 8 spokes with rectangular, oval or semi-oval body situated on the crossbeam and axle but more often shifted before the axle. Chariots are depicted as if in plan, with wheels sprawled along the sides of the body; the horses are shown one above the other or against each other, often back to back as they are in burials. Possibly this style of depicting wheeled transport appeared due to the custom established in the steppes from the Eneolithic to remove the wheels from the axle and place them in the corners of the grave (Bussagli 1955). The depiction of wheeled transport in plan is characteristic of the large north Eurasian zone stretching from Scandinavia to Mongolia (Bussagli 1955; Anati 1960; Kozhin 1966: 61). In another zone of the Old World, in the Near East, chariots were usually depicted in profile. They are represented in this manner on seals and reliefs (Nagel 1966: fig. 15-30). Chariots are depicted in the same way on Mycenaean stelae, paintings, seals, and ceramics (Karo 1930: tables 5, 7, 10, 24; Anati 1960, fig. 3, 4; Furumark 1941, fig. 56) and in Mycenaean tablets (Wiesner 1998, fig. 5, 6, 13; Lurie 1957: 248, 334, fig. 45). A chronological explanation for these differences (Sher 1980: 202-5) does not seem convincing. Probably, these are two different artistic traditions (Kozhin 1966: 81; Kuz'-mina 1980c: 32-34). With respect to stylistic features Kazakhstan and Central Asian chariots are especially close to the images on the petroglyphs of the Altai, Xinjiang, Tuva and Mongolia, constituting a single Central Asian province (Dorzh and Novgorodova 1976; Novgorodova 1978: 203-206; Devlet 1976b: 28; Sher 1980: 232).

Great success has been achieved in resolving the chronological problems of the petroglyphs. A considerable number of the chariots can be dated to the Bronze Age on the basis of this evidence:

1) Chariot images analogous to the ones on petroglyphs (Fig. 34: 6, 8) have been discovered on vessels from the Alakul' burial at Spasskoe and the Timber-grave Sukhaya Saratovka 2 (Stokolos 1972: fig. 13,2, Galkin 1977: fig. 1), and

on Timber-grave pots from Politotdel'skoe, from the Lvov and Zhdanov museum wheels with axles are depicted (Kuz'mina 1974a: 82; Cherednichenko 1976: 139, fig. 4-6). These can be correlated with European data. Depictions of chariots from Kivik are dated to the Bronze Age according to its tumulus complex (Glob 1974), a number of images are found on vessels of the Bronze Age (Vizdal 1972: 233, fig. 1; Cherednichenko 1976: 139, fig. 4-6; Smirnov and Kuz'mina 1977: 54-55; Piggott 1978: fig. 1). In the Caucasus there is representation of vehicles in plan, including a Bronze Age vessel from Dilizhan in Armenia (Esayan 1976: table 97, 1) and also a bronze model of a two-wheeled chariot with ten-spokes from Gokhebi in Georgia (*AO* 1976: 478, 479). Caucasian examples are important because some names relating to wheeled transport are common to the Indo-European and Caucasian languages, including Nakh-Dagestani.

2) Palimpsests are known on petroglyphs. Chariots are covered over by Scythian drawings (Mar'yashev and Rogozhinsky 1991: 6).

3) In Tuva chariot images are found in combination with Okunevo escutcheons (Devlet 1976 b: 28).

4) Two stylistic groups of chariot images are found in Mongolia, the later is dated on the basis of a Scythian weapon on a stone from Darvi-Somon, which is set to the Scythian period and serves as a *terminus post quem* for the earlier one (Novgorodova 1978: 203-206).

5) The symbol for the chariot in the early Chinese script is stylistically close to chariot images on Central Asia petroglyphs (Fig. 54: 13). This analogy is chronologically important because some researchers of wheeled transport believe that the chariot was borrowed into China from the Eurasian steppes. Chinese examples and chariot images on petroglyphs help partially to reconstruct the more ancient type of Andronovo chariot. It likely had a single axle carriage with draught-pole and two forked yokes to which horses were harnessed. Rotating wheels were attached to a fixed axle; then onto the axle and pole the frame was set; the frame was sometimes shifted forward in front of the axle. The chariot size was smaller than that of the Shang.

As for the wheeled transport of the ancient Aryans in the Near East in Mitanni, it is reconstructed on the basis of written sources (Zaccagnini 1977: 21-38). In texts from Nuzi written in the Hurrian language but preserving Indo-Iranian names connected with transport and the horse, heavy transport vehicles are contrasted with lighter battle and ceremonial chariots. The Mitanni king Tušratta sent a whip with a gold knobbed handle decorated with lapis-lazuli to the Egyptian Pharaoh Amenhotep III.

The wheeled transport of the Aryans of India is reconstructed on the basis of Vedic texts and the *Mahābhārata* (Kal'yanov 1967: 136-160; Kane 1946: 200-205; Gode 1960; Pusalker 1963; Margabandhu 1973; Sparreboom 1985; see Fig. 95: 2; Rau 1986; see Fig. 95: 2). The Vedic Aryans used a draught vehicle *ánas-* and a battle chariot (*rátha-*). Draught vehicles were of two types: a large firm four-wheeled (*indrāṇasa-*) and the more ordinary two-wheeled vehicle with a fixed axle (*ákṣa-*), attached to the body with ropes. The wheel was composed of three parts: two outer segments and a central part with a protruding hub, which were fastened by cross laths (*Śatapatha-Brāhmaṇa* 5.4.3; 7.2.3). "Three planks form the vehicle wheel. There is a large hole for the hub of the central plank to insert the axle into it… A pair of side planks is fixed by bushing keys" (*Aitareya-*

Brāhmaṇa 4.15.6). The wooden draught pole was perpendicular to the axle and above it; a double pole was fixed with wooden nails. From behind and under the body there was a loop used probably as a brake. Following the text of the *Kātyāyana-Śrautasūtra* (8.4.5), "the wheels of both draught vehicles are tri-partite. They are fixed on both sides of the axle… There are also two poles (i.e., a double pole) extended forward; an axle; cross-beam in front and behind separating both parts of the pole; … the yoke is attached to a forked pole… This was the construction of both vehicles". The yoke (*yugám*) was attached to the front part of the draught pole by two depressions for the back of the head of the draught animal. The yoke was fastened to the pole with ropes; there were four holes in the yoke into which wooden pegs were inserted. The pegs were on both sides of the animal to fix its head. From the yoke the two ends of the double pole met to form an isoscelese triangle. In the *Rigveda* (3.53.17) Indra is called: "You whose wheel-rim endures no damage, be of help to us! Both oxen must be hardy, and the axle must be firm. The pole must not unfasten or the yoke must not break. Indra must preserve both vehicle supports from breaking." The frame of the vehicle was planked and above it were bent arched planks; it was re-covered by a 'cap' (*gadhā*-) made of mats or pieces of felt. A door was made in the edge of the *kibitka*. The body of the vehicle was 'a hut for women', 'a hearth', the *gārhapatya*- —the interior of the vehicle; there is a "forked sharpened pole, a yoke, a step into the body" (Rau 1986: 18, 24).

In later texts six types of vehicles are mentioned: those for carrying people (*ārohaṇa*-), for the hearth and kitchen utensils (*mahānasa*-) and special vehicle types for carrying military equipment and chariots. Using three-spun ropes first the left then the right-hand animal was harnessed; halters with reins (*raśmi*-) were attached. The priest exclaimed: "You belong to Varuṇa! The rope of Varuṇa is set" (*Taittirīya-Saṃhitā* 1.2.8.2).

Oxen, bulls, horses, mules, and the ceremonial harnessing of a horse and a mule were used. Vehicles harnessed to four camels are mentioned in the *Rigveda* (8.6.48) and later texts.

Chariots were two-wheeled. Detachable wheels had an indefinite number of spokes, rim and hub; sometimes they were bound with metal. The axle was attached to the frame by ropes, the pole was straight. There is a vague mentioning of a chariot one horse high. In the *Rigveda* (4.40) a trotter is described with a bridle on its head and harness on the muzzle. The harness ran from behind the back of the head to attach to the saddle-girth. In the *Śatapatha-Brāhmaṇa* and other texts the halter is mentioned many times. The driver bore a whip. In the *Jaiminīya-Brāhmaṇa* (1.129-130) two horses, poles, reins, both wheels, and the body of a divine chariot are mentioned. In the *Taittirīya-Brāhmaṇa* (1.5.12.1) the two leading and two interchangeable trace-horses of Prajāpati's chariot are described; the chariot "gleams and it is decorated with metal plates and balls", it has a skin-made cover, sections for quiver and arrows (*gorytus*). The driver and warrior in a leather coat of mail are in the chariot. "Indra is the chariot warrior, the moon is the driver" (*Atharvaveda* 8.8.22-23). The chariot descriptions with warrior and driver are numerous in the *Mahābhārata*.

According to Vedic texts they made semi-subterranean sheds for keeping the chariot with ditches for placement of the wheels (Rau 1986; Renou 1939: 491, 492) as in the Sintashta graves and in the Chinese *che-ma-ken*.

According to W. Rau the length of the chariot axle of the Vedic period was 2m, the pole length 3.61m, the yoke 1.65m. As far as descriptions are concerned, the Aryans applied a dorsal-yoke harness system, reproduced in modern experiments, in which a saddle-girth belt is used connected to the horse's collar; the main effort is not on the animal's neck (as with the throat harness for oxen) but on its chest (Spruytte 1977: 13, 17, fig. 14, 20, 21, table 16). This type of harness is preserved in modern India. There is not enough data to identify the harness type of the Andronovans. But chariot construction according to the images on petroglyphs can be compared with the Vedic evidence. A graphic reconstruction of the Vedic chariot on the basis of textual evidence was suggested by S. Piggott (1962: 32; Rau 1983, fig. 5). Petroglyphs of north-west India in Gilgit (Thor) (Fig. 34: 15), populated by relict Indo-Iranian speakers who left their homeland before the Indo-Aryans, represent the two-wheeled horse-drawn chariot (Jettmar 1985: 755, 757, fig. 6). In central India there is an image of a two-wheeled two-horse chariot (Lal 1961: fig. 5, 6); in Mirzapur we find four-wheeled vehicles harnessed to a pair of horses (Kasambi 1968: 123); in Merkhan Pakhar (Mirzapur) there is a two-wheeled chariot with four horses (Allchin and Allchin 1973, fig. 4); on a vessel of the Jorwe type from Inamgaon there is a two-wheeled ox-cart drawn by a pair of bulls (Shchetenko 1979, fig. 39). These images are not executed in the Near Eastern manner, in profile, but they are made in plan, in the style characteristic of northern Eurasia, Kazakhstan and Central Asia. This important stylistic feature reflects the Andronovo influence on the development of wheeled transport in India in the second half of the 2nd millennium BC.

It is probable that these steppe tribes were decisive in the development of horse-breeding in India as well. Although the domestic horse was already known to the Harappan culture, only in the post Harappan period in India was horse breeding and the horse cult documented by ritual horse burials or their images in Swat (Katelai) and Gomal (Gumla, Hathala; Dani 1970-1: 49-53; Castaldi 1968: 598-602). This rite has no sources in India, south Central Asia and Iran, or the Near East but it is well known on the Eurasian steppes from the Eneolithic and was especially popular among the Andronovans (Kuz'mina 1974a; 1977: 34). The possible influence of steppe tribes, coming from Central Asia, on the development of horse breeding in India is affirmed by paleozoologists who have deduced that the Swat horses belonged to the eastern breed (Azzaroli 1975: 353-5).

The appearance of the Bactrian camel as a draught animal in Baluchistan is probably connected with Andronovo influence. On the post-Harappan settlement of Pirak camel bones and clay camel figurines (Fig. 104), including figurines with holes for attachment to vehicles, and horses and mounted horsemen were found. J. F. Jarrige (1979: 92-5, 100) dates the complex to the second half of the 2nd / beginning of the 1st millennium BC. He remarks that Bactrian camels are not characteristic of the previous Baluchistan cultures and their appearance in Baluchistan is connected with Central Asian influence. The Bactrian camel was not known in Harappa but it often appears in Vedic literature. The role of the Bactrian camel in the economy led to the formation of its cult, brilliantly reflected in Indo-Iranian religious tradition. In the *Rigveda* (8.6.46) there is mention of four pairs of camels (yoked), and camels are mentioned in the *Mahābhārata* and in the *Laws of Manu* (3.162; 4.115,120; 5.3; 8.296). The camel was especially honored in the *Avesta*, where it appears many times and comes as the main

sacrifice animal (Vidēvdāt 9.37, Yasna 44), as one of incarnations of the wind god Vāyu, the storm and victory god Vərəthragna (Bahrām Yašt, 8), and the embodiment of Glory-Farnah (Zamyād Yašt, 34-38).

Cheek-pieces

The Andronovans employed cheek-pieces of horn and bone to harness horses to their vehicles. These can be divided into three classes, shieldlike, grooved and rodlike. The shieldlike cheek-pieces are subdivided into two groups, those with tenons and those without.

Shieldlike cheek-pieces with tenons

A large number of these cheek-pieces are found on sites of the Sintashta-Petrovka type (Figs 36; 37; 39), in the Urals—15 various examples from the cemetery of Sintashta I (Gening 1975a: 94), one cheek-piece from Sintashta II (*AO* 1975: 168), one from the settlement of Kulevchi III (*AO* 1979: fig. on 138), in northern Kazakhstan on the settlements of Novonikol'skoe (fragment) and Petrovka II (one and three half-finished) and four from the cemetery of Berlik II, kurgan 10, together with a chariot (Zdanovich and Khabdulina 1976: 96; Zdanovich 1983: 57, 63, fig 3.1, 2, 7, 9, 10; 1985; 1986; 1988: 138-139, fig. 31.7, 8).

The Petrovka cheek-pieces belong to a category that was distributed widely over the Eurasian steppe (Map 7). It was A. M. Leskov (1964) who examined them and first mentioned their similarity to objects from Mycenae followed by B. A. Latynin (1965), A. D. Pryakhin (1976: 122-124, fig. 2), K. F. Smirnov and E. E. Kuz'mina (1977: 42-43, fig. 11). Analogous cheek-pieces are known from the Danube region (Oancea 1976: 59-75; Hüttel 1978: 65-86).

In 1978 the author developed a scheme for the evolutionary development of the types of cheek-pieces of the Eurasian steppe and neighboring regions on the basis of the typological-technological method (Fig. 37; Kuz'mina 1980: 8-21, fig. 1) which has received some recognition (Azzaroli 1985: fig. 10). It has stood the test of time and may be a significant addition to the results of the most recent discoveries of cheek-pieces in the cemeteries of the Abashevo culture, Tavlykaevo IV in the Urals (Gorbunov 1986: tab. xvii, 6); Utëvka IV on the Volga, Vvedenka on the Don (Vinnikov and Sinyuk 1990: 127) and especially in the burials of the chariot-warriors in the kurgans of the Potapovka type, contemporary with the closely related Petrovka, Potapovka, Utëvka VI on the Volga (Vasil'ev *et al.* 1992; Kuznetsov 1993: 74), Kondrashkinskiy I (Pryakhin 1992) and Pichaevskiy (Moiseev 1990: 56) on the Don (Table 5).

Type	*Culture*	*Site*	*Tenons*		*Panel*
			number	*type*	*shape*
IA	Late Helladic	Mycenae, grave 4	3	solid	round
	Petrovka	Petrovka II	4	solid	round
	Sintashta	Sintashta, graves 5, 11, 30, 39	4	solid	round
	Timber-grave-Abashevo	Surush	3	solid	rectangular
	Abashevo	Tavlykaevo IV	3?	solid	round

	Abashevo	Balanbash	3	solid	round
	Catacomb-Multi-roller	Kamenka	2	solid	round
IB	Late Helladic	Mycenae, grave 4	3	solid	round
IC	Sintashta	Sintashta, grave 12	4	solid	round
	Potapovka	Potapovka 3/4	4	solid	round
	Multi-roller?	Trakhtemirovo	4	solid	round
IIA	Monteoru IIA-IIB	Cândeşti	3	solid	round
	Monteoru IC_4-IIA	Carlomaneşti	3	solid	round
	Monteoru IC_4-IIA	Sarata-Monteoru	3	solid	round
	Sintashta	Sintashta, graves 11, 12	4	solid	round
	Potapovka	Potapovka 5/8	3	inserted	round
	Potapovka	Utëvka VI, 6/6	3	1 insert; 2 solid	round
	Potapovka	Kondrashkinskiy I	3?	solid	round
	Potapovka	Pichaevskiy	3	insert	round
	Timber-grave-Abashevo	Otrozhka	1	solid	rectangular
	Abashevo	Kondrashevka	3	insert	round
IIB	Petrovka	Berlik 10	2	solid	oval
	Sintashta	Sintashta, grave 30	2	insert, solid	oval
	Potapovka	Utëvka VI, kurgan 2	2	insert	oval
	Potapovka	Utëvka VI, Kurgan 2	4	solid	oval
	Potapovka	Utëvka VI, 6/4	4	solid	oval
	Potapovka	Utëvka VI, 6/6	2, 4	solid	oval
	Potapovka	Bogoyavlenskiy	4	insert	rectangular
III	Late Abashevo	Staroyur'evo	4	insert	round
IV	Coslogeni?	Ulmeni	4	solid	round
	?	Sarata-Monteoru	4	solid	round
V	Late Helladic	Dendra, grave 7		solid	round
	Late Helladic	Mycenae, grave 81	4	insert	round bronze
	Late Helladic	Mycenae, grave 15	4?	insert	round
	Late Helladic	Mycenae, palace		insert	round
	Late Helladic	Kakovatos, tholos A	4	insert	round
VI		Tiszafüred	4	insert	round
	Abashevo	Vesely	4	insert	round

Table 5: Classification of shieldlike cheek-pieces with tenons

Eurasian bone and antler cheek-pieces constitute a single category of artifact possessing a flat tenon with a large central round, rarely rectangular, opening, sometimes surrounded by a bevel, and three or four (rarely two) protruding tenons on the reverse side. According to the form of tenon they are divided into three variants: disc, oval and segmented. According to the arrangement of the additional openings they are divided into six types.

Type I, subtype A. Disc cheek-pieces with one or several small openings on the periphery of the disc with three or four tenons. These are found on the settlement of Petrovka II (1 whole and 3 unfinished, made from deer antler), at Sintashta in burials 5, 11, 30 and 39, and also in the Urals on the Abashevo settlement of Balanbash (Sal'nikov 1967: fig. 8, 19) and in the cemetery of Tavlykaevo IV (Gorbunov 1986: tab. xvii. 6), on the Timber-grave-Abashevo settlement of Surush on the Middle Volga (Vasil'ev 1975: fig. 6.2); in the late Catacomb (or Multi-roller Ware) settlement of Kamenka in the Crimea (Rybalova 1974: fig. 3.1; Leskov 1964: 12). Cheek-pieces of subtype A1 with three tenons are found in grave 4 of Grave Circle A (according to G. Karo, the 4th shaft grave) at Mycenae in Greece (Karo 1930: 130, tab. 70, no. 532-535). The Mycenaean cheek-pieces were originally interpreted as pot covers (H. Schlieman), helmet attachments for plumes (Karo 1930: 372), as model thrones (Wace 1960), and as votive tablets (Mylonas 1957: 103); their utilization as cheek-pieces was rejected because among the pairs of tenons there were transparent holes in which tubes were inserted (Littauer and Crouwell 1973a: 207-213). But this does not exclude their use as cheek-pieces (Oancea 1976: 71; Hüttel 1978). The utilization of disc-shaped cheek-pieces was supported by figures from the Tiryns frescoes (Fig. 66: 8, 10; Evans 1927: figs. 810, 811; Wiesner 1968: fig 15a and b).

To subtype IB belong two cheek-pieces with three tenons from shaft-grave 4 with small extruding semi-oval slats without functional significance and ornamented on the end of the disc with running wavy lines or running spirals (Karo 1930: pl. 70, no. 533, 534).

Subtype IC is defined by disc-shaped cheek-pieces with large central holes, sometimes with one or two small ones, and several small holes on the end of the disc. They are from Sintashta (grave 12), Potapovka (kurgan 3, grave 4) and Trakhtemirovo in the Ukraine. A. M Leskov (1964: fig. 1) and S. S. Berezanskaya (1982: 31, fig. 40.1) suggest a connection between the latter and the Multi-roller Ware culture.

The construction of the type II cheek-pieces is distinguished by distinctive slats on which small holes are distributed. To subtype IIA, those with a rectangular slat, belong those cheek-pieces with a truncated segmented disc and arranged along the chords are small holes, often with inserted tenons. These are found at Sintashta, graves 11 and 12, at Potapovka, kurgan 5, grave 8 (Kuznetsov 1993: 74), Utëvka VI, kurgan 6, grave 6 (Vasil'ev *et al.* 1992: fig 5, 12), in the kurgans at Kondrashkinskiy I (Pryakhin 1992: fig 1.1), Pichaevskiy (Moiseev 1990: 56), in the Abashevo cemetery of Kondrashevka (Efimenko and Tret'yakov 1961: fig. 31.4), and on the Timber-grave-Abashevo settlement of Otrozhka (with thanks to B. G. Tikhonov for the unpublished information). Three cheek-pieces of subtype IIA have been found in the Danube region, a fragment of one in the ashpit about the settlement of Carlomaneşti along with ceramics belonging to Monteoru IC_4-IIA; a second from the settlement of Sarata-Monteoru in a complex of the same

culture (Oancea 1976: fig. 3, 162); a third from the settlement of Cândeşti in a level belonging to Monteoru IIA-IIB (information from V. S. Bochkarev).

To subtype IIB belong cheek-pieces with tenons of an oval (rarely rectangular) form, with a central hole and with a markedly protruding triangular tag with additional holes. Such cheek-pieces are known from Sintashta, grave 30, Berlik II, kurgan 10 (Zdanovich 1988: fig. 31.7,8), and also along the Volga Utëvka VI, kurgan 2 and 6, graves 4 and 6 (Vasil'ev 1975: fig. 6.1; Vasil'ev *et al.* 1992: fig. 4.7-9, 18, 5.13, 6.9-11) and on the Don from the cemetery of Bogoyavlenskiy, kurgan 1, grave 3 (with thanks to Yu. P. Matveev for this information).

A special variant of the cheek-pieces consists of examples of segmented shields, with a large central hole and tenons. They are found on the settlement of Novonikol'skoe (Zdanovich 1983: 3.1; 1988: pl. 10.9), Kamyshnoe (Potemkina 1985: fig. 107, 192; dates of the 15-14th centuries BC are not settled) and Kulevich III (*AO* 1979: fig. on p. 138). Possibly we can add here a bone object, found on the Timber-grave settlement of Sosnovskiy 3 in the Samara region, as a similar unfinished cheek-piece (information from S. A. Agapov). Unfortunately, all four examples are fragmentary so that they do not permit complete identification. It is possible that they had the distinctive tag with the small hole and may be assigned to subtype IIC.

To type III belong cheek-pieces having a distinctive rectangular tag with small holes and additional holes on a second flat piece which principally distinguishes them from subtype IIA. There are two cheek-pieces from the cemetery of Staroyur'evo on the Don having four insertions, pegs, ornamented on the outside with crosses, running zig-zags and with teeth along the edge of the disc (Pryakhin 1972: fig. 3).

To type IV belong the cheek-pieces with a large central and two smaller holes on the periphery of the disc and additional transverse holes with four solid tenons. So far they are known only from the Danubian region, one from Ulmeni which was found together with ceramics of the Cernavodă (Eneolithic) and Coslogeni (Bronze Age) cultures; a second is from Sarata-Monteoru from an unknown context (Oancea 1976: fig. 5.34). The first cheek-piece was ornamented along its ends with zig-zags; the second with two rows of teeth.

Type V cheek-pieces are round discs; in contrast to the preceding they have two equal central holes (sometimes with bevels) and on the four inserted pegs (sometimes decorated with grooves), inserted in the rectangular holes of the disc. They are so far known only from Greece, three or four cheek-pieces were found in the palace of Mycenae in the 'House of Shields'; fragments of two more were found at Mycenae, possibly in grave 15; one come from tholos A at Kakovatos on the Peloponnese, one is from Dendra, grave 7 (Wace 1960: figs. 2-4; Oancea 1976: figs 4.5-10). To the same type one should add the bronze disc with two central holes and four holes for receiving the dowels. It was found at Mycenae in grave 81 (Fig. 67: 4).

Type VI consists of disc-like cheek-pieces with protruding plates on which additional holes are situated. Two examples with four tenons and a small slat with two small holes were found by M. S. Smirnov in 1920 in kurgan 1 at the site of Vesely near Sterlitamak in Bashkiria in a complex with pottery with crushed shell temper (Archive of the St Petersburg Institute of Material Culture 63, 1920: 2-4, with thanks to V. P. Shilov for making me aware of this find).

Analogous cheek-pieces with several holes in the disc are from Tiszafüred in the Danubian region (Bona 1975: tab. 195.1).

In addition to this, in central Kazakhstan A. A. Tkachev (1991: 8, 12, 15) refers to finds of shieldlike cheek-pieces along with the bones of a horse; in enclosure 7 of the cemetery of Atasu (Ayshrak) an inserted bone tenon was found in an assemblagte with early Alakul' ceramics and a bone bead (Archives of IIAE AN KazSSR, Diary of Central Kazakhstan Expedition, 1952). These finds indicate the eastern limits of the distribution of disc-shaped cheek-pieces with tenons in the Eurasian steppe.

Analysis of the details of the classification of types of disc-shaped cheek-pieces permits us to reconstruct the evolution of the objects of this category (Fig. 37). Original were cheek-pieces of subtype IA which were distributed across the Eurasian steppe from the North Pontic to northern Kazakhstan and at Mycenae in Shaft-grave 4. The similarity of the objects of this subtype over the entire area and especially the similarity of details not functionally determined leaves no doubt that there was a single origin for the disc-shaped cheek-pieces. The most archaic in the series are the cheek-pieces of Balanbash which are crude, asymmetric, with three tenons and a single small hole.

An important innovation in the form of disc-shaped cheek-pieces was the making of additional holes in the second plate. Along the Danube it was realized in Type IV (Ulmeni) which was developed from subtype IA. In south Russia the principal new type of cheek-pieces was Type III (Staroyur'evo), which also developed from Subtype IIA. In Greece evolution took a different course; on the basis of Subtype IA there was created Type V (Kakovatos) which stimulated imitations in metal. It is possible that distant replicas of cheek-pieces of Type VI with holes on the plate appear as bronze cheek-pieces with tags with holes, as were found in the citadel of Mycenae in the Late Helladic IIIB or IIIC level (Crouwel 1981: tab. 1).

The second important improvement in the form of disc-shaped cheek-pieces was the application of the inserted peg, which replaced the quickly worn out solid tenon (characteristic of the cheek-pieces of Type I) with a type that significantly extended the life of the cheek-piece. In the south Russian steppe this innovation was already known from objects of Type II and was characteristic for the insuing line of evolutionary development of Type III (Staroyur'evo) which was similar to the Late Mycenaean cheek-pieces of Type V (Kakovatos).

Keeping in mind that the genetic line tends to reflect the general tendency of development of the cheek-pieces, this does not exclude the mutual co-existence of old and new types in a time of intensive search for innovations. In a closed context at Sintashta in grave 30 there were found cheek-pieces of subtypes IA and IIB, in grave 12 there were subtypes transitional between IC and IIA, at Utëvka in kurgan 6, grave 6, were subtypes IIA and IIB. But the regularity of evolution supports, in the first place, the correlation of changes in form and ornament, and secondly it is supported by stratigraphy, e.g., at Potapovka it has been established that kurgan 3 with a cheek-piece of subtype IC according to our classification was older than kurgan 5 with a cheek-piece of subtype IIA which bore Mycenaean ornament (Kuznetsov 1993).

What about the absolute chronology of the various types? A. M. Leskov (1964) dated the disc-shaped cheek-pieces of the south Russian steppe after

analogous ones from shaft-grave 4 at Mycenae to the 16th century BC. V. A. Safronov (1966: 189-190), on the other hand, argued that "cheek-pieces, similar to those from Kondrashevka, were distributed in Greece from the middle of the 2nd millennium BC through the 13th century BC, while they were imported there from Egypt… It follows that their appearance in the Don region does not require a date earlier than the 13th century BC." The publication of the cheek-pieces from the Danube by A. Oancea cites different dates from a variety of archaeologists but he does not establish his own chronology.

The classification of cheek-pieces and the establishment of their evolution permits us to establish the origin of the disc-shaped cheek-pieces and their chronology. The most archaic disc-shaped cheek-piece was amorphous and undecorated of Type I and derived from contexts of the Catacomb-Multi-roller Ware and Abashevo cultures from the Ukraine to the Urals. This permits us to attribute the first controlling of chariots with cheek-pieces to tribes of the Abashevo and Multi-roller Ware cultures (KMK=Kul'tura Mnogovalikovoy Keramiki). The second played a decisive part in the origin of the closely related sites of the Potapovka type from the Don to the Volga, and the Sintashta and Petrovka cultures of the Urals and Kazakhstan. Among the Potapovka and Sintashta-Petrovka population the tactics of chariot warfare underwent a massive development that is evidenced in the first place by the burials of warriors, preserved with chariots and horse gear, and, secondly, by the greatest concentration of disc-shaped cheek-pieces in the Old World in the forest-steppe between the Don and Urals; thirdly, there is the intensive quest here for the most rational construction of the cheek-piece, evidenced by the coexistence of various types. Taking into account the monocentric origin of the disc-shaped cheek-pieces it is possible to suggest that they expanded into Kazakhstan, then into the Danube region and further into Greece from the south Russian steppe. In this case the date of the cheek-piece from grave IV at Mycenae, belonging to the end of the Middle Helladic/beginning of the Late Helladic period, serves as a terminus ante quem for the cheek-pieces of Type I from Potapovka, Sintashta and Petrovka, and further the most archaic examples of the Abashevo (Balanbash, Tavlykaevo, Surush) and the Catacomb-Multi-roller Ware (Kamenka, Trakhtemirovo), which may belong to the 17th century BC.

The development of cheek-pieces of Type II (with the characteristic plate and often with inserted tenons), to which belong the majority of the Potapovka and Sintashta examples, is established on the basis of synchronization with the Danubian examples dating to the period of Monteoru IC_4-IIA. Subtype IIA and IIB are contemporary as indicated by their mutual existence at Utëvka VI.

Some of the cheek-pieces of this subtype are richly ornamented (Figs. 36, 37). An example from Potapovka is decorated with Mycenaean ornament of opposed triangles, forming zigzags to the end of the disc, waves with a recessed background over the plate and with festoons about the hole. On a cheek-piece from Utëvka on the end of the shield there are three rows of checkerboard ornament; running waves with recessed triangular foundation are along the plate. On the Kondrashkinskiy cheek-piece, both around the hole and on the plate, there are festoons and zigzags on the plate that are similar to those from Potapovka. The example from Pichaevo is decorated with a chain of rhomboids and zigzags on the end, V-shaped figures are on the plate, around the holes they

form rosettes; a cross is on one of the tenons, on the other a four-pointed solar symbol.

The Bogoyavlenskiy cheek-pieces are ornamented on the end plate with a running wave and on the third tenon by spirals forming a rosette. The cheek-pieces from Cândeşti are decorated on the end by two rows of triangles forming zigzags. On the cheek-piece from Sarata-Monteoru the plate is decorated with zigzags and isoceles triangles with festoons hanging from the top; in the center of the example from Carlomaneşti there are running waves with dots and teeth on the end.

These ornaments belong to the Mycenaean type (Figs. 38; 66; 67; 79) about which we have already written (Smirnov and Kuz'mina 1977: 46-50, fig. 12). The Bogoyavlenka and Utëvka cheek-pieces are ornamented with classical Mycenaean running waves. They appear in the art of the Middle Helladic period (Mylonas 1957: figs. 43, 45) and are especially characteristic for the time of the shaftgraves, cheek-pieces of Type I and plates of shaft-graves III and IV, stela no. 1428 (Karo 1930: tab. v, lxx, nos. 533, 535, xx, no. 38). On the example from Bogoyavlenskiy the waves are combined with rosettes, which are similarly represented on plates from shaft-graves IV and V (Karo 1930: No. 319, 337, 344 and 676), and at Utëvka with the checkerboard pattern, which are figured in composition with waves in paintings in the megaron (Müller-Karpe 1980: tab. 243.6). The cheek-pieces from Pichaevo were covered with decoration, created out of V-shaped figures, that was very typical for shaft graves III, IV and V (Karo 1930: tab. xxi, N 23; lxi, N 340, 345). Similar to the Bogoyavenka five-petalled rosette are the bone plates from Füzesabóny and Nitriansky Hradok, the four-petalled ones from Veterovo, and the eight-petalled from Tell-Açana (Müller-Karpe 1980: tab. 291, B8; 294, D7; 298: 17; 159, A4) (similar but simplified ornament is known from a plate from the cemetery of Balakty in central Kazakhstan). According to the Mycenaean analogies the cheek-pieces of Type II may be dated to the 16th century BC.

To this same time may also belong the bone pendant from the Pokrovskiy cemetery, decorated with simple waves, similar to those on Mycenaean cheek-pieces of Type I (Karo 1930: tab. 70, 534). It is interesting to analyze the head-dress from the Abashevo kurgan of Algashi (Efimenko and Tret'yakov 1961: fig. 14). The ornament of this, internally filled zigzags, had a long devel-opment in Greece (Furumark 1941: motif 65). The Mycenaean diadems, embroi-dered with plates with six-petalled rosettes and double-spiral pendants, recall the Abashevo culture's initial headbands (Efimenko and Tret'yakov 1961: 56, figs. 10, 12). Similar diadems are found in Egypt at Thebes in graves of the XVIII dynasty and in the Near East in Assyria that provides a basic synchronization of cultures from the three continents to the 16th century BC (Müller-Karpe 1978: 16-18).

The cheek-pieces from Kondrashkinskiy and Potapovka were decorated with opposing triangles, forming zigzags to the end of the disc just like a plate from grave V (Karo 1930: no 707, 716, 722) and hanging festoons. The latter is also represented on cheek-pieces from Staroyur'evo and on a bone disc from the Aba-shevo settlement of Shilov on the Don (Liberov 1980: figs. 1.2, 2.2). The motif finds an analogy on bone objects from Vatina; many bone whips and staffs from Eastern Europe are decorated with Mycenaean motifs (Fig. 79: 11-35).

In Transylvania and along the Danube the ornaments, which developed under Mycenaean influence in the 16th century BC, continued for a long time and were transformed (Bochkarev 1968; Hachman 1957; Točik 1959; Foltiny 1967; Kóvacs 1969; Bona 1975; Hüttel 1982). The post-Mycenaean period saw a characteristic degradation of the scheme with the spread of circular ornament with dots. The apogee of this ornamental system reached the Noua culture. On the cheek-pieces of Type III from Staroyur'evo festoons framed with dots are a late characteristic of Type IV (Monteoru, Ulmeni).

Thus the absolute date for cheek-pieces of Type I in view of the complete similarity of this original form over all areas is set to the 16th century BC according to the analogy with the 4th shaft grave at Mycenae, which is assigned to 1570-1550 BC (Mylonas 1957: 181; Marianatos 1960: 177), while it serves as a terminus ante quem for the most archaic form of the south Russian steppe which may belong to the 17th century BC.

It should be mentioned that in the past years there has been a tendency to review the chronology of A. Furumark and advance the antiquity of the Mycenaean complex by a century. Dates of the 17th century BC are based, firstly, on the time of the eruption of the volcano on Santorini (1645 BC) as established by radiocarbon dates; secondly, by synchronisms with the Egyptian and Near Eastern complexes in which Mycenaean objects have been found (Dietz 1991; Warren and Hankey 1989; Kemp and Merrilleese 1980). The chronological relationship of the Mycenean graves has also been revised (Killian-Dirlmeier 1988) and the absolute development of the Egyptian dynasties. However all these hypotheses are questionable. But if the dates of Mycenae were to be revised, this would permit one to advance the antiquity also of the Eurasian complexes, assigning the Novokumak horizon to the 18th–17th centuries BC.

Cheek-pieces of Type II, decorated with ornamental compositions fully analogous to the art of the shaft graves at Mycenae, date to the 16th century BC. But some examples of this type also bear degenerate post-Mycenaean decoration, characteristic for the Carpathians and Danube region of the 16th–15th centuries BC.

The similarity of detail of the most developed Eurasian Type III cheek-pieces with those of Mycenaean Type V provides a basis for synchronization. The cheek-pieces of Type V were found in tholos A at Kakovatos in a LH II context (dated to the 15th century BC; Palmer 1965: 171), in grave 7 at Dendra (LH IIIA, i.e., 14th century BC), in the 'House of the Shields' at Mycenae which was destroyed in LH IIIB, i.e., the 13th century BC, and, consequently, belonged to the 15th–14th century BC (Wace 1960: 42). Thus the development of the latest Type III, the disc-shaped cheek, is set no later than the 15th–14th centuries BC and it also serves as a terminus ante quem for the cheek-pieces of Type II, which belong to the 16th century BC. The presence of 'Mycenaean' ornament on the disc-shaped cheek-pieces both in the Danube region and also on the Eurasian steppe as far as Kazakhstan, a well known phenomenon that includes other categories of material, provides evidence of the influence of the highly developed Mycenaean civilization on the cultures of Europe, including the East (Sulimirski 1970: 43-50, fig. 66; Beresanskaja 1971: 7, 8, Smirnov and Kuz'mina 1977: 43-50), brought about by the course of trade items (Smith 1987). However, scholars of the Mycenaean civilization suggest that the Mycenaean dynasty came

to Greece from the north and it is in that direction that they seek a series of traits of Mycenaean material culture. The character of the chariot myth speaks for a central European origin for them. A specially important mythologem is the swan-horse, carrying the solar god across the sky (Ivanov 1969: 54); the possibility of a Mediterranean origin is excluded as this myth could only come out of northern Eurasia, where the flight of the swan signals the coming of spring. In Greek myth the chariots of the Amazons, pulled by swans, fly from the Rhipian mountains, i.e., the Urals.

In pre-Mycenaean Greece there was no developed tradition of horse transport that was not stimulated by the invention of the horse-drawn chariot. In contrast, on the Eurasian steppe horsemanship was known from the 4th millennium BC to the 3rd millennium in a zone from the Dnieper to the Ural which defined the horse-using cultures, the formation of a cult of the horse (Kuz'mina 1977) and the tradition of sacrificing horses in burials, which only appeared in Greece with the arrival of the Mycenaean dynasty; the burial of two horses was uncovered in the dromos of a tholos at Marathon (Vanderpool 1959: 277-283). In contrast, in the steppe the ancient horse-raising tradition led to the development of horse-training. The intensive quest for the most effective methods of harnessing is evident from the wide variety and instability of variants of cheek-pieces in the steppe on sites of the Potapovka and Petrovka-Sintashta cultures. All of this points to the conclusion that the formation of cheek-pieces of Type I originated in the Eurasian steppe where the largest number of cheek-pieces are known, and the most archaic examples devoid of any decoration are known from the Abashevo and Catacomb-Multi-roller Ware cultures. On the border of the Middle and Late Helladic periods the chariot and paired horses with disc-shaped cheek-pieces from the steppe found their way into Greece.

Cheek-pieces without tenons

This group comprises cheek-pieces with a flat shield and a large central hole; usually there is a transverse side slot and a protruding triangular tab with small holes. Two subtypes are distinguished, Ia with one extension, Ib with two extensions (Figs. 37, 38).

Subtype Ia, variant 1, with round shield is present in burials of the Alakul' type in the Urals such as Alakul' (together with a pair of horses, Sal'nikov 1952: 58, fig. 7.2); in northern Kazakhstan at Novonikol'skoe (*AO* 1977: 514, fig. on p. 513) and Petrovka 2 (Zdanovich 1983: 63); and also on monuments of mixed types, e.g., the Kozhumberdy settlement at Tasty-Butak in western Kazakhstan (Sorokin 1966: table xxxviii, 22), in the Amangel'dy burial at Aydabul' in northern Kazakhstan (Akishev 1959: 16, fig. 8); they are also known as chance finds in the Ukraine such as Diky Sad and Surskaya Zabora, or Voloshskoe (Sharafutdinova 1968: 27, fig, 3,52; 1982: 139-140, fig. 55.7, 11, 56, 59, 67; Cherednichenko 1977: fig. 2.3). A variant of this type is a cheek-piece from a Timber-grave settlement of Polyani on the Severskiy Donets (*AO* 1975: 383; Berezanskaya 1982: fig. 40.2). In contrast to the examples from Tasty-Butak and Vatina it has additional small slots on the triangular slat.

Two cheek-pieces from the Timber-grave settlement of Kazangulovo 1 in Bashkiria bore oval and not round shields and these should be assigned to a special variant $1A_2$ (Gorbunov and Obydennov 1975: 254-257, fig. 1.1,2). Cheek-pieces

of subtype 1A, as K. F. Smirnov (1961a: 60-63, fig. 9,1,11,1; type II in his classification) remarked, are close to Danubian ones mentioned by A. Mozsolics (1953: fig. 6.4-6; Bökönyi 1953: 11, fig. 2; Foltiny 1967: 28, fig. 6.7). Cheek-pieces from Vatina and an example from Toszeg belong to subtype IA (Hüttel 1978: fig. 9; 1982: fig. 4); other examples from Toszeg belong to subtype IB.

As far as the origin of shieldlike cheek-pieces without tenons is concerned, it is probable that they can be derived from shieldlike cheek-pieces with tenons of types III and IV with which they are related through the presence of a side slot through another tab (Kuz'mina 1980a: 15, fig. 1). Their evolution along both the Danube and across the Eurasian steppes occurred contemporaneously through the preservation of active contacts between the regions which is evident not only from the resemblance with respect to form and construction of the Hungarian and Timber-grave/Andronovo cheek-pieces but also because they bear the same post-Mycenaean ornament—circular with points—decorating shields of two Toszeg examples (Hüttel 1982: fig. 3.5, 8) and from Novonikol'skoe, a degraded Mycenaean wave from Kazangulovo and decayed post-Mycenaean rosette from Vatina. These Danubian analogies can help dating the Andronovo cheek-pieces. A. Mozsolics (1978) assigned all disc-like cheek-pieces to the Early Bronze Age in Hungary, which is defined by her as the 14th–12th centuries BC without dividing them into classes and types; I. Bona (1975: 105-139) dates Toszeg and Vatina to 1450-1200 BC. A date of the 15th–13th centuries BC seems most reliable and agrees with radiocarbon dates for the Novonikol'skoe burial that places it in the 14th century and for the Tasty-Butak settlement which is 1229± 80 BC.

Grooved cheek-pieces (Figs. 37-39)

Another class of cheek-pieces consists of cheek-pieces with protruding teeth-tenons on the edges (Figs. 37-39, 80: 35). They have a large central hole and separate tab. They are divided into two main types: 1) without a side slot, 2) with additional side slot.

Type 1 is represented by an example from the early Petrovka-Alakul' settlement of Mirny 4 in the Urals (Chemyakin 1974: 55, fig. 2,6) where a cheek-piece of oval form was found with a central oval slot and separate shield. Another is a cheek-piece of rectangular form with a large rectangular hole and separate triangular tab with a small hole. Cheek-pieces of this variant are found in the Petrovka burials of Satan in central Kazakhstan along with a chariot (Tkachev 1987: fig. 1.4) and Aksaiman in northern Kazakhstan together with a pair of draught horses (Zdanovich 1988: 78, fig. 30.22, 23). Two cheek-pieces of a well-developed variant with cross projections on the slat like those on the shieldlike cheek-pieces without tenons (Alakul', Kazangulovo, Toszeg) were also found (Zdanovich 1988: fig. 30.24, 25).

Cheek-pieces of Type I are archaic in form and in construction and are comparable to disc-like cheek-pieces with tenons of subtype IIB, which establishes their lower data as the 16th century BC. Zigzag ornament on the shield of the Satan cheek-piece does not contradict this; it is analogous to the decoration on Type II cheek-pieces although it is known later as well.

Type II is presented by classical rectangular grooved cheek-pieces with a side hole on a second slat. On the basis of the separate tags with small slots, the grooved cheek-pieces are divided into two subtypes: IIA with rectangular slat,

2B with triangular slat. One cheek-piece of Type II was found on the Kozhumberdy settlement of Tasty-Butak; its slat was broken (Sorokin 1966: table xxxviii, 30). Subtype IIA cheek-pieces are found in central Kazakhstan on the settlement of Ikpen' in a complex with Fedorovo type pottery (Fig. 80: 35) and in the Ukraine on settlements of the Multi-roller Ware culture such as Podgorovka (Berezanskaya 1982: 127, fig. 40.3) and the early Timber-grave settlement of Osipovka (Belyaev 1980: 15), on the Severskiy Donets and Don, on settlements with mixed Multi-roller Ware and Timber-grave-Abashevo ceramics such as Kapitanovo, Prokazino, Shilovo, and on early Timber-grave sites along the Volga in burials both at Usatovo and Krasnopol'e, and on the settlements of Moechnoe Ozero and Tochka (I am grateful to I. B. Vasil'ev for this information). Cheek-pieces of subtype IIB have been discovered on the Donets Timber-grave sites such as Il'ichevo and along the Volga at settlements such as Ershovo and Guselka 2, and the kurgan at Komarovo which included a pair of chariot horses, one of which was bridled; in addition, grooved cheek-pieces are found in the Timber-grave complexes of Novomolchanovka, Cherebaevo, Stepovoe (Smirnov K. 1957a: 47-50, fig. 1.2; Cherednichenko 1968: 102-104, fig. on page 103; 1970: 234, fig. 2.1,5; Bratchenko 1976: 151, fig. 72, iv,2; Pryakhin 1976: fig. 10, 11; Shapovalov 1976: 158, 160, fig. 4.1; Berezanskaya *et al.* 1986: 100).

Zigzag ornament is found on some of the rectangular cheek-pieces (Usatovo, Komarovo, Tasty-Butak). It is characteristic of disk-like cheek-pieces with tenons (Mycenae, Staroyur'evo, Sarata-Monteoru, Ulmeni), and it is preserved on disk-like cheek-pieces without tenons (Novonikol'skoe). Another cheek-piece comes from the Timber-grave settlement of Chishma in Bashkiria; it is decorated along the edge by curved zigzags, and from above by concentric circles (*AO* 1980: 144). This post-Mycenaean ornament is characteristic of disc-like cheek-pieces without tenons from Novonikol'skoe and Toszeg and provides an upper date for grooved cheek-pieces.

In the peculiarities of construction (presence of tenons, central hole, transverse slots, and tag with small holes) Type II grooved cheek-pieces are closest to the most developed Type III disk-like cheek-pieces. Their decorative ornaments are also analogous, which aligns them to a single line of bridle development and, therefore, synchronizes them and sets their lower date to the middle of the 2nd millennium BC. K. F. Smirnov (1961a: 52, 57) observed the similarity (in the method of bridle fastening) between grooved cheek-pieces and Hungarian cheek-pieces of another class, the horn cheek-pieces of Füzesabóny type with a large central hole, transverse hole and small holes on the end. They are assigned to the Middle Bronze Age, Füzesabóny-Toszeg-Ottomani horizon. According to A. Mozcolics, they date to 1400-1100 BC. A. Točik (1959: 42-53, table II.3) noted a Füzesabóny type cheek-piece from a settlement of the Modarovskaya culture in Slovakia in which objects with Mycenaean ornaments are known. A. Mozcolics (1960: 133ff) attributed great significance to Anatolian influence. S. Foltiny (1967: 23, fig. 7.6) related the Füzesabóny type with a cheek-piece from Alaca Hüyük from the Hittite layer of 1450-1300 BC and a cheek-piece from Megiddo of 1200 BC. He especially emphasized the finding of a bone disk analogous to a bronze disk from Kakovatos which was already compared (Hachman 1957: 174-175, fig. 7.10-12) and found together with a cheek-piece. R. Bochmer (1972: 201) believed that the Alishar and Alaca Hüyük cheek-pieces (of unspecified

date) and the Bogazköy cheek-piece can be no earlier than 1450 BC. T. Kovacs (1969: 159-164) examined the horn cheek-pieces from the Carpathians and dated them on analogy with cheek-pieces from Asia Minor from Beycesultan and Alaca Hüyük to 1450-1300 BC. H. G. Hüttel's (1982) skepticism about a connection between the Anatolian and Danube rodlike cheek-pieces is not well founded, but he does justly stress that their Asia Minor origin is not proved. T. Kovacs (1969: 164), I. Bona (1975: table 105) and B. Hansel (1968) lowered the lower date of the Hungarian sites of the Middle Bronze Age to the 16th–15th centuries BC on the basis of objects with Mycenaean ornament.

In order to specify when grooved cheek-pieces began to appear it is important to take into account the finding of a grooved cheek-piece with a bone plate with Mycenaean ornament on the early Timber-grave settlement of Il'ichevo (Shapovalov 1976: 158, 159, fig. 5; Smirnov and Kuz'mina 1977: 47, fig. 12.6). On analogy with Mycenaean ornaments and a bone plate from the Vatina culture (Marinatos 1960: 90, fig. 202; Tasić 1973: 32, table IV.4) its lower date can be set to the end of the 16-15th centuries BC. The setting of the lower date to the middle of the 2nd millennium BC is also secured by culturally mixed sites reflecting the interconnections of the Multi-roller Ware, Abashevo and early Timber-grave ceramics of the Pokrovskiy stage.

The upper date of grooved cheek-pieces is established on the basis of the discovery of a grooved cheek-piece with a disk-like cheek-piece without a tenon on the Kozhumberdy settlement of Tasty-Butak; its age is defined as the 15th–13th centuries BC and by a radiocarbon date of 1229±80 BC.

Type III is represented by the only cheek-piece from the Chelkar settlement in northern Kazakhstan (Orazbaev 1958: 275, tab. ix, 1), its tag is protruded and it has no holes. It probably reflects a degradation of the Type II cheek-piece. The absence of close analogies makes its dating impossible. A. M. Leskov (1970: 45, fig. 30.4) compared it with a cheek-piece from the settlement of Kirovskiy and assigned it to the 13th century BC. A cheek-piece from the settlement of Mosolovskiy along the Don is also unique: it has two holes on a rough tag (Pryakhin 1992: fig. 6).

How Type I and II cheek-pieces were fastened is not entirely clear. On the basis of a grooved rectangular cheek-piece on a horse skull from the Komarovo kurgan, K. F. Smirnov (1961a: 50-51, fig. 3) suggested that the horse was bridled with the help of nose and lip belts; a soft leather bit with a loop was passed through the central slot to which the rein was fastened; the cheek belt was fastened to the side slot, and small holes on the tag were for fastening with a nose belt; the tenons on the cheek-pieces were used as snaffles (Smirnov 1961a: 63). (For a reconstruction of the fastening system of different cheek-pieces see Littauer 1969: fig. 7; Gorbunov and Obydennov 1979; Pryakhin 1992).

There is no instance of a Type I cheek-piece found in situ in a Petrovka grave. The images of chariot horses with disk-like cheek-pieces on frescoes from the palace at Tiryns are important for reconstructing the bridle (Wiesner 1968: fig. 15, a, b). N. N. Cherednichenko (1976) supposes that bridle fastening was close to that described.

We see then that two classes of cheek-pieces (shield and grooved) appeared over a wide zone of the Eurasian steppes from the Dnieper to northern Kazakhstan in the Multi-roller Ware culture, Abashevo, early Timber-grave (Potapovka

type) and early Andronovo (Sintashta, Petrovka types) and developed further in the Timber-grave-Pokrovskiy, and Andronovo-Alakul' and Fedorovo complexes. The difference in form of both classes was preconditioned by peculiarities of the raw material: shieldlike cheek-pieces were made of a wide part of horn or from the epiphises of a cow's metatarsus (Balanbash, Kamenka), which results in a round, oval or segmented form. Grooved cheek-pieces were cut from a longitudinally split tubular bone, resulting in their rectangular or oval form, grooved in cross section. The principle of construction of the cheek-pieces is similar for both classes: they have protruding tenons and a large central slot; they evolved in the same direction, starting with a tag with small slots (rectangular as in variant A or triangular, variant B), then a transverse hole appears. Finally, they employed flat (without tenons) cheek-pieces with transverse holes.

Two classes of cheek-pieces, rectangular and disk-like (according to J. H. Potratz, Type I were of bronze and not bone) were also used for harnessing chariots in the Near East (Potratz 1966: 103-116, fig. 45, 46; table 106-109,115). They are found in Gaza (Tel-El-Adzhul), Assur, Ras-Shamra, new chance finds of disk-like cheek-pieces are housed in the Jerusalem and Metropolitan museums (Littauer and Crouwel 1982: table xvii; 1986b, table xlii) and also in Egypt in Tel-El-Amarna and in Greece at Mycenae (Crouwel 1981: table 1.2-4). Unfortunately, stratigraphic contexts are not clear for many of them. Typologically, the earliest rectangular and disk-like cheek-pieces from Gaza, according to F. Petrie, are connected with the Hyksos and they date from the 17th century BC, a date which is accepted by J. H. Potratz (1966: 109, 110, 115 116) or the 16th–15th centuries BC according to K. Sheffer: a disc-like cheek-piece from Tel-El-Amarna (without tenons) is dated 1413-1377 BC, a rectangular one to 1375-1350 BC. An image of a disk-like cheek-piece has been found in Abydos in the temple of Ramesses II (13th century BC) (Frene 1965: 105). A rectangular cheek-piece from Gezer has been assigned to 1300-1100 BC. H. G. Hüttel (1978: 10) dates all Near Eastern cheek-pieces to the 16th–13th centuries BC. The terminus ante quem for a disk-like cheek-piece from Ras-Shamra is the destruction of the city at the end of the 13th century BC. M. Littauer and J. Crouwel (1979: 208; 1982: 178; 1986: 165) assign the wheel-like metal cheek-pieces of Gaza, Amarna, Mycenae and others to the second half of the 2nd millennium BC.

The correlation of the different types of bone and horn cheek-pieces across the Eurasian steppes, in the Danube region and Mycenae, and the bronze cheek-pieces with tenons of the Near East has been discussed many times. However, hypotheses concerning the origin of the cheek-piece are diametrically opposed. A. M. Leskov (1964: 302), K. F. Smirnov (1961a: 57, 71-2; Smirnov and Kuz'mina 1977: 43), E. E. Kuz'mina (1971b: 92-3; 1977; 1980a: 18), N. N. Cherednichenko (1976: 147-148), and V. B. Kovalevskaya (1976: 60-61) suggest that Near Eastern and Mycenaean cheek-pieces derive from steppe cheek-pieces. According to A. M. Leskov they come from Central Asia; K. F. Smirnov, E. E. Kuz'mina and V. B. Kovalevskaya suggest south Russia; according to N. N. Cherednichenko they derive from eastern Europe and then passed to Mycenae and then on to the Near East. A. Mozsolics (1960: 125) admits that the prototypes of cheek-pieces in the Danube region were borrowed from the Pontic steppes, but the main importance is attributed to Anatolian influence. G. Potratz (1941) considered the Danubian cheek-pieces to be the prototypes of the Near

Eastern cheek-pieces. H. G. Hüttel (1978) notes the similarity of the steppe, Danubian and Mycenaean disk-like cheek-pieces but insists on the independent development of European and Near Eastern cheek-pieces of different classes and he rejects diffusion. In contrast, B. A. Latynin (1965: 203-204), V. A. Safronov (1966: 189) and A. Oancea (1976: 75) believe that the disc-like cheek-pieces appeared along the Danube and the steppes from the Mediterranean; according to B. A. Latynin they derived from Anatolia, according to V. A. Safronov and A. Oancea from Mycenae. M. Littauer (1969: 298), stressing some differences in construction, asserted that bone cheek-pieces of the steppes are imitations of metal ones from the Near East. Later she and J. Crouwel (1979) stressed that Near Eastern cheek-pieces developed independently.

Hypotheses about a Near Eastern origin for the steppe cheek-pieces can probably be rejected on the basis of the construction of the bone cheek-pieces, their form, size, tenons and central hole with a reinforcing bevel, which were originally dictated by the specific character of the initial raw material; then the formal peculiarities were repeated in metal. An expressly Mycenaean bronze cheek-piece was found in grave 81: its construction included inserted tenons which reproduced an important improvement of bone cheek-pieces, but one that was no longer necessary in the more solid bronze ones. Cheek-pieces from Gezer, Amarna, Mycenae and Cyprus have a bronze twisted bit, imitating a softer material. Thus, the first cheek-pieces were made of bone and horn with a strap bit; bronze cheek-pieces originated on this basis.

An Anatolian origin for the steppe chariot and cheek-pieces is also improbable. At Sharkishly in central Anatolia only disc-like cheek-pieces without tenons are known; rectangular and disc-like cheek-pieces were not used but rather rodlike cheek-pieces of horn which were not found in the Eurasian steppe (Hüttel 1978: 10, fig. 3). Rodlike cheek-pieces of horn, round in section, can be regarded a Hittite form. They were found at Alaca Hüyük in a layer of *c* 1450-1300 BC, at Beycesultan about 1450-1300 BC, in Bogazkoy and Alishar; there is one find from Megiddo, Palestine. In terms of construction and ornament such cheek-pieces are closely analogous to Hungarian cheek-pieces of the Füzesabóny type (Foltiny 1967: 23). In the Carpathians and Danube basin two main types of horn cheek-pieces were distributed, Füzesabóny (with one central hole) and Toszeg (with two central holes). They coexist in a single complex, but some Toszeg cheek-pieces are decorated with the Mycenaean wave ornament and they probably originated somewhat earlier, in the 16th century BC. The similarity between the Hittite cheek-pieces and the Carpathian-Danubian ones reflects without doubt active cultural connections between these two regions. The peculiarity of this form, which was not found in other regions, probably suggests a genetic kinship between two groups of horse-breeding populations. If this assumption is correct, it agrees well with the linguistic hypothesis of a Hittite migration from the Carpathian-Danube region.

The cartographical distribution of the earliest three main classes of cheek-pieces in the Old World in the middle of the 2nd millennium BC—disc-like with tenons, rectangular cheek-pieces with tenons and rodlike cheek-pieces of horn—shows that disc-like cheek-pieces were used in the steppes, along the Danube, in Mycenae and in the Near East, except for the Hittite kingdom; the rodlike ones were found along the Danube and in the Hittite realm; rectangular with tenons

were distributed in the steppes, Mycenae and in the Near East. The synchronous character of the two latter classes is indicated by the similar construction of bridle and the ornaments mentioned by K. F. Smirnov. Their predominance in different territories indicates the specific character of the traditions of two different groups of horse-raising peoples. As was mentioned above, rodlike cheek-pieces are specific to the culture of the Hittites, as well as peoples of the Carpathians and the Danube regions, where many linguists see peoples related to the Hittites such as the Thracians, Phrygians, etc. Disc-like horn and bone cheek-pieces with tenons were found in the culture of the Achaeans, the Indo-European people of Mycenaean Greece, in the steppes and among supposedly Indo-European populations of the Carpathian-Danube zone. Rectangular cheek-pieces (bone and bronze) are characteristic of the steppes and the Near East, except Anatolia. Rectangular cheek-pieces with tenons survive in the Near East till the Assyrian period. The invention of a second small slot that provided a firmer fixing of the cheek-pieces and the use of a forked cheek belt improved their form. Disc-like cheek-pieces with tenons were used in Luristan till the Iron Age (Potratz 1966). Disc-like cheek-pieces without tenons are spread in other regions; their lower date is established according to findings at Amarna of 1413-1377 BC.

In construction, the earliest Near Eastern bronze cheek-pieces with rectangular plate, with a central hole and small slots above the plate, in terms of their form and the presence of a bevel around the central hole, are closest to a cheek-piece from Mirny; in terms of the construction with a transverse hole they are close to the grooved cheek-pieces with a rectangular plate known from the steppe. The bronze disc-like early eastern cheek-pieces with tenons and an additional side slot for fastening the cheek belt resemble most of all the steppe cheek-pieces of Type 3 (Staroyur'evo). If these comparisons are valid, they are of principal importance, suggesting the natural habitat from which the prototypes of cheek-pieces of both classes could appear in the Near East. As bone disc-like cheek-pieces with tenons combine with rectangular cheek-pieces with tenons only in the Eurasian steppe from the Dnieper to central Kazakhstan, we can propose that this zone was the initial territory whence cheek-pieces originated in the Old World. If this conclusion is true, it is very important in resolving the problem of Indo-Iranians origins.

Rodlike cheek-pieces (Figs. 39: 4-7; 42: 10)

Type 1 is a cheek-piece which is three-holed, slightly curved, round in section, with an oval slot in the center and with one or two small transverse round slots. A fragment of this type was found on the settlement of Atasu in house 4 in a com-plex with ceramics with applied-roller ornament (Margulan *et al.* 1966: table xxiv, 7). Cheek-pieces of the Sabatinovka stage of the Timber-grave culture from the settlement of Kirovo in the Crimea, and Voinskaya Greblya, Skelya, Il'ichevka in the Ukraine (Terenozhkin 1965: 70-71; Sharafutdinova 1968: 16-34; 1982: 138-139, fig. 55, 4-5; Leskov 1970: 45-46, fig. 30.5; Shapovalov 1976: 164-5, 170, fig. 4,2; Berezanskaya 1982: 40; Berezanskaya *et al.* 1986: fig. 29.4, 7,10). A metal cheek-piece of this type was found on the settlement of Kuzeli-Gyr in Khorezm (Terenozhkin 1958: 34-39, fig. 1; Kuz'mina 1966: 59-60, table xv, 41). The type is spread over a vast territory of Eurasia, on the sites of Wörschach and Şanț-Rodna Nouă that are assigned to the Bronze D and Hallstatt

A periods, i.e. to the 12th–11th centuries BC according to H. Müller-Karpe and it is close to Hungarian cheek-pieces (Rusu 1960: 161-180; Pitioni 1954: 475; Smirnov K. 1961a: 63-65) dated by A. Mozsolics to *c* 1100 BC, according to other scholars to the 13th–11th centuries BC (Smirnova 1970: 106-110), indicated by a radiocarbon date from Il'ichevka of 1360±40 BC. Cheek-pieces of this type are also known in western Siberia, on the post-Andronovo settlement of Elovka (Matyushchenko and Lozhnikova 1966: 188, fig. 5).

Type II is represented by cheek-pieces, oval in section, with three holes in one plane (the central one is oval), sometimes with a noticeable widening at the holes. It is known from the settlement of Yazevo 1 on the Tobol (Potemkina 1979: fig. 6.4; 1985: 289, fig. 17.1, 108, 237). Cheek-pieces with small transverse holes are found at Shortandy-Bulak in central Kazakhstan (Margulan 1979: fig. 161.16) in a complex with ceramics with applied-roller. S. Ya. Zdanovich (1979: 12) mentions the finding of this type in the Sargary complex in northern Kazakhstan. Two straight cheek-pieces of this type are found in the settlement of Yukalekulovo of the Cherkaskul' (Mezhovka) culture in the Trans Urals (Obydennov 1986: fig. 3b, 38, 29). They are assigned to Type V according to K. F. Smirnov (1961: fig. 12). This type is also characteristic of Late Timber-grave sites of the Volga (Zhirnokleevka), of the Maklasheevka stage of the Pre-Kazan' and the late Sabatinovka cultures, Belozerka and Chernolessk in the Ukraine (Dereivka, Usatovo, Subbotovo) (Smirnov K. 1961a: 66; Khalikov 1969: fig. 55, no. 163; Leskov 1971: fig. 2, no. 18,19,4; Sharafutdinova 1982: 140, fig. 55, 8-10; Berezanskaya 1982: fig. 40.5). The type is spread over a wide territory, including post-Mycenaean Greece, where according to S. Foltiny (1967: 30, fig. 13) it was introduced by steppe nomads, Hungary where, according to A. Mozsolics (1960: 90-93), it is dated to the pre-Scythian period and has an Eastern origin, the northern Caucasus where it is known on the monuments of the Koban culture, and western Siberia, Bol'shoy Log, Elovka, Irmen (Gryaznov 1956b: 74; Gening, Gusentsova *et al.* 1970: 46-47, fig. 1, 113; Matyushchenko 1974: 58-60, fig. 13.4, 30.7, 45.3) where it is appears in the Karasuk period and survived until early Scythian times. The Eurasian three-holed cheek-pieces of this type were the prototypes of the three-holed tubular cheek-pieces of the early Scythian period that appeared in the 8th century BC and it provides the *terminus ante quem* for this type (Jessen 1953: 109, 110, fig. 24; 1954: fig. 7).

Of great importance for the chronology of the sites of the Alekseevka type is the discovery of a curved cheek-piece (Fig. 42: 10) with three holes and two small transverse slots that was found in the settlement of Kent in central Kazakhstan (Varfolomeev 1988: 87, fig. 5.20). It is analogous to an example from the Sabatinovka settlement of Chikalovka in the Ukraine (Sharafutdinova 1970) which dates to the 13th–11th centuries BC in the Danube region. The complex of the Kent settlement (Fig. 42) includes bone objects with circular ornament of the Noua-Sabatinovka culture (Fig. 87), a large set of bronze objects characteristic of the hoards of the Final Bronze Age and imported ceramics of Namazga VI type (Varfolomeev 1987: fig. 6; 1988: fig. 3,4,6; 1991: 15, 20). It helps us synchronize the European and Central Asian lines of development.

A cast model for the production of a bronze cheek-piece of type II was found in Central Asia on the settlement of Dal'verzin (Kuz'mina 1966: 60, table 15.40). Similar bronze cheek-pieces were found in Iran, in Giyan 1, Sialk VIB,

Hasanlu (Fig. 106; Conteneau and Ghirshman 1935: table v.6; Ghirshman 1939: tables lvi, lvii, 1963: fig. 338), and, taking into account an origin of this type in the Eurasian steppes, it is in good accord with the hypothesis originally proposed by R. Ghirshman about the arrival of Iranian-horsemen at Sialk VIB from the Eurasian steppes. The date of metal cheek-pieces of this type is defined by the Giyan and Sialk complexes to the beginning of the 1st millennium BC which provides a *terminus ante quem* for the appearance of bone cheek-pieces. The upper date of the latter is defined by their appearance in Assyria on an Assyrian relief of Assurbanipal (668-629 BC). H. Potratz (1966: 28, 33) explains this by contacts with the Medes and Scythians.

In light of the discovery at Kent of numerous objects of horse gear of pre-Scythian date (Varfolomeev 1987: fig. 6.5-7; 1988: fig. 4.10-13, 5), it is natural that we also find bronze three-holed cheek-pieces, a stirrup-like bit, buckles, perforated bridle ornaments of early Scythian type with analogies at Arzhan in a Final Bronze Age burial at Izmaylovka in eastern Kazakhstan in a complex with vessels of Begazy and Dongal types (Fig. 107; Archaeological monuments 1987: figs. 32, 33). They complete almost a millennium of development of horse gear in the Andronovo culture and open a new, Scythian, page in the history of the steppe. Three-hole cheek-pieces with a stirrup-like bit of the Arzhan type are found to the north of India in Swat, in the Timargarha cemetery (Lesnik 1971).

Frontlet (Fig. 39: 2)

Among the horse-gear of the late Andronovo period, one should mention a bone frontlet from house 4 at the settlement of Atasu, found in the same complex as applied-roller pottery and a cheek-piece (Margulan *et al.* 1966: 215, table xxiv, 8). A similar object was found in the Sabatinovka II layer of the settlement of Il'ichevka on the Donets which also had ceramics with applied-roller ornament and a three-hole cheek-piece of the Boriyash type, analogous to the Atasu one, which defines the dates of both complexes and affirms their synchronization (Shapovalov 1976: 165, fig. 7.19). The dating of the frontlets is specified by the discovery of a frontlet with the image of a sphinx in the palace of Ashurnasirpal (1050-1032 BC) at Nimrud (Foltiny 1967: fig. 4).

Thus, there is a continuous development of the bridle from the 17th to the 9th century BC in the Andronovo culture. Cheek-pieces of classes I and II of the 17th–13th centuries BC were used for chariot harnessing, which is witnessed by their discovery in situ on the skull of harnessed horses and from their depiction on works of art in other places of the Old World. Class III, Type II cheek-pieces were probably used for horse riding, judging by their genetic connection with the early Scythian ones. Their appearance at the end of the 2nd millennium BC shows the time when horse riding spread across the steppes.

The tactics of chariot warfare and horse riding

Chariot warfare dominated in the 16th–12th centuries BC over a vast territory of the Old World—across the Eurasian steppes, along the Danube, in Mycenaean Greece, the Near East, Egypt and later in China.

According to linguistic data wheeled transport and horse-raising were especially wide-spread among the Indo-Iranians. Apart from common Indo-

European 'transport' terms the Indo-Iranian languages established a developed horse-raising vocabulary that included terms for the color of the horse, its age, parts of the body, fodder, etc.; there were also common words for 'chariot', 'shaft', 'bridle', 'saddle-girth', and many names of harness parts (Abaev 1949: 54; Bailey 1955: 1-14; 1957), as well as the names of rituals connected with the horse (Ivanov 1969a; 1969b; 1974; Dumonte 1927; Kane 1946; Renou 1954). The expression 'managing horses' is applied to the highest official; the term *raθaēštar-* 'standing on a chariot' denotes a representative of the privileged warrior caste with special insignias (gold, red color and weapon), and a special role in society (Leroy 1946; 1957; Brandenstein 1962; Christensen 1934: 136; Dumézil 1930: 109-130; Benveniste 1932; 1938; Grantovsky 1960; D'yakonov 1961: 60-62; HTP, 143-147; Bongard-Levin and Il'in 1969: 162-176; Gafurov 1972: 54-57; Kuz'mina 1975: 291-292; 1977).

Where were chariots, that played such a revolutionary role in the military art of the Old World, invented? M. Littauer and J. Crouwel (1996: 938) repeat their old point of view that the chariots in the steppes were imitations inspired by the Near East. This conclusion is based on two erroneous premises. The first, following the theories of M. Gimbutas and D. Anthony, is that they believe that there were mounted warriors in the steppe since the Neolithic period. Secondly, following E. Izbitser (1993), they believe that two-wheeled vehicles were unknown in the steppes in the 3rd millennium BC. However, two-wheeled carts have been found in Pit-grave and Catacomb burials of Storozhevaya Mogila, Pervokonstantinovka kurgan 1/8, Mar'evka kurgan 11/27, Lola, etc.; clay models are known, e.g., in Tri Brata kurgan (Novozhenov 1994: 133, 140) and in a collection of V. A. Safronov. Two-wheeled carts with disc or so-called crossbar wheels are found on petroglyphs in Kazakhstan (Novozhenov 1994: 89, 91, fig. 51).

In the cemetery of Novonikolaevka of the Mikhaylovka culture a two-wheeled cart with crossbar wheels was painted in ocher on the stone roof of a grave, if I interpret this image correctly (Rassamakhin 1999: 47, fig. 3.56). Such light wheels are depicted on seals in Anatolia, on a cylinder in Hissar III in Iran, and on a silver cup from Afghanistan (in the Louvre and in the royal cemetery at Gonur; Fig 96: 1-3, 10). They are viewed as transitional to the spoked-wheel (Littauer and Crouwel 1977: fig. 21, Amiet 1989: 61, fig. 6; Dubova 2004: 277, figs. 36-39).

A Near Eastern origin for the steppe chariots has also been asserted by M. V. Gorelik (1985). But he failed to distinguish between the chariot and those freight and road vehicles, the heavy military wagons that were harnessed to equids other than horses. This led him to erroneous conclusions on the time and place of the origin of the chariot in the Old World. In his table 2 chariots are represented only on images of the second half of the 2nd millennium BC. The date of chariots depicted on Syrian seals (table 3) was established on analogy with two samples from the Nuzi archive which dated to the second half of the 15th century BC. M. Littauer and M. Gorelik's hypothesis was supported by V. V. Trifonov (1996) who alluded to images of two-wheeled carts drawn by equids on Syrian-Palestinian seals. The latter are dated to the 18th–16th centuries BC (Porada 1979; Moorey 1986), but these images are too schematic.

New evidence for the history of transport comes from excavations in Syria at Tell-Brak, which dates to the 4th–2nd millennia BC and as ancient Nagar was

the capital of the Hurrian dynasty at the end of the 3rd millennium BC, and then an important trade center of the Mitanni state in the 16th century BC (Oates J. *et al.* 1997: 141-154). Indo-Aryan horse breeders were among the Hurrian population of this city which is seen in the Indo-Iranian horse-raising terms in the Hittite treatise of the Mitannian Kikkuli, Indo-Iranian names of gods and rulers in documents from Nuzi, the Amarna archive in Egypt, and in new texts and seals (Fig. 96: 8) from Tell-Brak, which bear the names of the kings Artašumarra and Tušratta. Indo-Aryan dominance in the Hurrian world is usually explained by their role in the spread of horse-raising and training skills, light military horse drawn chariots, the compound bow and the creation of the *marianni*; the 15th century BC Mitanni played an important role in the Ancient East. Aleppo and Alalakh submitted to Parattārna, his son Saušattar controlled Cilicia and Assur, his grandson Artātama gave his daughter in marriage to Pharaoh Tutmos IV, and in the 14th century BC Tušratta's daughter became the wife of Akhnaton. In her rich dowry there were chariots with gold decorations, six thousand arrows and iron objects. In 1332 BC the Hittite king Suppiluliumas sheltered Šattiwāza, the son of the assassinated Tušratta, who then married his daughter. Suppiluliumas made a treaty with him sealed by the names of Hittite and Hurrian gods; at the end of the treaty the Indo-Iranian gods Mitra, Varuṇa, Indra, and Nāsatyas (Mitrašil, Uruwanaššil, Indara and Našatianna) are mentioned. He also helped the fugitive regain his throne (Jankowska 1982). The Mitanni kingdom was destroyed by the Assyrian King Adad-Nerari (1305-1274 BC) during the rule of Vasašatta. Nagar and other cities were destroyed. All this happened about 1300 BC according to dendrochronological dates.

There has been a long discussion about the role of the Indo-Aryans in horse-raising and the spread of the chariot across the Near East. New material from Tell-Brak helps to resolve this problem. In layers of the 3rd/beginning of the 2nd millennium BC archaeologists discovered a hostel for traveling merchants, donkey burials, 102 cart models, 191 equid figurines and numerous images on seals analyzed by J. Oates (Oates 2001).

It is known from written sources and seal images that carts belonged to gods and kings and they were used for ritual and cult purposes. Four-wheeled vehicles harnessed to two or four animals with the help of a yoke and pole, both with open and closed frame, dominate among the models from Tell-Brak. Seventy percent of the two-wheeled vehicles belong to the end of the 3rd – beginning of the 2nd millennium BC. They are represented by two types: 1) low maneuverable carts with curved pole and a platform with a seat; 2) lighter and more maneuverable carts in which the driver stands or sits right above the axle, which is sometimes shifted to the end of the platform. These are prototypes of original chariots.

All 271 wheel models have a protruding hub, 269 wheel models are tripartite, sometimes they have tyres; one wheel is of the light type, with slots (cross-bar wheel). And only one wheel with an image of spokes, belonging probably to the Ur III period, provides early evidence of this type which was known in Mesopotamia and Anatolia from images on seals that date to the beginning of the 2nd millennium BC (Oates 2001). Thus, in the pre-Mitanni period, light two-wheeled carts were known from Tell-Brak, but the actual form of the chariot had not yet appeared.

The donkey (*anšu*), onager ('desert donkey') and mule (*kunga*) are mentioned in written texts. The donkey was the main transport animal. The skeleton of a tall donkey with a bronze bit assigned to the 3rd millennium BC was found on the settlement (Clutton-Brock *et al.* 1993: 209-221). Donkey skeletons are found in grave H 70 in Halava, they also belong to the end of 3rd millennium BC. Some figurines from Tell-Brak depict these large draught donkeys. Onagers were spread in Iran and Syria; from the Neolithic period they were the main game for meat; judging by a hymn to King Shulga they were hunted with nets. Onagers are very wild and cannot be domesticated.

Mules are a hybrid of a donkey and a female onager. Brak-Nagar was a famous center of their breeding and trade. Texts from Ebla say that the mule was ten times more expensive than the donkey and it was considered a better animal for harnessing, especially for four-wheeled and ceremonial vehicles. Mules harnessed by a nose ring as bovids, by a nose belt or a muzzle-kaptzug which prevented them from biting, can be seen on the majority of models and cart images (Fig. 95: 3; 96: 4, 6, 7).

As far as the horse is concerned, only donkeys and mules are mentioned in the documents from Tell-Brak. In Mesopotamia the horse *zizi* or *anšu kur-ra* (donkey of the mountains) is very rarely mentioned from the Ur III period. But a text of the Old Babylonian period recommends that one ride a donkey, not a horse. Among the vast osteological material from the ancient Near East horse bones are supposedly found only in Tell-Leilan; the identification of bones from Tell-Selenkaya as horse, made by S. Bökönyi, has been disputed (Boessneck and von den Drisch 1977).

J. Oates considers that only four out of the 191 equid figurines depict horses as well as a figurine from Tel-Taya, and admits that even the four might be large Syrian donkeys. Greater doubts are connected with the extremely rare images that have been interpreted as riders (Fig. 96: 4-6,9; Moorey 1970).

In light of all this, the animals harnessed to two-wheeled carts by nose rings and kaptzugs, depicted on seals including the one from Kül-Tepe, should be interpreted as mules and not horses (Littauer and Crouwel 1979: fig. 28, 29, 32). Just a few figurines from Kül-Tepe probably depict horses (Özgüç 1950: table xxxiii, 1.2).

Thus, although the horse may have been known in the ancient Near East in the 3rd millennium BC, it did not play any role. Large donkeys and mules remained the draught animals at the beginning of the 2nd millennium BC as well. Reliable evidence indicating the use of the horse is confined to harnessing to the original light chariots with spoked wheels and these are dated before the 18th–17th centuries BC. The extreme rareness of the horse could hardly stimulate the invention of horse-drawn chariots in the Near East. The fact that horse-raising terms and training skills were borrowed by the Mitanni from an existent Indo-Iranian tradition already in the middle of the 2nd millennium BC reinforces our belief that the Indo-Aryans played an outstanding role in spreading the horse-drawn chariot in the ancient Near East as well as in India.

The Eurasian steppe was the homeland of horse-raising in the Old World. Horse bones are numerous on sites of the 3rd / beginning of the 2nd millennium BC. Ritual horse burials and their images on petroglyphs and in plastic art are known, indicating the creation of a horse cult (Kuz'mina 1977; 2000). Thus, both

prerequisites for the invention of the chariot were present in the steppes: the two-wheeled cart and horse, and a military situation that stimulated the introduction of new battle tactics. It supports the hypothesis of an independent invention of the chariot in the south Russian steppes.

Near Eastern texts indicate that before the middle of the 2nd millennium BC a group of Indo-Aryans penetrated to the north of Mesopotamia and the southern part of the Armenian plateau (Ivanov 1968; Brandenstein 1948; Thieme 1960; Hauschild 1962; Mayrhofer 1966). They took a leading position in Mitanni and neighboring principalities which is seen in the names of Indo-Iranian deities, as well as Indo-Iranian personal names, including representatives of the ruling dynasty and nobility. The role of the horse-drawn chariot in this society is affirmed by the title of the ruler, literally 'managing horses', and names of rulers according to such etymologies as Tušratta (=*Tviṣratha) 'having rushing chariots', Abiratta (=*Abhiratha) 'facing chariots', Bardašva (*Vārddhāśva, son of *Vṛddhāśva 'possessing large horses') (Burrow 1976: 30; cf. Elizarenkova 1989: 429, 430). The term *marianni*, denoting nobility, from Indo-Iranian **marya-* '(young) man', indicates the existence of a privileged caste of warriors, although I. M. D'yakonov rejected this etymology. In Mitanni, Assyria, and the Hittite kingdom special treatises were written on the training of chariot horses. The earliest is the manual of Kikkuli the Mitanni (14th century BC). It was written in the Hurrian language and then translated into Hittite, but the entire horse-raising terminology in it is Indo-Aryan (names for the colors of horses, fodder, race track, turnings on the track, chariot driver). These Indo-Aryan terms are repeated later in Assyrian treatises (Ebeling 1951; Salonen 1955-56; Kammenhuber 1961). According to W. Nagel (1966: 36) in the 16th–15th centuries BC a *koine* was formed in military art in the Near East, under the influence of an Indo-Iranian military aristocracy battle chariots and trained horses quickly spread from Mitanni. Horses were extremely expensive (in Nuzi a horse was seven times more expensive than a bull and ten times more expensive than a donkey). They were brought from afar, from Mitanni and northern regions; they were kept in the king's stables; they were sometimes presented to nearby rulers. The Hittite king Hattusilis III requested the Babylonian king Kadashman-Enlil II to "send me horses, high-bred horses and tall stallions". In the third quarter of the 2nd millennium BC images of the horse-drawn chariot are often met in the monumental and applied art of Egypt and the Near East. It means that horse-raising and horse-training skills for the chariot were brought to the Near East by Indo-Aryans and that they were decisive in the change of battle tactics and in the development of chariot warfare.

A. Kammenhuber (1968) tried to disprove this thesis arguing that the horse was known in the ancient Near East before the arrival of the Indo-Aryans and also contested a number of etymologies. She was supported by I. M. D'yakonov (1970; 1988), but M. Mayrhofer (1974) rejected their main arguments. P. Moorey (1970) showed that although horse raising was known long before the arrival of the Indo-Aryans in the Near East (mainly in regions of Asia Minor) harnessing techniques were ineffective and the horse could not be used in battle. There are only a few passing remarks about Near Eastern peoples knowing the horse before the arrival of the Indo-Aryans (see Kuz'mina 1977). Most importantly, in spite of massive excavations there are practically no bones of

domestic horse in the osteological collections from Near Eastern settlements until the Hittite period (Boessneck and von den Driesch 1975: 209). We have only individual findings of horse remains in Asia Minor, e.g., Norsun-Tepe. Some suggest that these horses were domestic (Bökönyi 1991: 123-130) but others argue they were wild (Boessneck and von den Driesch 1976: 81-87).

Indo-Aryans introduced chariot-warfare tactics in Mitanni; Nuzi texts indicate a standard set of chariot equipment (Zaccagnini 1977: 21-38) consisting of a bow, two quivers with 30 arrows in each, a spear, a leather shield, reins, whip, two horse–cloths, leather coats of mail (sometimes with bronze) for horses and defense equipment for warriors, for the arms and *gurpisi* (lit. 'neck cover')—a hood standing like a comb with parts reaching the neck and shoulders (see Chapter 7). It was made of leather sewn with tendons, sometimes supplemented with bronze plates. The hood had 140-190 plates, the sleeve plates were smaller.

Socketed arrows and a flexible composite bow were innovations that the Indo-Aryans introduced to the Near East. The king of Mitanni, Tušratta, sent bows to Amenhotep III as a gift, and he presented three quivers with 90 arrows to Amenhotep IV.

Unfortunately, excavations in Mitanni have not uncovered this armament set which eludes archaeological verification. It is worth mentioning that the hood, composite bow, socketed arrows and spear are typically Andronovo equipment; moreover, socketed arrows are not found in the Near East where hafted types dominated. Socketed arrows were invented in the Eurasian steppes in the first quarter of the 2nd millennium BC. They were in warriors' quivers of the Sintashta-Petrovka period; in the Final Bronze Age they were introduced by pastoral tribes into the farming oases of south Central Asia, and saw their final development in the Saka and Scythian cultures and were again introduced to the Near East during their Asian campaigns (Kuz'mina 1966: 33-37; Medvedskaya 1982).

The horse-drawn chariot and similar set of armament found in Mitanni is reconstructed for the Aryans of India. There are fifteen synonyms to denote the 'horse' in Vedic language; more than twenty words denote 'way', 'movement'; the wheel and chariot make up an entire semantic field, symbolizing truth, law and cyclic world order (Elizarenkova 1982: 28, 41, 43, 44; 1999; Toporov 1981: 147-151). The god Tvaṣṭar, the Creator, made the chariot with his own hands. In Iranian mythology one of the seven *karšvars*, the northern homeland, was called X^{v}aniraθa, the country with 'skillfully made chariots' (P'yankov 1979; 2000). Both in the *Rigveda* and the *Avesta* the chariot is the attribute of a deity. Four white horses draw the gods' chariots (Dhalla 1922: 183). The Indo-Aryans have a magic chariot Puṣpaka; in the Nart tales there is the Barsag wheel and a self-flying chariot. A special *Rigveda* hymn (6.47.26-28) is dedicated to the divine chariot. A particular spell was pronounced when the king mounted his chariot, "Oh, divine chariot, accept sacrificial libations!" "Let standing on you conquer what is to be conquered!" (*Atharvaveda* 6.125).

Vedic sources contain evidence about the warrior-charioteers. According to the *Aitareya-Brāhmaṇa* (7.19) the symbols of the *kṣatriya* are "chariot, armor, bow and arrows"; according to the *Śatapatha-Brāhmaṇa* (5.3.5) "the bow is the *kṣatriya*'s weapon". Bronze knives, awls, stone axes, maces and grindstones are mentioned in the texts (Rau 1973; 1983).

Vedic data are confirmed by Avestan (Dhalla 1922: 131-133); unfortunately, some texts have been corrupted during oral transmission. The gods Miθra, Sraoša, Anāhitā, and Drvaspa drive chariots (Yašt 5.10,30; Yasna 57.27); the warrior's weapon includes a sword (Yašt 5.130; 10.131; 14.27), a spear (Yašt 10.39,102; 15.48; 17.12), bow and arrows (Yašt 7.28; 10.39) and a mace, which sometimes has a bull handle, sometimes it has 100 edges (Yašt 6.5, 10.96, 101, 132; 11,10), and sometimes it is made of gold (Yašt 10.96, 131). The body was covered by protective armor, the main part of which was a helmet made of a bull skin or metal (Yašt 13.45; 15.57) and a shield.

Words relating to warriors and the army are Indo-Iranian terms. One of them derives from the word 'hero', 'victor', another comes from the verb 'to throw, shoot' arrows, spears (Gertsenberg 1972: 33). The name of a missile weapon is Indo-European, an arrow name is Indo-Iranian, originating from the verb 'to fight', synonyms for the arrow and spear, the axe, adze, shield, protecting breastplate are also Indo-Iranian (Gertsenberg 1972: 35, 187, 193, 213, 216, 219, 221, 222; Pant 1978).

In the ancient literature the weapon is both a creation and attribute of the gods: Indra has the *vájra*, a stone axe and bull-headed mace with four projections; Yima also has a bull-headed mace; Bhīmasena possesses a stone mace with four projections. The gods present weapons to heroes: Agni gives an arrow to Arjuna, Brahma delivers one to Rāma, Ahura-Mazdāh to Yima. I. M. Steblin-Kamensky (1995) suggests that Yima received a sharpened stick. The Iranian peoples preserved ideas about the divine origin of weapons for a long time. Quintus Curtius Rufus (History of Alexander 7.8.17-18) relates the legend about heavenly gifts sent to the Saka, "A plow and bull yoke for farmers, spear and arrow for warriors, cup for priests". Herodotus' story about the Scythian gods, who guard in fire golden gifts fallen from heaven—a plow, yoke, pole-axe, and cup—is a variant of this myth (History 4.5-7). There is a Nart tale about a golden weapon falling from heaven.

The archaeological realia that reflect these mythological ideas about the creation of a divine weapon and sky chariot are found only in the culture of the Eurasian steppes of the 17th–16th centuries BC.

The Aryan arms described in Vedic literature, the *Avesta*, and in texts from Nuzi are similar to ones found in burials of the chariot-warriors along the Don and Volga on sites of the Potapovka type and in the Urals, in Sintashta and Petrovka burials. In Sintashta were found bronze axes, spears, knives/daggers, adzes, hooks, sets of bronze and stone arrows, stone maces, abrasive materials for sharpening weapons, single-edged scraper-knives that could be used as a currycomb for horses and tools for making wheels such as adzes and chisels, and also ornaments, bone handles and cheek-pieces (Gening 1977). In burial 4 of kurgan 6 (Utëvka IV) a spear, adze, dagger, stone arrows, bone handle-top and cheek-pieces were found (Vasil'ev *et al.* 1992: fig. 4-6). In the Kondrashkinskiy kurgan was an axe, spear, knife-dagger, adze, stone arrows, bone cheek-pieces and buckles; in Vlas'evskiy kurgan a dagger-knife, stone macehead, bone handle-top and buckles were excavated (Vinnikov and Sinyuk 1990: fig. 28; Pryakhin 1992: fig. 1). A chariot and a pair of harnessed horses (sometimes more) were buried together with warriors in the Urals. This tradition of putting a chariot and horses in a chief's grave also continued in the steppes in the Scythian

period, which is demonstrated by the discovery of vehicle parts and handles in the Elisavetinskiy kurgans, Melitopol', Tolstaya Mogila, Gaimanova Mogila, Chertomlyk, Aleksandropol', Krasnokutsk and Vasurinskiy kurgans. The axle width of Scythian chariots is similar to that of the Andronovo; the wheel diameter is smaller, the spokes number 8-12 (Rostovtsev 1914: table xii.1; Terenozhkin 1972: 123; Mozolevsky 1979: 191ff). Vehicles and horses were found in the eastern part of the steppes, in Pazyryk (Rudenko 1953: 146-235), moreover, in all cases they were found only in royal kurgans.

These data confirm the identification of the Andronovo tribes with the Indo-Iranians. Arguments about the formation of Central Asian metal cheek-pieces of Class I and II under the influence of more archaic bone cheek-pieces of the Eurasian steppes also supports this identification. The evidence pertaining to the history of the horse in the Old World also proves it. Paleozoologists V. I. Gromova (1940; 1949), V. I. Tsalkin (1970) and V. I. Bibikova (1967; 1970) maintained that horse-breeding became one of the main branches of the steppe economy already from the middle of the 4th millennium BC. Religious and mythological beliefs associated with the horse emerged in this zone in the same period. In most ancient ritual horse burials of the Old World on sites of the Mariupol' and Pit-grave cultures one can find sources of the *aśvamedha* and other horse cult rituals characteristic of the early Indo-Europeans and Indo-Iranians in particular (Ivanov 1974; Kuz'mina 1977; Mallory 1981). Paleozoologists attribute the Near Eastern chariot horses to the same breed as Andronovo horses: they were brought from the north, from the steppes (Azzaroli 1975).

Thus, the evidence of Andronovo transport history provides an important argument in favor of the Indo-Iranian attribution of the Andronovans.

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In the 12th century BC chariot warfare tactics lost their importance in Andronovo society; mounted horsemen armed with bows and arrows replaced chariot drivers. The bottom date for the change in battle tactics over the broad steppe zone is set to the 12th century BC because it is then that we see the spread of cheek-piece types which genetically preceded those of the Scythian horsemen. Mounted battle tactics required a steady seat for a horseman. It must not be confused with riding as it was practiced by pastoralists from the moment of horse domestication (Kovalevskaya 1976). In the Near East individual images of unarmed riders in the last quarter of the 2nd/beginning 1st millennium BC are known in Amarna, Sakkar, Sindzherli, on a seal from the Louvre (Schafer and Andrae 1925: 381; Yadin 1963: fig. 219-224; Meyer 1953: 32; Herzfeld 1937: 51; Azzaroli 1985: 23).

At the same time horse-riding spread to Greece, Cyprus, Anatolia, and the Caucasus which is proved by numerous images of riders in applied art (Anderson 1961; Bosert 1942: 91, fig. 945, 1183; Hanfman 1961; Uvarova 1900: tables lx,2, lxi,8; Hančar 1935: table 14; Kuz'mina 1973c).

Later mounted warfare appeared in the Near East. Written texts show that especially in the first centuries of the 1st millennium BC riding became more and more important in the armies of Assyria and Israel (Kings 1.5, 4.26, 10.26) (*VDI* 1951: no. 2, 296, 299; no. 3, 330; Yadin 1963: 184-186; Saggs 1963: 2). This

process is reflected in Assyrian art: on monuments of the 1st millennium BC the images of riders become more and more numerous (Herzfeld 1938: 50-51; Barnett 1960; Barnett, Falkner 1962, Hanfman 1961: 243-255; Yadin 1963: 415-417; 442-443, 450-451). It is seen from written documents that the appearance of riders in the army was necessitated by defensive measures against the raids of steppe tribes from the north. Scholars agree that this innovation in warfare was influenced by the steppe peoples.

M. Gimbutas' hypothesis (1956) about the emergence of horse riding in the Eurasian steppes already in the Eneolithic and the role of these horsemen who destroyed European cultures with sword and fire has been supported by V. N. Danilenko and N. N. Shmagly (1972) and D. Anthony (1995) finds no proof. In the first place, as N. Ya. Merpert (1961b: 77-80; 1966b) and E. Comşa (1976) convincingly showed, there was no mass invasion of steppe peoples into Europe, rather there was gradual penetration by separate groups of population from the south Russian steppes; moreover, none of them was an all shattering invasion. In the second place, objects that have been described as cheek-pieces were not really ones (the same is true of Siberian objects understood as cheek-pieces by P. M. Kozhin). The function of the latter is defined on the analogy with Anyang objects as devices for knot unfastening (Komissarov 1980) or net braiding which is proved by findings of analogous objects in European cultures that did not know the horse (Dietz 1992).

The late appearance of horse riding is affirmed by Indo-European linguistic data as well. In early Indian literature, in the *Rigveda* and *Mahābhārata*, the chariot is ubiquitous but horse riding is mentioned only a few times (Kal'yanov 1967: 136-160; Kane 1946: 200-205; Pusalker 1963). In the ancient parts of the *Avesta* the common Indo-Iranian name of the social group of *raθaēštar* 'chariot driver' is used. Only in Yasna 11.2, a relatively late text, is the term 'chariot driver' replaced by the word for 'horseman', *bāšar* (Benveniste 1951: 122-124) which has no Indian correspondences. As this text was compiled certainly not before the beginning of the 1st millennium BC it proves that originally the Indo-Iranians had chariot-warfare tactics and horsemanship appeared only at the end of the 2nd millennium BC.

Similarly in Mycenaean Greece a member of military aristocracy was called *hippeús*, 'chariot driver'. The term 'charioteer' was preserved even when battle tactics had changed and Homeric heroes drove chariots onto the battle-fields to fight on foot; in the 6th century BC this term was used to denote a privileged social group of horsemen (Lurie 1957: 324-330).

Names for wheeled transport and the horse are common in all Indo-European languages; they all have similar myths and ideas about sky and solar gods driving chariots across the heavens; Indo-European driving and wheel burning rites on solar holidays are similar, but names connected with riding do not reflect Indo-European and Indo-Iranian unity.

V. I. Abaev (1979 III: 357) showed that the Ossetic words connected with vehicle and chariot have a common Indo-European and Indo-Iranian origin in particular, while the whole terminology connected with riding is of Iranian origin (rider, bridle, horse cloth, saddle-girth, tail belt, etc).

The linguistic evidence confirms that the Indo-Europeans, as elsewhere in the Old World, originally practiced chariot-warfare and that horse riding was spread

later. In the period of the spread of the horse-drawn chariot the Indo-Europeans still had contacts with each other; moreover, active contacts can be traced between Greeks and Indo-Iranians who share a number of common mythologems. Horse riding was completed only after the collapse of Indo-Iranian unity. According to archaeological data Indo-Iranian unity should finally dissolve not before the 17th–16th century BC, but earlier than the 12th century BC (or if we take into account calibrated data – not before beginning of the 2nd millennium BC).

Evidence for the emergence of horse riding in the 12th century BC is important for resolving the problem of the migration of the Iranian-speaking peoples. E. A. Grantovsky (1970) maintained that analysis of Iranian names indicated that they appeared on the Iranian plateau at the end of the 2nd millennium BC and became numerous only in the 8th century BC. In Iranian culture of this period there appear a number of important innovations. At Hasanlu, Dinka-Tepe, Marlik, and Babadzhan archaeologists have discovered a horse burial rite that is alien to early Iranian cultures (Dyson 1965: 210-211; 1967; Ghirshman 1964: 56; 1963: 24, 26, 28; Muscarella 1968: 35; Negahban 1964: 15, 16) and in Luristan and Sialk VI we have a horse-harness burial rite (Maleki 1964: 35; Vanden Berghe 1959: 104-123; 1968; Ghirshman 1963: 279). Numerous images of riders, horses, and griffons found in Amlash are marked in art (7000 ans: 25, no. 130, 131; Calmeyer 1964: table 10, 26; Gabus 1967: table xvii), Luristan (Hancar 1934: fig. 38; 1935; Potratz 1942: fig. 12-14, 40), Sialk VI (Ghirshman 1939: 1; 1963: fig. 69, 75). In Sialk VI and Giyan a bronze bit of pre-Scythian type (Class III, type II) was found. R. Ghirshman (1939) was the first to associate these innovations that he found in Sialk with the migration of the Iranians. In his last work R. Ghirshman (1977) unfortunately rejected this hypothesis (for a critical approach to his new ideas see Lelekov 1978: 220-226). The participation of the Medes and Scythians in the creation of the Luristan culture (Vanden Berghe 1968) or that of the Cimmerians (Ghirshman 1963: 42, 71-72) as well as R. Dyson's (1965: 208-209) attempt to connect the horse burials in Hasanlu with the Cimmerians and Scythians are not convincing due to the later arrival of the latter (Kuz'mina 1973c: 185, 187; 1977: 33-34; 1971d; Pogrebova 1971: 258-260; 1977a: 114-140; 1977b). But their connection with the migration of the Iranians is probable. This is affirmed by the fact that these new features in the spiritual culture of Iran have a long tradition of development in the Eurasian steppes (Kuz'mina 1971d; 1973c; 1977; Pogrebova 1977a; Mallory 1981). These ritual burials and images of horse and riders probably mark the route of Iranian-speaking tribes moving from the Eurasian steppes to the Iranian plateau who brought with them horse raising, riding, mounted combat and the cult of the horse.

CHAPTER NINE

ECONOMY

The economy of the Andronovo culture was based on mixed farming and stockbreeding with different emphasis on the various components according to both chronology and region.

Farming

O. A. Krivtsova-Grakova (1948: 103-104) and S. V. Kiselev (1949: 56) were the first to study Andronovo farming. The main indirect evidence of farming is the topography of the Andronovo settlements, the majority of which are situated on fertile grounds in the flood-plains of rivers (Sal'nikov 1951b: 126; 1954: 248). There is little direct evidence for Andronovo farming. At Alekseevka on a ritual mound there were pits with carbonized stalks and grains of wheat (Krivtsova-Grakova 1948: 73). There are old identifications of rye (?) and millet found on settlements in Kazakhstan (Minaeva and Furaev 1934; IK SSR 1977: 111) and palaeo-botanical discoveries of wheat and millet on settlements of the Fedorovo type and the Cherkaskul' culture (Lebedeva 1996: 54, 55) and neighboring Timber-grave sites of the Urals (Lavrushin and Spiridonova 1999: 102). There is the imprint of cereals preserved on the bronze sickle from a settlement at Malokrasnoyarka (Chernikov 1960: 44, table 36, 19). Traces of burnt roofing material were found at the settlement of Ushkatta 2, consisting of clay-covered straw (the cereal involved was indeterminate to species; excavations by E. E. Kuz'mina).

Primitive stone querns are found on the majority of Andronovo settlements; they are rectangular or oval, 15-25cm long, 2-6cm thick, with artificially deepened surfaces. There are three types of grinding stones: elongated, rectangular in section, round or cylindrical, sometimes with a conical handle, or shaped like a pyramid with a flattened top: Alekseevka, Kipel', Novo-Burino, Zamaraevo, Kambulat 2, Ushkatta 2, Kiimbay, Elenovka, Shandasha, Atasu, Buguly 1, Suukbulak, Milykuduk, Tagibay-Bulak, Shortandy-Bulak, Karkaralinsk, Ust'-Narym, Malokrasnoyarka, Trushnikovo, settlements of northern Kazakhstan (Krivtsova-Grakova 1948: 103-104, fig. 18, 30; Sal'nikov 1951b: 125, fig. 12; 1967: 333; Kuz'mina 1962a: 88; 1962b: 14, fig. 3, 6; 1964b: 106; Margulan 1979: 262, table 8.1, fig. 126, 134, 162, 164, 165, 172, 180; Chernikov 1960: 37, tables 25, 26.2, 27.13, 39.3,4,7, 50,5, 51; 52; Zdanovich 1979: 11, 18; Chebakova 1975: fig. 3.15, 16; 4. 12; 5. 8). There are interesting finds of querns in the ritual complex of Baksay on the Atasu river in central Kazakhstan and in burials in the Urals at Adamovka and Ataken-say, in the latter case under the head of a girl (Margulan *et al.* 1966: 260; Sal'nikov 1967: 333; Kuz'mina 1963b: 127). The finding of cereal grains in a ritual context at Alekseevka and the sickle in a woman's grave at Tulaykin Aul attest to a farming cult among the Andronovans. Judging by the sickle and querns in women's burials the harvesting and processing of grains was a female occupation among the Andronovans.

However, querns and pestles need not have been used only for grain grinding but also for crushing wild plants and ore (such use is supported by assemblages in industrial complexes at Shandasha, Atasu, Dzhazkazgan, Trushnikovo and near mining sites, cf. Kuz'mina 1964b: 106; Margulan 1979: fig. 126, 180; Chernikov 1960: table 2; 1949: tables 1.1,2,3, 5. 1), which has been supported by use-wear analysis by G. F. Korobkova.

Finds of bronze sickles of several types are known over the entire Andronovo region. The first group comprises sickle-like knives with a slightly concave blade without a defined handle. These appear already in the Sintashta-Petrovka stage (the settlements of Arkaim and Kulevchi, the Sintashta burial), they are known in the Alakul' and Kozhumberdy complexes (Tulaykin Aul burial, the settlements of Chernyaki 3, Kambulat 2, Starikovskoe, Ushkatta 8, Kamyshnoe 1, Petrovka 2, Novonikol'skoe, Bogolyubovo 1) and survive to the Final Bronze Age (Stalinskiy Rudnik, Myrzhik) when they become numerous on sites of the steppe cultures of Central Asia and also appear in western Siberia (Grakov 1935: fig. 67.6; Gryaznov 1956: 30-31, fig. 7, 26; Orazbaev 1958: 276, 278, table 10, 2; Chernikov 1960: table 8.4, 5; Kuz'mina 1966: 44-46, table 9; Sal'nikov 1967: 331, fig. 53.7, 8; Zdanovich 1973: 118; Chebakova 1975: fig. 5.10.11; Stokolos 1972: fig. 6. 1; Margulan 1979: 5-9, fig. 166; Avanesova 1979: 14; Zdanovich 1988: tables 10, 20, 21; Kadyrbaev *et al.* 1992: fig. 118. 11; Gening *et al.* 1992; fig. 75.6; 148, 164; Zdanovich 1997: fig. 9). Early sickle-shaped knives were polyfunctional and could be used as knives, sickles, and carpenter planes. These tools are quite analogous to Abashevo and Timber-grave ones and are genetically connected with them (Krivtsova-Grakova 1955: 54, fig. 12.12; Sal'nikov 1967: fig. 2, 3, 5, 6.1-5; 24.12; Chernykh 1970: fig. 54. 12-17, 55. 1-9). Their forms developed from slightly curved knife-sickles to a specialized type of knife with a straight blade and then a sickle itself. Its efficiency rose due to an increase in the curvature of the blade. At the end of the Bronze Age sickles often had holes for attaching a handle. Andronovo mass production of sickle-shaped knives is shown by matrices with some negatives in the Urals at Kundravinskaya and at Orenburg (Krivtsova-Grakova 1948: 103; Tikhonov 1960: table 20. 14).

The second group consists of sickle-choppers of the Sosnova-Maza type (Fig. 43: 19-21) found in the Urals, north, central, and eastern Kazakhstan, Semirech'e and in west Siberia, including those found on settlements of the Final Bronze Age at Stepnyak, Alekseevka, Yazevo, Ust'-Narym, Malokrasnoyarka, Konezavod, Chaglinka, in the burial at Zevakino, in the late layer of Petrovka 2 and Novonikol'skoe, and in the hoards of Alekseevskiy, Turksib and Shamshi at the end of the 2nd/beginning of the 1st millennium BC (Chernikov 1949: table 10.4; 1960: 38, 44, 162, tables 36.19, 16.11; Orazbaev 1958: 141; Akishev and Kushaev 1963: 108, fig. 83; Grishin 1960: 123, fig. 1, 6-7, 20; Chlenova 1955: fig. 3, 5; AO 1969: 393; 1973: 467; Kuz'mina 1966: 54-56, table 11; Kozhumberdiev and Kuz'mina 1980: 145-146, fig. 1, 17-19; Krivtsova-Grakova 1948: 107, fig. 27.3; Evdokimov 1975c: 112; IK SSR: fig. 108.1, 2; Arslanova 1974a: tables 1, 4; Zdanovich 1973a: 118; Avanesova 1979: 15; Potemkina 1979: fig. 6.3). The mass production and late date of sickle-choppers is affirmed by a bronze mold (Omsk museum). V. V. Golmsten thought that these tools were not sickles but cutting instruments used for clearing flood land for sowing and for stocking up branches for cattle. Modern Turkmen use an analogous tool for

slaughtering cattle, so it is possible that sickle-choppers were connected rather with cattle-breeding and not so much with farming. Andronovo sickle-choppers are analogous to those of the Timber-grave culture (Sosnova-Maza, settlement at Samara, Osinovye Yamy) and share a common genesis with them (IAK 1909: vol. 29: 65-66, fig. 6, 11; Krivtsova-Grakova 1955: 62, fig. 14.7; Merpert 1966a: 132; Chernykh 1970: fig. 55, 10-15).

The third group is composed of sickles with a hook known in the Urals, northern and eastern Kazakhstan including the Final Bronze Age settlement of Yavlenka (Zdanovich 1988: table 10c, 110), and is analogous to a similar form from the Timber-grave culture.

The fourth group consists of sickles and scythes with one or two flanges; they are known in northern and eastern Kazakhstan, Semirech'e, in western Siberia including the Final Bronze Age hoards of Issyk-Kul' and Predgornoe, in a burial at Predgornoe and on the settlement of Chaglinka together with pots with applied-roller decoration that indicate the date of this type (Kuz'mina 1961c; 1966: 56-57, table 11. 9, 10, 15-17; 1967: fig. 1; Kozhomberdiev and Kuz'mina 1980: 86-87, fig. 1, 10; Grishin 1960: 123, fig. 1, 8; IK SSR: fig. 108, 4; Orazbaev 1970: 141). We can see then that harvesting tools appeared in the Andronovo culture from its formation and shared a common genesis with tools from Eastern Europe, Abashevo and Timber-grave, and developed along similar lines over the whole Eurasian steppe. In the Final Bronze Age the number of sickles increased and local improvements were developed, which points to the development of farming in various isolated groups.

The nature of earth moving tools is not clear. Archaeologists believe that the Andronovans had hoe farming (Krivtsova-Grakova 1948: 103; Sal'nikov 1951: 124; Chernikov 1960; Margulan *et al.* 1966: 260-261; Markov 1973: 104; IK SSR: 111; Potemkina 1985: 318). Bronze adzes could have been used as earth-moving tools. They were known in the west of the Andronovo territory: the burials of Novy Kumak, Kenes, Petrovka (Smirnov and Kuz'mina 1977: 36, fig. 3.2; Zdanovich G. and S. 1980: 183, fig. 1, 7), in burials of the Alakul' complex at Orsk, on the Emba and on settlements at Chelkar (Formozov 1951a: 120, fig. 32; Kuz'mina 1961b: 92-93, fig. 32.10; Chernikov 1951: 159, fig. 2, 10; Orazbaev 1958: 275, table 11, 9-11, Gening *et al.* 1992, fig. 127: 140, 146, 148, 152, 164, 175, 184, table 39). In eastern Kazakhstan, the Minusinsk region and the Central Asian steppes only individual cases of such findings are known (Chernikov 1949: 67, table 7.2; Martin 1883, table 8, 9; Kuz'mina 1966: 17, table 3, 12). Andronovo adzes are analogous to Abashevo and Timber-grave adzes and they have a common genesis (Krivtsova-Grakova 1955: fig. 13, 3-5; Chernykh 1970: fig. 52.4-9, 11-14; Sal'nikov 1967: fig. 6, 15, 24.4; Gorbunov 1986: table 15.9, 10).

On the Tobol, and northern, central and eastern Kazakhstan, in Semirech'e, in the Altai and western Siberia there were adzes of another type—massive palstaves with flanges (Fig. 43a: 11; 43b: 6-9). They have been recovered on the settlements and in houses of the Final Bronze Age at Petrovka, 2, Alekseevka (a mold) and in Malokrasnoyarka; they are also included in numerous hoards dating to the end of the 2nd millennium BC. These are Sary-Ozek, Kamennoe plateau, Alekseevskiy, Sukuluk, Sadovoe, Karakol 2, Shamshi and Balandino (Tallgren 1911: 123, fig. 71; Gryaznov 1927: 211: 1930: 162, 156, fig. 3, 13, 14;

Chernikov 1949: table 8.2; 1960: 44, 82, 164; table 36.7, 64.9, 67.5; Moshinskaya 1957: 61.5; Kuz'mina 1966: 18-20, table 3, 9, 10, 14-17; 1968a: 13-15; Kozhumberdiev and Kuz'mina 1980: 144, fig. 1, 25; Evdokimov 1975c: 112; Zdanovich S. 1974b: 320; 1979: 12; Margulan 1979: fig. 2, 4; Zdanovich 1988: table 10d, 18). Andronovans used adzes of both types: traces of tool use have been seen on both the foundation ditches of their houses and grave pits. However, for the cultivation of large fields, adzes, which have very narrow blades, were of little use. Woodworking was the main purpose of this multi-functional tool. Celts of the Seyma type, most probably of Andronovo origin, were used for digging (Gryaznov 1941: 251-254; Zotova 1964: 59-63; Chernikov 1960: 80, 81), but there are no such finds in complexes at present. Celt-spades appeared at the end of the Bronze Age in central and eastern Kazakhstan, in Semirech'e, Fergana, and western Siberia (Chernikov 1951: table 1, 17; 1960: 83, table 15. 4; Grishin 1960: 122, table 7.4; Kuz'mina 1961b: 258, 259; 1966: 24-26, table 5; Margulan 1979, fig. 2, 3).

Stone and horn tools could also have been used for loosening the soil (Zdanovich, S. 1979: 18, Kadyrbaev *et al.* 1992, fig. 116) but their use would have been limited to secondary cultivation of the soil.

Stone hoes are considered to be the main agricultural tool of the Andronovans. They are found across the whole Andronovo region on settlements such as Alekseevka, Zamaraevo, Elenovka, Kiimbay 1-7, Ushkatta 2, Shandasha 2, Atasu, Myrzhik, Ak-Mustafa, Ulutau, Karkaralinsk, Buguly, Suukbulak, Tagibay-Bulak, Milykuduk, Kanay, Ust'-Narym, Trushnikovo, Semipalatinskie Dyuny, and on settlements of northern Kazakhstan. They are dated to the Full and Final Bronze Age (Krivtsova-Grakova 1948: 103, fig. 28.1, 2; Sal'nikov 1951b: 124-125; 1967: 331; Sal'nikov and Novichenko 1962: fig. 6; Kuz'mina 1962a: 14, fig. 3, 8; 1964b: 106; Margulan *et al.* 1966: 260, tables 23, 37.1, 33.15, 43.1, 47; Margulan 1979: 171, 215, 231, fig. 126, 164.5, 173, 180, , 4, 5; Chernikov 1960: 29, 37, 56, 88, tables 16, 26.4, 5, 49; Zdanovich, S. 1979: 11; Potemkina 1985: 318.1; Kadyrbaev *et al.* 1992: 149-155, fig. 113-115). These tools are nearly rectangular or trapezoidal in form with slightly curved blades and hollowed out for fastening onto an elbow-shaped wooden handle. They are made of solid rock and often well polished. According to S. A. Semenov, the Ust'-Narym hoes were used for breaking up the soil (Chernikov 1960: 556). However, use-wear analysis of seven samples from the Elenovka micro-district, undertaken by G. F. Korobkova, showed that they were used as mining instruments, which is proved by the split character and worn out traces formed by hard rock strokes and the presence of copper ore fragments. The distribution of these 'hoes' near ancient mining districts and their discovery in the Temir and Sarybulak mines (Kadurbaev *et al.* 1992: 150) support this conclusion.

All the above-mentioned tools, even if we accept that they were used for cultivation, could be used only for small-scale gardening of the flood lands; for field cultivation they could not be used as the soils characteristic of the Urals and Kazakhstan demand deep plowing. Consequently, if Andronovo agriculture was hoe farming, it had a low efficiency and could not be significant for the economy. However, the abundance of grain storage pits within the settlements and the general level of cultural development among the Andronovans, who widely employed domestic animals, suggests that they also used the plow. But

on the petroglyphs of Kazakhstan, in contrast to those of Central Asia, the plow is not evident, although figures of vehicles and chariots are often met. Thus, the question of the tool usage and ways of land cultivation of the Andronovans and thus of their farming character and its scale is not quite clear although arable farming does seem highly probable.

The distribution of Andronovo settlements suggests some regional economic variation (Maps 13, 14). If in the north of their territory, in the forest-steppe zone of the Urals and northern Kazakhstan, settlements are situated along the river banks near flood plains on fertile lands suitable for hoe-gardening and arable field farming, in the southern steppe zone in the south Urals, western and especially central Kazakhstan many sites are on the open steppe with stony and saline soils and even in semi-desert regions where cereal cultivation was inefficient or impossible (Sorokin 1962a: 59; Kuz'mina 1962b: 92; Margulan 1979: 261). This conclusion is supported by the fact that in settlements of the forest-steppe in every house there are several, sometimes dozens, of pits for grain, in which grain could be kept during the whole winter, without losing its germinating capacity (Bowen and Wood 1968), while in the southern Urals and western and central Kazakhstan they are found very rarely or not at all, and the only pits discovered are associated with storing ore. In these fundamental districts of the Andronovo culture only stock-breeding could form the basis of the economy, making the Andronovo economy mainly a stock-breeding one.

There are indications that at the end of the Bronze Age the Andronovans constructed artificial dams and employed irrigation from streams and estuaries, resembling Tazabagyab ones (Andrianov 1969; Itina 1977: 176-178), but it was more primitive. Dams and small water courses have been discovered in the southern Urals at Lake Buruktal, at Elenovka and in northern Kazakhstan (Sal'nikov 1967: 333-334; Zdanovich, S. 1979: 19). In central Kazakhstan large dams are known, made of two rows of stone slabs and an earthen embankment partitioning off gorges and broad gullies of the Altyn-Kazgan, Keregetas, Kipchakpay, Korgantas, Kushoku, Milykuduk, Akchi, etc. (Margulan 1979: 263-270, fig. 188-197). Irrigation could have been made for field irrigation and the creation of water-meadows, but dams in the Elenovka micro-district and numerous ones from central Kazakhstan suggest by their topography and traces of flotation minerals that they were used not for amelioration of the fields but rather for washing ore.

Andronovo irrigation works are fundamentally different in structure from the contemporary and more ancient irrigation systems of south Central Asia and Iran, which proves their local origin. All types of Andronovo agricultural tools also have nothing in common with those of Central Asia and Iran, but they are identical to those of Eastern Europe.

This indicates a similar level of development and a common genesis for the farming economy of the Andronovans and Timber-grave people in Kazakhstan and western Siberia, because proto-types of many of the common steppe farming tools are known in Eastern European complexes of the pre-Seyma period (Poltavka and Abashevo).

Stockbreeding

The formation of the economic-cultural type and the evolution of the economy of the steppe tribes were to a large extent defined by the natural and climatic conditions of the steppes and their periodic changes.

The Eurasian steppes belong to the zone of unstable farming. Although chernozems (productive black earths) constitute more than 2.5 million hectares, large areas comprise soils of low fertility, grey soils, white saline soils and sand (Milkov 1964). The climate of the steppe is severely continental. The amount of precipitation from the northern borders of the steppe to the southern falls from 430mm to 150mm per year, and the moisture coefficient is six times greater in the south due to evaporation. Some districts in the south and east become a semi-desert zone (Mordkovich 1982: 26). Although Mesopotamian field irrigation produced crops that yielded thirty fold and more, in Turkmenia fifteen fold, in Greece 800-1000kg per hectare, in the Balkans 225-450kg per hectare (Masson 1971: 102), in western Kazakhstan even in the 19th century the yield of the average crop was only four fold. But for the development of stock-breeding the steppes offered optimum conditions, providing natural pasture. In the steppe characterized by feather-grass and various other grasses it was possible to obtain up to 15 quintals of hay per hectare, in wormwood-tipchak steppe up to 7 quintals, and in semi-desert up to 5 (Milkov 1964: 167-169). Six-seven heads of oxen and horses could be pastured on 1 square km of mixed-grass steppe (Mordkovich 1982: 185). This preconditioned the further evolution of the economy by increasing the role of stock-breeding.

A complex sedentary economy was established in the steppes in the 3rd millennium BC (Kuz'mina 1996). The next stage in the evolution of the economy was in the 17th–16th centuries BC, the period of the Timber-grave and Andronovo cultures. The economy remained complex sedentary which is indicated by fortified settlements of the Arkaim type. However, Petrovka tribes did not choose the path toward urban civilization, the intensification of the economy and growth in labor productivity. The specific character of its ecological niche conditioned the development of Andronovo society.

The stock-breeding of the Sintashta population derived from Abashevo. They raised very tall cattle, sheep and mainly horses which were exploited for food and for the first time for pulling chariots; the role of the pig decreased sharply (Varov and Kosintsev 1996: 54). Bones of domestic animals constitute 96% of the faunal remains of which cattle is 60.4%, ovicaprids 24.2%, horse 15.4%, and single bones of pig or boar are encountered (Zdanovich 1997: 56, 57). The same composition of species is recorded for Sintashta-Petrovka burials. Hunting played a minor role, but the combination of steppe and forest species is of interest: wolf, fox, hare, marmot, boar, roe deer, saiga, aurochs, bear, elk, red deer (Zdanovich 1975: 57). Two-humped camels (*camelus Bactrianus*), probably domesticated, appeared for the first time (Lavrushin *et al.* 1999: 101). These tendencies developed in the next stage, marked by the apogee of the culture seen in the expansion of territory and the abundance of sites which surpassed the number of other periods.

This was the time of the climate optimum of the Subboreal period when the climate became milder. Carbon analysis of the Elenovka micro-district, conducted by G. N. Lisitsyna, and geological and paleoecological research of the

Arkaim area (Lavrushin *et al*. 1999: 101-102) demonstrate that there appeared forest regions in the steppe, where birch, lime, aspen and pine grew, and under the influence of Siberia the Siberian pine, larch, and fir-tree appeared, which do not grow here at the present. Andronovo houses and the timber-frameworks in graves were made of pine. Various grasses and cereals dominated in the steppe. These conclusions are confirmed by the composition of wild animals, which include both representatives of steppe fauna: wolf, fox, hare, boar, kulan, saiga, roe-deer, argali-djeyran, and forest animals: steppe bear, stag and reindeer, elk and beaver, that are found across the whole Andronovo natural habitat, although not met here at the present (Smirnov 1975; Khabdulina *et al.* 1984: Nurumov 1987; Akhinzhanov 1992). Paleoecological conditions were favorable for the spread of a complex economy with stock-breeding dominant. It provided the Andronovans with meat, milk, wool, skins, fuel and bone for implements.

The composition of the herd is reconstructed on the basis of faunal remains from settlements. Cattle occupied first place, ovicaprids second, and horses were third. Dog and the Bactrian camel were also known (Krivtsova-Grakova 1948: 100-102; Kiselev 1949: 55-56; Sal'nikov 1951b: 122-124; 1954a: 148; 1967: 327-330; Gryaznov 1957: 21-28; Chernikov 1960: 62, 64, 167; Kuz'mina 1963a: 38-46; 1977: 28-52; 1980: 11-35; Margulan *et al*. 1979: 257-263; Makarova 1974: 201-206; 1980: 141-151; IK SSR 107-109; Zdanovich S. 1979: 17-18; 1981: 44-54; Maksimenkov 1978: 48, 51; Akhinzhanov *et al.* 1992).

The specific character of Andronovo stockbreeding was examined by V. I. Tsalkin (1964: 24-30; 19972b: 66-81) and furthered by P. A. Kosintsev (1989), Varov and Kosintsev (1996) and S. M. Akhinzhanov (1992). Andronovans raised the same breed of cattle (Ukrainian grey type) that was found in the Abashevo, Timber-grave and earlier Eneolithic cultures of the south Russian steppes and along the Danube. It were large (withers height was 126cm, average weight was 350kg) and long horned animals but many were hornless (Tsalkin 1972b: 70-71). In the Trans-Urals and eastern Kazakhstan a smaller breed of cattle was found (Krivtsova-Grakova 1948: 102; Sal'nikov 1951b: 128; 1967: 328; Chernikov 1960: 62; Kosintsev 1989: 94). In addition to oxen large bulls were used for draft (withers height 133cm; Tsalkin, 1964: 26; 1972b: 71, 72). The use of a bull harness by the Andronovans is confirmed by Kazakhstan petroglyphs. Andronovans sacrificed mainly bulls rather than cows; usually large mature animal skins with a skull and legs, substituting for the whole animal under the principle of *pars pro toto*, were placed in burials (Tsalkin 1972b: 72). Andronovo stockbreeding was mainly meat oriented which is indicated by evidence for butchery on the bones among the food waste. In the western Andronovo region young animals were mainly used for food; 50% of slaughtered animals were not older than two years, 75% were younger than three years. This yielded a highly productive strategy of livestock slaughter.

The Andronovans also consumed milk from cows. The main evidence are vessels in all burials and cult places. Analysis of their content has not been conducted, but they probably contained vegetable and dairy food (Gryaznov 1957: 23). The meat and dairy focus of the economy, especially in the forest-steppe, is indicated by the age-slaughter pattern (Kosintsev 1989: 96, table 5). In the Final Bronze Age they undoubtedly used dairy products and learned to process them: on the settlement of Kipel' a vessel for cheese and cottage cheese

making, with holes in its base, was found (Sal'nikov 1951b: 124). Cheese production supplies products for long term storage and was an important invention necessary for a nomadic and mountain pasture economy, where cattle were far from the settlement for a long time.

The Andronovans processed skins of all domestic animals, using blunt knives fashioned from jaw bones. These are numerous on settlement sites (Krivtsova-Grakova 1948: fig. 24; Margulan *et al.* 1966: table 3; Chernikov 1960: 28-29, 46, tables 15.1; 38.2; 39.5).

Ovicaprids occupied second place in the Andronovan herd. The Andronovans raised the same breed of sheep as the Timber-grave and other synchronous and earlier cultures of the south Russian steppes. It was a large sheep with an average height at the withers of 70cm and more; its weight was 50kg (Tsalkin 1972b: 72-73; Galchenko 1990: 60; Kosintsev 1989: 98; Akhinzhanov *et al.* 1992). Judging by remains from burials, sheep were sacrificial animals. Sheep were used for meat (there are many bone fragments on settlements). Young animals were mainly used for food: two-thirds of the bones belong to individuals up to one year and a half (Tsalkin 1972 b: 72). According to A. V. Galchenko (1990: 60) most sheep remains derived from animals from five months to a year in age. He connects this with the fact that lamb skins of this age are the most suitable for making sheepskins. Sheep wool was spun: many clay spinners, twisted woolen threads (Alekseevka, etc.) and knit objects (Orak, Andronovo, Ust'-Erba, Pristan') as well as cloth and impressions on ceramics are known (Sosnovsky 1934: 92-96; Krivtsova-Grakova 1948: 101; Kiselev 1949: 42, 48; Maksimenkov 1978: 14, 40, 72). According to statistical analysis of osteological materials from settlements ovicaprids occupied second place in terms of the number of bones and individuals, but often they come first. However, even though sheep are more prolific (3-5 lambs per year) than cows (1 calf) and may account for a greater proportion of the bones or individuals recovered (Gryaznov 1957: 23), since sheep weigh one-seventh that of a cow it turns out that in spite of the large number of sheep bones on the settlements the food of the Andronovans consisted of 60-70% beef and only 10% of mutton (Tsalkin 1972b: 80). This indicates a real but not a very significant role for sheep-breeding in the Andronovo economy. By following horses sheep could obtain food in the winter under snow (Gryaznov 1957: 25; IK SSR: 107) which was a main precondition for the transition to mountain pasture and semi-nomadic stockbreeding.

The Andronovans raised goats, but these played an insignificant role. Goat bones have never been found in burials, consequently they did not belong to the sacrificial animals (there are exceptions in the burials at Hripunovo and Chistolebyazh'e). Andronovo goats as well as the goats of the Timber-grave and other East European cultures belong to the *prisca-aegagrus* type. Falconeriod goats have not been recovered (Tsalkin 1972b: 73). Thus, both types of ovicaprids and the insignificant role of the goat in the economy indicate a principal difference between the Andronovo stockbreeding and that of south Central Asia and Iran, where sheep-breeding and goat-breeding played the main role, thus providing another important proof of the East European and not south Central Asian origin of Andronovo stockbreeding.

Horses came third in the Andronovo herd. They were used not only for transportation purposes, for chariot harnessing, but also for meat, which is

proved by fragmented bones on settlements. Horse-meat constituted 20-30% of Andronovo meat consumption (Tsalkin 1972b: 60). Probably in the late Andronovo period they learned to make koumiss (sour horse milk), for which goblet-shaped vessels were used (Margulan 1979: 262; Kuz'mina 1974). The horse was the main cult animal among the Andronovans, which is indicated by sculptures and representations of horses on Kazakhstan petroglyphs, and also horse burials or skins with the head and legs that substituted for them in rituals and Andronovo status burials of the Sintashta, Petrovka and Alakul' types. The Fedorovo tribes usually placed horse ribs and a shoulder-blade in a grave (Kuz'mina 1977: 28-52; 1980c: 32, 1994; Gening 1977).

On the basis of horse bone measurements made by V. I. Gromova (Sal'nikov 1951b: 124) and V. I. Tsalkin (1972b: 74-77) it has been established that the Andronovans bred three breeds of horses: small, up to 128-136cm at the withers; average and tall, up to 136-152cm high, weighing 350kg, thin-legged and semi-thin-legged. In addition, for the first time in Eurasia we have very large horses (152-160cm), thin and semi-thin legged and distinctly graceful: these were the horses that were placed in elite burials (Sal'nikov 1951b: 123). The modern Akhaltekin breed goes back to these Andronovo horses and, ultimately, all the high bred horses of the world: from the elite horses of Andronovo come the famous Nisa horses that were bred in antiquity in Central Asia. They are the ancestors of the Akhaltekin horses; after the occupation of Central Asia by the Arabs in the Middle Ages, the Arabs took Nisa horses to Arabia, and from there they reached England, where English race horses were bred (Belonogov 1957; Barmintsev 1958). The Fedorovo horses of the Urals and eastern Kazakhstan differed from the Alakul' by their small height (Sal'nikov 1967: 328; Chernikov 1960: 64; Akhinzhanov *et al.* 1992). Horse-breeding, reaching its climax among the Andronovans, developed in the south Russian steppes beginning with the 4th millennium BC, while at the same time in south Turkmenistan reliable recovery of horse bones and images of horses appear only in the Namazga VI period (Kuz'mina 1980c: 27-29; 1981a; 1981b). The unusually high level of horse-breeding constitutes the most important peculiarity of Andronovo stockbreeding and helps to distinguish the role of the Andronovans in Eurasian history.

Another important feature of the Andronovo economy was the breeding of the Bactrian camel. Camel bones are found at the settlements of Arkaim, Atasu, Ust'-Narym, Petrovka 2, and Alekseevka (Tsalkin 1972b: 77; Margulan 1979: 258, 259; Makarov 1978: 136, Lavrushin *et al.* 1999: 101). Ritual burials of a camel foal and camel bones in Aksu-Ayuly (enclosures 3, 4, 5), camel skulls from Telzhan-Kuzeu and near a hearth in the settlement of Milykuduk, bones in graves 2 and 5 in Begazy, a clay statuette on the settlement of Ushkatta, a stone head from the Irtysh (Fig. 55: 8-9) and numerous representations of camels on petroglyphs in Kazakhstan and Central Asia demonstrate the cult significance of this animal (Figs. 34: 10, 55: 7-9; Kuz'mina 1963a: 38-44; 1980c: 29-30; Margulan *et al.* 1966: 262; Margulan 1979: 258, 259; Kadyrbaev and Mar'yashev 1977: 162-170). In the second half of the 2nd millennium BC camel-breeding was known in Eurasia apart from Andronovans only among Central Asian tribes (Itina 1977: 138, 185-190; Kuz'mina 1980: 30).

Finally, the Andronovans bred dogs. They were not used for food, but they were kept as guard-dogs. Two breeds were known: a small husky type and a

larger guard-dog (Krivtsova-Grakova 1948: 102; Sal'nikov 1951b: 124). Dog burials at cemeteries and in special graves suggest an animal cult.

The actual composition of the Andronovo herd is reconstructed on the basis of percentage ratio of individuals with corrections, introduced by M. P. Gryaznov (1957: 23) and Yu. A. Krasnov, taking into account the greater fertility of sheep (the composition for Sargary is the following: cow – 41%, horse – 37%, sheep – 22% (Zdanovich, S. 1979: 19). Taking into account the dead weight of individuals of different species it can be seen that in terms of meat consumption among the Andronovans beef constituted 60-70%, horse-flesh 20-30%, and mutton – 10% (Tsalkin 1972b: 80).

With respect to both structure and breeds, Andronovo stockbreeding was structurally similar to East European, especially the Timber-grave culture (Table 6) and it is of East European origin. It displays a clear steppe character. Its peculiarity is the complete absence of the pig and highly developed sheep-breeding that marks the Andronovo culture off from other Eneolithic and Bronze Age cultures of the Eurasian steppes (Tsalkin 1964: 27, 29; 1972b: 80; Kosintsev 1989: 101; Akhinzhanov *et al.* 1992); in addition, it had specialized horse-breeding and camel-breeding.

Culture	*Cattle*	*Ovicaprids*	*Horse*	*Pig*
Pre-Kazan'	26.9	13.9	23.1	36.1
Noua	45.3	23.6	16.3	14.8
Pontic T-G	46.6	24.0	21.5	7.9
Don T-G and A	50.0	19.3	17.6	13.1
Ural T-G and A	40.1	24.8	14.8	20.3
Middle Volga TG	40.5	32.3	16.4	10.8
Andronovo[1]	36.7	46.2	16.7	-

(according to Tsalkin 1964, table 1)

Table 6: Correlation of the MNI of domestic animals species in various archaeological cultures of the second half of the 2nd millennium BC
T-G = Timber-grave, A = Abashevo
1. In V. I. Tsalkin's table, pig constitutes 0.4% of the domestic animals for the Andronovo culture but this figure was based on the settlement of Zamaraevo which is now assigned to the Cherkaskul' culture which did engage in pig-keeping. Later V. I. Tsalkin (1972: 79) stated that the Andronovans had no pigs.

In the early and developed stages of the Andronovo culture the economy was settled which is shown by the long duration of settlements with very large houses. In the winter cattle were kept in the settlement. Andronovans stalled their cattle which is indicated by special fences and household annexes at Alekseevka and other settlements. In many Andronovo houses there is an inner area not so deep as the rest of the structure and containing a floor covered with organic waste. It is highly probable that this part of the house was employed for cattle keeping, especially young animals in the winter time for which there are numerous ethnographic parallels. Cattle fodder was hay and branches cut with sickle-scythes and Sosnova-Maza choppers. The stalling of cattle was a great achievement of the Andronovans, who considerably surpassed Western Europe where this system appeared only in the Iron Age.

A balance between meat and dairy products in stock-breeding guarantees a stable economic basis for society which leads to population growth and demographic expansion. In a meat-dairy economy the cattle return to the settlement for milking every evening. But this system limits the possible area of pasturage and strictly limits the number of beasts in a herd as the stocking rate on the Eurasian steppe is no more than six-seven head of large-hoofed animals per one square km of pasture.

Human activity finds itself in a contradiction with its limited natural resources. In the first place, constant population growth requires growth in the amount of food, i.e., livestock. In the second place, even employing the most effective system of pasturage with the herd regularly foddered several kilometers round the settlement, in 20-25 years there will be overexploitation and the productivity of the pasture will diminish to two to four times lower. It requires 50 years for regeneration.

These factors conditioned the necessity of moving Timber-grave and Andronovo settlements to a new place, several dozens of kilometers every 20-25 years, which explains the relatively small number of burials relating to a single generation in the cemeteries.

Demographic analysis of the Elenovka micro-district involved a comparison of house area on the settlement with the number of burials in the associated cemetery (taking into account an average life expectancy in Andronovo society of 30 years according to V. P. Alekseev). This showed that the settlement and the adjacent cemetery functioned from 25 to 50 years (Kuz'mina 1974c; Evdokimov 1984: 17).

Settlements with mixed layers suggest several occupations at a convenient place to which the community returned frequently after 25-50 years.

The gradual expansion of territory was stimulated by constant pressure from the surplus population. It explains a large number of monuments of the 15th–13th centuries BC in the steppe and the archaeologically well-traced expansion of the Timber-grave and Andronovo cultures that gradually mastered the whole Eurasian steppe. By the 13th century BC the extensive development of this mixed economy had come to an end.

Intensification could now be achieved only by a transition to the new semi-nomadic economy and the development of new pastures. A more progressive system of stockbreeding appears, when the main population lived in long-term settlements and herds were driven to pastures, gradually moving from one pasture to another, which yields unlimited possibilities for increasing livestock. In conditions of extensive cattle-breeding seasonal pasturage is the most rational land-using system, that is why the transition to mountain and desert pasturing of cattle was a progressive phenomenon. This new system of economy was established among the Andronovans in the 13th–12th centuries BC in the Final Bronze Age (Gryaznov 1957: 25-26; Margulan *et al.* 1966: 263; Margulan 1979: 261; IK SSR: 107). However, it certainly originated much earlier. During the whole Bronze Age conditions for nomadic cattle-breeding gradually developed within Andronovo society.

On the basis of herd composition and the topography of Eneolithic and Bronze Age sites, N. Ya. Merpert (1968: 41-43, 51) and V. P. Shilov (1970: 18-25; 1975: 5-15) established the important fact that there was a non-uniform

development of various tribes and an early transition to mobile forms of stock-breeding in some semi-desert areas that were not suitable for a mixed economy. Among the Andronovans the same area specialization is noted (Map 13). The composition of the herd is the same along the entire territory of the Andronovo culture, but the relative proportion of species varies somewhat according to ecological conditions (Table 7).

Region	*Site*	*Cattle*	*Sheep*	*Horse*
Middle Urals				
	Kamyshnoe 1	55.6	33.3	11.1
	Kamyshnoe 2	55.8	20.9	16.3
	Novo-Burino	52.4	33.3	14.3
	Kipel'[2]	36.7	53.3	10.0
	Zamaraevo[3]	41.8	41,7	16.6
	average	42.8	44.5	12.7
South Urals[4]				
	Karabutak	41.1	35.3	20.6
	Ushkatta	29.2	52.3	18.5
	Kupukhta	40.0	50.0	10.0
	Shandasha	25.5	64.3	10.0
	average	33.9	50.5	14.8
Tobol				
	Alekseevka	27.9	53.5	18.6
	Alekseevka 1969	36.4	27.2	36.4
	average	32.2	40.3	27.5
N. Kazakhstan				
	Petrovka II	42.5	38.3	14.2
	Novonikol'skoe	37.4	36.0	19.2
	average	39.9	37.1	16.7
	Sargary	33.5	36.2	30.3
	Petrovka IV[5]	36.4	34.6	30.8
	average	34.9	35.6	30.5
	regional average	37.4	36.5	23.6
C. Kazakhstan				
	Buguly[6]	20.0 (21.5)	63.3 (70.0)	13.3 (8.5)
	Karkaralinsk	30.0 (37.2)	45.0 (36.8)	25.0(26.0)
	Shortandy-Bulak	23.1 (21.3)	80.8 (52.8)	30.8 (25.9)
	Ulutau	(33.1)	(30.1)	(36.8)
	Suukbulak	(33.6)	(42.2)	(24.2)
	Average	26.0 (29.4)	63.0 (46.4)	23.0 (24.2)
E. Kazakhstan[7]				
	Kanay	37.4	32.0	9.5
	Ust'-Narym	26.4	37.7	7.5
	Malokrasnoyarka	17.4	39.1	15.2
	Trushnikovo	22.5	31.4	18.7
	average of all domestic animals	38.9	44.3	16.8

Table 7: Correlation of the MNI of the main domestic animals in different ecological zones[1]

1. As 100% comprises all domestic animals bones, including dog and camel, the sum in the table is sometimes lower than 100%.
2. The closest numbers for Kipel', obtained by V. I. Gromova, are: cattle – 2.3%, sheep – 47%, horse – 8.7%. The table does not include the data for wild and domestic animals together.
3. Part of the Zamaraevo materials must be assigned to the Cherkaskul' culture.
4. Excluding the settlement of Baytu with its small amount of material.
5. The calculations of S. Ya. Zdanovich (1979: 18), from which the data for Petrovka IV are taken, must be wrong as the sum exceeds 100%.
6. Per cent of bones taking into account other years of excavation which is shown in brackets. The number of individuals was not determined.
7. For eastern Kazakhstan the 100% includes all animal remains, including wild; the average here includes only the domestic species defined by V. I. Tsalkin.

Bones of all animals, including wild ones, comprise the 100% listed. Unfortunately, the material is fragmentary; there are few analyses from Siberia due to insufficient research of settlements. According to the settlements of Shlyapova, Klyuchi, and Bateni the species composition was the same with cattle dominating the herd (Gryaznov 1957: 23; Maksimenkov 1978: 48, 51). Data from P. A. Kosintsev (1989: table 1) about Trans-Urals settlements and A. V. Galchenko (1990, table 1) for the Altai, that are reported without employing the MNI, are not included in the table:

Site	*Cattle*	*Ovicapr.*	*Horse*
Duvanskoe	17	88	64
Cheremukhovy Kust	106	61	28
Sukhrino 3	98	79	30
Kambulat	21	18	8
Bol'shoy Log	32	52	35
Firsovo 15	13	9	9
Pereezd	30	37	8

Table 8: Number of bones
Data about other settlements are not reliable because sampling was unsystematic. The data on the age of animals from P. A. Kosintsev (1989) differ from the ones published by V. I. Tsalkin.

On early sites of the forest-steppe zone of the Urals and northern Kazakhstan the percentage of cattle ranges between 37% and 52%, averaging 40%, while sheep makes up only 37-44%. In contrast, in the steppe zone, in the southern Urals and in central Kazakhstan there is the opposite relationship of these species: cattle constitute only 26-34%, while sheep increases sharply to 50-63%, reaching on some settlements record numbers for Bronze Age sites of the Eurasian steppes: 64% at Shandasha, 63% at Buguly and even 81% at Shortandy-Bulak (Tsalkin 1972b: 80, table 15; Makarova 1974: 206, table, 205; 1980: 142-148, tables1, 2; Akhinzhanov *et al*. 1992: table).

The composition of the herd varied considerably over time. Across the whole Andronovo region there was a certain tendency to reduce the number of cattle, although the number of sheep in the forest-steppe areas changed insignificantly.

However, the role of the horse grew everywhere: in the Middle Urals from 10% (Kipel') to 16% (Zamaraevo), in eastern Kazakhstan from 7-9% to 15-18% (Malokrasnoyarka, Trushnikovo), in northern Kazakhstan from 14% (Petrovka II) to 31% (Petrovka 4), in central Kazakhstan from 24-25% (Suukbulak, Karkaralinsk) reaching a maximum of 31% (Shortandy-Bulak) and 37% (Ulutau) and 36.4% on the settlement of Alekseevka on the Tobol. In the Final Bronze Age the Andronovo culture became mainly horse-breeding. The increasing role of the horse in the transition to semi-nomadic pastoralism is especially evident; the herd composition remained the same, but the role of the horse grew, because herds were driven to remote pastures by mounted herdsmen. Also, horses can obtain food under snow, breaking it with the hoof. Horses eat the upper part of the stalks, and sheep, following them, eat the lower part of the grass; this is why both animal species were herded in the winter together.

Semi-nomadic pastoralism, originating within Andronovo society, was the main basis for the transition to a full nomadic economy. Although it did not become a mass phenomenon in the Andronovo period, in some districts this form appeared already in Bronze Age. Nomadic society is a "society in which the main source of supporting life was realized by means of extensive pasture cattle-breeding economy" (Markov 1973: 103; 1976). S. I. Rudenko (1961) singled out several types of nomadism: meridional, desert, vertical, etc. The Andronovans were the first among the steppe tribes of Eurasia who mastered the vertical type of nomadism, where herds are driven away to rich mountain pastures in the spring. This is proved by the topography of the cemeteries that are situated near passes high in the mountains: in the Pamirs at Kokuybel'su and Kyzyl-Rabat (Litvinsky 1972: 16, 17, 29), on Chirchik in Aurakhmat and Iskander (Voronets 1948; Kuz'mina 1966: 71-72), in Semirech'e at Tash-Tyube, Tash-Bashat, Dzhazy-Kechu (Kozhemyako 1960; Kuz'mina 1970; Kozhomberdiev and Galochkina 1972; Galochkina 1977) and in the Tian-Shan, where at a height 3000m above sea level, there is the highest mountain cemetery of Central Asia—Arpa (Bernshtam 1952: 19-20).

According to G. E. Markov (1973: 103; 1976) pastoralists' acquaintance with high mountains makes it possible to introduce the term 'mountain-steppe Bronze Age' instead of 'steppe' Bronze Age. The usage of such a term seems unjustified. In the first place, steppe people used mountain pastures only in the summer; in the second place, and it is the main thing, the incorporation of mountain pasturage was a process that required many centuries and was formed in the steppe; that is why the Andronovo culture is better labeled a 'steppe' culture.

The Andronovans already knew the desert type of nomadism. Evidence of this are the numerous sites in the sandy regions of the Caspian and Aral seas (Fig. 44; Formozov 1947; 1951b; Vinogradov 1959; Vinogradov *et al.* 1973; Kuz'mina 1963c; 1976b; Glikman and Melent'ev 1968; AO 1968: 147-149), in Khorezm (Itina 1977: 79-82, 104-109, 119-121) and in southern Turkmenia (Masson 1959: 27, 116; Kuz'mina 1963c; Kuz'mina and Lyapin 1984: 6-22; Sarianidi 1975; 1978: 549). M. A. Itina (1977) stated that short term Andronovan settlements cover the Tazabagyab channels and houses, i.e., they were abandoned during the drying of the river-beds and were connected with spring migrations, when delta channels were filled with water and the desert started to bloom. Temporary round surface houses have been found on these sites. This is a

type of frame house, the predecessor of the yurt of modern nomads, that originated among the Andronovans and Tazabagyab people in the Final Bronze Age. The invention of this house in Eurasia that is ideally adjusted to the conditions of nomadic life was a considerable innovation in their culture presupposing the possibility of a transition to a nomadic way of life.

The distribution of Andronovo and Timber-grave sites (Map 4) shows that migration from north to south was along the Ust'-Urt break, rich in springs and along the areas where underground waters reach the surface which simplifies well digging (Formozov 1959a: 88; Vinogradov *et al.* 1973: 102). Consequently, the invention of the well permitted the mastery of the desert by the Andronovans during the flowering of their culture. A comparison of the map of Andronovo desert sites with a map of the seasonal migrations of nomads of the Early Iron Age and Middle Ages shows that they coincide completely. It suggests that the migration routes through the deserts were first found by the Andronovans and that they remained unchanged for more than three millennia (Vinogradov *et al.* 1973: 102-103; Kuz'mina and Lyapin 1983, Vaynberg 2000).

So the Andronovo sites give striking evidence for the transition of a part of the steppe tribes to dynamic nomadism already in the Bronze Age. This new, more progressive form of economy led to a harmonization of the needs of society and the possibilities of different ecological niches. Among all the cultures of the Eurasian Bronze Age, the Andronovo culture is characterized by a herd composition most suitable for the transition to a mobile economy. Here we find: 1) the complete absence of pig; 2) immensely large percentage of sheep which can find fodder under snow in winter (after horses); 3) numerous horses capable of obtaining food under snow, with the number of horses growing in the Final Bronze Age. Within the Andronovo economy for the first time was a number of innovations that provided an opportunity for the transition to steppe nomadism: 1) the invention of deep wells for obtaining water in the desert; 2) the invention of a light-frame transportable house suitable for the nomadic way of life; 3) the development of wheeled transport using bullocks and specially bred heavy draught-horses; 4) the use of the Bactrian camel for the first time in the steppe; 5) the appearance of horsemen in the 12th–9th centuries BC documented by rod-like cheek-piece types; 6) the invention of cheese providing long term food products from cattle-breeding; and 7) the development of a proper orientation on the steppe with the custom of seasonally changing one's place of habitation.

Without these factors distant migration in the steppe, deserts and high mountains would have been impossible. Ecological factors were probably decisive. The steppe has favorable conditions for stock-breeding: in a short period of time livestock increases and there is population pressure which requires division of pasturage and forces part of the population to migrate. In other periods there are unfavorable conditions, epidemics that also lead to migration, forcing people to leave an area unsuitable for their traditional economy. Population density grew in some regions in the Final Bronze Age with the appearance of very large settlements (Evdokimov 1984). At the same time the cultural layer of some settlements was covered by river alluviums (Khabdulina and Zdanovich 1984). According to some evidence from the 12th–10th centuries BC the steppe climate became more severe and damp. A complex of these factors contributed to the transition of the Andronovans to a semi-nomadic and

then nomadic economy. The reason for this transition was in the very nature of extensive cattle-breeding, which demanded an increase in livestock and an expansion of pasturage. The northern steppe territory is limited by the taiga zone which is unsuitable for stock-breeding. So after mastering the Eurasian steppe latitudinally, which was completed in the third quarter of the 2nd millennium BC, new areas of economic significance could be sought only in the south, and this defined the next direction of migration.

In the farming cultures of south Central Asia and Iran there were neither the preconditions nor reasons for migration into the steppes, which were unsuitable for their traditional irrigation-farming economy. Desert survey has shown that sherds of wheel-made ceramics of the Anau type are not found further than the first ridge of sand dunes. There are no archaeological traces of a migration of the farming cultures to the north in the 3rd–2nd millennia BC.

A study of the economic types of the Eurasian steppe tribes in the Bronze Age and in the Eneolithic (Merpert 1968: 41-43, 51; Shilov 1970: 18-25; 1975; Kuz'mina 1981c; 1986c; 1996) as well as the analysis of the specifics of Andronovo cattle-breeding elucidates the history of pastoral nomadism in Eurasia. This has caused sharp debates which have lasted for years between A. J. Toynbee (1935: 404) who assigned the beginning of nomadism to the 4th–3rd millennia BC and who overestimated the role of nomads in Old World history, and his rivals, who thought that the transition to nomadic pastoralism only happened on the border of the 2nd–1st millennium BC (Khazanov 1973: 5-10) or in the 8th–7th centuries BC and resembled a sudden jump (Gryaznov 1955; Markov 1973: 109).

In reality the development of the pastoral economy was a regular historic process preconditioned by population demand to adjust its economy to the ecological conditions of the steppe. In spite of widespread opinion the nomadic way of life was already established in the Final Bronze Age. But at the crisis period experienced by Andronovo society at the end of the 2nd millennium BC when a large part of the steppe population moved from a mixed settled economy to pastoral nomadism, another part of the Andronovo tribes looked for a way out by intensifying farming and probably in economic specialization, which is shown by irrigation and water control constructions, the modification of the old and the search for new types of farming tools (specialized plate-like sickles with folded-over sleeves, adzes with edges, celt-spades). This conclusion contradicts the generally accepted mass transition to nomadism (Margulan *et al.* 1966: 261; IK SSR: 107, 112; Markov 1973: 105) but it is confirmed by evidence about Andronovo house-building: while everywhere instead of large long-term houses with stone and wood constructions there appear light-frame constructions and houses of the proto-yurt type, in some districts stone architecture reaches its peak. Such ecological niches with settled life and intensive farming were the regions, rich in mines, in central and eastern Kazakhstan and the fertile foothills of Semirech'e and the valleys of Central Asia.

In Central Asia the settling of steppe pastoralists and their transition to farming is especially clear, and can be seen in the related farming cultures, Chust in Fergana, Burgulyuk in the Tashkent oasis, which were formed in the steppe zone. The decisive role of the steppe component in the Chust culture is convincingly shown by Yu. A. Zadneprovsky (1962). The same genesis is seen

for the Bishkent (Vakhsh) culture in northern Bactria (Mandel'shtam 1968; Kuz'mina 1972a).

At the end of the 2nd millennium BC there were three types of cultures across Central Asia:

1) primordially farming cultures, genetically connected with the ancient farming cultures of Iran and Central Asia, which continued in the oases of southern Turkmenia in the territory of future Parthia and Margiana and which advanced into Bactria;

2) farming cultures, created as the result of the settlement of pastoral tribes, genetically connected with Eurasian steppes populations, developing in the steppe regions of Central Asia, in Khorezm, Fergana, the Tashkent oasis and Bactria;

3) pastoral cultures, created as the result of the transition to nomadic stockbreeding by pastoral tribes, that were genetically connected with the Eurasian steppe population and related to the farming culture of type 2 that had undergone sedentarization (Kuz'mina 1972a: 144).

Both related groups of steppe populations migrated to the south and assimilated the originally farming cultures of south Turkmenia and Bactria, that were genetically alien to them. This resulted in the formation of a series of 'barbarian' cultures of the border of the 2nd/1st millennium BC such as the Yashilli in south Turkmenia, Yaz 1 in Margiana, Kuchuk in northern Bactria and Tillya in southern Bactria.

The formation of the languages and cultures of these groups from the steppes and Central Asia at the end of the Bronze Age became the genetic basis of the further development of Central Eurasia in the early Iron Age when Iranian-speaking tribes performed in the world historical arena. These tribes were the nomadic Sauromatians of the Volga and the Ural, and the Saka in Kazakhstan, southern Siberia, and the south of Central Asia. South of Central Asia, in Iran and Afghanistan, they were the farmers of Khorezm, the Sogdians, Margianians, Bactrians, Medes, and Persians. Their language and history are known to us from the descriptions of Greek authors and documents of Achaemenid Empire.

The Indo-Iranian economy

The Indo-Iranian economy is reconstructed, first on the basis of common Indo-European words preserved in their languages, second from the terms present in the earliest Vedic literature, summarized by A. Macdonell and A. Keith (1958), and finally from the ancient texts analyzed in many works, that reconstruct Aryan society and way of life (Zimmer 1879; Bhargava 1971; Ghurye 1979; Srinivas 1982, Sharma 1983, Pandey 1965). Although the work of some Indian scholars suffers from attributing to the Vedic period a relatively modern form of economy and social system, the conclusions of W. Rau (1975; 1983) and T. Ya. Elizarenkova (1972; 1989; Elizarenkova and Toporov 1995) are extremely important and are based on a thorough analysis of the sources.

Works by W. Geiger (1882), Ch. Bartholomae (1904), M. D. Dhalla (1922), M. M. D'yakonov (1954), V. I. Abaev (1956), V. A. Livshits (1963; 1998), R. Frye (1962; 1972; 1976; 1996; 2002), and M. Schwartz (1985) are of the utmost importance for the reconstruction of the Avestan economy and society.

According to linguistic data the Indo-Iranian economy was mixed farming and stockraising, with stockraising dominant. I. M. Steblin-Kamensky (1982) showed that there is often a shift of meanings in the names of cultivated plants. A whole semantic bundle is connected with the Indo-European word for 'grain', initially in early Indian and Avestan 'barley' as in the other Indo-European languages. The names of wheat in some Pamir languages go back to it, and in Scythian and some other Pamir languages it indicates 'millet', also Avestan 'plow land', 'crop', Afghan 'plow'. The word 'grain' is an ancient borrowing into Finno-Ugrian from Indo-Iranian (Steblin-Kamensky 1982: 22-26). The word 'barley' is an Indo-European term (Gamkrelidze and Ivanov 1984: 655). Barley is mentioned in the *Rigveda*, but wheat and rice are absent there (Elizarenkova and Toporov 1995: 502). Common Indo-European are words for 'chaff', 'awn', 'grinding' ('millstone'), as well as a semantic bundle originating from the verb 'to crush': 'pestle', 'flour', 'oat flour' (Schrader 1913; Steblin-Kamensky 1982: 27, 48). Common Indo-European is 'millet' that is probably close to Greek; the word for 'rye' has no Indo-European roots; the early Iranian term denotes 'barley-like' (Steblin-Kamensky 1982: 30, 33).

This linguistic evidence corresponds to literary testimony. Yima received a divine gift—a plow. In the *Rigveda* and *Avesta* tilling with a pair of bulls harnessed to a plow is mentioned as well as barley, hay, stone mortar and pestle, copper sickle and axe for slaughtering cattle. Public wells are also known, but reference to irrigation constructions is doubtful (D'yakonov, M. 1954; Elizarenkova 1972: 38; 1989: 449, 451; Elizarenkova and Toporov 1995: 512, 513, 519, Dhalla 1922: 142; Rau 1975; 1983).

Cattle-raising was the basis of the Indo-Iranian economy. In Vedic texts there are about twenty words to denote a horse, ten for a bull, fifteen for a cow; these have numerous epithets (Elizarenkova 1982: 39, 42, 47; Elizarenkova and Toporov 1995: 502, 503), and are constantly compared to gods. Sheep, goat, and the Bactrian camel are also known. Domestic animal names in the Indo-Iranian languages have secure Indo-European cognates. There are several terms denoting 'bull', 'cow', 'cattle', words for 'beef', 'udder', 'to milk', 'milk', 'butter', and also an Indo-Iranian-Baltic term to denote 'milk' and an Indo-Iranian-Greek-Slavonic term to denote 'curds' (cheese), several Vedic terms to denote dairy products, showing the special development of dairy cattle-raising among the Indo-Iranians (Schrader 1913; Abaev 1979 III: 155-156, 319; Gamkrelidze and Ivanov 1984: 563-573; Lehmann 1973; Elizarenkova and Toporov 1995: 519).

Of common Indo-European origin are also the Indian and Iranian names 'sheep', 'fleece', and 'wool' (Gamkrelidze and Ivanov 1984: 577-580). V. A. Livshits has made some important contributions. An ancient term for 'cattle' was recorded in the *Avesta* and was then later attributed to 'sheep' in the Iranian languages; Yima's sacrifice of cattle (Yasna 32.8) was replaced by a sheep sacrifice. These facts indicate that the rise of sheep-raising in Iranian society occurred after the collapse of Indo-Iranian unity. The etymology of the early Persian word 'palace' (used for instance for Persepolis) denoted 'fence', 'pen', 'sheep-fold'.

Goat-raising was not significant among the Indo-Iranians. The words 'goat' and 'ram' have only regional correspondences.

The exclusive role of horse-raising, the presence of camel-raising and the complete absence of the pig make up the characteristic features of Indo-Iranian

stock-raising. The Indo-European term 'piglet' has been preserved only in Khotanese Saka (Burrow 1976: 11), and the other Indo-Iranian names for the pig refer to the wild boar.

E. Benveniste (1970: 307-320) showed that the common Indo-European term 'cattle' denoted 'movable property'. In Indo-Iranian languages the word 'war' and 'booty' literally denote 'cattle stealing' (Abaev 1979 III: 122-3, 149, 171).

Evidence for cult practice is an important source for studying Indo-Iranian stockbreeding. It has been stated that an animal's value was defined by its place in society. According to the *Rigveda* and *Avesta* horse sacrifice occupied the first place, the bull was second and sheep third (Ivanov 1974; Schmidt 1980). Dog was of considerable significance among the Indo-Iranians, especially the Iranians: it is a friend of man, sometimes follows him after death; it is protector of every family and its cattle, that is why the dog is honored in the *Avesta*; to kill it was considered a grave sin (Dhalla 1922: 157, 178).

The predominant role of cattle-raising among the Indo-Iranians is revealed in requests to the gods and in the constant epithets of the gods. In Rigvedic hymns (2.1.5; 3.1.23; 3.15.7) Agni calls a cow as 'giving wonderful wealth', 'much promising reward'; Indra (3.31.4; 7.18.22) is called 'ruler of golden horses', 'generous with oxen', 'herdsman of cows', 'lord of cows', the one whom "the noble cow allows to milk sweet honey"; he is prayed "to make us seizers of cows"; he gave people 'well milked cows, horses'; Mitra-Varuṇa—"wonderfully giving shepherds of the Universe make all milking cows in an enclosure swell" (5.62.2). The Aśvins (1.118.2; 1.157.2; 7.71) are summoned to "make our cows swell from milk, fast horses frisky"; "with fat and honey sprinkle our domination"; "oxen-givers, horse-givers, come, bringing good". Viṣṇu is prayed to "provide us with wealth consisting of horses" (7.100.2), Agni is asked to bring in cattle (5.2.5,12), take belongings from the enemy; to give wealth of fast horses (5.6.10), "wide stream of milk, basis of wealth" (5.15.5), "you are… the giver of reward, made of cows" (5.23.2). Indra is "owner of dun horses", "herds in front of well-milked cows", "as a shepherd herds of cows" (5.31.2,3); he "did much for a cow, fighting for pastures" (5.33.4). Mitra and Varuṇa are asked to give as reward the winning of cattle (5.41.1), they "increase plants, make cows swell from milk, pour out rain" (5.62.3). Gods are asked to "bring wealth, consisting of harnessed horses" (5.41.5). The Maruts provided hundreds of cows, an honorary gift of cows, of horses (5.52.17). Parjanya is asked: "let there be a good watering-place for cows! You made deserts easy to pass" (5.83.8,10). Pūṣan, the cattle protector (1.42), is addressed with the prayer to preserve one on the road from wolf and robber, to create easy-traveled roads, "to bring to good pastures"; in one hymn (1.22.4) there is an appeal to all the gods:

> Let us be sought ways
> For a happy journey
> Indra, Maruts,
> Pūṣan, Bhaga, worthy of worship!

The latter hymns make it possible for us to accept the opinion that the Vedic Aryans were not settled but mobile cattle-keepers (Rau 1983; Elizarenkova and Toporov 1995: 489, 490). They spent half a year in settlements from the sowing of barley to its harvest, for half a year their house was a wagon and proto-yurt,

they conducted wars using their chariots to conquer new lands and cattle. There is "no hints of city life in the *Avesta*" (Livshits 1998: 221).

In the earlier parts of the *Avesta* the Iranian economy is also presented as cattle-breeding. Cattle is the main property (Livshits 1998: 218, 222), the word for 'house' (*nmāna*) denotes also a 'room for cattle, cattle-shed' (Vidēvdāt 2.23; 16.14), the word 'property' means 'living existence', hence 'means of existence'. 'Houses rich with cattle' are mentioned (Yašt 17.8). Zarathuštra prays for giving cattle to the honest cattle-breeder, for increase of cattle (Yasna 31.15; 45.9). The cultural hero Yima bears a constant epithet 'possessing good herds' (Yasna 9.4, 5; Yašt 5.25; 17.31; 19.31, 34). Ahura-Mazdāh is prayed for "the abundant in pasture beautiful life" to come (Yasna 48.11). "For all time there are codes about the pastoral life, which must not be broken by anybody" (Yasna 51.14).

The Vedas reflect the mobile way of life; in the *Rigveda* there are more than fifteen words denoting 'way – road' (Elizarenkova and Toporov 1995: 511; Elizarenkova 2000). In the Mihr Yašt (9) Mithra has the constant epithet 'master of vast pastures'. In Yašts 10.28 and 13.52 it is said: "We worship Mithra, possessing vast pastures for cattle, Mithra who presents herds of cattle", "let him put in this house herds of cows". Mithra, Tištriya, Haoma (Yašt 10.28, 65; Yašt 9.17, 19) are called to present cattle and horses, water pastures. The goddess Anāhitā is invoked as 'increasing herds', 'increasing property', 'increasing wealth': "Let me conquer vast kingdoms, where horses are snorting, wheels are ringing" (Ardvīsūr Yašt). Cattle is the measure of wealth (Yasna 46.2; 29.12; Yašt 5.25; 12.31; 19.31, 34).

The goddess Asi is protectress of cattle (Yašt 18.4, 5). In the Mihr Yašt (10.38) it is said about the driving away of cattle: "the cow, accustomed to pastures, is driven along the dusty road of captivity, dragged forward in the clutches of treaty-infringing men as their draught-animal; choking with tears they (= cows) stand, slobbering at the mouth" (Gershevitch 1959: 93). The soul of the cow appeals to Ahura-Mazdāh to defend cattle from being stolen and driven away. Punishment follows for cow stealing and maltreatment of animals (Yašt 10.38, 86). Highest virtues are "to praise Ahura-Mazdāh and give fodder to cattle" (Yasna 35.7).

The Indo-Iranian word for 'social man', the main producer, denotes 'shepherd' (literally 'bringing fodder to cattle', D'yakonov M. 1961: 61, 363) which is related to Hittite 'shepherd' (Ivanov 1957). Vedic *grāma* 'village, community' is cognate with Slavonic *gromada*, that initially denoted a group of traveling shepherds (Rau 1983, Elizarenkova and Toporov 1995: 490, 491).

Thus, the Indo-Iranian economy was mixed farming–cattle-raising with herdsmen dominant; it was relatively mobile already in the Vedic period. It has neither analogies nor sources in the whole Indo-Near Eastern region. There the economic basis was irrigation farming; stock-raising played a secondary role and differed in species, and in the percentage or species: sheep and goat occupied the first place, cattle, often of the zebu breed came second, pig played an important role, donkey was the main transportation animal, the horse was known from the 3rd millennium BC in Mesopotamia, but it was not used in the economy (Tsalkin 1970b; 1972a; Masson 1964; 1976).

In the Indo-Iranian herd cattle, on the contrary, occupied the first place, ovicaprids were represented mainly by sheep, and horse-raising occupied an

exceptional role. Such a type of economy in the Bronze Age existed only in the Eurasian steppes of the Old World, where one must look for the Indo-Iranian homeland.

For a more precise cultural attribution the absence of pig-breeding among the Indo-Iranians and their acquaintance with the Bactrian camel are decisive. Of all the pastoral steppe cultures these peculiarities are typical of the Andronovo culture, economic and cultural type (ECT) which corresponds fully with that of the Indo-Iranians.

Indisputable proof of the Aryans coming into India has been demonstrated by F. B. J. Kuiper (1991). For the flora and fauna of the *Rigveda* all south Indian plants, animals, and birds are called by loanwords from Dravidian and Munda, every day objects and crafts are also borrowed, and what is more important, terms connected with farming: irrigation, channel, gutter, irrigated field. This reflects the influence of a non-Aryan farming population with a different type of culture (Kuiper 1991: 14, 15, 21) and the gradual adaptation of Aryan cattle-breeders to a different ecological zone and a different ECT.

The historic fate of the Iranian tribes is clarified by the Gāthas which, according to tradition, were created by Zarathuštra. There is the call to reject pastoralism and pass over to settled farming (D'yakonov, M. 1954; Abaev 1956). The symbol of faith of the Zoroastrians is (Yasna 12): "I… reject stealing and seizure, from damage bringing and destruction of Mazdā settlements", "the root of belief of Mazdā worship… is plowing; he who plows bread, plows truth". This makes it possible to relate the culture of the Iranian-speaking peoples at the time of Zarathuštra to the culture of the barbarian occupation, when steppe pastoralists moved from the north to the south of Central Asia and Afghanistan and passed over to a sedentary life and the assimilation of the ancient local farming population.

CHAPTER TEN

THE ETHNOGENESIS OF THE INDO-IRANIANS AND THE ETHNIC ATTRIBUTION OF THE ANDRONOVO CULTURE

The retrospective approach

Our analysis of material culture carried out according to the methods discussed earlier shows that in the 2nd millennium BC there were two large zones, Central Eurasian and Indo-Near Eastern, both developing independently from the Neolithic-Eneolithic period. According to its economic and cultural type the Andronovo culture belonged to the Central Eurasian zone as it culturally paralleled the pastoral cultures of the steppes of southern Russia, especially synchronous cultures such as the Timber-grave culture, which were evolving in a parallel way. The differences between these cultures are limited to some details of house construction, ceramics and burial rite which, as we suggest, are the very features that determine their ethnic affiliation and that justify their separation into two independent cultural units. The third related yet independent culture is the Tazabagyab, which differs from the Timber-grave and Andronovo in the large role of irrigation agriculture in the economy, house type and ceramics.

Comparing the categories of Andronovo material culture with those of the following Indo-Iranian Sauromatians and Saka, we discern a genetic succession determined not by isolated categories of artifacts but a systematically and transparently interrelated all-encompassing typological complex. It is important to stress that no definite interactions with the south—from the zone of ancient agriculture—mitigated the transition to the Early Iron Age in the steppes. All elements of Saka material culture that were ideally adapted to the ecological conditions of the steppe had been slowly maturing during the previous millennium and the transition to nomadic pastoralism arose out of the Final Bronze Age when livestock, transport, tools, clothes and type of housing were established to form the preconditions for passing to the new type of pastoralnomadism. The military traditions of the nomads were an important part of their culture, emphasized by Persian as well as Greek authors, and these had their roots in the Bronze Age: the equestrian tradition succeeded the chariot combat tactics in the late 2nd millennium BC when new types of cheek-pieces appear to be developed in the Iron Age; the main types of early-Scythian arrows derive from the Andronovo-Alakul' (Kuz'mina 1985b) as well as different types of Saka spears, axes, adzes, knives, and sickles, which all form continuous typological series (Kuz'mina 1966; 1985b).

Succession is determined not only through the elements of material culture, defined as belonging to an economic-cultural type, but also through those functionally non-defined but ethnically significant traditions: technologies and the ornamentation of ceramics. Despite the transition to mass nomadism the traditions of post-frame house architecture survived in the 'house of the dead',

the sub-kurgan chamber that was ritualized and, hence, an important ethnic indicator. Details of costume, particularly headdress, that served as tribal indicators even in ethnonyms (pointed-hat Saka) also go back to the Andronovo. K. F. Smirnov (1957b; 1964), K. A. Akishev (1973); Akishev and Kushaev (1963), B. A. Litvinsky (1972) and M. K. Kadyrbaev (1966: 408-409) established the succession of the burial rite, particularly the construction of kurgans, stone enclosures, different types of graves, and the prevailing westward orientation. This provides an objective foundation for establishing a genetic connection between the Sauromatian and Saka cultures in the 7th–6th centuries BC and the Andronovo culture so that an Iranian or Indo-Iranian attribution of the latter is well substantiated by the retrospective method.

The evidence of material culture

Following the method suggested in Chapter 1 we compared the material culture of the ancestral Indo-Iranians as reconstructed from the evidence of language and written testimony with the economic and cultural types of the Old World (2nd millennium BC); we specifically compared the Central Eurasian zone (including the pastoral cultures of the Eurasian steppes) and the Indo-Near Eastern zone (including agricultural and stock-breeding cultures).

Already in the 19th century the analysis of the vocabulary of the Indo-Iranian languages, primarily the vocabulary of the oldest written sources that preserve Indo-Iranian tradition, the *Avesta* and the Vedas (primarily the *Rigveda*), established that the Indo-Iranians lived in the vast steppe with large deep rivers and they had a mixed economy with stock-breeding predominant (Geiger 1882; Oldenberg 1894; Schrader 1901; Pedersen 1931; Marquart 1938, D'yakonov 1956; Ivanov and Toporov 1960; D'yakonov M. 1961; HTP 1963; Bongard-Levin and Il'in 1969; Grantovsky 1970; 1980; 1988; Abaev 1972; Gafurov 1973; Elizarenkova 1972; Boyce 1975; Burrow 1976). This is demonstrated by the fact that though the Indo-Iranian languages have general Indo-European names for cereals and the plow, they have a poorer agricultural vocabulary than other Indo-European languages. And, in contrast, cattle- and horse-breeding terms are numerous. Indo-Iranian gods have epithets such as 'master of vast pastures', 'granting the richness of cattle', and 'splendid richness of horses'. The gods are constantly asked to grant rich livestock, especially horses, to protect cattle, to water the pastures and thus it leaves no doubt that cattle-breeding dominated the economy of the Indo-Iranians.

Livestock and the relative value of the animals are defined by numerous descriptions of sacrifices: the highest sacrificial animal was the horse followed by cattle and sheep. The Sanskrit word 'war' literally means strive to capture cattle (Schrader 1901; 1913). V. A. Livshits noted that in the Persian language the sacrificed sheep is designated by the word *gospand* which derives from Iranian 'holy' + 'cow', hence, cattle did prevail in the herd of the ancient Indo-Iranians. Unlike other Indo-Europeans the Indo-Iranians did not raise pig, but they bred Bactrian camels (Kuz'mina 1963a; Bulliet 1975).

Indo-Iranian pottery was made by hand for domestic use without the potter's wheel (Sinha 1969; Rau 1972) (Table 9). W. Rau showed that the earliest Indo-Iranians did not know a professional craft with narrow specialization; they relied on domestic production. They knew metallurgy and metal processing (Rau 1973;

Bailey 1975; Jule 1985), including casting in special molds followed by forging and sharpening, that parallels the development of Andronovo metallurgy; alongside bronze, stone was also employed for the manufacture of tools and weapons such as querns, rubbing stones, utilitarian axes and battle axes, maces, ritual vessels—the types well known in Andronovo complexes.

Feature	Zone of agricultural cultures of the Near East and Central Asia	Zone of cattle-breeding cultures of Eurasian steppe
Production	Specialist male occupation	Non-specialist female domestic wares
Consumption	Market	Family
Technology	Potter's wheel	Hand-made
Pyro-technology	Special kiln	On fire or in hearth
Ornamentation	Slipping, painting, unornamented	Stamped ornament, applied-roller

Table 9: Comparison of ceramic traditions of the 3rd–2nd millennia BC

Chariot making was very important. The first chariot-maker was the creator-god Tvaṣṭar. The words 'chariot', 'shaft', 'saddle-girth', 'bridle' and many names of harness parts were common in the Indo-Iranian languages (Abaev 1949; 1972; D'yakonov 1956; Bailey 1955; 1957; 1958; Grantovsky 1970). Some elements of dress and weapons, including trousers and hood—the traditional dress of Eurasian steppe nomads—are also common (Bailey 1957).

However, there is no evidence for a general Indo-European terminology connected with specialized crafts and trade, irrigation, cities, fortification, monumental palaces and temples, cult images, and written language. Palaces (*vimāna)* where Indo-Aryan gods live in heaven, according to J. Hertel, are huge vehicles, 'houses on wheels'. Iranians called a palace *hadiš*, i.e., 'cattle pen', 'fold'. This is what the palace of Darius in Persepolis was called (Benveniste 1955). The common Iranian name for a dwelling place (*kata*) derives from the verb *kan-* 'to dig', i.e., denotes a semi-subterranian house (Benveniste 1955: 301). In the *Avesta* (5.101) the house of Anāhitā is described as a large post-frame house with a light opening and (timber) pillars. L. Renou (1939) analyzed such house descriptions in the *Atharvaveda* (3.12.1) to show that the common Indian and Iranian terminology and construction involved a large post-built semi-subterranian house with a gable roof (Table 10). The second type of dwelling place—the proto-yurt—can also be reconstructed. A word in the Middle and New Iranian languages for a tent or yurt-type house comes from Avestan *vi-dā-* ('to make a house') (ITN: 141; Benveniste 1955: 301). These linguistic data provide unquestionable evidence that not only proto-Vedic Aryans but also Iranians were not familiar with monumental architecture in the pre-Achaeminid period. Nor did they know temples. Herodotus (1.131) notes that there were no temples even in the Achaemenid period. They are mentioned neither in Vedic texts nor in the *Mahābhārata.* The term *pur* ('fortress') is used to designate only aboriginal settlements and Indra is called 'destroyer of purs' (*Rigveda* 4.30.20).

Hence, the economy of the Indo-Iranians in their homeland is reconstructed as mixed agricultural-stockbreeding with stockbreeding predominant and with distinct features of the transition to pastoralism and even nomadic forms already

with the Indo-Aryans. "We have neither houses nor fields… We are well in the world as people who indeed spend their lives on wheels" (Viṣṇupurāṇa 5,10,33).

FEATURE	ZONE OF AGRICULTURAL CULTURES IN THE NEAR EAST AND CENTRAL ASIA	ZONE OF STOCK-BREEDING CULTURES IN THE EURASIAN STEPPES
Type of dwelling place	Surface	Semi-subterranian post-frame
Construction material	Bricks, *pakhsa*, clay; rarely stone blocks horizontally set on clay mortar	Wood, poles smeared with clay, *baira*; rarely stone slabs erected vertically
General plan	Small square room 9 -12 m^2	Large rectangular dwelling place 50-300 m^2
Inter-house connections	Continuous living quarters of building system with open inner yard in the center	Separate dwellings, sometimes connected to a household annex
Type of covering	Flat roof	Gable roof, multistage-pyramid vault
Type of heating	Closed surface hearth, fireplace	Open circular, subterranian hearth, fire
Entrance	Doorway	Long corridor-ramp (*pandus*)
Social function	House for small family	House for large family community
Main settlement type	Compact plan of settlement with continuous blocks of multi-room houses	Dispersed plan of settlement with separate houses

Table 10: Comparison of dwelling places in the 2nd millennium BC

We see then, by a complex system of analysis the material culture of the ancestors of the Indo-Iranians cannot be assigned to the economic and cultural type of the Indo-Near Eastern zone where the economy was based on irrigation agriculture since the Eneolithic, where cattle breeding played a subsidiary role to mostly sheep and goat and animals such as the pig and donkeys, which were alien to the Indo-Iranians, were reared; the animal common to Indo-Iranian culture, the horse, was missing; where there were fortified cities, palaces, temples, houses with small rooms and an inner yard of the Indo-Near Eastern type; where craft specialization was developed that worked not for the family but for the market; where different types of wheel-made ceramics and a different costume or dress were used.

This is supported by the conclusions by F.B.J. Kuiper (1991) who demonstrated that terms connected with the flora and fauna of India, the potter's craft, irrigation and agriculture are borrowed in the *Rigveda* from aboriginal languages.

The culture of stock-breeding communities in the Near East cannot be labeled Indo-Iranian either, as the detached groups of stockbreeders were few, poor, disconnected, huddled in the deserts and mountains at the margins of fertile areas and, judging from the written sources of the 2nd millennium BC analyzed by H. Klengel (1967), J. R. Kupper (1957) and R. Walz (1959), specialized especially in sheep-breeding and since the 1st millennium BC started breeding camels (Dromedary), so their type of economy and level of culture also differed from that of the Indo-Iranians.

Therefore, our analysis of the Indo-Iranian type of economy and culture (Table 11) firmly places their culture in the central Eurasian zone, most closely

related to the pastoral cultures of the Eurasian steppes: the Timber-grave and mainly Andronovo.

Feature		*Indo-Near Eastern*		*Eurasian Steppe*	
		Agriculture	*Stock-breeding*	*Andronovo*	*Saka*
Agriculture	Irrigation	+	-	-	-
	Non-irrigation	-	-	+	-
Stock-breeding	Horse	-	-	+	+
	Cow	+	-	+	+
	Sheep	+	+	+	+
	Camel	+[1]	-	+	+
	Pig	+	-	-	-
	Donkey	+	-	-	-
Metal production	Slaves	+	-	-	-
	Community	-	-	+	+
Crafts	Specialized	+	-	-	-
	Domestic	-	?	+	+
Settlement	Town	+	-	-	-
	Village	+	+	+	+
Structures	Fortification	+	-	-	-
	Temple-palace	+	-	-	-
Writing		+	-	-	-
Seals		+	-	-	-
Costume	Cap	-	-	+	+
	Trousers	-	-	+	+
	Boots	-	-	+	+
	Sandals	+	?	-	-

Table 11: Comparison of economic-cultural types of the 3rd–2nd millennia BC and the Saka (*1. only in Anau*)

It is probable from the linguistic data that in the middle of the 2nd millennium BC the Indo-Iranian language family was an aggregate of independent related languages and dialects that constituted a language continuum. It is possible to suppose that separate local variants and types of sites of the Andronovo culture corresponded to separate tribes who spoke certain dialects. Such an understanding of the Indo-Iranian continuum allows us to attribute the Timber-grave culture, which was a possible ancestor of the Iranian-speaking Scythians, to Proto-Iranian. It seems that earlier types of Indo-Iranian ethnogenesis cannot be established at present with the same degree of probability. This is because the important cultural innovations (horse-drawn chariots, bronze alloys) that appeared in the Eurasian steppes and the subsequent migrations that took place within the zone were probably of a corporate character and involved different cultures (Poltavka, Catacomb, Multi-roller ceramics, Abashevo); these processes terminated to form two large cultural unities: the Timber-grave in the west and Andronovo in the eastern steppe. Conclusions concerning the languages of the corporate migrants are impossible without additional data.

The hypotheses that the bearers of the Catacomb and Abashevo cultures were Indo-Iranian cannot be strictly proven. First, to prove this we cannot apply the

retrospective method that we recognize to be decisive as their direct descendants and their languages have not been established. Second, it involes the comparison of single arbitrarily chosen instead of a complex of systematically bound features that are a precondition for reliable ethnic reconstruction; the set of interrelated cultural features in general does not correspond to Indo-Iranian culture as specific ethnic indicators are missing. Third, these hypotheses cannot be verified with the help of other independent data. However, as the Poltavka, Catacomb, Multi-roller ceramics and Abashevo cultures probably took part in the formation of the Andronovo and Timber-grave cultures to some extent, so providing them with a Proto-Indo-Iranian identity can hardly be excluded.

The next step in identifying an Indo-Iranian ethnos with a concrete archaeological culture is to uncover those ethnic indicators that clearly distinguish Indo-Iranian culture from that of other Indo-Europeans. These ethnic indicators include the fact that of all the Indo-European peoples virtually only the Indo-Iranians did not raise pigs nor sacrifice them and only the Indo-Iranians raised Bactrian camels and had a cult of this animal. As far as I know the only Bronze Age culture that did not practice pig raising was the Andronovo. As for the Timber-grave culture, pig is present in osteological materials although there is no cult of the animal. The culture of all Indo-Iranians had a developed cult of the camel in combination with the cult of the horse (Kuz'mina 1963a; Bulliet 1975). In contrast, peoples in the Near East knew only the Dromedary camel that never was a cult animal until Assyrian times (Salonen 1955-56). All Indo-European peoples except for the Indo-Iranians had no traces of an ancient acquaintance with the camel and nor traces of its cult. The name of the camel in the Indo-European languages, except for Indo-Iranian, is a later borrowing of a Semitic *gamal.* In the Indo-Iranian languages the Bactrian camel is called by a general word—the ancient Indian *úṣṭra-*, so it follows that the Indo-Iranians were acquainted with the animal after they had left the Indo-European homeland but had not yet separated into the Indian and Iranian branches. The cult of the Bactrian camel represented in Iranian mythology was formed in a zone where they continued to be in contact with each other. According to paleozoological and archaeological data the Andronovans who migrated from the south Russian steppes first became acquainted with the Bactrian camel in the 2nd millennium BC, and in the Andronovo and Tazabagyab cultures camel-raising was established and the cult of this animal was formed (Kuz'mina 1963a; 1980b; Margulan *et al.* 1966; Itina 1977). Numerous Bactrian figures proving the cult of this animal are found on petroglyphs in Kazakhstan and Central Asia (Kadurbaev and Mar'yashev 1977; Sher 1978; Martynov *et al.* 1992, Mar'yashev and Goryachev 1998). Thus, the Andronovo culture is the only culture in which the Bactrian camel, horse, ox, and sheep cults are combined, and there is no pig cult. In this culture horse-drawn chariots spread early, there was a chariot cult and elite chariot-warriors, the social strata of society was defined; the fire cult was developed (including a hearth and ash cult); the dead were buried in graves under a kurgan with a fence according to cremation or inhumation ritual; the economy involved mixed farming with stock-raising dominant. In other words the economy, everyday life, social system, ritual and beliefs of the Andronovans corresponds completely to the picture that is reconstructed for the Indo-Iranians according to the evidence of language, which leads to the conclusion that the Andronovans spoke Indo-Iranian.

CHAPTER ELEVEN

VERIFICATION OF THE HYPOTHESIS

Anthropological evidence

Anthropology provides an absolutely independent and extremely useful source of information for testing a hypothesis. The close relationship between the western Andronovo population and the Timber-grave people in the contact zone stretching from the Volga to central Kazakhstan is demonstrated by anthropological materials recovered from burials at Tasty-Butak, Tursumbay, Khabarnoe, etc. (Debets 1954: 489-492; Ginzburg 1956a; Durnovo 1970; Alekseev 1964b: 22, 23; 1967; Rud' 1981). At the same time a more massive type of Europoid (the so-called Pamir-Fergana or Andronovo type), predominated across most of Andronovo territory in the Urals, across all of Kazakhstan, in Fergana, and as far as the Sayan-Altay and Minusinsk Basin (Debets 1948; Levin 1954; Ginzburg 1957; 1962a; Alekseev 1961a, 1961c; 1967; Trofimova 1962a; Gokhman 1973; 1980; Rykushina 1976; 1979). In Siberia this type appears as a result of migration from the west, from Kazakhstan (Debets 1948: 70, 76; Dremov 1973; 1997). On the northern periphery of Andronovo territory one encounters Europoid skulls with a slight admixture of Mongoloid features, probably due to the participation of Siberian peoples (Dremov 1972; 1997; Shevchenko 1976; 1980).

The Saka of Kazhakstan and Central Asia were formed on the basis of the Andronovo type (Ginzburg 1951; Rychkov 1964; Alekseev and Gokhman 1984: 21, 27, 35; Ismagulov 1963; 1970; Tot and Firshtein 1970; Gokhman 1973; 1980). Thus, anthropological data confirm the conclusion that the Iranian Saka and Sauromatians succeeded the Andronovo, which was also demonstrated by the retrospective method. Anthropological materials also show the closeness and interrelationship between the Timber-grave and Andronovo populations in the large contact zone and the mixed character of the bearers of the Tazabagyab culture which has been established from the cemetery of Kokcha 3 (Trofimova 1957; 1959; 1961; 1962) as well as the succession of the Saka population of the Aral Sea region with tribes of the Bronze Age (Itina and Yablonsky 1997: 80,81).

As far as the anthropological type of the Timber-grave culture is concerned new material confirms the direct genetic succession between the Timber-grave and Poltavka populations of the Lower Volga and shows that west European ties were decisive in the formation of the Catacomb and especially the Abashevo cultures (Shevchenko 1989: 129-130). This conclusion is of great significance for resolving the problem of the formation of the Sintashta and Potapovka populations of the 17th–16th centuries BC. Skulls from Potapovka burials belong to the massive proto-Europoid type and are similar to the earlier Catacomb and

genetically follow the Timber-grave and west Andronovo, but differ from Abashevo (Yablonsky and Khokhlov 1994: 189).

In the 2nd millennium BC a population different in origin coexisted in Central Asia. In the south, in the foothills of Turkmenia, in Margiana and Bactria (Sapalli), as well as in Fergana (Chust, Dal'verzin) was a land dominated by agriculturalists; according to V. P. Alekseev (1990) this was a territory genetically connected with the Near East and Iran (Capprieri 1973) and also partially with north-west Hindustan, as in the steppes of Central Asia there was a merging of different populations. Skulls from the Andronovo cemetery at Muminabad are assigned to the east Mediterranean type (Khodzhaiov 1977: 9) and are close to Zaman-Baba, the steppe component of the Chust and Dal'verzin populations (Ginzburg and Trofimova 1972: 77). A skull from the late Andronovo cemetery of Vuadil' is analogous to material from Kokcha (Trofimova 1960: 114; 1964: 11), i.e., already mixed; another skull resembles Afanas'evo ones (Ginzburg 1956b).

Other materials provide unquestionable evidence that steppe populations advanced to the south of Central Asia: skulls from mixed Timber-grave and Andronovo cemeteries at Patma-say and Karalemata-say in Turkmenia and from a burial on the settlement of Takhirbay 3 are proto-Europoid with Timber-grave and Andronovo features (Ginzburg 1959a: 105-206). A. Isakov made a significant discovery in the cemetery of Dashti-Kozi whose materials combine elements of the Andronovo (Fedorovo type), and Mollali cultures: of twelve skulls, three are male and belong to the Andronovo type (Isakov and Potemkina 1988). This confirms the conclusion about contacts between aboriginal farmers and northern pastoralists.

The further advance of the steppe-tribes to the south-east is demonstrated by the cemetery at Qäwrighul/Gumugou on the shores of Lopnur in Xinjiang, where skulls are close to Andronovo and Afanas'evo (Han Kangzin 1994; 1998).

Cranial analysis by B. Hemphill and A. Christensen (1994) from the Bactrian cemeteries of Sapalli and Jarkutan have shown that the Bactria-Margiana Archaeological Complex (BMAC) was formed from a population migrating from north-west Iran, and its creators did not migrate afterwards into the Indian subcontinent. This excludes the hypothesis of A. Parpola (1988) who suggested that the creators of the BMAC were Indo-Aryans who migrated to India. They also showed that the BMAC began to interact with the northern steppe tribes thus supporting my hypothesis.

A migration from the north of groups of pastoralists is confirmed by data from Shortughai in Afghanistan. Here were found burials of the Bishkent culture, whose skulls, according to L. Bushe, belong to the same type as those found in the early cemetery of Tulkhar in northern Bactria and which have no analogies in the south (Francfort 1989: 211-223). T. P. Kiyatkina initially suggested that the Tulkhar population belonged to the broad-faced Europoid type of the steppe zone of Eurasia; however, later she rejected this, stressing a unique Tulkhar series for the 2nd millennium BC (Kiyatkina 1976: 16, 17, 61).

The progress of pastoralists to the south, into north-western Hindustan, can be traced in the cemeteries of Gomal and Swat, whose culture reflects the interaction of Bishkent and Andronovo components (Mandel'shtam 1968; Litvinsky 1981; P'yankova 1982b; Kuz'mina 1972a, b; 1975). Skulls from the

Timargarha cemetery have no analogies in the Indo-Near Eastern region; rather it is the northern, robust, massive type close to what is found in Tadzhikistan in the 2nd millennium BC and the Pamir Saka (Bernhard 1967: 376). T. P. Kiyatkina (1976: 23-25) notes the closeness of the Tigrovaya Balka skulls to Timargarha, bringing them together with the Timber-grave and Tazabagyab ones, but also stressing their difference (Tadzhik skulls have narrower faces). D. Alciati (1967) believes that the population that left the later cemetery of Butkara 2 of the Swat culture were migrants from Iran or from the area between the Caspian and the Aral seas.

It is important that the modern inhabitants of the Hindukush—the Nuristani and Dards—preserve archaic Indo-Iranian features in language and culture (Fussman 1977) and often have light hair and eyes (Herrlich 1937) which proves the genetic succession of these populations (contrary to V. P. Alekseev (1990: 203) who believed that the narrow faces of the Nuristani could be explained by temporal variability).

Thus, the existence of two zones (Eurasian steppe pastoralists and south Central Asian farmers), obtained by aligning an Indo-Iranian culture with a definite ECT, is supported by anthropological evidence: in the south there was the Mediterranean type and in the north there was the Andronovo variant of the proto-Europoid from which descend both the nomadic and farming Iranian population of north Central Asia and Kazakhstan of the 8th–4th centuries BC (Khodzhajov 1977: 13; 1983: 100-102; Alekseev *et al.* 1986: 125-130). The proposition of a suite of morphological forms, advanced by anthropologists, that finds a northern origin for the Andronovo and Tazabagyab series based on ethnogenetic factors assigned to a steppe ECT (Alekseev *et al.* 1986: 127) are in complete accord with our independent conclusions.

As for Hindustan and Iranian territories, anthropologists note the mixed character of their modern population (Alekseev 1964a; 1981; 1990) that can be compared with an advance of pastoral tribes to the south. In Iran a population movement from east to west, from Hissar III to Hasanlu, is traced anthropologically in the Early Iron Age I, connected with the appearance of Grey Ware that supports E. A. Grantovsky's (1970; 1998) hypothesis about Iranian migration. V. P. Alekseev (1981: 199-207) showed that the majority of modern peoples speaking Indo-European languages belong to variants of the Europoid type, which developed in European territory from the Neolithic and goes back to a considerable degree to the Cromagnon type. Two groups form an exception: the Armenians, belonging to the Armenoid type, formed in the Near East, and part of the Indo-Iranians (groups of the modern population of Iran and north India) with a greater mixture of racial types, but on the whole belonging to the Europoid dolichocranial type that was formed in the Near East and was established on Iranian territory and in south Central Asia at least from the Eneolithic. At the same time another part of the Indo-Iranians—the modern northern Tadzhiks and descendants of ancient Iranian such as the Uzbeks, as well as the ancient Iranian population of the greater part of Central Asia and the Eurasian steppes (Saka), belong to another anthropological type that is characterized by a massive facial skeleton and that is related to other groups of Indo-European populations of Europe where this type was formed (Alekseev 1981; Alekseev and Gokhman 1984). Thus, Iranian-speaking peoples were formed in

an anthropological environment composed of two Europoid components that differ in their genesis. Moreover, paleoanthropological evidence provides "real proofs of the ancient formation of northern groups of Iranians on the basis of massive Europoid combinations", and "the natural habitat of the northern, more massive component included the vast territory of the south Russian steppes, Kazakhstan, and northern areas of Central Asia, including north and south Tadzhikistan, that formed a far southern periphery" (Alekseev 1981: 203-204). The main component of the formation of the Saka was the Andronovo type. From this it follows that the Eurasian steppe nomadic Saka were not immigrants from the Near East but direct descendents of Andronovans, and the mixed character of the Indo-Iranian-speaking populations of Iran and India is the result of a new population spreading among aboriginals with whom a new language is probably to be associated.

This conclusion is confirmed by the evidence of Indo-Iranian tradition. The Aryans in the *Avesta* are tall, light-skinned people with light hair; their women were light-eyed, with long, light tresses (Yasna 26; Yašt 5.7, 15, 64, 78, 126; 13.107; 17.11) (Dhalla 1922: 23).

In the *Rigveda* light skin alongside language is the main feature of the Aryans, differentiating them from the aboriginal Dāsa-Dasyu population who were a dark-skinned, small people speaking another language and who did not believe in the Vedic gods (Elizarenkova 1972: 11; 1998: 433; Parpola 1988). Skin color was the basis of social division of the Vedic Aryans; their society was divided into social groups *varṇa*, literally 'color'. The varṇas of Aryan priests (*brāhmaṇa*) and warriors (*kṣatriya* or *rājanya*) were opposed to the varṇas of the aboriginal Dāsa, called 'black-skinned' (*Rigveda* 1.130.8). Modern researchers propose that the Dāsas were Dravidians, creators of the Harappan culture and script (Bongard-Levin and Gurov 1988: 65; 1990; Parpola 1988). Their homeland in the Punjab is proved by the Brahui who have preserved Dravidian language in the north and a cultural vocabulary reflecting an ancient acquaintance with the productive economy and developed crafts; moreover, some terms were later borrowed into the Indian languages as the newcomers adapted to a new ecological niche (Sankalia 1973; Kuiper 1991). Proto-Dravidians are genetically connected with the Near East, and are probably related to the Elamites and are assigned to the Europoid Near Eastern anthropological type (Alekseev 1990: 170). The Harappan population also had an Austronesian admixture. The greater part of the modern Indian population belongs to the Indo-Afghan type, forming a branch of the Mediterranian group. Genetically they go back to the Mohenjo-Daro, Mundigak and Sialk cultures (Mendez 1966). The representatives of the Munda people could also be included among the Dāsa; they are assigned to the Austronesian language family, distinct from the south of Hindustan. Anthropologically, the Munda belong to the Australoid-Negroid population and are characterized by dark-skin pigmentation and a flattened face.

Indian culture formed as the result of the active interaction of three aboriginal ethno-linguistic traditions: Proto-Dravidians of the Punjab, Munda of the south and Tibetan-Burmese of the north-east and the immigrant Indo-Aryans (Vorob'ev-Desyatovsky 1956; Bongard-Levin 1979; 1981; Bongard-Levin and Gurov 1988; 1990). In modern India the north-western population is much lighter than the southern; moreover, representatives of lower castes have darker skin color,

while higher ethnic-caste groups, who trace their genealogy from the ancient Aryans, are lighter, and among the Brahmans even light-eyed people are occasionally found.

V. P. Alekseev (1990: 161, 206) considers "the thesis of T. V. Gamkrelidze and V. V. Ivanov about Iranians separating through western areas of Central Asia and their movement around the Caspian Sea to be insufficiently demonstrated." He localizes the Indo-Iranian homeland in the north and suggests that they advanced from Central Asia.

Toponymic evidence for the Indo-Iranian homeland

The geographic zone of the ancient seat of the Indo-Iranians is indicated by the absence in the Indo-Iranian languages of the common Indo-European words for 'spruce' and 'bog'. This makes it possible to localize them in the steppe (Schrader 1913). The suggested identification of the legendary river Ra (Sanskrit *Rasa*, Iranian *Raŋha*) with the Volga and the Ripa mountains with the Urals (Marquart 1938; Grantovsky and Bongard-Levin 1970; 1998; Grantovsky 1976 supported by A. I. Dovatur, D. P. Kallistova *et al.* (1982: 248-249) and N. L. Chlenova (1983: 56-60;1989)) is extremely important for locating the Indo-Iranian homeland. V. Miller (1887) recognized the Iranian etymology of a number of geographical names in the North Pontic, later augmented by V. I. Abaev (1949). A large number of Iranian hydronyms with the root *don* (Iranian 'water') has been revealed for the drainages of the Dnieper, Desna, Seim, Severny Donets and the Poltava region (Toporov and Trubachev 1962; Strizhak 1965). The Indo-Iranian treatment of toponyms in the North Pontic has also been supported in a series of works by O. N. Trubachev (1975; 1976; 1999) and L. A. Lelekov (1980) while E. A. Grantovsky and D. S. Raevsky (1984: 47-62) agreed that the Iranian element is "the only undisputed (element) in the North Pontic." S. S. Berezanskaya (1982: 206-209) in charting the hydronyms of the Upper and Middle Dnieper area on an archaeological map showed that the area of the Iranian names does not coincide with the distribution of the Scythian culture but correlates completely with the territory of the Timber-grave culture, which is a strong argument in favor of assigning a Proto-Iranian identity to the Timber-grave people.

Indo-Iranian toponyms are also found on the Middle Volga and the Urals (Popov and Loyfman 1962). N. L. Chlenova (1983a; 1984) plotted the toponyms and demonstrated that Iranian toponyms were spread over Timber-grave and Andronovo territories, but part of the Andronovo toponyms can only be interpreted as Indo-Aryan; here also was included the Altai by A. M. Maloletko (1986: 70-75). These data are extremely important for the final resolution of the problem of the cultural and ethnic attribution of the Fedorovo complex. Due to the fact that Indo-Iranian toponyms of the pre-Scythian period have been found on the territory populated only by Fedorovo tribes, the hypothesis identifying the Fedorovo population as Ugrian that has been proposed by V. N. Chernetsov must be rejected, and the hypothesis of the Indo-Aryan attribution of Andronovans can be supported.

The same conclusion can be drawn from the toponymic analysis of the mountain regions of the Pamirs and the Hindukush where Andronovo-Fedorovo burials and petroglyphs have been recently discovered, including chariot paintings that are sometimes found on mountain passes; these probably indicate the direction of Indo-Aryan movement to the south. G. Morgenstierne (1929-1938; 1973) studied relict Indo-Iranian languages here and outlined a large layer of ancient toponyms (Edelman 1968). The Iranian toponym *dara-* 'river' is distributed from the Tian-Shan and Pamirs to the south of Tomsk and Novosibirsk and further to the borders of Mongolia, Pakistan and Afghanistan (Dulzon 1964; Pospelov 1980: 122). A substratum layer is present in the toponyms of the Pamirs which include Iranian names (Pakhalina 1976: 178-182; Steblin-Kamensky 1976: 182-185; Rozenfeld 1980: 157-162; Grunberg 1980: 165-169; Bailey 1958). E. Thomas (1883: 357-386), P. Bhargawa (1971), T. Elizarenkova (1972: 12-13; 1982: 4; 1989: 433, 440-443) and M. Witzel (1999a; b; 2001) analyzed the toponyms of the *Rigveda* that were applied to eastern Afghanistan and North-West India thus demonstrating Indo-Aryan migration from Central Asia through the mountain passes of northern Afghanistan and Baluchistan to the north-west of the Indian subcontinent.

The toponyms of the Hindukush and the river-names of north-west India possess Indo-Aryan etymologies and they are often reflected in the Vedas (Elizarenkova 1989: 438). However, in this region of Aryan toponyms, the names of the aboriginal Dravidian population are also encountered. This language is spoken by the Brahui, a relict of the aboriginal population of India (Sankalia 1973).

Indo-Iranian traditions on the homeland

The mythology of both the Iranian and Indian peoples preserve tales about their arrival from a legendary northern homeland, which have been analyzed by G. M. Bongard-Levin and E. A. Grantovsky (1976; 1983).

In Iranian texts, the idea about the kinship of all Iranian-speaking languages is reflected in a legend of how the ancestor of the Iranians divided the land between three sons: Sairima, the forefather of Sauromatians (who dwelt in the historic period from the Don to the Urals), Tur, from whom the Turians originated (the northern part of Central Asia was called Turan), and the younger son Iraj, the ancestor of the Iranian population (Christensen 1934). In the *Avesta* there is also a tale about the migration of his people to the south led by Yima; this migration was caused by overpopulation and the fall of temperature in the homeland (Vidēvdāt 2.3).

A mythologeme of the *Avesta* also points to a northern homeland: in the Ardvīsūr Yašt (V) the goddess Anāhitā is depicted in a beaver's coat. Such attribution of a deity could originate only as a result of more ancient ideas about the association of the goddess, who is protectress of waters, with this animal that inhabits water (Rapoport 1971: 31). Beaver bones are widely represented in the materials of Andronovo settlements in the Urals (Kipel', Novo-Burino), on the Tobol (Alekseevka), in central (Shortandy-Bulak) and eastern Kazakhstan (Ust'-Narym, Malokrasnoyarka, Trushnikovo), on the Ob—in the Pichugino cemetery

there was found the skull of a beaver (Krivtsova-Grakova 1948: 102; Chernikov 1960: 60; Tsalkin 1972: table 6; Makarova 1974: 203; 1978: 138; Smirnov 1975: 32; Martynov 1964a: 240; Potemkina 1985: 309). The beaver's natural habitat in the Old World was limited to the forest zone; discoveries in Kazakhstan fix the southernmost borders of the distribution of this species; at present the beaver is not met in this area (Skalon 1951; Afanas'eva 1960; Kozhamkulova 1969: 23; Lychev 1977; Lavrov 1981, etc). This means that the mythological image of the water goddess could have been created only in this zone. It is necessary to mention that the cult of the mother-beaver was also developed among Finno-Ugrian peoples, neighbors of the ancient Iranians. The connection of the mother-goddess with the inhabitant of water is found among other steppe peoples: the Scythians had a snake-legged nymph, a daughter of Borisphen (the Dnieper), the Narts' prime ancestress was Dzerassa, the daughter of Donbatyr, who lives in the water as a water turtle (Kuz'mina 1977: 21). A common Indo-European word derived from the lexeme 'water' denotes in the Indo-Aryan language a cult water animal in general. These data, in spite of the opinion of T. V. Gamkrelidze and V. V. Ivanov (1984: 529-531), make it possible to suggest the ancient origin of this cult and indicate its formation in the Eurasian forest-steppe zone close to the Finno-Ugrian peoples.

Art and mythology

The analysis of art is one of the means of verifying the Indo-Iranian identity of the Andronovo culture. Geometric ornament predominated on the ceramics of the pastoral tribes of the Eurasian steppes in the Bronze Age. This has led to the erroneous conclusion that their art was aniconic. However, samples of the art of people living in the region are quite numerous, and are presented in anthropomorphic and zoomorphic images on monumental sculpture, ceramics, small plastic art and petroglyphs.

Monumental sculpture includes large stelae attributed to the Andronovo cemeteries and mines of central and eastern Kazakhstan that depict schematic figures of rams, horses, Bactrian camels and bears with head raised towards the sky (Margulan 1979: 283, 285, 291, 292). A. H. Margulan notes that they are typologically similar to artwork in stone.

The representations on Andronovo and Timber-grave ceramics have been discussed in Chapter 8 (on transport). In addition to chariots there are single anthropomorphic figures such as a skier on a vessel from the Voronezh region (Vinnikov and Sinyuk 1990: fig. 34).

Small objects of plastic art may be made of stone, clay and bronze and include anthropomorphic and zoomorphic images.

Anthropomorphic images are found on stone scepters or pestles with mask-like heads (Fig. 55). A scepter from the Semipalatinsk region (Hermitage Museum; No. 1648/1; Margulan 1979: 292, fig. 222) that is oval-square in section has a protruding area on top below which was a mask; a scepter from the river Tuy, a right tributary of the Irtysh (Tobol'sk museum) comprised a round rod with a roller on one end terminating with the protruding head of a man (Moshinskaya 1952: 46-48, fig. 17 a; 1976: 56, table 6); from the river Ir, a right

tributary of the Ishim (Omsk museum) comes a long round rod with a roller and is flattened on top depicting two weakly protruding heads, similar in form, and joined at the back of their heads (Moshinskaya 1952: 48, fig. 176.1); a headed pestle is known from the Nura river of the Tselinograd region (Petropavlovsk museum) (Zdanovich and Moshinskaya 1973: 199-202, fig. 1; Moshinskaya 1976: 55, table 5); on a precipice overlooking the Ul-Zhilanshik river of the Turgay region (Turgay museum), a small stone smoothing-iron has been recovered with a protruding face on the butt-end (*AO* 1974: 492, fig. 491). A. Kh. Margulan (1979: 307, fig. 224, table 22. 2) was probably describing the same object although he claimed it was found on a settlement on Lake Akkol on the river Dzhilanchik and it is in Alma-Ata Art museum of Kazakhstan. In addition, two analogous naked male figures in sitting postures with raised heads are known: one from the Tobol river near Kustanay from the Kustanay museum (Zdanovich and Pleshakov 1981: 258-261, fig. 1.2) and the other from the Atbasarka river of the Akmola region, now in the Eastern Department of the Hermitage (Shkoda 1992: 58). A number of new discoveries have been made in Kazakhstan which have not yet been published. Finally a naked male figure of a skier on a bronze knife from grave 2 at Rostovka in the Irtysh area belongs stylistically to this group (Matyushchenko 1970: 103, fig. 33).

The objects described are technologically and stylistically uniform. They were made by pecking out brown sandstone or green serpentine. The face was modeled on several protruding planes. It is possible to state that its prototypes were carved wooden sculptures. The relief stresses superciliary arches, protruding skulls and a heavy chin, wide straight protruding nose, low squinting forehead, deepened cavities for eyes (only on the head from Tuy did they drill round cavities), the lips expressed in relief and the mouth comprise a straight line, that is absent in the Nura figure; the heads from Tuy and Ir lack the lips in relief, and figures with ears marked with rounded projections. The facial type is Europoid and close in all indices to the Andronovo (some Mongoloid admixtures are possibly found only on the skier from Rostovka). A round helmet or hat is found on every head but the Semipalatinsk one; it is slightly marked on the Akkol figure; the Nura and Rostovka show a cut from behind.

Initially V. I. Moshinskaya (1952: 50) dated the anthropomorphic figure found near the Irtysh to the 1st millennium BC. L. R. Kyzlasov (1956) assigned it to the Andronovo culture on the basis of its similarity to pestles with anthropomorphic figures which are now attributed to the Okunevo culture on the basis of closed finds. In 1976 V. I. Moshinskaya suggested the dating of this group to the second half of the 2nd millennium BC. However, the age of the sitting figure from Kustanay was lowered to the end of the 3rd / beginning of the 2nd millennium BC (Zdanovich and Pleshakov 1981: 261) and the analogous one from Atbasarka was set even to the middle of the 4th / middle of the 3rd millennium BC (Shkoda 1992: 58). But the stylistic unity of the whole series permits us to consider its creation within a single cultural sphere in a relatively short period of time. Decisive for cultural attribution are the small smoothing-iron with a mask and flat adze of Andronovo type on the Andronovo settlement of Akkol and a knife from Rostovka (which combines the images of a man and a horse; Fig. 68: 3) that permits us to make comparisons of the zoomorphic plastic art. It also allows us to consider the burial complex of the Chinese empress Fu

Hao in the imperial cemetery at Anyang in Xiaotun ("Henan chutu" 1981: 147, 148, fig. 136-181). This contained vessels with the empress's name, stone figures of Europoid men in round caps squatting or sitting on the knees with raised head treated (as can be seen from the reproduction) in a manner close to the Irtysh series (Müller-Karpe 1980: 366, fig. 123-126, 137, 145). The assemblage also includes a curved-back knife with the figures of horses (Müller-Karpe 1980: fig. 56, 140, 141) with correspondences in the zoomorphic plastic arts of the steppe and forest-steppe; nephrite rings and plates may be compared with those from Seyma, and a round bronze mirror is of Andronovo type. The burial dates to the 13th century BC.

Images of the horse occupy first place among the zoomorphic steppe figures in the plastic arts (Fig. 68). A stone horse-headed scepter was found near Malaya Cheka in the district of Chelyabinsk (*Drevnosti* 1991: 54, fig. 32). Horse heads are on a bronze spear shaft from Dzhetygora in northern Kazakhstan (Maznichenko 1986: 152-154), on stone scepters from eastern Kazakhstan in the Semipalatinsk district (Chernikov 1960: 24, fig. 21), near Bukhtarminskaya station (Slavnin 1949), and from the settlement of Volchiy in the Omsk region on the Irtysh (Moshinskaya 1976: 70, fig. 11). A pair of opposed horses forms the upper part of the handle of a bronze curved-back knife from Dzhumba from the Kalbin ridge in eastern Kazakhstan (Chernikov 1960: tables 1, 14.5); small horses are depicted on the ornamented handles of two daggers from the Karakol II hoard (Fig. 68: 5,6) in Semirech'e (Vinnik and Kuz'mina 1981: fig. 1); a pair of horses decorates a round temple ring with gold facing from the Andronovo cemetery of Mynchunkur (Fig. 68: 4) in Semirech'e (Akishev K. and Akishev A. 1983: fig. 48). Thus objects with horse images are found mainly in eastern Kazakhstan, Semirech'e and the Irtysh.

Similar objects are known northwards down the Irtysh in the Rostovka cemetery on the handle of curved-back knife with a horse depicted pulling a skier (Matyushchenko 1970: 103-105, fig. 33, 34) and eastwards in the Altai on a horse-shaped stone pendant from the Krotovo culture settlement of Saranin 2 in the Omsk region (Glushkov 1986: 196). Finally, analogous to the pair from Mynchunkur are a horse and mare on the butt of a Seyma knife (Bader 1970: fig. 52). Horses are depicted in the same way: they exhibit a large raised head with a thick mane and protruding fringe, drooping belly, thick short legs and fluffy long tail. Their species has been defined as the wild Przhevalsky horse (Bader 1970: 104; Kiryushin 1987: 117) but the horses are domestic, as there is a bridle on the Seyma mare and a horse from Rostovka. Their appearance suggests that they belong to an ancient Kirgiz breed now found in Semirech'e, eastern Kazakhstan and they are ancestors of the modern horses of the Mongol breed (Sokolov 1959). In the past they were distributed from the Asian steppes to China and Japan.

Kulans-dziggetais, now found in Xinjiang and Central Asia and in ancient times inhabiting the whole Eurasian steppe from the Ukraine to Mongolia and also the Trans Caucasus and the Near East, or tarpans (*Equus Gmelini*), widespread across the steppes, found from the Ukraine to Central Asia till the 18th century (Pallas 1786: 82, 83), are depicted on two single-bladed knives from the Altai (from the Elunino cemetery of the Elunino culture on the Ob; Kiryushin 1987: 101, 117, fig. 2, 4) and from Ust'-Mut (Pyatkin and Miklashevich 1990,

fig. 1, 2). Both animals differ from the typical horse: they are more massive, have large foreheads, a short upright mane without a fringe and with long pointed ears (Sokolov 1959). These features were emphasized by the Altai craftsmen.

The second most frequent image in plastic art is the wild stone ram (argali) and mountain goat. The natural habitat of these animals includes the eastern districts of Central Asia, Kazakhstan and the Altai. Rams decorate daggers from the Karakol II hoard (Vinnik and Kuz'mina 1981, fig. 1) and a single-bladed knife from Turbino (Bader 1964; 115-123, fig. 113). A mountain ram is placed on the celt from Rostovka in the Irtysh (Matyushchenko and Lozhnikova 1969: table 6).

Fragments with the expressive image of Bactrian camels that inhabited all Kazakhstan and Central Asia are found from the Irtysh (Moshinskaya 1976: 70, 72, fig. 12), from the Kusak river of the Djezkazgan region (Margulan 1979: 232, fig. 214) and from the Andronovo settlement of the early Kozhumberdy type at Ushkatta 2 in the Urals (Kuz'mina 1962b: fig. 3, 4; 1963a: 38-46, fig. 55. 8, 90).

Stylized bird figures terminate a spear shaft with horses from Dzhetygyr in northern Kazakhstan (Maznichenko 1986: 152-154). A beast, probably a tiger or snow leopard, inhabitants of Semirech'e, eastern Kazakhstan and the Altai, are found on a spear shaft reinforced with a forked rod found on the Irtysh south of Omsk (Chernykh and Kuz'minykh 1989: 67, fig. 31.1). Another schematic stone image of an undefined animal is held in the Alma-Ata museum (Moshinskaya 1976: 70).

Hence an analysis of the plastic art originating from the Andronovo culture indicates:

1. Some images are on knives (Dzhumba, Elunino, Ust'-Mut, Rostovka, Turbino, Seyma); they belong to one type: curved-back massive cast objects with protruding sharpened blade on the end, thickened back and ornamented handle.
2. In spite of differences in material (bronze, stone and clay), the stylistic manner is unique with the images of horses most strictly canonized.
3. The absolute majority of objects originate from eastern Kazakhstan, Semirech'e and the Altai.
4. The repertoire of the craftsmen is limited to several species of local fauna: the domestic horse of the Kirgiz breed, kulan, Bactrian camel, mountain ram, mountain goat and some wild feline (snow leopard or tiger).
5. The camel's head from the Omsk museum is made of quartz sandstone originating from north-eastern Kazakhstan (Moshinskaya 1976: 72).

This leads to the conclusion that the appearance of such images outside the borders of the limited area proves them to be imports from the Semirech'e-eastern Kazakhstan region and indicates a Seyma-Turbino origin.

O. N. Bader (1971: 98-103) remarked that the animal species on Seyma and Turbino knives represent steppe and mountain fauna of Central Asia. V. I. Moshinskaya (1976: 69-79, 109) analyzed Ural and west Siberian sculptures, dated a number of samples to the Bronze Age, and supported the idea that Seyma objects were produced in the Irtysh area after she compared the latter with plastic art from the settlement of Samus' IV (Moshinskaya 1976: 58-60) with Seyma type metal. A. A. Formozov (1976: 5-7) stressed the difference of the prevailing

zoomorphic images among the forest hunters and the steppe pastoralists, comparing the latter with the decorative art of the Okunevo culture and saw its influence at Samus' and Rostovka. The depiction of a mountain goat on the celt from Rostovka made V. I. Matyushchenko (Matyushchenko and Lozhnikov 1969) question the southern, that is Altaic, origin of Rostovka metallurgy. That was supported by M. F. Kosarev (1974: 115). The Karakol II hoard complex forced D. F. Vinnik and myself (1981) to reject the prevailing assumption about a connection between the single-bladed curved-back knives and the Karasuk culture (Artamonov 1973: 86), and show their closeness to Semirech'e and eastern Kazakhstan prototypes, suggesting a Seyma-Turbino production center in this region.

On the basis of other evidence (metal analysis) E. N. Chernykh (1970: 155-173) concluded that there was an eastern origin for ore Group 1 of the Seyma bronzes, which was demonstrated by his further research with S. V. Kuz'minykh (1989: 270). The authors see two sources of this trans-cultural phenomenon: the Altai (Elunino, Kanay, Ust'-Bukon) steppe metallurgists and horsemen and the forest hunters who engraved in stone and bone in the east Siberian taiga (Glazkovo).

B. N. Pyatkin and E. A. Miklashevich (1990: 150-152) followed A. A. Formozov in assigning to the Okunevo culture the whole series of zoo- and anthropomorphic images. Their comparison of the images of the horse in its special stylistic manner in the plastic art and petroglyphs of Semirech'e, eastern and partly central Kazakhstan, seems rather convincing but the attribution to the Okunevo culture is not sufficiently demonstrated.

What is the origin of this art style? From what we have seen so far it follows that most material originates from Semirech'e and eastern Kazakhstan, the center of tin mining for bronze production, which provided an enormous area for mining. Prototypes of curved-back knives and spears with forked-reinforced shaft specific for Seyma-Turbino metallurgy were found in the same district. They can be derived from an archaic spear from the Semipalatinsk dunes with a leaf-shaped blade without a midrib and three ridges for enhancing the firmness of a curved socket (Chernikov 1960: table 65. 1).

There is no need to trace Seyma stone and bone arrows from Trans Baikal: they are widely distributed across the whole Andronovo territory. As for nephrite, its deposits are in the Tian-Shan, Pamirs and in eastern Turkestan. Lapis lazuli was extracted from the same mines. A southern rather than an eastern origin of Seyma stone ornaments is probably seen by the discovery of a bead of light-green stone in grave 9 in the Kanay cemetery in eastern Kazakhstan, and cylindrical segmented paste beads in graves 3 and 7 (Chernikov 1960: 32, 34, tables 19.3,4, 20b), beads of green and white nephrite from Rostovka, cross-shaped turquoise beads in the burial of Sopka 2. Turquoise beads are found in many Petrovka burials; in typology they are analogous to those of Central Asia during Namazga V and VI (Kuz'mina 1988b: 51, 52; Zdanovich 1988: 138).

In the south of Central Asia there was a continuous tradition of depicting animals in plastic art in 4th to 2nd millennia BC. Metal pins with ox, cow with calf, goat, mountain ram, bird heads or figures as well as compositions with humans are especially noted from southern Turkmenia and Bactria (Kuz'mina 1966: 80-82, table 16; Sarianidi 1977: 83, 85, fig. 43, 44; Askarov 1977: tables

1, 6, 5, 6). The most north-easterly discovery of such a type comes from the Hak hoard in Fergana, immediately neighboring Semirech'e. V. G. Shkoda`s (1992) opinion on the stylistic similarity between a figure from the Atbasarka river and the anthropomorphic image on a stone vessel from Sarazm near Samarkand is important. They, as well as the pin with horse on the top from Zardcha-Halifa (Fig. 68: 1), demonstrate contacts between pastoralists and southern farmers.

Thus, it is possible to imagine that the origin of plastic art in the steppes was stimulated by southern contacts with bronze smiths of Semirech'e and eastern Kazakhstan, who delivered tin or bronze to the farmers in exchange. This is shown by the appearance of tin alloys in Turkmenia and in Bactria in particular in the 2nd millennium BC along with traditional arsenic alloys (Kuz'mina 1966: 91; Askarov 1977: 123, 124) and ready made objects of the Andronovo type (Fig. 53).

What is the cultural attribution of the creators of this art and the whole Seyma-Turbino complex? S. S. Chernikov (1960: fig. 21, table 14, 5) related the material from eastern Kazakhstan to the Andronovo culture. Present day arguments in favor of this attribution are:

1. The absence of Okunevo or sites of some other culture; only Andronovo of the Fedorovo type is found in this territory.

2. There is a probable genetic connection between the Fedorovo population of eastern Kazakhstan and the previous (non Okunevo) population represented in the destroyed burial of Ust'-Bukon' (where one finds a cist and pots with rounded shoulder and archaic horizontal herring-bone pattern and impressions (Chernikov 1960: 16, 17, table 6.1, 2)) and the Kanay cemetery that displays the typical combination of archaic weakly profiled vessels with zonal ornament (comparable to Ust'-Bukon' and to a certain extent to Samus') with typically Fedorovo pots with rounded shoulder, comb stamp decoration, including oblique triangles (Chernikov 1960: table 19, 3, 5).

3. In archaic grave 9 two extended burials with raised knees and with ocher were found inside the enclosure. Skulls from the grave belong to the Andronovo type (Ginzburg 1956: 239). Fedorovo utensils were found on the settlement, only some fragments preserving Eneolithic traditions (Chernikov 1960: tables 17, 18).

4. The discovery of a temple ring with two standing horses in the Mynchun-kur burial in Semirech'e, analogous to horses on a knife from Seyma (Fig. 68: 2), is of decisive importance. The cemetery belongs to the early Semirech'e sites. In grave construction (cist) and ceramics with rounded shoulder and saucer it can be compared to the Fedorovo cemeteries of eastern Kazakhstan (Karabaspakova 1991: 14). The form of temple ring is typical of those found in Fedorovo cemeteries (Komarova 1962: 66; Avanesova 1975b: fig. 2; 1991). The natural region of cast rings wrapped with gold foil includes northern Kazakhstan (Borovoe) and the Ob (Prigorodnoe, Volchikha, Kytmanovo, Vakhrushevo, Krasny Yar and Preobrazhenka).

It has been proposed that the invention of tin bronze, the most important innovation of the Bronze Age, led to the rise of the Andronovo Fedorovo population that inhabited the area of eastern Kazakhstan and Semirech'e which was rich in cassiterite deposits; it also stimulated the rapid growth in bronze casting here and the creation of new types of bronze objects (spears with forked-rod reinforcement, single-bladed curved-back knives, cast temple rings, etc.).

The rich cassiterite deposits led to active contacts between early Fedorovo tribes and their neighbors. They exported tin or bronze bars to the south. An original decorative art was formed in the steppes under the influence of the zoomorphic and anthropomorphic plastic art of southern farmers (probably through neighboring Fergana).

The main flow of this production of Fedorovo metallurgists was from Semirech'e and eastern Kazakhstan to the north. Manufactured objects were sent, not raw material, which accounts for their similarity over the vast Eurasian territory. The main trade route was the Irtysh, which is indicated by the concentration along the Irtysh of a large number of finds and the appearance of such sites as Rostovka and Chernoozer'e. From the Irtysh over the forest and steppe border goods were transferred further to the west to the Urals (Turbino) and the Volga (Seyma). Another part of the export trade went to the north-east (perhaps round the Altai uplands), along the Irtysh and further through the Kulunda and Baraba steppes to the Altai foothills, and then to the north along the Ob to the taiga zone where we find the settlement of Samus' IV.

The spread of Seyma metallurgy and art in the Altai region and pre-taiga Siberia is connected with the Andronovo Fedorovo tribes. This can be shown through several lines of evidence. On the upper Ob the Elunino culture was the aboriginal culture during the Early Bronze Age, with radiocarbon dates of 1610±30 BC and 1680±75 BC. The synchronous spread of bronze objects and zoomorphic plastic art of the Seyma type, horse sacrifice and sporadic incidents of cremation (Elunino, Komsomol'skiy Mys) are known from the cemeteries of this culture. At Elunino and Tsygankova Sopka we find several examples of violent death among representatives of the local population; their anthropological type with its Mongoloid admixture differs from the Europoid western intruders (Kiryushin 1987: 100-125).

In the Baraba steppe V. I. Molodin has described the local Krotovo culture. Here the spread of Seyma metal types is also connected with the Andronovo Fedorovo population: in Preobrazhenka III Fedorovo graves cut a Krotovo layer and they were covered by Irmen kurgans; at Sopka 2 Fedorovo ceramics were present on a Krotovo site (Molodin 1977: 64-68, tables 11, 7). Finally Fedorovo vessels were found in the Samus' IV settlement, that yielded Seyma type molds (Matyushchenko 1973a: 10, 42, fig. 6, 2).

Acquiring horse and metal from Fedorovo people the Siberian peoples mastered bronze-casting and later in ore rich districts, first of all in the Altai, they formed their own local metallurgical centers. Horses and chariots as well as Andronovo-Seyma bronzes (resulting in local replicas) and Andronovo gold temple rings reached China through Xinjiang and northern Chinese tribes. Copies were then created in China.

Several images were known in Andronovo decorative art: horse, ox, Bactrian camel, ram and goat. The same animals are popular on petroglyphs. The dating of these to the Bronze Age is based on the following: 1) stratigraphy and palimpsests; 2) discovery of plates with images in graves, for instance at Tamgaly; 3) discovery of a cultural layer on a settlement connected with petroglyphs; 4) the changing of styles and themes; 5) the closeness of images on stones and dated material objects; 6) technique of execution; 7) weathering and staining (Bernshtam 1962; Kadyrbaev, Mar'yashev 1977; Medoev 1979; Sher 1980;

Maksimova *et al.* 1983; Martynov *et al.* 1992; Samashev 1992; Rogozhinsky 1991; Mar'yashev, Goryachev 1998; 1999; Novozhenov 1994, Tashbaeva 1999).

Petroglyphs related to the Andronovo culture were found in the Balkhash area, in central and eastern Kazakhstan, in Central Asia, including the Pamirs. They are especially numerous in Semirech'e, where the two largest complexes are found: Tamgaly and Saymaly-Tash. Saymaly-Tash has 10,000 stones with drawings of different periods. It is near a mountain lake 3,400m high and difficult to reach. Images of horse-drawn chariots, battle scenes, ritual dances, and solar images form the most important group of petroglyphs of the Bronze Age.

I have proposed a widely accepted hypothesis regarding the interpretation of Eurasian steppe art on the basis of Indo-Iranian mythology (Kuz'mina 1976c). The image of the horse, chariot, chariots with two riders (Aśvin twins), a chariot with a fantastic team, Bactrian camel, ram, ritual plowing scene, heroes in battle (Fig. 34, 55.2, 56.3) can be explained by Indo-Iranian tradition (Kuz'mina 1963a; 1971a; 1977; 1986b; Kadyrbaev and Mar'yashev 1977; Sher 1980, etc). Images of a sun-faced character on the Saymaly-Tash and Tamgaly petroglyphs (Fig. 55.1, 3; 56) are probably the images of the most ancient Indo-Iranian Mithra = Sun God. The word sun in the Parthian language originates from this name. Another function of the god is being a guardian of a treaty and order (Gershevitch 1959). "Mithra, with eyes open, observes people" (*Rigveda* 3.59.1, 4); he is depicted either with one eye, i.e., the sun, or in the 'Mihr Yašt' (10) in the *Avesta* he bears the epithet 'thousand-eyed'. The same image is present on a scene of worship and ritual dances (Fig. 56.2). A solar figure on the back on an ox (Fig. 56.4) probably symbolizes the cosmogenic myth concerning Mithra sacrificing the primal ox. The plowing scene is the common European rite of the first furrow, that is connected with an incantation (*Atharvaveda* 3.17.2, 48) and myth how Ahura-Mazdāh handed a golden plow to the first Iranian king Yima (Vidēvdāt 2.2, 16, 18). The Scythians and Saka knew the myth about the golden plow falling from the sky (Herodotus 4.5-7; Quintus Rufus 7.8, 18).

The chariot, the most frequent attribute of a deity in the Indo-Iranian pantheon, is the most popular image in the *Rigveda*. For example, in Maṇḍala V Agni (1, 2, 5, 10, 13), Indra (29, 30-32, 35, 43), the Aśvins (41, 43, 73-75, 77), Maruts (53-61), Mitra-Varuṇa (63, 65), Uṣas (80) and others are in chariots. The epithets of the celestial chariot indicate that it is high, with solid rims, pleasant, beautiful, splendid, bright, golden, easy-going, fast-running, tireless, hard to be reached, quick, quick as thought, running like the wind, thunderous, prey-seeking, victory-bringing; the horses are described as fast, tireless, stately, beautiful, with straight back, dun, white, red, bird-horses. In the *Avesta* horse-drawn chariots are also attributes of the gods, of Anāhitā and Mithra in particular. The latter's horses are "terrible, fast-running, they carry the fast chariot, stretching out raw-hide reins." This reflects the enormous significance of the chariot in Indo-Iranian culture, and recalls the image of the chariot from Thor on the Indus river near the pass leading from the north into India.

Another image is the Bactrian camel which is an incarnation of the Iranian Vərəθragna (Behram Yast, 3) related to Indo-Aryan Indra-Vṛtrahan. The ram in the *Avesta* is the incarnation of Farnah, the personification of glory and charisma; he is still worshiped in the Pamirs. The horse, ox, ram, and goat cult

reflect the role of these animals in sacrifices and in mythological texts in which the gods are compared to these animals or identified with them (Elizarenkova 1972; 1989; Kuz'mina 1976).

All this leads us to interpret the petroglyphs as ancient sanctuaries. Interpreting the semantics of some images and compositions of Andronovo art on the basis of Indo-Iranian mythology is a serious argument in favor of setting the Aryan homeland in the steppe.

Some mythological representations

There exists a vast amount of literature on the ideological beliefs and ritual practices of the Indo-Iranians. It is significant for our theme to emphasize only those mythological ideas, ritual practices, social structures of the earliest Indians and Iranians that are so closely related, including items of vocabulary, that it completely excludes the possibility of an early break of Indo-Iranian unity and a long separate development of Iranians and Indians. This refutes the hypothesis of R. Ghirshman and confronts T. V. Gamkrelidze's and V. V. Ivanov's suggestion that the Scythians and Saka left Iran only in the Iron Age, with unbridgeable difficulties in explaining their connections with the Finno-Ugrians. In the second place, H. Oldenberg showed that in spite of the genetic closeness of religious beliefs, the Vedas and *Avesta* differ considerably, and that in the *Avesta* many of the heroes play opposite roles to their counterparts in the Vedas. In the third place, along with the Mazdayasna people of the *Avesta* and the Veda worshippers there were other peoples in the Indo-Iranian family who had a different religious practice; these were the Vrātya, in particular, and other Indo-Aryan but non-Vedic tribes that are mentioned in the *Mahābhārata*. This is confirmed by the non-orthodox mythology of the Nuristani, which has been studied by G. Fussman (1977). It follows that we can only expect a unity in the main system of ideological beliefs of the separate Indo-Iranian tribes, whereas their religious practice differed in details among various tribes of the Indo-Iranian continuum which had already split from the homeland.

The main event of Indo-Iranian religious practice was the sacrifice (of horse, bull and sheep) and the cult of the ancestors, that was reflected in sacrifices and in the construction of a tumulus. The words 'tumulus' and 'grave' were common Indo-Iranian (Bailey 1957). In the burial rite of the Indo-Iranians food offerings and the slaughter of animals were extremely significant. Status burials were followed by a horse-sacrifice (*Rigveda* 10.56). Judging from Vedic tradition, Indo-Iranians practiced both cremation and inhumation with the further construction of a mound above the grave and sometimes with further fencing (Mandel'shtam 1968; Elizarenkova 1972; Litvinsky 1972; Gening 1977; Kuz'mina 1985b; 1986b, and notes). The Iranians were probably bi-ritual in antiquity. Cremation is clear from the criticism of this ritual in Yasna 65.8 and in the Vidēvdāt (3.41; 6). Fire played a great role in the burial ceremony which is reflected in the *Rigveda* hymns directed to the fire-god Agni. The fire was the main conductor of sacrifice and it was an intermediary between the human world and the gods. This idea is reflected also in the developed hearth and ash cult both in Vedic and in Avestan tradition (Hertel 1925).

The farming cultures of the Indo-Near Eastern region of the 2nd millennium BC do not reflect this picture. There in their temples they made libations and sacrificed objects, rarely ovicaprids; horse-offerings are unknown. Burials were places under the house floors, sometimes in earthen graves; there is no evidence for tumuli, stone circles, stelae and wooden houses.

On the contrary under the tumulus burial rite there was a frame-work in the grave; a horse, ram, or bull was slaughtered on the grave or at the funeral feast; the warriors were buried together with horses and chariots, and the sacrifices of animals at different ceremonies: all these are typical of the culture of the Eurasian steppes.

These characteristic features are found in a number of steppe cultures in the 2nd millenium BC. A. M. Mandel'shtam demonstrated some specific convergences between the Bishkent culture and the Indo-Aryan one and he showed their connection with Andronovo rituals. Among a number of specific Indo-Aryan–Andronovo correspondences are: the construction of a round or rectangular enclosure, a frame-work inside the grave of stone or wood, the dead laying head to the west with face to the south towards the kingdom of the dead, and, what is more important, cremation (Gonda 1962; Tiwari 1979). The convergence of Indo-Aryan ritual with Andronovo and especially with Fedorovo bears a systemic character and speaks not for just individual traits but a whole constellation of characteristics. Thus, the analysis of the burial rite of representatives of some of the archaeological cultures of the Eurasian steppes confirms the hypothesis of an Indo-Iranian homeland in this zone. The specific complex of correspondences between the Bishkent and Andronovo, especially Fedorovo, ritual with Indo-Aryan hints at the possible connection of these groups of the Indo-Iranian continuum with the Indo-Aryans.

This hypothesis is supported by the evidence of social stratification of Andronovo society in light of the data concerning Indo-Iranian tradition (Smirnov and Kuz'mina 1977; Kuz'mina 1985b; 1986b). Rigvedic and Avestan terms indicate that there were three social groups recognized in Indo-Iranian society (Benveniste 1932; 1933; D'yakonov, M. 1954; 1961; Ivanov and Toporov 1960; *ITN*; Bongard-Levin and Il'in 1969; Grantovsky 1970): priests, warriors, and ordinary people. The commoner was called *vaiśya* in the *Rigveda* and *vāstryō fšuyant* in the *Avesta*. Farmers in Sasanid Iran were called by a derivative of this word but its literal translation is 'delivering grass to the cattle'. The Avestan *vāstrya* is related to Hittite *westara* 'shepherd' (Ivanov 1957). The warrior in the *Avesta* was denoted by the term *rathaēštar* i.e. 'standing on a chariot'. This term was known also to the Indians although more often they used *kṣatriya* 'a warrior possessing power' and *rājanya* 'regal looking'. The *kṣatriya* insignia is a bow according to the *Śatapatha-Brāhmaṇa* (5.3.5); according to *Aitareya-Brāhmaṇa* it is a chariot, armor, bow and arrows (7.19). Such sets are represented in early Timber-grave and Andronovo cemeteries which makes it possible to interpret this fact in the light of Indo-Iranian tradition which provides another independent method of verification.

CHAPTER TWELVE

MORTUARY PRACTICE

Alongside ceramics mortuary practice is the most important identifying feature of an ethnic group. It comprises a time honored custom sanctioned by mythological tradition; it is not connected with economic and cultural type; and because it can be preserved for a long period of time it does not change in space even when an ethnic group has engaged in distant migrations. It is this stability of ritual that makes it such an important ethnic indicator. That is why, if our attribution of the Andronovans as the bearers of the Indo-Iranian language is correct, then all the details of their burial rite which is reconstructed by archaeological data should find a correspondence in the rituals reflected in the Vedas, *Avesta*, and in the later tradition of the *Mahābhārata* and *Rāmāyaṇa*.

The burial rite of Indo-Iranians has attracted the attention of scholars of ancient literature since the 19th century. Works by W. Caland (1896), S. Gupta (1972), Pandey (1976), and J. Tiwari (1979) should be specially mentioned. Comparisons of Indo-Iranian tradition with the archaeological evidence of the Asian steppes and Central Asia of the 2nd mill. BC has been made by A. M. Mandel'shtam (1968) B. A. Litvinsky (1963; 1972; 1981) and E. E. Kuz'mina (1986). Special attention has been paid to the study of the horse cult, because it constitutes a peculiarity of the ancient Indo-European, especially Indo-Iranian, peoples (Koppers 1938; V. V. Ivanov 1974; Kuz'mina 1977; Mallory 1981; Maringer 1981; Polomé 1994; Renfrew 2000). The works dedicated to the burial rites of other Indo-European peoples have been applied as comparative material. Extremely important are the data from the syncronous Hittites (Gurney 1952; Ardzinba 1982) and the Greeks (Vermeule 1979), as well as generalizing researches on Indo-European burial rite (Jones-Bley 1997; 2002; Hansen 1987), mythology (Puhvel 1984; 1987; ed. 1970; Dumezil 1966; Mallory 1989, etc.).

In Indo-Iranian cosmogony sacrifice was the basis of the world order or *ṛta*. The universe was born from the sacrifice of the first man (Puruṣa), and the primordial horse of the Indians and bull of the Iranians. The elements, plants, animals, and man originated from parts of their bodies. A world created from sacrifice was maintained by sacrifice: gods in heaven feed on offerings and preserve the world order, the ancestral fathers feed on offerings and dwell in eternal meadows and pastures of the dead in the upper sky in the realm of Yama, the forefather of people who led the way there ("Where our ancient fathers passed beyond, there everyone who is born follows, each on his own path", *Rigveda* 10.14.2). The ancestors help their living kinsmen (the well-being of the gods and ancestors depends on their generosity, but if the descendents neglect their duties they punish them severely). As was the case with the Indians, the Iranians also worshiped their ancestors, bringing rich sacrifices to them at the funeral and on feast days.

In the *Mahābhārata*, in the *Bhagavadgītā* the divine-creator Brahma "having created people together with the victim, ordered: Reproduce!"

—"And sacrificing be sated with your sacrifice
Gratifying yourself and gratifying the gods
There will be great help from the sacrifice to you.
Accepting these sacrifices in the celestial hall
The pleased gods will reward you."

In the *Rigveda* the sacrifice is glorified many times:

"Offer to Yama the oblation rich in butter, and go forth. So may he intercede for us among the gods, so that we may live out a long life-span.
Offer to Yama, to the king, the oblation rich in honey. We bow down before the sages born in the ancient times, the ancient path-makers." (10.14.14-15)

A special hymn is dedicated to the funeral in *Atharvaveda* 18.4.

There is a detailed prescription in the *Atharvaveda* how to perform a sacrifice. It is said in hymns sung at the slaughter of a goat (9.5) and cow (9.9) that they must be cut with a knife by limbs, "with hymns put the cauldron on the fire" and the separated parts of the body are enumerated: head, front and hind legs, skin, ribs, each of them substitutes for the whole animal and it will provide the donor 'milk curds, milk, melted butter, honey'. And just the same parts of body were brought by the ancient Iranians according to the request of Yima to the gods and the ancestral Fravashis for a reward. The Fravashis presented a "herd of cattle and hordes of sons, a fast horse and solid chariot" to those who "will bow to them with meat in hand, clothes in hand, with prayer, worthy of Aša's reward". The late Avestan Bundahišn enjoins one to remember the dead by good words because they can avert troubles from descendants; this is clarified in the *Rigveda* (10.56.6) where "The fathers have established their own offspring as paternal power, like a thread stretched out among those who are to follow."

The fire-god Agni conveys the sacrifice to the heavens and the deceased himself is viewed as a sacrifice in the cremation ritual, where the gods will revive the corpse to new life in heaven. The funeral feast also guarantees rebirth.

In the *Mahābhārata* (11.26-29) there is a picturesque description of the burial of the Pāṇḍavas and Kauravas after their battle. After the fight the surviving warriors gathered their own and the alien dead:

"Highly honored, they gathered dry wood,
Different weapons, broken chariots,
On fires carefully led, the main heroes were burnt
According to posthumous rites"

and honored them with "sacrifices burnt on blazing fires, with an offering of melted butter", performed a funeral feast to the ancestors, and singers glorified the deeds of great heroes, and for the entire night the purifying splendid fires shone over the battlefield while hymns sounded and women wept (11.26.37-40).

The cremated heroes departed to the Otherworld, similar to the worlds of Indra (11.26.11) and ascended to the heavens, because honest death in battle "opens wide the splendid gates of heaven."

The burial rites of the Indo-Aryans are found in the other great epic poem, the *Rāmāyaṇa*. In the sixth book 'Battle', King Ravaṇa's body was covered with cloth, put on a couch and his fame was sung, it was carried. In front of the procession went those expert in the *Yajurveda*—the brahmans holding the burning torches, who erected an altar, built a fire and placed Ravaṇa's body there, sprinkling it with ghee. After a libation to the ancestors and the slaughter of sacrificial animals they lit a fire, while women mourned and wept.

Judging from the Vedic texts and modern ethnographic data in India the deceased asked Earth to accept him, looking south to the country of the dead. Prayers were read above him, "we go to the gods, to the supreme light" (Pandey 1982: 191), and his relatives repeated: "Go to the Sun!" The dead was placed to the west of the domestic hearth and then the body was carried from the settlement on a mortuary vehicle harnessed to two bulls, followed by mourning relatives, who walked with their hair let down and did not look back at the dwellings of the people, or toward the east, the home of the gods (Pandey 1976; 1982: 190-194).

The place of burial was set west or south-west from the settlement and it had to be washed by water from the west, from the direction of the setting sun. On the burial ground, on a bunch of reeds or mat—a symbol of immortality and moisture—they put cult objects and offered sacrifice to Yama, king of the dead. The deceased was cleansed, robed in new linen clothes; small pieces of gold, another symbol of immortality, were placed on the eyes, nose, and mouth.

After that, according to the *Śatapatha Brāhmaṇa* (12.8.1) they addressed the god Pūṣan, the protector of domestic cattle and roads, with these words: "Pūṣan carries you to the ancestors"; they then slaughtered the sacrificial animal. A black cow was given to the *brahman* (priest), a goat or ram to the *vaiśya* (commoner), and his horse and chariot to the *kṣatriya* (warrior); these were to help the deceased to cross the river to the kingdom of the dead. It is said in the *Rigveda*, in the burial hymn to a horse (10.56) that carries a man's body to heaven: "By merging with a body, grow lovely, dear to the gods in the highest birthplace. Victorious racehorse, let your body, carrying a body, bring blessings to us and safety to you."

The horse is burnt with its master. This ritual was also known among the Greeks: in the *Iliad* (23.175) Achilles brings horses to the funeral pyre of his friend Patroclus (Vermeule 1979). And in a *Rigveda* hymn (10.135.3) the dead father of the boy goes to Yama's kingdom on "a new chariot without wheels, which had only one shaft but can travel in all directions."

After that followed the gifts and libations to Yama and the ancestors:

> "The one who has passed beyond along the great, steep straits, spying out the path for many, the son of Vivasvan, the gatherer of men, King Yama—honor him with the oblation.
> Yama was the first to find the way for us, this pasture that shall not be taken away. Where our ancient fathers passed beyond, there everyone who is born follows, each on his own path" (*Rigveda* 10.14.1).

They asked the sacrificed cow that would "give us back the cows, oh Indra" *Rigveda* 10.19.6).

The burial started after such rites. The early Indians of the *Rigveda* period buried hermits and small children in the earth and even later, inhumation is mentioned in the Laws of Manu and is used till this day. But cremation became the prevailing ritual. On a stack of firewood covered by reeds they laid the deceased. His personal sacrificial utensils, vessels, gold decorations and bow "for him to defend us" were put near the *kṣatriya*, his widow was told to: "perform the ancient custom", and she lies on the right side of the deceased. Then the son is given gold, and instructed to take the "bow from the hand of the dead man, to be our supremacy and glory and power" (*Rigveda* 10.18.9); the widow is raised by the younger brother of the dead with the words: "Rise up, woman, into the world of the living", and they go round the place prepared for the cremation three times from right to left with water: "Let water flow for you in three worlds: in this world, in the air and in the sky" (Macdonell 1900: 126).

After that an animal is sacrificed to the fire-god Agni who bears the deceased to the heavens with his flame: "The goat is your share; burn him with your heat! … carry this man to the world of those who have done good deeds" (*Rigveda* 10.16.4). The corpse is covered by the limbs of the slain animal:

> "Gird yourself with the limbs of the cow as an armor against Agni, and cover yourself with fat and suet, so that he will not embrace you with his impetuous heat in his passionate desire to burn you up" (*Rigveda* 10.16.7).

Three sacrificial fires are lit from the fire taken from the domestic hearth, the *gārhapatya*-. The funerary fire is set on three sides while one exclaims:

> "For good, O Agni, burn him from behind, for good from the front! …
> Let fires enjoy him, sacrifice the whole!
> The one who sacrificed ascended the formed fire,
> Ready to fly in sky" (*Atharvaveda* 18.4.11-14)

They address Yama with a prayer. The funeral fire burns for about three hours. Then water is poured on it and a new purifying fire is lit, and offerings to the gods and ancestors are brought (Caland 1896: 19, 58, 92). Finally the mourning concludes. The participants wash themselves and address the Sun: "We have returned from darkness", "These living have separated themselves from the dead… we have gone towards the dance and laughter" (*Atharvaveda* 12.2.22).

The ashes were spread or better thrown into a river, especially the sacred Ganges or Jamuna in modern India (Pandey 1982). In ancient time the ashes were gathered on a flat dish which could not hold water: "Collect your body in joints! By prayer I make parts of your body" (*Atharvaveda* 17.4.52). Ashes were put into the grave, left in the dish or spread on the bottom. Pots with sacrificial melted butter were also put in the grave: in the *Rigveda*, in the hymn to the funeral fire (10.16.8) Agni is asked: "do not overturn this cup (the ritual pot *kumbha* – E.K.) that is dear to the gods" and in the funeral hymn in the *Atharvaveda* (18.4.25) pots covered with flat cakes or stones are mentioned "full of honey and exuding fat".

The rite of inhumation is also described in the *Rigveda* funeral hymn (10.18, verses 10, 11, 14):

> "Creep away to this broad, vast earth…
> Let her guard you from the lap of Destruction.
> Open up, earth; do not crush him. Be easy for him to enter and to burrow in.
> Earth, wrap him up as a mother wraps a son in the edge of her skirt…
> On a day that will come, they will lay me in the earth".

At both the inhumation of the corpse as well as the cremation the wife lay near her husband and then she was told:

> "Rise up, woman, into the world of the living. Come here; you are lying beside a man whose life's breath has gone" (*Rigveda* 10.18.8).

The deceased was accompanied by parts of sacrificed animals, his personal belongings, weapon, vessels; these were probably placed at the head as was the receptacle for cremation.

The grave constructed for the two rites was considered by the Indo-Aryans as a house for the dead.

> "Let the earth as she opens up stay firm, for a thousand pillars must be set up…and let them be a refuge for him for all his days…
> Let the fathers hold up this pillar for you; let Yama build a house for you here" (*Rigveda* 10.18.12-13).

The Atharvaveda funeral hymn is extremely interesting (18.4.37):

> "This frame-work is made by constructing logs
> Kinsmen, come and look at him!
> This mortal goes into eternity.
> Make him a house".

In his translation B. L. Ogibenin describes the pillar as a 'column, supporting a vault'; in the translation of T. Y. Elizarenkova the frame-work is called a 'pile'; a wall or fence appears more likely.

What do we gain from these texts? Kinsmen made a grave as a model of a house for the living. It was dug into earth, its walls were strengthened with wood, supporting pillars were erected and a frame-work was made from logs. Moreover, the same terms were used for house building as those for the supporting pillar, the *axis mundi*.

After some time (usually ten days) the grave was covered by an earthen mound both for a cremation and inhumation: "I shore up the earth all around you" (*Rigveda* 10.14.13), or in the translation by B. L. Ogibenin of *Atharvaveda* 18.4: "I deepen you-earth into earth…, cover him, oh earth" and "I set up this fence to guard against the world of the dead":

> "I set up this wall for the living…
> Let them… bury death in this hill" (*Rigveda* 10.18.4; *Atharvaveda* 12.2.22)

H. Bailey (1957) established that the word 'grave' is common Indo-European and in other languages it means 'kurgan', 'tumulus'; the word 'ashes' is also common Indo-European. Surrounded by a stone wall the tumulus had either a round or rectangular form, but the *Śatapatha-Brāhmaṇa* prefers the latter; in other cases a round construction is the best. The *śraddhā-*, the funeral feast, was held on the third and thirteenth day after the funeral. Flat cakes, milk, fat, honey, and water were brought to the deceased and the ancestors:

> "These pots covered by flat cakes, …
> Let them be full… of honey, fat exuding
> These grains that I scatter for you, …
> Let king Yama approve them for you" (*Atharvaveda* 18.4.15-26).

Ancestor sacrifices accompanied all the most important family, calendrical and clan celebrations.

The fence that separated the dead from the living was made of wood or stone. It was known not only in the Indo-Aryan but also in other Indo-European traditions (Lincoln 1991; Della Volpe 1992; Jones-Bley 1997; 2002).

Unfortunately we have no such reliable and early evidence about the Iranian practice. Strict regulation of burial rites is preserved only in later parts of the *Avesta,* which were strongly revised by priest-magicians, and which obviously did not correspond to the ancient practice. It is possible only to state on the basis of some passages and evidence that Iranians, just as the Indians, initially buried their dead in the earth (Vidēvdāt 3.41; 5.7, 47, 48; 6.8; Yašt 13) or cremated them; orthodox Zarathustrians regarded the customs of the Arachosians to bury or burn bodies as 'foul' (Vidēvdāt 1) and ordered that corpses be placed in the open air to be devoured by birds of prey (Vidēvdāt 5.7, 45, 46). Herodotus described this practice in Achaemenid Iran, but he stressed that "however, the Persians in general cover the body with wax and then bury it."

The peoples of Central Asia and neighboring regions: Bactrians, Sogdians, Parthians, Caspians, Derbics, Hircanians (Strabo 11.2.9-13) knew the custom of displaying the corpse. But this custom was never spread among the Saka nor Scythians, nor their descendants, the modern Ossetes, nor the Iranian-speaking peoples of mountainous Tadzhikistan and the Hindukush and the nomads of Iran. These all bury their dead under a kurgan, often preserving ancient Iranian customs, sometimes corresponding to Vedic ritual in every detail. All Iranians worshiped Yima (Yama) in antiquity, but he did not become the god of the dead; he was a light sunny first man and king, in whose country there was general prosperity. The Yima cult was unusually popular in Central Asia and it was preserved till the Middle Ages and tales about him can be heard even nowadays. Yima taught people to perform animal sacrifices similar to those of the Vedas.

Two terrible dogs, descendants of the primordial dog Saramā, guard the entrance to the kingdom of the dead where Yama rules. The way there is difficult and dangerous. It passes over a narrow bridge which the Iranians call the Činvant- 'selected way': good deeds will help the righteous to cross, bad deeds will push the unjust into the abyss of an underground ocean where, as the Indians thought, lived 'underwater fire', a monster with a horse skull and open mouth instead of a head and the serpent of the depths, *Áhir budhnyàs*.

Ideas having much in common with Indo-Iranian exist among other Indo-European peoples: there is the celestial Valhalla and underground Hell of the Scandinavians, the heavenly Elysian fields and subterranean Tartarus of the Greeks, the three-headed dog Cerberus at the entrance of Hades' realm, the crossing over the river Styx in Hades' kingdom, and the lord of the sea, Poseidon, in the form of a black horse (Puhvel ed. 1970; 1987; Vermeule 1979; Jones-Bley 1997; 2002).

We know about these beliefs from mythological texts: The Eddas, Iliad, the works of Hesiod, tragedies, and monuments of art: Scandinavian grave stelae and Greek vessels on which solar signs are depicted in the upper sphere: a cross in a circle or swastika and birds in the middle, a funeral chariot or ship of the dead, and at the bottom—earth symbols or a monster. Another common idea was the returning home of hosts of ancestors from time to time, and heroes whose victories live eternally in their descendents' memory, inspiring them to new deeds.

Cremation and horse sacrifice are typical only of the Indo-European peoples such as the Hittites, judging from the excavation of the Osmankayasy burial of the 14th–13th centuries BC. In Iran, however, horse sacrifice appears even later, only at the end of the 2nd, beginning of the 1st millennium BC, and it is obviously connected with the arrival of the first Iranians, who communicated its present name to this country ('Iran' from ancient Indo-Iranian 'Arya').

Tumulus burial and horse sacrifice were unknown to the farmers of the southern regions of Central Asia, who buried their dead in the 3rd–2nd millennia BC in settlements in family burial-vaults, tholoi, under the floors of houses or in out-of-the way quarters (Masson and Sarianidi 1972; Askarov 1977). Later there appeared burials in the earth in shallow pits or trenches, which were set outside the area of the tell (Ganyalin 1956a).

Where must we look for the sources of Vedic funerary ritual? Their homeland was the wide Eurasian steppe. The bearers of the Pit-grave (Yamnaya) culture, that developed at the end of the 4th–3rd millennia BC in the steppes from the Danube to the Urals, began to bury their dead in graves covered by large kurgan mounds. The cult of the horse and bull appeared already among the ancestors of the Pit-grave people in the Mariupol' culture: they engraved images of honored animals on bone plates, displayed them on the stone scepters of their chiefs, and the animals themselves were sacrificed during feasts and funerals by dismembering their bodies, separating the head, legs and skin as the Vedic Aryans did and in the way Iranian nomads and the peoples of the Pamirs and Hindukush still do.

The origin of the fire cult is also set to the Pit-grave period. The vehicle cult appeared at the same time with a funeral vehicle drawn by bulls placed in the grave of a particularly honored man, sometimes buried together with a scepter, and accompanied by sacrificed bulls and horses (Piggott 1969; Kuz'mina 1971a; 1974a). In order not to forget the deeds of ancestral heroes, they were glorified in hymns, and their images were placed on stone stelae erected on top of the kurgan. The ancestral hero is displayed on them girded with a belt and with a sharp-ended staff in his hands. It should be remembered here that girding with a belt was the most important rite of the Indo-Iranians and befit only the twice-born after initiation. With regard to the pointed staff which was used to prod

cattle and drive bulls in a vehicle, this was presented to Yima by the supreme Iranian god Ahura-Mazdāh. From that time onwards it was possessed by shepherd-kings; the word 'shepherd', 'pastor' is of common Indo-European origin and later it began to denote master, king and even god (Ivanov 1951).

Thus, already in the Pit-grave culture we come across many prototypes of the future culture of the Indo-Iranians. This is the conclusion of E. A. Grantovsky (1970); V. Georgiev (1956), M. M. D'yakonov (1961); G. M. Bongard-Levin *et al.* (1969) who saw the distant ancestors of the Indo-Iranians in the tribes of the Pit-grave culture. N. Ya. Merpert (1960) came to the same conclusion independently, applying the retrospective archaeological method.

It has been said that the kurgan rite and animal sacrifice, including the horse which was much honored by the Indo-Aryans, existed among different peoples of the Eurasian steppe. But only in one culture, in the Andronovo, do we find a combination of all the specific elements of the Vedic funeral complex. How did the Andronovans bury their dead?

Like the Indo-Aryans they buried their dead far from their settlement, on the river bank, and they oriented the graves to the west or south-west, the direction of the setting sun. They dug the graves into the earth and constructed a timber frame-work; in the treeless regions they replaced it with a stone cist. They erected overhead a cover on the central supporting pillar. The grave was covered with earth by a kurgan of pyramidal form; it was surrounded by a circular or square stone fence. Like the Vedic Aryans and earliest Iranians they too knew both burial rites—cremation and inhumation. The Andronovo-Fedorovo type practised cremation. It is important to take into account the directions of Sanskrit commentators that the Indo-Aryans gathered ashes into a flat vessel, and among all the Eurasian cultures such ash-dishes were known only in the Andronovo culture. In the first case we find a heap of scattered ashes in a grave and very often there is a clay dish in which it was carried. There are also horse ribs and some vessels at the wall.

Neither weapon, nor ornaments, nor bones of other sacrificial animals are found. But in light of the Indo-Aryan data this was according to ritual prescription. Objects were taken away, and the sacrificial animal was burnt on a funeral fire.

Inhumation dominated among the other Andronovo (Sintashta, Petrovka and following Alakul') types.

The essence and many details of Andronovo rituals can be explained only in the light of Indo-Iranian literary data. The Indo-Iranians conceived of the earth as a square or circle, or these figures were inscribed into one another. A round kurgan with a square grave in the center was a microcosm of the universe.

Each part of the world had its own god-protector. In India Indra was protector of the east, Varuṇa the west, Soma the north, and Yama protected the south. The orientation according to parts of the world was extremely important, but varied among different peoples: for the Indians the bad, dangerous side was south; for the Iranians it was the north. This complex of ideas probably preconditioned the strict orientation of graves in a single direction which became a traditional characteristic of the culture of an actual ethnic group.

In Sintashta-Petrovka and Alakul' graves the deceased were flexed on the side. For a long time this was explained by the idea of death as a dream and so

the dead were placed in the pose of sleep or because ancient people were afraid of the dead and tied them tightly by ropes to prevent them from walking. But Vedic texts explicitly state that the earth provides a rest for the deceased as a mother does for her son and that he will survive to a new life; thus the flexed position mirrors the foetal position. To achieve the necessary flexed pose the deceased was really tied, and the god of death Yama carried a rope as his own attribute, and he was constantly called 'tying the dead'.

There are traces of fire rituals in Petrovka burials: ashes strewn on the floor of the grave, coals and ashes in the mound, and burning of the ground above the grave cover. A quite similar picture is witnessed in Early Timber-grave burials. Although it is all a manifestation of a single fire cult the presence of fire is the result of quite different ritual actions, conducted at different times and for different reasons: the ashes in a Fedorovo grave are associated with the cremation of the deceased, the ashes in Petrovka and Timber-grave burials where we find inhumations are probably the residue of an animal sacrificed to Agni or Yama, a burnt wooden ceiling or burnt clay ground above it may be compared to the purifying fires set by the Indo-Aryans after funerals.

There are usually two to three vessels in Andronovo graves. They are at the head of the dead, just as it is described in the Sanskrit texts. Parts of sacrificial animals were also placed in Alakul' graves: the skull and legs of a horse, bull or ram. Sometimes vessels and bones were placed above the grave pit and at the edge of the fence. For a long time scholars believed that this was a food offering given to the dead for the afterlife. Examination of the original texts reveals that the ancient Indo-Aryans thought quite differently. In reality, remains found under the kurgan mound are traces of not one but of several rituals conducted at different times and for different purposes. In the first place, sacrifice was given not to the dead or for the dead but for all the deceased's ancestors headed by Yama. They are called upon many times to descend to the earth, sit on the strewn straw and taste the food prepared for them. They are reminded not to forget to thank the sacrificers and to send them cattle and healthy posterity as a reward. In the second place, some sacrifices were brought in a certain order to the individual gods—Yama, Agni, and Pūṣan, and the texts indicate for whom and for what reason the animal has been presented. In the third place, the main sacrificial animal was not there to please the dead, ancestors or gods but as a means of transport. It is said directly in the texts that the ram or bull is the animal of the protector of roads, Pūṣan, and they will help the deceased to cross to the kingdom of the dead. A special Rigvedic hymn was sung in honor of the horse that will carry its master to the sky. It is certain that such chariot horses accompanied Sintashta-Petrovka and Alakul' burials. Moreover, they lay in pairs as if in harness and they were sometimes put not into the burial but on its roof. In these cemeteries there are chariot burials. In some cases the chariot was probably put in the grave with the wheels removed and without the shaft as in a Rigvedic hymn where the boy talks to his dead father. In other cases the imprints of wheels indicate that the chariots were put into special grooves to a depth of approximately one third of the wheel diameter. This detail is not present in the funeral hymn, but in texts dealing with construction, it is prescribed to build special sheds for chariots near a house and it is recommended to prepare grooves

for the wheels of the chariot. One can observe a striking resemblance in the smallest details. The same grooves are fixed in Chinese *che-ma-kens* for chariots.

Finally, in Andronovo kurgans vessels and animal bones were placed not only in graves, but also on the edge of the mound, near the stones of the enclosure. In the light of Vedic data this complex was a funeral feast conducted some time after the funeral. There are only skulls and legs of animals separated into joints in strict prescription with sacrificial immolation in the *Atharvaveda.* It is known that according to the beliefs of all Indo-Europeans a collective feast or funeral feast guarantees future revival. The funeral feast and collective meal are the most important rituals both in the calendar and marriage and funeral ceremonies. We can see this in the fact that Russian has a word of elevated register, *zhrets* (priest) and a word of low style *zhrat'* (to gobble) which are derived from the same root; funeral feasts are also depicted on paintings in Greek tombs and sarcophagi.

Vedic data can explain another peculiarity of the Andronovo burial rite: paired burials of different sexes. Approximately 2% of Andronovo graves are paired burials of man and woman. They lie facing each other, man on the left, woman on the right side.

These burials have been intriguing scientists for a long time. V. S. Sorokin (1962) and M. A. Itina (1977) believed that the woman was a forcibly buried slave or concubine of the man. This conclusion received universal recognition, although there is a serious reason to doubt it.

In the first book of the *Mahābhārata* (91-100) it is said that when the forefather of the Pāṇḍavas, King Pāṇḍu, died, his young wife Mādrī, mother of the twins Nakula and Sahadeva, voluntarily mounted the funeral pyre after her husband. And in the third book (277-283) when Satyavan was doomed to death by the gods, the all-ruling Yama came with a rope to tie him. But his wife Savitrī, who never parted with her husband, was ready to go with him after Yama:

"Let wife follow her husband everywhere.
I was with him when he lived, I will be with him when he died."

It is said in the Laws of Manu that after her husband's death a woman was free to chose whether or not she must follow him to the Otherworld.

Judging from the *Mahābhārata*, *Atharvaveda* and *Rigveda* this custom of *sati* was never strictly observed and suicide was replaced by a symbolic act—the widow only lay down on the right side of the dead husband, exactly as in Andronovo burials.

Iranian-speaking peoples transformed this rite differently. There a widow placed a cut plait of her hair. This is done to the present time, for example, among Kurdish women and this custom was also found not long ago in Ossetia (Kaloev 1971). The custom of the voluntary death of a widow to be buried with her husband was known to other Indo-European peoples: Herodotus says (4) that so did the wives of noble Thracians, neighbors of the Iranian Scythians, and the same rite existed among Scandinavians, as is described in the sagas. The reason for *sati* was that the women could enter Valhalla only at the price of a sacrificial death. This means that it was not a slave woman but the full loving wife who

followed her husband. This conclusion is also very important for understanding family relations in Andronovo society as it shows that the extended family living under a single roof consisted of small nuclear families (either son with spouse or daughter with spouse). The small number of family burials supports this supposition. In the Baytu burial, for example, we discovered a grave where the husband and wife lay and a child was buried at their feet.

More numerous in the Andronovo culture were burials of a mother with one, sometimes two, small children placed near her in one grave or buried closely in a special pit. These are rather difficult to explain. It is generally accepted that the majority of early peoples of the world strictly observed exogamy where the wife was necessarily taken from another kinship line. Then the husband and children would be buried in the cemetery of his kin, while his wife would be brought to the cemetery of her kin. But if women are buried together with children then the Andronovans did not observe exogamy; they had endogamy where marriages were made within kin groups. Such a supposition is affirmed by another category of Andronovo material culture: ceramics. It has already been said that in every micro-district and even in every settlement ceramics have specific features, and it is possible only when a daughter trained by her mother has remained in her native settlement. It means that the Andronovans had matrilocal marriages, i.e., the husband came to the wife's settlement or he was from the same kin.

This important demographic conclusion can also be used to affirm the Indo-Iranian attribution of the Andronovans because both Indians and Iranians did not know the custom of exogamy in antiquity (Herzfeld 1941, I: 119; Livshits 1963: 506). Kinsmen marry each other among modern Iranian peoples, e.g., Kurds, Luri, mountain Tadzhiks and others (Andreev 1927; 1958). This ancient custom could be attributed to the caste system in India when marriage was within a caste without taking into account kinship affiliation.

In the Andronovo culture apart from child burial in a clan cemetery there were special cemeteries where infants were buried. And in the Indic Laws of Manu (5.68, 69) it is said that a "child who died before two years must be carried by relatives from the settlement, covered with flowers, and buried in the pure earth without gathering its bones afterwards. Such a child must not be burnt on a pyre and water must not be poured over it."

Thus, the variety of Andronovo funeral rites finds a complete and thorough correspondence in early Indic texts. Survivals of these rites are still present among the modern peoples of India, Iran, the Hindukush, Pamirs, and Ossetia.

This analysis shows that the whole complex of Andronovo burial rites finds analogies among other Indo-European peoples. The kurgan with the surrounding fence and the burial construction beneath it represents the house of the dead. The combination of cremation and inhumation, *sati*, the rite of sacrificing a pair of horses and a chariot as a means of transport, sacrifice of a cow, sheep and ram, sometimes the burial of a dog, the placement of vessels with ritual food in a grave (honey, milk, fat), as well as weapons and ornaments characterize the burial practice of the majority of Indo-European peoples: Hittites, Greeks, Germans, Balts, Slavs, etc. It leads to the undisputable statement that the Andronovans were Indo-Europeans. However, the common Indo-European character of the whole burial complex does not, strictly speaking, permit one to declare the Andronovans as Indo-Aryans. V. F. Gening (1977) erred when he

declared that the Sintashta people were Indo-Aryans when he only compared the burial rites with those of common Indo-European, not the rites specific to the Indo-Aryans themselves. For this reason L. A. Lelekov (1982) opposed him. The Indo-Aryan attribution of the Andronovans can only be established on the basis of the similarity between Andronovo and specifically Vedic burial ritual.

In accordance with my methodology the decisive arguments for the ethnic attribution of the Andronovo culture rests on the evidence of material culture, economy and cultural complex. The data on the burial rite and beliefs can be used only to verify the hypothesis. As the Andronovo burial rite is in full systematic agreement with the Vedic one, this fact can be used as a decisive argument for declaring the Andronovans as Indo-Iranians.

The absence of a pig sacrifice and the special role of the horse and chariot serve as particular ethnic indicators that distinguish Indo-Iranians from other Indo-European peoples and single out the Andronovans from neighboring tribes. The rite of cremation which is characteristic only of the Fedorovo tribes of the Andronovo culture makes this population close to the Indo-Aryans.

Another important argument in favor of setting the Indo-Iranian homeland in the steppe is the widespread idea of an afterlife as a heavenly pasture which is reflected in Vedic literature, and which is close to the Greek Elysian Fields. It has been thoroughly studied by Puhvel (1969). The mythologeme of an afterlife as a wide heavenly pasture could have appeared only among the herdsmen people of the steppes.

If we recall that burial rite is the most important ethnographic feature of a living people and that it can be preserved even over long development in one place and after migration into another economic and geographical zone, then this correspondence is the safest basis for acknowledging the Andronovans as Indo-Iranians.

This conclusion, important in itself, has great importance also because we can use Indo-Iranian data to reconstruct the social structure of Andronovo society. As mentioned above, they led a pastoral way of life, did not know specialized crafts, lived in large houses in large family communities; moreover, while analyzing materials from settlements there are seemingly no traces of social and economic differentiation. But is this really so? The study of Andronovo cemeteries yields different picture. Beginning with the monuments of the Sintashta-Petrovka type of the 18th–16th centuries BC it is possible to see the considerable differences in size of constructions and grave-goods from the various kurgans. There is a notion in the archaeological literature of a ‘standard set of a burial’ (Alekshin 1981; 1986b), i.e., a complex of the most typical characteristics of given culture, that include the size of the kurgan and grave pit, the complexity of construction, the number of vessels, sacrificial animals, and grave goods.

In the Sintashta-Petrovka type cemeteries with an average grave size of 2.5-3x2m and 1.5-2m depth, there are graves measuring 4x3m, to 3.7m deep. Such graves do contain the most complex wooden constructions, the largest number of sacrificial animals, the best modeled vessels with the richest ornament. Chariots and harnessed horse burials are found in these graves; near the deceased there is a set of weapons, including a knife, stone and bronze arrows, stone mace, spearhead, and chisel (Tkachev 1995; 1996; Epimakhov 1995; 1996; 2002).

The same picture is seen in Alakul' burials of the 15th–14th centuries BC: there is an absolute predominance of kurgans from 7m to 20m in diameter, 0.15-0.6m high with graves 2-3x1.4-1.75m, 0.5-1.4m deep with a pair of vessels. But in every cemetery there are several enormous kurgans up to 40m in diameter, up to 1.5m high or constructions surrounded by double and even triple rings of monumental stone slabs. There are graves in such kurgans that measure 3.2x2.5m, 2.3m deep; their walls were covered with a frame-work of large logs, covered by a layer of logs which is sometimes double. These graves were unfortunately robbed in antiquity but there we still find numerous bones of animals, gold ornaments dropped by robbers, bronze knives, maces, horse cheek-pieces, sets of arrows, all of which prove the former richness of the burial. (The same differences in the sizes of the kurgans and graves are found in early Fedorovo burials, but the absence here of corresponding grave goods diminishes our results). One conclusion must be evident: Andronovo society was not uniform; there was a group of people who occupied a privileged position.

Site type	*Construction size*			
	Average		*Maximum*	
	Diameter	*Height*	*Diameter*	*Height*
Late Alakul'	-	-	-	-
Late Kozhumberdy	2-5	Enclosure	8	-
Atasu		Long fences		-
Kozhumberdy	7-10	0.8	17	0.8
Amangel'dy	8-12	0.2-0.7	16	0.9
Early Alakul'	7-20	0.15-0.6	40	1.5
Petrovka	12-20	0.2-0.4	-	-

Site type	*Pit size*			
	Average depth		*Maximum depth*	
Late Alakul'	1.35/1.5x0.6/1	?	1.6x1.25	?
Late Kozhumberdy	1.4/1.5x0.6/0.75	0.3-0.7		-
Atasu	1.5/1.7x0.8/1	0.6-1.2	2.2x1.6	1.6
Kozhumberdy	1.7x0.9/1.1	0.7/1	2.9x2	1.6
Amangel'dy	2.2/2.5x1.5/1.75	0.3/1	3.2x2	1.5
Early Alakul'	2.3x1.4/1.75	0.5/1.4	3.2x2.5	2.3
Petrovka	2.5/5x2/3	1.5/2	4x3	3.7

Table 12: Evolution of burial constructions and pit dimensions

CHAPTER THIRTEEN

INDO-IRANIAN CONTACTS WITH OTHER LINGUISTIC GROUPS

The study of contacts between peoples belonging to different language families is important not only for the reconstruction of ancient cultural relations but also for elucidating the homeland of the ethnic groups in contact. The methodology requires comparative analysis of three different sources: linguistic, archaeological and mythological.

Indo-Iranians and Finno-Ugrians

The hypothesis of the relationship between the Hungarians and the Ob-Ugrians and their Siberian homeland was suggested already in the 15th century by the Italian humanist Enea Silvia Piccolomini (later Pope Pius II). In the 17th century the great German scholar Gotfried Leibnitz singled out a Finno-Ugrian language unity and marked its borders. The Finno-Ugrian languages comprise four branches: Balto-Finnic which spread very early to the west; Volgaic (Mari, Mordvinic and the now extinct Merya, Muromian, Meshcherian); Permic (Udmurt, Komi); Ugrian (Khanty, Mansi, Hungarian); Saami; the Samoyedic branch of the Uralic language family are not discussed here. N. Anderson first noticed the Indo-European connections with the Finno-Ugrian languages, and B. Munkacsi and B. Collinder (1954) raised the issue of borrowings from the Indo-Iranian languages. The division into west (Finno-Permic) and east (Ugrian) is assigned to the transition between the 3rd and 2nd millennia BC (Fodor 1976; Hajdu 1985; Rédei 1997, Napol'skikh 1997). Numerous data on Indo-Iranian borrowings in the Finno-Ugrian languages were systematized by K. Rédei (1986, 1997), E. Korenchy (1972), A. Yoki (1973) and augmented by A. Csillagy (1974), etc. Important contributions were made by the Iranists Th. Burrow (1976), V. I. Abaev (1972), J. Harmatta (1981), A. V. Lushnikova (1990), and E. Helimsky (1996). They all suggested a chronological stratification of the linguistic material and proved that contacts were carried out not only with Iranians but also with Indo-Aryans and that they go back to deep antiquity. This was also confirmed by A. Parpola (1988; see also Carpelan and Parpola 2001).

Another important source for the study of Finno-Ugrian, Ugrian and Indo-Iranian contacts in particular, are the common mythological features of these peoples, investigated by B. Munkacsi, K. Karyalainen and A. Kannisto, also by Hungarian scholars (*Popular Beliefs* 1968; *Ancient Cultures* 1976), Finnish and Russian scholars (Aykhenval'd, Petrukhin and Khelimsky 1982; Gertsenberg 1975; Steblin-Kamensky 1995). Works by V. N. Toporov (1975; 1981) and G. M. Bongard-Levin and E. A. Grantovsky (1976) are also of particular interest.

The earliest layer of Indo-Iranian borrowings is defined by common Indo-Iranian, Indo-Aryan and proto-Iranian terms relating to three spheres of culture: productive economy, social relations and religious beliefs. Words pertaining to

the productive economy include domestic animal names ('sheep', 'ram', 'Bactrian camel', 'stallion', 'colt', 'piglet', 'calf'); terms connected with stock-raising products or processing ('udder', 'skin', 'wool', 'cloth', 'spinner'); farming terms ('grain', 'awn', 'beer', 'sickle'); names of tools ('awl', 'whip', 'horn', 'hammer' or 'mace'), probably the word for 'ladder' (or 'bridge'), and finally, 'metal (ore)'. A large group of words reflects personal, family and social relations (e.g., 'man', 'sister', 'orphan', 'name'), important Indo-Iranian social terms, e.g., *dāsa* ('non-Aryan, alien, slave') and *asura* ('god, rich, master, hero'). The word 'price' and words for numerals illustrate the establishment of exchange relations. Finally, a considerable part of the borrowed words reflects religious beliefs and practice: 'heaven', 'below (lower world)', 'god (happiness)', *vajra* (Indra's weapon), 'dead (mortal)', 'kidney' (organ of the body used in the Aryan burial rite) and names of stimulating drinks used both by Indo-Iranian priests and by Finno-Ugrian shamans, e.g., 'honey/mead', 'hemp', 'fly agaric'.

We may ask when and where could contacts occur between Indo-Iranians and Finno-Ugrian peoples where the latter accepted words and the skills of a productive economy, incipient social stratification, and a complex mythological system and developed ritual?

Decisive arguments for establishing the Finno-Ugrian homeland are the names for common plants and animals, which localize the territory of formation before its collapse to the forest zone of Euraia, excluding the far north (Chernetsov 1953, 1963; *Osnovy Finno-Ugorskogo yazykoznaniya* 1954; Veresh 1984-1985). F. P. Köppen, V. V. Radlov, and P. Hajdu (1985) initially placed it west of the Urals because of common words for 'elm', 'lime', 'ox', 'pine', 'bee', and 'honey'. Palynological research on archaeological sites of the 2nd millennium BC in the forest and forest-steppe zones of the Urals and western Siberia have recovered elm, lime, birch, aspen, and Siberian pine (G. N. Lisitsyna analyzed materials from the author's excavations in the southern Urals). It is known that wild bees are found in the Urals and in southern Siberia, where bronze objects, cast in wax molds, were found. This evidence convinces us of the view expressed by the majority of scholars, that the Finno-Ugrian homeland was situated in the Urals and southern Siberia. V. V. Napol'skikh (1997) provides the most detailed argument for a Uralic homeland that is demonstrated by palynological data. It is confirmed by common terms in the Samoyedic languages and borrowings from Paleosiberian languages (Helimsky 1988; Nikolaeva 1988).

In Siberia the beginnings of the productive economy, acquaintance with horse-breeding, and developed bronze metallurgy appear in the aboriginal settlements and in the cemeteries of Rostovka, Preobrazhenka, Samus' IV, Krokhalevka, etc., which are dated to the 14th–13th centuries BC and earlier (Matyushchenko 1988; Molodin 1973; 1977; 1985). The discovery of Andronovo ceramics of the Fedorovo type, metal objects specific to the Andronovo-Fedorovo metallurgy of eastern Kazakhstan and Semirech'e, which are decorated with images of animals found in the mountain-steppe regions of the Tian-Shan and Altai, are sufficient to suggest that Andronovo-Fedorovo tribes influenced their northern neighbors in the formation of the productive economy, horse-breeding and metallurgy on the southern taiga. A more powerful southern impulse from the Fedorovo type is evident in another group of sites of the pre-taiga zones of the Urals and Siberia. These comprise the following cultures: Cherkasul' (an-

other name is Zamaraevo and Mezhovka), Pakhomovo, Suzgun, Chernoozer'e, and Elovka, that are united under a single name 'Andronovoid' (Gening and Eshchenko 1973; Matyushchenko 1973a; 1973b; Kosarev 1974; 1981; Molodin 1985; Korochkova 1987; Obydennov 1986; 1997; Obydennov and Shorin 1995; Potemkina *et al.* 1995, Shorin 1988; Gening and Stefanov 1993; Gening and Stefanova 1994). Although they maintain their forest image with a predominant reliance on fishing and hunting as the main basis of the economy, they also indicate an acquaintance with incipient farming and stockraising (horse, cattle, and ovicaprid bones were found in settlements). By all the most ethnically sensitive features (domestic architecture, ceramic types, burial rite) they preserve the traditions of the preceding aboriginal cultures of the Eneolithic and Early Bronze Age, but stock-raising and bronze metallurgy point to the influence of Andronovo-Fedorovo populations. The forest zone ceramics were ornamented: the decoration reproduces the Fedorovo type although transformed (that is why this culture was called Andronovoid).

Scholars unanimously acknowledge this Andronovoid complex but differ in explaining its origin and ethnic attribution. V. I. Moshinskaya (1957: 134) and K. V. Sal'nikov (1964a: 22) suggested that the similarity in ceramics between the Andronovoid cultures of the forest zone and Andronovo resulted from the fact that both were formed on the basis of related Neolithic and Eneolithic cultures of the Urals and western Siberia. V. N. Chernetsov (1948: 151-153, table 6; 1951: 29; 1953: 61) traced the development of Fedorovo ornament from the Bronze Age to modern Ob-Ugrian decoration, although modern Ugrians employ Andronovoid ornament not on ceramics, but in dress and birch-bark (Chernetsov 1948: 139, Ivanov 1963: 161, fig. 100). Such a conclusion is still accepted without criticism (Veresh 1978; Potemkina 1983). M. F. Kosarev (1974: 149-151) also believed that the Fedorovo and Andronovoid Suzgun and Cherkaskul' sites in the Trans Urals were formed on the single base of "the development of the tradition of executing comb geometric decoration with a comb in the forest Trans Urals", but the appearance of the Andronovoid Molchanovka and Elovka cultures in the Ob region he explained by Andronovan migration and its influence on the Siberian aboriginals. He concluded that the Fedorovo culture was formed in the Urals and assigned it to the Finno-Ugrians. However, he stressed that "the assumption of an Andronovan (Fedorovo) and Elovka ethnic unity is far from indisputable" (Kosarev 1974: 157). V. N. Chernetsov's hypothesis must be rejected at present. Fedorovo monuments are discovered not only in the Urals but also in the south of Central Asia and Afghanistan, where Ugrians have never lived (see Chapter 3).

1) The hypothesis of an origin of the Fedorovo type in the Urals has been disputed. The sources for Fedorovo ceramic technology and triangular ornamentation are found in the Eneolithic of central and eastern Kazakhstan.

2) Although S. V. Ivanov`s (1964: 1-7) conclusion is based on much ethnographic material, the Andronovoid ornament complex is characteristic of the art not only of the Ob-Ugrians but also of peoples from other language families—Kets, Evenks, Dolgans, Yukaghirs and later Turkic-speaking Yakuts and Buryats. The Ugrian ornament complex includes: a) the simplest elements that originated convergently among different peoples of the world; b) elements characteristic of some Eurasian cultures including the Andronovo and Timber-

grave, and continued in the art of the Eurasian steppe peoples; c) specifically Ugrian elements (Ivanov 1963: 154-158).

It follows that survivals of the Andronovo ornamental tradition among Uralic-Samoyedic peoples do not prove that the Fedorovo people spoke an Ugrian language; it only points to the active and prolonged influence of Andronovans on both Finno-Ugrians and other Siberian peoples.

This deduction is in agreement with the conclusions of linguists that some terms connected with the productive economy in the Finno-Ugrian languages (as well as the Ket and Turkic language) are borrowed from Indo-European, first of all from Indo-Iranian and later Iranian (Joki 1973). As linguists set the Finno-Ugrian homeland in the Eurasian forest zone, where the productive economy appears in the second half of the 2nd millennium BC, i.e., the period of the spread of Andronovoid ceramics, the latter probably reflects Finno-Ugrian and other Siberian peoples' perception of Indo-Iranian cultural influences; this proves that the Fedorovo people belonged not to Ugrian but to Indo-European, most likely Indo-Iranian peoples, to some group that differs from Alakul' but is related to it. It must be mentioned that in the given Andronovoid ornamental complex there are specific Fedorovo, Alakul' and Kozhumberdy elements (Moshinskaya 1957: 124; Ivanov 1963: 161, fig. 100; Matyushchenko 1974; Kosarev 1974: fig. 32). This points to the influence of not only Fedorovo but other Andronovo tribes as well.

It is important for ethnogenetic reconstruction that the Fedorovo ornamental complex is present in the decoration of modern Iranian-speaking Tadzhiks (Bobrinsky 1900) and it is known in Hindustan where it has no sources in the local Eneolithic cultures and could spread only with the arrival of the Indo-Aryans. This supposition is supported by the evidence of handmade pottery in the more traditional districts of north-west Hindustan and textual materials on such technology spread by the Vedic Aryans.

If we identify the Andronovo tribes as Indo-Iranians then we can see the Andronovoid cultures as representatives of the Ugrians, and the boundary between the forest and steppe zones was the area of their contact with one another. Thus, the correlation of evidence on the ethnic formation of two different language families strengthens both independent hypotheses about the natural habitats of their locations.

An important argument in favor of both hypotheses is toponymics: the names of the sacred Ural mountains—*Ripa*—is fixed in both ancient Iranian and Ugrian traditions; the idea connected with a sacred Meru mountain is found in India and among the Finno-Ugrians; and also the common name of the sacred river Volga—*Ra* (Indian *Rasa*, Avestan *Raŋha*), the sources of which were the Kama and the Belaya rivers, flowing from the Urals (Grantovsky 1960; 1998; Bongard-Levin and Grantovsky 1983; Abaev 1972; Dovatur and Kallistova *et al.* 1982; Chlenova 1983a;1989; Marquart 1938; Christensten 1943).

Mythological data provide a third group of sources supporting this hypothesis. The formation of the Ugrian pantheon and the reflection in it of the cult of the three earliest Indo-Iranian gods, evidenced by Indo-Aryans in the 14th century BC in the Near East and among the Indians in the *Rigveda* and the Iranians in the *Avesta*. This reveals an acquaintance with Indra as shown by the borrowing of his sacred weapon, the *vajra*; there is Varuṇa, frequently compared to the sup-

reme god Numi-Torum in terms of functions and attributes: horse-drawn chariot; and Mithra, whose functions and common Iranian epithet 'world contemplating man' was adopted by Mir-Susne Hum, who is related (as well as his epithets) with a shining white horse. The connection with the horse, whose sacrificed burials and images in plastic art appear in the taiga zone on sites exhibiting Andronovo influence, proves that horse-raising was borrowed by the Finno-Ugrians along with the mythological ideas and rituals similar to the Indian *aśvamedha* (Moshinskaya 1978; Kuz'mina 1977). The formation of the image of Numi-Torum on a chariot can be safely dated to the 2nd millennium BC when chariots were used by the Andronovans in the steppes, as in the Scythian period chariot battle tactics were no longer used.

Other pantheon heroes such as Sornipos ('golden ray') and King Yima also demonstrate Ugro-Aryan contacts (Steblin-Kamensky 1995). Analysis of the image of the Mother-Goddess is of special interest. In Ugrian tradition she is referred to as a she-beaver and is depicted with two beavers at her sides or standing on a beaver (Skalon 1951; Kuz'mina 1988b; 1990; Chlenova 1989). This contamination between Indo-Iranian and Finno-Ugrian is connected with 1) the aphrodisiac power of beaver's secretion providing fertility; 2) the connection between the beaver and the two spheres of the Universe—the earth and underground/underwater—related to the mother-earth. It was assumed that the Mother-Goddess image associated with the beaver was borrowed from Ugrian peoples by ancient Iranians. In Yašt 5 of the *Avesta*, dedicated to Arədvī Sūrā Anāhitā, the 'stainless' goddess, she is dressed in a beaver coat. It is evident that such an attribute could appear only in antiquity when the beaver was first an embodiment, then a companion, of the goddess, and only in a zone where beavers lived. Analysis of osteological materials from the Andronovo settlements of Kipel', Novo-Burino, Alekseevka, Shortandy-Bulak, Ust'-Narym, and Malokrasnoyarka showed that in the Bronze Age beavers dwelt over the entire Andronovo area (Kuz'mina 1988c: 56-57; Afanas'eva 1960; Kozhamkulova 1969), although at present this animal is not found in Kazakhstan.

The beaver's name in the Indo-Iranian languages is common and refers to a water animal with sparkling brown skin—both beaver and otter as in the Ugrian languages (Gamkrelidze and Ivanov 1984: 2: 529-531). Correlation of the mother-goddess with the sphere of rivers and water animals is characteristic of all Iranian-speaking peoples: among Iranians she is protectress of the water, Arədvī Sūrā Anāhitā in beaver furcoat; among the Scythians, the ancestral mother, daughter of the Dnieper (Don Apris), a snakefooted nymph. In Greek art she is depicted with sea-horses, among the Ossetes she is the ancestress Dzherassy living in the depths of the water, the daughter of the water ruler Don Betyr and she is depicted as a turtle (Kuz'mina 1977; 1988c).

Probably the ideas about a world axis and the Sampo mill, the spirit of the wind, retained only in Finnish tradition, was connected with the earliest Indo-Iranian god of the wind, Vāta. Cults of Kara, a sacred fish of the Volga river, found in Ugrian tradition, and the fantastic elk Śarabha were, according to Th. Burrow, G. M. Bongard-Levin and E. A. Grantovsky, adopted by the Indo-Iranians from the Finno-Ugrians and they can be referred back to the same ancient period. The name of the Bactrian camel and its cult is an ancient Finno-Ugrian borrowing from Indo-Iranian (Kuz'mina 1963a). The practice of the

shamans also has Indo-Iranian sources. The open clothing of the Khanty (Prytkova 1953) that does not correspond to a northern ecology is an Andronovo borrowing. The information in Indo-Iranian tradition about the Arctic and northern lights was borrowed by the Greeks from the Scythians (Bongard-Levin and Grantovsky 1983) and can be connected with the spread of Andronovo bronze axes and tools to the Arctic Circle.

All this evidence supports the hypothesis that the Indo-Iranian homeland was situated in the neighborhood of the Finno-Ugrian zone and, therefore, one may assign the Indo-Iranians to the Andronovo culture.

Indo-Iranians and Greeks

Scholars have often stressed the special importance of areal isogloses and mythologemes between the Indo-Iranian and Greek worlds (Elizarenkova 1989: 438; Ivanov 1969b;1974; Ivanov and Toporov 1960: 15-16). As Mycenaean texts show that the Achaeans were in Greece already in the 16th century BC, the culture claiming Indo-Iranian attribution must archaeologically exhibit ties with the Mycenaeans. S. S. Berezanskaya (1971) was the first to pay attention to contacts between the population of the Pontic steppes and Mycenaen Greece in the Bronze Age, which is confirmed by the resemblance in the architecture of the stone-built burial chambers and by some categories of inventory. I (1977; 1978; 1980a; 1980b; 1981a; 1984b) have already mentioned the similarity of some object types from Petrovka, early Andronovo and Early Timber-grave sites, including arrows (important because in the Greek language an Iranian term is used for the bow and quiver, cf. Benveniste 1937). The main item of comparison is the spread into Greece of horses for chariotry, horse burials and cheek-pieces which compare well with those of Andronovo and show the specific importance of horse-drawn chariots in both regions and their common origin. The resemblance between archaic steppe cheek-pieces with tenons and Greek ones has been examined in Chapter 8. This similarity is of great importance, and to this we might add the spread of Mycenaean ornaments on the cheek-pieces (Karo 1930; Penner 1998), scepters and other objects in the steppes, especially along the Don (Figs. 38, 66, 67, 79). These facts are extremely important because myths connected with the horse, chariot and fast-running solar horse, are related to a number of regional Greek-Indo-Iranian correspondences (Vanderpool 1959; Crouwel 1980: 22; Nefedkin 2000: 111; Smirnov and Kuz'mina 1977: 42-50, fig. 11-12). At present new samples have been found on steppe sites proving the existence of connections with Greece (Sinyuk *et al.* 1985; Pryakhin *et al.* 1988a, b; Penner 1998). Current criticisms of these conclusions (Besedin 1996; Trifonov 1996) are not convincing (Kuz'mina 1998a, b; Penner 1998).

In Greek myth Apollo, the Sun god, was born in the north, in the Ripa mountains. In the vernal equinox white swans harnessed to a chariot carry him to Greece (Ivanov 1969: 54; 198). Ripa is the name of the Ural mountains, which are situated according to Indo-Iranian mythology in their homeland (Dovatur *et al.* 1982). In the Urals, on the vernal equinox, there is a mass swan migration (Chlenova 1983a). These facts support the existence of the areal Greek-Indo-Iranian contacts and the corresponding localization of the homeland in the steppes, to be more exact, in the Urals.

CHAPTER FOURTEEN

CONCLUSIONS TO PART ONE

This analysis of the material culture of the Andronovo tribes has been conducted according to the methodology outlined above and over a vast background of synchronous and diachronous archaeological cultures. The evidence has been viewed in the context of written documents, and linguistic, anthropological, and ethnographic data on the culture of the Indo-Iranian peoples; its conclusions have been verified independently by a variety of methods: 1) by establishing the time and direction of migration routes; 2) the analysis of anthropological data; 3) the combining of archaeological and toponymic maps; 4) the study of Indo-Iranian traditions about their homeland; 5) the possibility of interpreting the semantics of Andronovo art and rituals in the light of Indo-Iranian mythology and ritual practice; and 6) the evidence of contacts with Finno-Ugrian and Greek speakers. All of these have led me to the following conclusions.

The retrospective method establishes the succession of the Andronovo culture and the cultures of the Iranian-speaking Sauromatians and Saka, which replaced it in the 8th century BC. This follows not from an individual element of the complex but by the sum total of features, both belonging to one ECT (which defines the similarity of tools, composition of herd, partially house type) and ethnically diagnostic features, which are not connected with the sphere of manufacture and which as a result give extremely important information about ethnic succession thus serving as ethnic indicators (ceramics, clothes, ornaments, types of industrial technology, range of prestige animals reconstructed through the study of ritual burials and art that reflect a unity of mythological ideas, and the retention of functionally unconditioned traditions in production). The genetic connection between specific sets of weapons (spears, arrows), and horse gear (cheek-pieces, vehicles) is significant. The genetic succession of the steppe population is supported by anthropological data. It helps affirm the conclusions of previous researches and accepts the Saka and Sauromatians as the direct descendents of the Andronovo tribes and thus renders the Iranian or Indo-Iranian attribution of Andronovo justified.

Andronovo traditions are revealed in the culture of modern Iranian, Indian and relict tribes (domestic architecture in Ossetia, the Hindukush, the Pamirs and Hindustan, the type of light dwellings of Iranian nomads, the technique of hand-made pottery in the Pamirs and Hindukush, dress). The succession of anthropological type of some population groups has been traced. This too affirms the validity of attributing an Indo-Iranian identity to the Andronovo culture.

The analysis of the entire Andronovo natural habitat, and the reconstruction of its ECT as an integral system has led us to assign it to the central Eurasian zone and marks its utmost proximity to the ECT of the pastoral cultures of the Eurasian steppes, especially the Timber-grave culture, and marks it as

fundamentally different from the Indo-Near Eastern ECT type, seen in its agriculture, form of stock-breeding and herd composition, industrial character, settlements and houses types, dress, etc. In the Andronovo and Timber-grave area of the 17th–9th centuries BC there is no mass migration and no major cultural influences from the second order civilizations of Iran and southern Central Asia.

The combination method has shown that the ECT of the early Indo-Iranians, reconstructed by written texts, historic tradition, and linguistic and ethnographic materials, does not fit the Indo-Near Eastern zone but finds correspondences in the Central Eurasian zone in the circle of pastoral cultures of the Eurasian steppes. This is seen in the mixed economic type with stock-breeding dominant, herd composition (horse, cattle, sheep), character of industrial production (domestic production for the family, absence of specialized differentiated crafts for the market, hand-made pottery); house type (long term pole-supported structure with a ridged roof and light proto-yurt); dress which did not correspond to the ecological conditions of India and Iran and had no sources there, while the genesis of every category can be traced to the south Russian steppes from the Eneolithic period. The systemic character of connections is established not according to individual elements but according to a sum of interconnected culturally determining features which firmly connects the origin of the Indo-Iranian ethnos with cultures of the Eurasian steppes, first of all with Andronovo, Timber-grave and also with the related Tazabagyab and Vakhsh. They probably reflect the ethnographic cultures of different tribes of Indo-Iranians before their split in the steppe homeland long before they began their migration to India and Iran. Numerous Indo-Iranian tribes with cultural peculiarities and dialects are known from the *Rigveda* and *Mahābhārata*.

The method of surveying culture-indicative features specific only for the given ethnos was used as a further step in the comparison of Indo-Iranian culture, especially Indo-Aryan, with Andronovo. The most important ethnic indicators are: the absence of pig in domestic livestock; the presence of the Bactrian camel; the special role of horse-breeding and horse sacrifices; the special role of the horse-drawn chariot and its cult; the technique employed in making tripartite vessels by means of coil modeling; the form of unique square vessels; and cremation ritual. These confirm the validity of our attribution and make it possible to stress the specific similarity of some Fedorovo type features with Indo-Aryan.

The process of ethnogenesis in the steppes in the 2nd millennium BC was of an autochthonous character of development, involving integration and migration, which was strengthened in the 17th–16th centuries BC, probably because of the appearance of the chariot and bronze casting. In the west of Andronovo territory, the Sintashta-Petrovka type sites were formed as a result of the influence of western cultures (Poltavka, Abashevo, Catacomb, Multi-roller Ware); the Timber-grave culture was formed simultaneously under the influence of the same components.

Beginning from the middle of the 2nd millennium BC there was intensive assimilation and integration in the Andronovo region of the Alakul' tribes, that are genetically connected with the Petrovka and Fedorovka tribes, which led to a consolidation of the Andronovo culture. In the third quarter of the 2nd

millennium BC there was a settling apart of groups of the Andronovo population from Kazakhstan to south Siberia and Central Asia. Gradually the pastoralists mastered new ecological niches; the highlands of the Pamirs and Tian-Shan and the deserts of Central Asia. The first wave of Indo-Iranian migration to the south is dated to the Novokumak period.

Population movements in the steppes were governed by the character of their pastoral economy that demanded a change of pastures every 20-25 years, and with increased livestock there was a need to widen the areas of pasture. This led to the rise of more progressive semi-nomadism and then to the nomadic form of pastoralism. The premises for mastering new territories were slowly developed in the 2nd millennium BC as a result of the normal development of the pastoral economy: a herd (cheese, koumiss); suitable dress; orientation skills; discovery of wells. The complex of these conditions created the possibility for migration to the south. Its reasons were concealed in the very character of extensive stock-breeding and the unstable ecology of the steppes.

The penetration of the speakers of the various Indo-Iranian dialects to the south was a process which was both long and which occurred at different times. Also, it did not involve the mass change of the aboriginal population. This type of migration to a zone of a more progressive ECT involves craftsmen remaining aborigines and newcomers acquiring the cultural complex by adjusting to the new ecological niche. It is archaeologically established first of all by changes in the spiritual sphere and by separate innovations in material culture that serve as ethnic indicators. At the end of the 2nd millennium BC in the south of Central Asia, in Iran and in the north of Hindustan such innovations comprised the appearance of hand-made ceramics, technologically non-conditioned ornamentation with modeled rollers; a wooden house with ridged roof; proto-yurt; and costume. These artifacts had no sources in the local culture and were ecologically alien to it, as well as the horse, chariot, and camel cult reflected in art and ritual and tumulus burial and cremation. Their appearance in the south witnesses the arrival of a new population from the Asian steppes. It is possible to connect the spread of different Indo-Iranian dialects with this population.

PART TWO
THE MIGRATION OF TRIBES AND THEIR CULTURES IN CENTRAL ASIA

CHAPTER FIFTEEN

CULTURES OF CENTRAL ASIA IN THE 4TH–3RD MILLENNIA BC

A number of economic and cultural zones formed in Central Asia during the 4th–3rd millennia BC. In the south, in Turkestan (the future Parthia), the lowland territory and the lower reaches of the Tedjen river saw the development of the farming culture of Anau brought about by migration from Iran (Pumpelly 1908), or Namazga (Masson l966, 1982; Masson and Sarianidi 1972; Kohl 1981).

According to the chronologies of B. Kuftin and V. Masson, stages I to III date to the Eneolithic. In the Namazga III period a new wave of migration from Elam into the oasis of Geoksyur is presumed which is documented by the similarity of ceramic ornament. The Eneolithic culture is represented by multi-layer settlements—tepes made up of blocks of multi-room houses and sanctuaries (Masson 1962, 1982: 58-60; Sarianidi 1962)—Anau (the northern hill), Namazga, Kara-depe, the Geoksyur oasis on the Tedjen. The economy was based on irrigation farming supplemented by the breeding of sheep, goats, Bactrian camels, and a southern breed of zebu-like cows (Tsalkin 1970; Ermolova 1976). Ceramics were hand-made and painted. Metal articles were made of imported forged copper (Kuz'mina 1966; Terekhova 1975). The dead were buried in the settlements under the house floors, and in the Namazga III epoch—in round burial-vaults or tholoi. The clay figurines reflect the cult of a mother-goddess.

The Bronze Age, the stages of Namazga IV and V, is marked by the appearance of large fortified towns: Namazga at 50ha, Altyn-depe at 26ha, Ulug-depe at 20ha, and by the development of full craft specialization. The potter's wheel was employed for making pottery (Masimov 1976). Special furnaces were used for firing pottery and casting metalwork. Four-wheeled wagons drawn by a pair of oxen or camels became common (Kuz'mina 1980b, 1983; Fig. 94).

The Anau culture reached its florescence in the Namazga V period (Masson 1964, 1966, 1976, 1981, 1982; Masson and Sarianidi 1972). Social stratification occurred. At the capital settlement of Altyn-depe one can distinguish blocks with large houses for the nobility and those of craftsmen engaged in making unornamented standardized ceramics and various articles of arsenical bronze, not forged but cast according to the lost-wax method. Rich burials came into being. Ideological concepts became more complicated, as evidenced by a four-tiered cultic construction at Altyn-depe, clay figurines of goddesses, and crosslike metal objects and zoomorphic seals. Imports from Tepe-Hissar and Harappa reflect wide cultural relations.

Simultaneously with the development of the farming culture of Anau, the settlement of Sarazm emerged in the fertile valley of the Zeravshan, 45km east of Samarkand (Isakov 1991; Lyonnet 1996). It was founded by the former occupants of the Geoksyur oasis in the lower reaches of the Tedjen with a view to

mining the rich deposits of polymetallic ores and turquoise. These riches attracted also the farmers of Baluchistan, who constitute the second component of the Sarazm culture. The conclusions concerning the genesis of this culture are based on the analysis of the ornaments of the ceramic complexes and imported articles. In the development of Sarazm four stages are distinguished, dated by the radiocarbon method from 3400 to 2000 BC. Sarazm is an enormous settlement of 100ha, consisting of multi-room houses with temple-sanctuaries, and in Period III—with palaces. The economy was based on irrigation and, partially, bogar farming (i.e., semi-irrigated and only in spring) and the breeding of ovicaprids and cattle. In periods I-III the ceramics of Sarazm were hand-made and painted; in period IV (2700-2000 BC) the potter's wheel appeared. The working of turquoise, lapis lazuli, and agates was developed. Yet the staple branch of the economy throughout these periods was the extraction and smelting of metal, which is evidenced by the findings of furnaces, clay molds, crucibles, a lead ingot weighing 10kg as well as numerous metal articles. We thus may consider Sarazm as the largest metallurgical center of Central Asia engaged in export. Sarazm enjoyed wide relations from Iran up to Baluchistan and Seistan. In the 3rd millennium BC wide contacts were characteristic of the ancient Near East as a whole (Amiet 1986; Lamberg-Karlovsky 1994).

Another outpost of the ancient Near East civilization was the settlement of Shortughai in the north of Afghanistan in ancient Bactria, located on either bank of the Amu-Darya (Francfort 1977, 1989). The excavations of the hills of the settlement brought out the dynamics of its development. Four stages were distinguished. The settlement came into existence as a colony of the Harappan culture, which is documented by the typically Harappan building technique, the ceramics bearing Harappan decoration made on the potter's wheel, a seal, beads, and articles made of shell. The Indian colony is likely to have been set up in order to develop the rich neighboring deposits of lapis lazuli; by controlling this trade it was possible to establish wide cultural relations. Based on the radiocarbon dates H.-P. Francfort sets stage A to 2200-2000 BC and points out relations with Harappa, Mundigak IV, Shahr-i-Sokhta III-IV, Yahya IVB – Bampur V-VI, Kulli, Shahdad, and Hissar IIIC.

Possibly, another center of the 3rd millennium BC farming culture will be discovered in the fertile valley of Fergana. Our hopes are aroused by the finding here of the Khak hoard containing copper articles of the Hissar III type and of two stone weights of ancient Near Eastern type (Voranets 1956; Kuz'mina 1966, Besenval l987, fig. ii).

Thus in the 3rd millennium BC the lands of southern Central Asia and northern Afghanistan, suitable for irrigation farming or rich in mineral resources, were occupied by a farming population that had migrated from various regions of the ancient Near East: from Iran (including Elam), Baluchistan and India. The migrants brought with them the achievements of Near Eastern civilization: the producing economy (domesticated wheat, barley, ovicaprids and cattle, including zebu-like cattle), the skills of manufacturing painted ceramics, metallurgy and metalworking as well as wheeled transport, which enabled wide exchange relations to be established.

What is the ethnic origin of the various groups of farmers of southern Central Asia's south?

I. M. D'yakonov (1967: 85-87, 108-112) suggested that the Elamite language of south-western Iran and the Dravidian language of India were related and that they separated prior to the 3rd millennium BC. This hypothesis was substantiated by D. MacAlpin (1981). Dravidian is considered to have been the language of the population of southern Turkmenia (Litvinsky 1963: 128; Masson 1977: 115-118). H.-P. Francfort (1989) assumes that the Bactrians spoke Elamite. The majority of serious linguists hold that the Harappan civlization was created by Dravidians (Parpola 1974, 1988; Witzel 2001) or Dravidians and Munda (Bongard-Levin and Gurov 1988; l990; Kuiper l993).

At the end of the 3rd millennium BC the ancient farming communities in the wide zone comprising the south of Central Asia, Iran, Afghanistan, Baluchistan and the south-east of Hindustan underwent a crisis. There is evidence of population decline (Namazga fell to 2ha), other settlements generally fell into a decline, e.g., Altyn-Depe, Sarazm, Shortughai, Tepe-Hissar III, Shah-Tepe, Tureng-Tepe, Shahr-i-Sokhta, Tepe-Yahya, Mundigak; and the Harappan civilization in India perished. What caused the crisis is not yet clear. Scholars have proposed ecological disasters: earthquakes, floods, drought, and soil exhaustion. M. Wheeler (1968) attributed the fall of Harappa to an Aryan invasion from the north. However, the picture appears to have been much more complex. The florescence of culture in Central Asia led to a demographic explosion. The ecological resources of the oases became insufficient for feeding the increased population. At some settlements it appears as if the crisis progressed gradually. The most plausible hypothesis seems to be that which was advanced independently by B. and R. Allchin (1988) and G. Bongard-Levin (1963, 1979, 1981; Bongard-Levin and Gurov 1988, 1990). In Eurasia during the late 3rd millennium BC there occurred an ecological crisis that aggravated the existing acute economic problems, thus triggering an internal political crisis and gradually leading to the widescale disaster. The collapse of most of the large settlements enabled the pastoral tribes that were situated on the borders of the farming oases to occupy the partially abandoned lands and to subjugate and gradually assimilate the indigenous population. As a result, following the crisis period, there formed new cultures. However, let us remember that this is just a hypothesis.

If in the 4th–3rd millennia BC the oases of south Central Asia continued the farming cultures of Western Asia and India, what was happening in the same period in the other regions of Central Asia?

In Tadzhikistan there existed an extremely primitive culture, the Hissar (Ranov 1998). This population was engaged in hunting and used archaic stone implements. In the north over the vast territory embracing the northern shores of the Caspian Sea, the region near the Aral Sea (future Chorasmia/Khorezm) and the Buchara oasis in Transoxiana there emerged the Kelteminar culture (Vinogradov 1968, 1981; Vinogradov *et al.* 1996; Gulyamov *et al.* 1966). The specific ecological conditions predetermined the main economic and cultural development of this region. Paleoecological research has established that during the 4th–3rd millennia BC this was the period of the Lyavlyakan pluvial (Vinogradov and Mamedov 1975: 234-55), when the present-day deserts were a series of impassable marshes and lakes. The lakes abounded in fish and waterfowl that made fishing the staple of the Kelteminar economy. The population dwelt in camps in large clan cabins (shelters). Though over 800 Kelteminar sites

have been examined, none have yielded either cereals or the bones of domesticated animals. "There are no elements of the producing economy… present" (Vinogradov 1981: 146, 147).

A. A. Formozov (1959: 155) drew the boundary between the zones of European and Asiatic Neolithic cultures along the Emba river. Subsequent research has confirmed the cardinal differences in the development of the Neolithic and Eneolithic cultures in the European and Asian zones of the steppes, which enables one "to speak of their belonging to different cultural domains" and to assign the sites of the Volga Region, the Urals and the north Caspian to the western Pontic-Caspian circle (Ivanov and Vasil'ev 1995: 121). In this zone in the 4th–3rd millennia BC one can trace a gradual development of the producing economy under the influence of the farming cultures of the Carpathians and the Danube (Vasil'ev and Vybornov 1988; Vybornov and Sinuk 1985; Rasamakin l999; Kuz'mina 1996-97; 2003).

By contrast, in the Asian part the proximity of the southern farmers did not result in the formation of an agricultural economy and the subsistence of Khorezm's Kelteminar population was based on fishing and hunting water-fowl, and in the steppes of Kazakhstan—on the seasonal hunting of ungulates (for a discussion about an independent center of horse domestication in Kazakhstan see *PSAH*). These ecological and archaeological data rule out the very possibility of a mass migration of Indo-European farming populations from the Middle East through Central Asia into the Pontic-Caspian steppes, which was suggested by T. Gamkrelidze and V. Ivanov (1984) and all the more so of the localization of the Indo-European homeland in Central Asia, as suggested by J. Nichols (1997), or in Bactria (Sergent 1997). On the contrary, not only was there no migration from Central Asia into the steppes but also the contacts of the farming population with the northern tribes were very sporadic and did not lead to a change in the economic and cultural type. In Sarazm unprepossessing ceramics were found comparable with those of the Kelteminar and Pit-grave-Poltavka cultures (Lyonnet 1996: 49, pl. v, vi: 8). A. Vinogradov (1968: 146-150, fig. 62) identified some influence of the southern forms and ornaments on Kelteminar pottery in Khorezm, but it was only on the late Kelteminar settlement of Lyavlyakan 506 that molds for the ax-adze and ax-hammer of the southern types were found (Vinogradov and Kuz'mina 1970) along with a workshop for preparing turquoise; and in the Dam-Dam Chashme and Jebel caves in Trans-Caspia bones of sheep were discovered, probably domesticated, and ceramics of the Shah-Tepe III-II and Kyzyl-Arvat type (Tsalkin 1956: 220, 221; Shnirel'man 1980: 74, 75). But these contacts were sporadic.

On the other hand, during the drought in the steppes and the completion of the Lyavlyakan pluvial there can be traced an eastward advance from the territory of the Pontic-Caspian steppes of late Pit-grave tribes, apparently, under the influence of the Catacomb culture. They brought to Siberia farming and cattle-breeding skills, cereals and domesticated animals as well as metallurgy and wheeled transport and established the Afanas'evo culture (Vadetskaya 1986; Tsyb 1984; Semenov 1993; Gryaznov 1999: 51-54). Many associate the Afanas'evo culture with the Tocharians (Pulleyblank 1966, 1996; Mair 1998; Mallory and Mair 2000).

Some similarity to the sites of the Pit-grave culture are seen in burials from the cemeteries of Ubagan and Verkhnyaya Alabuga on the Tobol river (Potemkina 1985: 151-155, 201; fig. 63: 1-9) and in a mound surrounded by a stone circle from Karagash in Central Kazakhstan (Evdokimov and Loman 1989: 34-46; fig. 5). The dead were buried in keeping with the Pit-grave rite on their backs with the knees raised, accompanied with ocher, copper and stone articles and round-based ceramics with stamped ornament. In Karagash the bones of sheep and cattle were found. Anthropologically, this burial is of the Pit-grave type.

Under the influence of a western impulse at the end of the 3rd millennium BC we find for the first time among the late Neolithic sites of Kazakhstan the bones of domestic ovicaprids and cattle of East European breeds and also those of the horse (Formozov 1950; Chalaya 1977; HKSSR 1977; Makarova and Nurumov 1989).

The earliest culture in Central Asia reflecting the active ties between the farming and steppe populations is the Zaman-Baba in the oasis of Bukhara (Gulyamov *et al.* 1966: 118-186; Kuz'mina 1958, 1968). The steppe component is seen in the form of a semi-subterranean hut at the settlement and the burial rite of the Pit-grave and Catacomb type in a kurgan, the presence of chalk, ocher, animal bones, and a form of round-based and pointed-based ceramics comparable with the Pit-grave and in part Catacomb types, yet devoid of ornament. Having arrived at the Zeravshan river, the pastoral population came into contact with the farmers, representatives of the late Sarazm and Namazga V cultures of the Hapus-depe settlement.

The southern component is expressly represented by wheel-made ceramics, accounting for 10% of the vessels, ceramic kilns, painted vessels of the Mundigak IV type, two female figurines and copper pins with a shovel-like top, mirrors, various beads of turquoise, lapis lazuli and other stones as well as beads of paste made in the shape of a Maltese cross.

The economy of the Zaman-Baba culture was complex: imprints of wheat and barley grains were found along with grinding stones and sickle blades; in the osteological assemblage wild animal bones constituted 15%, while 85% belonged to the cow, sheep and donkey, domesticated in the south.

The cultural characteristics of the Zaman-Baba culture do not make it possible to assign it to the BMAC and date it to the second quarter of the 2nd millennium BC (Askarov 1981) or to the turn of the 2nd–1st millennium BC (Sarianidi 1979). A wide range of analogies with Namazga V, Shah-Tepe II, Hissar IIIB, and Mundigak IV determines its date as the first quarter of the 2nd millennium BC or earlier if the radiocarbon dates are to be accepted. The cultural synthesis, for the first time attested in Zaman-Baba, then becomes characteristic of the cultures of Central Asia throughout the historic epoch.

CHAPTER SIXTEEN

THE INDO-ARYAN MIGRATION AND THE FIRST STAGE OF THE ANDRONOVO MIGRATION TO THE SOUTH

The problem of migration

To verify the hypothesis that the Indo-Iranian homeland lay in the Asiatic steppe the issue of migrations both within the Eurasian steppes and neighboring regions is very important. First we need to examine the problem of recognizing migrations in the archaeological record.

Gordon Childe's *The Aryans: A Study of Indo-European Origins* was published in 1926. Here he examined the problem of the Indo-European homeland. This fruitful trend was however for a long period compromised by the school of Gustav Kossina whose works were strongly nationalistic. During the difficult years of the ideological struggle of the 1930s, Soviet archaeologists transferred N. Ya. Marr's stadial theory, propagated initially in linguistics, to archaeology. They rejected the idea of migration and began to support an autochthonous theory. A. A. Formozov (1959b) must be honored for acknowledging the role of migration as an important factor in ethnogenesis. Migration is a complex historic process. N. Ya Merpert (1978: 9-27) singled out types of migration of the Neolithic, Eneolithic and Bronze Age. D. Dietz (1973: 1-14) worked out a template of *migration* criteria with a complete transfer of culture. R. Hachmann (1970) and L. S. Klein (1973: 1-14) noted cultural transformation during the adaptive process to a new ecological niche and the inclusion of new groups in the process of migration (corporative by-pass migration) and spoke skeptically about the possibility of identifying them. V. S. Titov (1982: 89-114) paid special attention to the reflections of anthropological migration and the external signs of invasion (fires, hoards, etc) and he developed a tree models of substratum – superstratum relations. C. Renfrew (1987: 120-144) stressed the role of social and economic factors and outlined three models: demographic (expansion in search of resources, often gradually from one center); elite dominance (submission of aborigines by a small group of emigrants); and the model of systems collapse (economic and social crisis of aboriginal culture simplifying migration from one center or from some periphery). This model had already been employed by G. M. Bongard-Levin (1963) in connection with the arrival of the Indo-Aryans in the Harappan civilization. Yu. V. Bromley (1983: 273-283) emphasized the role of migration in ethnogenesis and the process of social stratification and the importance of mixing and bilingualism. V. P. Alekseev (1986: 5, 8-10) discussed the possibility of preserving an aboriginal anthropological type during an ethnic shift, focusing on the characteristics of the newcomers during intermarriage and bilingualism. I. M. D'yakonov (1982) approached the problem on the basis of documentary analysis and demonstrated that migrations in the

Near East, even when they led to language shift, were not always reflected in the archaeological record. I (Kuz'mina 1981a: 103, 104; 1986c: 174, 175) studied the question of the reflection of migration in the economic and cultural zones (ECT, cf. p. 13):

A. Migration from a more advanced ECT to the zone of a less advanced type.

1. Colonization (or systematic migration): the culture and language of the superstratum are completely transferred; the substratum population is ousted or it survives within its own ECT. The archaeological reflection is a widening of the culture's natural habitat (including discrete settlements). Examples are the colonies of the Harappans, Phoenicians, Greeks, Roman camps, Russian settlements in Siberia. This type of migration must not be confused with cultural borrowing.

B. Migration within a single ECT.

1. Colonization (or systematic migration): the culture and language of the superstratum are completely transferred; the substratum population is ousted. The archaeological reflection is an expansion of the culture's natural habitat.
2. Assimilation: migration in one direction (single trajectory) or in different directions from one center (radial), often slow and in stages, resulting in steady contacts with the substratum population that influences the culture greatly. The archaeological reflection is the formation of a local culture variant, and with continuous isolation we expect divergence. The superstratum language shares isoglosses with the substratum; sometimes, if bilingualism continues the substratum language wins. Conclusions about language shift or preservation are impossible without additional data.
3. Integration: the migrating bearers of one culture (single trajectory) or an amalgamation consisting of the bearers of several cultures, leads to the interaction between the substratum and one or several superstratum cultures. The archaeological reflection of this scenario would be the formation of a new archaeological culture as a result of the combination of its several elements ('blocks' to use the language of V. S. Bochkarev). There is a substratum language or one of the superstrata with isoglosses of others. Conclusions regarding the language are impossible without additional data.

C. Migration from a more backward ECT to a more advanced.

1. Colonization which in this zone presupposes a mass invasion (in contrast to A and B) as a result of a conquest which is often attributed to a preceding crisis or collapse of the substratum culture due to internal social and economic reasons. The archaeological reflection sometimes consists of traces of violent destruction, fires, hoarding on sites of the substratum culture, which are covered by a layer of a new culture; there may be the formation of a new regressive culture, in which gradually the old superstratum elements re-emerge at the expense of the migrants who have had to adapt to a new ecological niche; there may be the inclusion of aboriginal craftsmen. Innovations appear in the spiritual culture (burial rite, art images), also in military art and the appearance of some features of culture and production that are not ecologically and functionally preconditioned. The superstratum language is established. In the case of an amalgamated migration

the substratum language can be preserved. Examples are Central Asia, the Turkish conquests of the Byzantine empire, the Barbarian conquest of the Roman empire.
2. Elite assimilation and integration: the migration of a small group, unified and possessing a military advantage and establishing its political supremacy. Here the newcomers adopt the aboriginal culture. The archaeological reflection is the preservation of the substratum culture, innovations in spiritual culture (burial rite, iconography) in some ecologically and functionally unconditioned elements, sometimes in military technology, defensive architecture, aristocratic burials that point to social stratification. It is impossible to draw conclusions on the preservation or shift of language without additional data. In the case of a superstratum victory (integration) it fixes borrowings from the cultural and social vocabulary (scribe, literary texts, priest, temple, palace, specialized craftsmen), notations of a new type of economy and a new ecological sphere (including semantic shift, e.g., Proto-Indo-European 'willow' in Hittite becomes 'olive-tree'). Deities of the substratum religion are incorporated. In the case of a victory of the substratum language (assimilation) this establishes onomastic innovations, some lexical borrowings, especially in military technology. A new language is formed in the case of long bilingualism.

Thus, the reflection of migration in culture, and hence in archaeological culture, is in the first place dependant on the ECT of the migrating participants and its direction; the direction of language shift is even more difficult and it is probably dictated largely by social factors. Anthropological traces of migration are sufficiently clearly fixed in a change of anthropological type in the case of a mass migration of a population, that replaces the aboriginals or in the appearance of mixed types in the case of intermarriage and processes of integration; here the substratum type often dominates. These three processes: culture, language and change in anthropological type are sometimes independent and differently directed, and ethno-genetic conclusions are possible only as a result of a complex comparison and mutual correction of all kinds of sources.

Analysis based on a large body of material concerning migrations, drawn from written sources, permits one to posit possible models of Indo-Iranian migration. According to the hypothesis of V. V. Ivanov and T. V. Gamkrelidze we should expect a migration of type 1, i.e., the colonization of the steppe by Iranian farmers, who brought with them from the Near East the whole complex of civilization, and into eastern Iran and India they carried an archaeological culture formed in western Iran. Both the first and the second supposition are archaeologically disproved: even supporters of the early appearance of the Indo-Iranians in Iran and their association with Grey Ware (T. C. Young, J. Deshayes, R. Dyson, I. N. Khlopin) posit its origin in the 3rd millennium BC in eastern Iran and a later spread to the west only at the end of the 2nd millennium BC from the east. V. I. Sarianidi (1990) localized the Indo-Iranian complex in eastern Iran and argued its spread into Baluchistan and to the south of Central Asia. At present he suggests connections of the Proto-Indo-Iranians with Greece (without taking into account the chronology of Achaean migrations) and the arrival of Indo-Aryans from the Near East; he connects their culture with the Bactria-Margiana Archaeological Complex (BMAC). In the latter he sees the main sources of Zoroastrianism (Sarianidi 1998). There is serious criticism of this hypothesis

(Mallory 1988; VDI 1989). Neither of these hypotheses explains the formation of the Indo-Iranian steppe peoples: the Scythians, Sarmatians and Saka, as well as the early contacts between the Indo-Iranians and the Finno-Ugrians.

This does not permit an acceptance of the Near Eastern hypothesis and it confirms a steppe localization as the Indo-Iranian homeland. Moreover, abundant evidence for the cattle-raising character of Indo-Iranian economy in their language and in the Avesta and Vedic tradition are totally neglected.

Migration in the Eurasian steppe and neighboring regions

Until the present there have been two competing models for the Bronze Age of the Eurasian steppe: migration and autochthonous development. The main achievement of the past decades has been the establishment of a new view of the process of cultural formation. In the history of the steppe there are periods that are probably connected with cultural innovations, e.g., the establishment of settled stock-breeding and its replacement by pastoral nomadism, the transition to bronze or iron metallurgy, the mastery of chariots or horse-riding. When the smooth cultural development of the steppe is seen to be broken we find considerable evidence for the migration of ethnic groups and the regrouping of cultural features. As a result, new cultures are formed on the basis of similar components and these are termed 'cultural blocks'. Their specific composition is conditioned by the varying degrees of substrate elements and the interaction of cultures that come into contact during corporate migration.

Uncovering the direction of steppe migrations during the 2nd millennium BC is the most important method employed in verifying the hypothesis that the Andronovo tribes were Indo-Iranian. What were the ethnic movements and what was the nature of interactions across ethnic units?

We can discern three periods in the history of the Eurasian steppe: 1) the first quarter of the 2nd millennium BC when earlier cultures decayed and there emerged two large cultural entities—the Timber-grave culture of the European steppe and forest-steppe and the Andronovo culture of the Asian region; 2) the 15th–13th centuries BC when there was a period of stabilization and the Timber-grave and Andronovo cultures engaged in extending their territories through the colonization of new lands and by forcing out or suppressing native populations whose influence would precondition the formation of local variants; and 3) the 12th–9th centuries BC when there was considerable increase in activity between cultures and migrations primarily to the south and east.

The first stage of Andronovo migration

At the end of the 3rd/first quarter of the 2nd millennium BC there were considerable ethnic movements across the Eurasian steppe. These were probably stimulated both by an ecological crisis—increased steppe aridity (Kremenetsky 2000; Spiridonova 1991) and the consequential introduction of pastoral nomadism—and the improvement of both transport and bronze metallurgy (Map 8). The Poltavka culture formed on the basis of the Pit-grave expansion from the

Middle and Lower Volga to the southern Urals and the north Caspian region as far as Mangyshlak (Fedorova-Davydova 1964: 23-90; Kuz'mina 1976: 25, 26; materials from site surveys by I. B. Vasil'ev, A. N. Melent'ev, V. D. Beletsky; Vasil'ev *et al.* 1986; *Problems of Ancient History* 1990). The Don saw the migration of Catacomb tribes (Kiyashko 1974: 18; Bratchenko 1976: 117-118; Kachalova 1972). Catacomb and then Multi-roller sites appeared along the Volga. The Abashevo culture moved to the east (Kachalova 1976a; Kachalova and Vasil'ev 1989; Kuz'mina, O. 1979; Malov 1986; 1989).

G. B. Zdanovich (1979a; b; 1988) surveyed the early Andronovo sites of the Petrovka type in northern Kazakhstan and he suggested that they were formed on the basis of the local Neolithic Vishnevka type complex although he also admitted some influence from the western Abashevo culture and possible ties with Central Asia.

The discovery of the Sintashta cemetery in the Urals with its burials of warrior-charioteers accompanied by a rich set of arms, chariots, pairs of draught horses and cheek-pieces for their harnessing and burial 25 in the Novy Kumak cemetery prompted K. F. Smirnov and myself (1976; 1977) to propose a Novokumak chronological horizon that unites sites of the Urals and western and northern Kazakhstan. On the basis of the stratigraphic position of the Novokumak kurgan the horizon can be set between the Catacomb culture and the developed Andronovo culture of the Alakul' type. At this time the characteristic cheek-pieces are found as far as Mycenae and the horizon is dated to the 17th–16th centuries BC. Most important is the bold suggestion that the Novokumak-Sintashta horizon formed in the Urals as a result of a migration from the west and the assimilation of several East European cultures—the Catacomb culture (in its later development as the Multi-roller Ware culture), the Abashevo culture (within the large number of Corded Ware cultures of Europe), and the Poltavka culture which reflects a later derivative of the Pit-grave culture along the Volga and in the Urals.

The most important characteristics of the Novokumak sites that help define an ethnic group—kurgan burial, timber structure in burial chamber, ritual animal burials, cult of the horse and vehicle—derive from Eastern Europe; they are not found in the local Neolithic which itself may be traced to west of the Urals during the 4th–3rd millennium BC. The similarity among jars and pot-like vessels with a ridge on the shoulder among the Sintashta, Petrovka and Poltavka cultures is a product of their method of manufacture. Another important component of the Novokumak horizon is the Abashevo culture which is demonstrated by vessels of particular Abashevo form with projection on the rim of the vessel, Abashevo types of decoration and some features of the burial rite (flat graves). The similarity with the Multi-roller Ware culture is seen in the distribution within the Novokumak complexes of vessels that imitate Multi-roller types in form and ornament, modeled cones, herring-bone motifs divided by vertical lines (Smirnov and Kuz'mina 1977: fig. 9). V. F. Gening (1977) accepted the participation of western cultures in the formation of Sintashta.

Potapovka burials and Utëvka VI, which has been assigned to the Potapovka type, are related to the burials from the Urals; at present they are known in the Middle Volga region. They are considered to be the genetic predecessors of the Timber-grave burials (Vasil'ev *et al.* 1991; 1992; 1994; 1995). Elite warrior

burials with weapons and cheek-pieces that have been recovered from the Don region are assigned to the Don-Volga Abashevo culture (Pryakhin and Matveev 1991; Pryakhin, Besedin *et al.* 1989; 1990; 1991; 1998; Pryakhin and Besedin 1998; Matveev *et al.* 1995) or to the late Pokrovskiy-Abashevo culture (Sinyuk 1996; Sinyuk *et al.* 1995).

Stratified sites provide information concerning the formation and development of these complexes. The earliest Catacomb culture on the Don is replaced by the Abashevo culture which is, in turn, covered by the Timber-grave culture (Matveev *et al.* 1995: 78; Sinyuk *et al.* 1995: 40-49; Moiseev *et al.* 1995: 75).

A series of Catacomb sites have been found on the Lower Volga which precede Timber-grave sites (Malov and Filipchenko 1995; Dremov 1996). The coexistence of the Poltavka and Abashevo complexes has been established for the Middle Volga in Aleksandrovka (Vasil'ev *et al.* 1995). At the settlement site of Kuysak in the Urals the lower layer exhibits Poltavka ceramics; the middle layer is mixed with Abashevo ware; and in the upper layer vessels of the Sintashta type are found which reflect a synthesis of the original components (Malyutina *et al.* 1995). Along the Ilek, isolated Poltavka burials are found in the cemeteries of Zhaman-Kargala, Tanabergen and Imangazy-Karasu; subsequent burials, situated in a circle and destroying the earlier ones, were of the Sintashta type (Tkachev 1996: 64; 1998: 42). At the cemetery of Bol'shekaragan in kurgans 11 and 24 one finds Poltavka and Sintashta vessels coexisting; the later ceramics of kurgans 20 and 22 are similar to those of Petrovka and the Timber-grave culture (Batalov *et al.* 1996: 86-88).

There is evidence that permits us to distinguish two stages within the Novokumak horizon. On the settlement of Ust'e the earlier occupation belongs to the Sintashta type with its oval plan while this is covered by a later settlement of rectangular form which may be assigned to the Petrovka type (Vinogradov 1995a: 17; 1999). The same sequence is evident from other settlements on the basis of aerial survey (Batanina 1995; Zdanovich G. and D. 1995: 50; Zdanovich 1997: 59; Nelin 1999: 17). A similar development from Sintashta to Petrovka type has been observed in the cemeteries of Krivoe Ozero, Stepnoe, Kamenny Ambar, Bol'shekaragan, Tanabergen (Vinogradov 1995a: 26; 1999: 66; Kostyukov *et al.* 1995: 173; Batalov *et al.* 1996: 86-88; Tkachev 1995; 1998: 42-46; Epimakhov 1998: 180; Figs. 59-64).

Thus, the formation of the complexes of the Novokumak horizon occurred due to the assimilation of tribes living in the vicinity of the Urals who belonged to the wide range of European cultures—Pit-grave, Poltavka, Catacomb and the more northerly Abashevo. They played different roles in the various regions which accounts for their local characteristics. They probably witnessed a long process of consolidation which presupposes a bilingual population. This is why it does not seem accurate to provide a purely Aryan attribution to the Sintashta people.

There is no evidence so far for the participation of a local substrate in these processes (Matveev 1998) which contradicts the opinion of G. B. Zdanovich (1997). In the next stage, the Petrovka phase, there was a consolidation of culture, the bearers of which spread across northern and central Kazakhstan and into Central Asia; this reflects the beginning of the early migration of the Andronovo population.

Sites of the Novokumak horizon share similar features: the syncretic character of the culture and the appearance of chariots and the armament associated with the chariot-driving warriors. What was the reason for these innovations and what was the source?

K. F. Smirnov and myself (1977) suggested that the impulse of these ethnic and cultural innovations was a migration by representatives of several cultures to the east. These cultures already formed the basis for future innovations which was stimulated by their contacts with more developed cultures along the Danube and the Caucasus. V. S. Bochkarev (1991) suggested the idea of a center of cultural genesis in the Volga-Ural region. This idea is shared by A. T. Sinyuk (1996) who believes that the new culture came to the Don from the Urals but other Voronezh archaeologists oppose this point of view and stress the absence of many features in the Urals which we find in the west in the Catacomb and Abashevo cultures.

An ecological crisis (sharp aridization of the climate) could be one of the reasons for migration to the east (Kremenetsky 2000; Spiridonova 1991). Another and perhaps the most likely stimulus for migration to the Urals was a crisis in the Carpathian metallurgical center (Chernykh 1978) that used to supply metal to the steppe; now local exploitation of copper deposits was required. It is likely that by the late Pit-grave period excavation had already begun in the largest of the Kargaly deposits in the southern Urals (Morgunova *et al.* 1994; Chernykh 1999). Some small but easily accessible and rich copper mines were discovered near the Sintashta settlements (Zaykov 1995). Metal processing was the main occupation on all the settlements and in evidence in every house (Grigoriev 1994). It was the shift to the Urals as the major metallurgical production center of the Eurasian steppes that made the Urals (and not the Volga or Don) the center of cultural genesis.

Traces of numerous fires and rebuilding have been found in all the Sintashta fortresses that have been examined; all central warrior graves were robbed in antiquity reflecting the unstable situation of the region. The necessity to defend the mines and the settlements of metalworkers required the building of fortresses and these then served as the production centers (Fig. 58). The labor requirements of building the fortresses, undertaking mining and the processing of the metals demanded a social group that could organize the workforce and distribute metal. The same group probably also oversaw the military functions. The main task of the organizing elite was the consolidation of the ethnic group. This military elite stimulated the developments of the arts of war and the introduction of the tactics of chariot warfare. The development of metallurgy and the use of the chariot expanded the cultural connections of the Ural population.

CHAPTER SEVENTEEN

THE AGRICULTURAL TRIBES OF SOUTH CENTRAL ASIA IN THE 2ND MILLENNIUM BC

The culture of Central Asia is still divided into the south and north. In southern Turkmenia the 2nd millennium BC belongs to the Namazga VI stage (Pumpelly 1908; Ganyalin 1956; Marushchenko 1959; Masson 1959; Shchetenko 1999). The date of this stage ranges from the (20th) 18th to the 13th centuries BC. The population failed to recover from the earlier crisis and the number of settlements decreased, e.g., Anau (Southern hill), Namazga-depe, Tekkem-depe, El'ken-depe. Their area does not exceed 1-2ha. But the prolonged development of the stage is reflected in the thickness of the cultural layers, e.g., Namazga—7m, Tekkem—6m.

The culture is genetically related to the preceding Namazga V culture. Its traditions are preserved in the architecture of the fortified settlements with blocks of multi-room houses and in the manufacture of unornamented wheel-made ceramics, fired in two-tiered kilns, in the types of decoration and in metal objects.

The economy is based on irrigation farming (barley and wheat). The importance of cattle-breeding increased: cattle, ovicaprids and Bactrian camels. The horse appeared for the first time. V. Masson (1959: 109, 110) notes progress in the development of craft and irrigation. Innovations are also recorded in the sphere of spiritual culture: special burial grounds (Yangi-Kala and Asgabat) came into being. Relations with India continued, indicated by the discovery of stone beads of the Jhukar type with circular ornament. Yet the orientation of the main contacts changes: ties are established with the northern pastoral tribes, and high-tin bronze articles of the Andronovo-type become widespread.

In the 2nd millennium BC the center of the farming culture shifts eastwards. As early as the Namazga V and, possibly, even the Namazga IV period, a new seat of the ancient Near Eastern civilization forms in the delta of the Murgab river (future Margiana) and in northern Afganistan and south-east of Central Asia downstream of the Oxus river (Amu-Darya): the Oxus culture or the BMAC (Bactria-Margiana Archaeological Complex) (Sarianidi 1977, 1990; 2002; Masimov 1979; Francfort 1989; Hiebert *et al.* 1992; Lamberg-Karlovsky 1994). Both these names are inexact, since the Oxus culture characterizes only Bactria, while the BMAC is merely a complex, although we are dealing here with a full culture with several variants.

The development of this culture dates back to the late (?) 3rd–2nd millennium BC. In Margiana the BMAC is represented by the major settlement of Gonur and its affiliated cemetery as well as the settlements of Kelleli, Togolok 1, 21, 24, Auchin I, and Takhirbay 3. In southern Bactria BMAC settlements include Girdai-Tepe, Dashly 1,3, Shortughai (stage B), numerous

cemeteries destroyed by looters, the Fullol hoard, and chance finds (Sarianidi 1977, 1990, 1998, 2001a,b, 2002; Francfort 1989; Amiet 1977, 1986, 1997; Pottier 1984; Tosi and Wardak 1972).

The origin of the culture is debatable. H.-P. Francfort emphasizes the continuity of life at Shortughai and the continuity of building techniques during stage B of the Harappan cultural traditions. V. Sarianidi (1987) presumes that the culture emerged in eastern Iran where it has not yet been discovered. Now he, following T. Gamkrelidze and V. Ivanov (1984), points out its western sources, noting ties with Anatolia and even Greece.

Initially, V. Masson (1989: 172,173) supposed that the development of the Murgab was associated with the cultural crisis of southern Turkmenia in the Namazga V period, when part of the excess population moved to the Murgab. This view seems unquestionable. The decisive argument in its favor is the continuity in the BMAC of the Namazga IV and V traditions of the manufacture of light-slipped ceramics, and the industrial technology that was maintained in Central Asia up to the time of Alexander the Great (Kuz'mina 1971, 1976).

The ceramic complex of Central Asia during the Bronze Age and Achaemenid period differs from the gray-black polished pottery of north-eastern Iran (Shah-Tepe, Hissar), just as from the cultures of Baluchistan and India.

The second component of the BMAC is the culture of Elam, as has been convincingly demonstrated by P. Amiet (1986, 1997). Of critical importance is not just the similarity of random types of articles but of the whole complex of the material culture (specific axes with a figured top, mirrors with an anthropomorphic handle, pins, steatite columns and female figures in Elamite dress) and, most importantly, images of art reflecting the spiritual culture of society. As a rule, their borrowing is associated not with cultural influences but with the migration of a population bringing along a new ideology. This conclusion is reliably supported by analysis of the semantics of the images on the seals (Klochkov 1997; Antonova 2000; Francfort 2001). As for ties with Anatolia, identified by Sarianidi, they are likely to reflect not a migration but wide cultural relations characteristic of the Bronze Age of the whole of south-west Asia (Amiet 1986; Lamberg-Karlovsky 1987, 1994; Hiebert and Lamberg-Karlovsky 1992).

In the evolution of the Margiana culture several stages are singled out, reflecting the development of the oases on the Murgab. The earliest was the Kelleli oasis (Masimov l979). At the settlement of Kelleli the Namazga V traditions are represented particularly clearly. The heyday of the culture goes back to the Gonur period. V. Sarianidi believes that a shift of the Murgab delta brought about also a migration of the population to the south. The latest Bronze Age sites are the settlements of Takhirbay 3,1 dating from the second half of the 2nd millennium BC (Masson 1959).

Somewhat later than in Margiana and southern Bactria there forms a culture in northern Bactria (Map 17). In southern Uzbekistan it is represented by the sites of Sapalli, Dzharkutan, Mollali, Bustan and others. A. Askarov distinguishes them as the Sapalli culture. In actual fact, by all the culture-determining characteristics they belong to the Oxus culture and may be viewed only as its local variant. Based on the stratigraphy and ceramics the stages of Sapalli and Dzharkutan have been assigned to 1700-1300 BC and those of

Kusali, Mollali and Bustan (1300-900 BC) to the Final Bronze Age (Askarov 1977: 101; Askarov and Abdullaev 1983: 40-44; Askarov and Shirinov 1993). This chronology appears to require refinement and shifting to an earlier time.

The Oxus culture is the pinnacle of the development of the region's Bronze Age farming civilization. Here were uncovered settlements with multi-room houses and—constituting the peculiarity of the culture—square, rectangular and round fortresses with towers and by-pass corridors (Kelleli, Sapalli, Dashly 1, 3), temple complexes with altars related to the fire cult and hallucinogenic drinks (Togolok 21, 3, Dzharkutan), and palaces with ceremonial halls (Gonur, Dashly 3).

The staple of the economy was irrigation farming supplemented by cattle-breeding whose role grew towards the late 2nd millennium BC. Great strides were made by craft specialists: there were wineries, workshops for manufacturing unornamented, light colored, wheel-made ceramics of varied types; workshops for manufacturing figurines, stone articles, including cylindrical and flat seals. Metal-working became particularly developed. Ore came from Iran and Afghanistan (Rusanov 1982). Production included implements, weapons, vessels bearing depictions of hunting scenes and animals, polymorphous creatures, as well as seals with cross-shaped patterns and images of goddesses, animals, snakes and dragons (Sarianidi 1998).

Considerable changes occurred in ideology. Four types of burials were established: 1) under the house floors; 2) in the deserted areas of a settlement—these rites maintain the ancient tradition of Anau; 3) in a burial ground in a pit, often faced with bricks—they are predominant in Margiana, whereas in Bactria catacomb burials prevail (4). The dead lie flexed on their side, accompanied with vessels, sometimes with a ram's carcass and ornaments. Very rich burials stand out; some of these are cenotaphs, sometimes containing a ram or a clay figure.

The architecture of the temples and applied art reflects the religious system with complex rites and the cult of a female deity. The BMAC mythology forms part of the circle of ancient Near Eastern beliefs and, judging by the artistic images, is closest to the pantheon of Elam (Amiet 1977, 1997; Francfort 2001; Litvinsky 1989; Klochkhov 1997; Antonova 2000).

Contrary to the opinion of many western scholars, the BMAC continued to develop in the second half of the 2nd millennium BC. It is exactly from this time that we find many sites in Uzbekistan, assigned by Askarov to the Dzharkutan, Kuzali, Mollali and Bustan stages. In this period active contacts with the Andronovans were established.

At the late stages of the Oxus culture this population migrated eastwards and formed the BMAC in the foothill valleys of Tadzhikistan. The specific ecological conditions predetermined the peculiarity of the cultural development. In the narrow mountain valleys only the bogar type of farming and cattle-breeding were possible, while the rich pastures of the south would enable cattle to graze throughout the year (P'yankova 1998: 163). Therefore, in Tadzhikistan there formed two types of cultures: cattle-breeding ones and the Tadzhik variant of the BMAC.

The culture is represented by the settlements of Kangurt-Tut, Teguzak, Dakhana in the valley of the Vakhsh river and the summer site of Baraki-Kuduk, as well as the cemeteries of Kangurt-Tut and Nurek, and in the Hissar valley by

the Tandyryul and Zarkamar cemeteries, a grave at Tup-Khona, by ceramic finds in Kafirnighnan and Dushanbe (P'yankova 1994: 355-372; 1998: 163-170; Vinogradova 1994: 29-47; 2000: 89-109; 2001: 199-201; Götzelt *et al.* 1998: 115-144) and also by the layers of stage B at the settlement of Shortughai in Afghanistan (Francfort 1989).

According to the stratigraphy of Shortughai, the BMAC period containing the ceramics of the Fedorovo type is chronologically subsequent to stage A of the Harappan culture and is cut through by the burials of the Bishkent-Vakhsh culture, synchronous with the Andronovo culture ceramics of the Fedorovo type and the late Andronovo ceramics with applied-rollers (Table 13). At the settlement of Teguzak the BMAC layer lies over that of the Neolithic culture of Hissar (Vinogradova 2000: 93-94), while at Kangurt-Tut the sequence runs: Hissar-BMAC-Yaz I. In France (CNRS) and Russia (GIN) radiocarbon dates have been obtained: 1594 BC and 1291 bc and 1756 BC and 1320 bc respectively.

The settlements are located on the mountain slopes. The houses have stone foundations for the walls, occasionally the floor is faced with pebbles, and round hearths; they are organized in terraces on the slopes. There are also proto-yurts faced with stone. The economy was mixed. The bogar type of farming is documented by barley and wheat, querns, and grain-storage pits. They reared cattle (52%), ovicaprids (19.5%), horses (19%), donkeys (5.6%) and camels. The stone articles continue the tradition of the Neolithic Hissar culture. The development of metalworking is evidenced by finds of molds. A substantial percentage is accounted for by bronze implements of the Andronovo type. Ceramic production is highly developed. The vessels are wheel-made, fired in two-tiered kilns and belong to types of the Mollali and Bustan stages of the Sapalli variant of the BMAC. The Mollali stage at the settlement of Dakhana yields 86% wheel-made pottery, and 14% hand-made. Andronovo-type vessels are absent. In Kangurt-Tut wheel-made pottery of the Mollali and Bustan stages accounts for 53%, hand-made for 47%; the number of Andronovo pieces is insignificant. But in Teguzak Andronovo vessels total as much as 43%.

The burial rite is typical of the Mollali stage. Dismembered and children's burials are known within the settlement. In the Kangurt-Tut and Tandyryul cemeteries catacombs were discovered sealed with stone or clay. Of frequent occurrence are cenotaphs, some of them containing a clay anthropomorphic figure. Also earth pits and pits with a step are found. The dead were in the flexed position on their side. There are also well burnt bones and ash. At Teguzak a ritual hearth, coated with clay, was found, which testifies to the cult of fire. The graves contained wheel-made and, rarely, hand-made vessels, beads of lapis lazuli, ornaments and miniature votives (knife, mirror, ax-adze, razor, pitchfork). These have analogies in Sapalli. Thus the Tadzhik variant, though belonging to the BMAC, is marked by a peculiar economic and cultural type. Of great importance were the contacts of Tadzhikistan's farmers with the neighboring Andronovans (see Chapter 21).

CHAPTER EIGHTEEN

THE OCCUPATION OF CENTRAL ASIA BY PASTORAL TRIBES

The first Indo-Aryan migration to the south

Those who support an Indo-Iranian or Aryan attribution to the Andronovo culture have provided evidence of the migration of steppe tribes to the south into Central Asia and Afghanistan in the second half of the 2nd millennium BC (see bibliography in Kuz'mina 1994; P'yankova 1998). The appearance of horse bones and the depiction of horses in Turkmenia, where the horse was earlier unknown, and the spread of horse-drawn chariots in Namazga VI are all connected with this wave of migration (Kuz'mina 1980). In Bactria one horse burial is known from Dashly 19 (Sarianidi 1977: 148) and there are images of horse heads on ceremonial bronze axes and handles (Fig. 95; Pittman 1984: fig. 32; Amiet 1988: fig. 9b; Ligabue *et al.* 1988: figs. 96, 101; Fig. 95).

Recently there has emerged evidence of contacts between the population of the Urals and the south already in the Novokumak horizon. A lapis-lazuli bead, originating from Bactria, has been found in a Sintashta settlement; a plate imitating pottery from the BMAC has been found in a Petrovka layer on the settlement of Ust'e (Vinogradov 1995b: 72); under the mound of a kurgan at Krasnoe Znamya (Fig. 60) a bronze mirror with a protruding handle has been uncovered, ceramics of the Sintashta-Abashevo type, and two horse skulls; in the main burial (nr. 1) on this site was found a spear, adze, chisel, awl, knife, abrasives, three Sintashta vessels, bones of a ram and a dog skeleton (Sungatov *et al.* 1995: 60, fig. 2). The mirror is of Bactrian type (Sarianidi 1977: tab. 2.8, fig. 40).

The Zardcha-Halifa grave at Panjikent near Sarazm, on the left bank of the Zeravshan (Bobomulloev 1993; 1997; Bostongukhar 1998) is of great importance for clarifying the time and fate of the early Andronovo tribes (Fig. 65). The deceased lies in an oval grave, 3.1m long and 3.5m deep. He lies flexed on his right side, head to the south-west, one arm under the head and the other on the stomach. The skeleton of a ram was placed at his head. This rite is typical of the Sapalli culture of northern Bactria (Askarov 1977: 138). The assemblage of grave goods was rich. Ceramics included globular vessels with a narrow neck, two examples of an incised base and a tamga on the shoulder of one of the vessels. These were wheel-made and fired pink. Such ceramics are comparable to the Dzharkutan stage of the Sapalli culture, e.g., the Dzharkutan cemetery, partially Dashly 3 (Askarov 1977, figs. 31, 32; Askarov *et al.* 1983: 7, tab. xxi.7, xxviii; Sarianidi 1977, figs. 27, 28).

There are also analogies with other assemblages in the BMAC and in Iran. In Sapalli, Hissar III and the BMAC there are parallels to the bronze vessel (Askarov 1977, tab. xxvii.15; Sarianidi 1977, fig. 41.9; Amiet 1988, fig. 3), a bronze vessel with a knurled neck found in Bactria (Amiet 1988, fig. 11b, d); a

temple ring with bulges at the ends is similar to ornaments from Sapalli (Askarov 1977, tab. xxxix.17, 19) along with a gold cup, razor-knife, hafted dagger with straight shoulders, and gold and turquoise beads. A stone phallus-shaped pestle, 26.5cm long and 4.5cm in diameter is assigned to the same complex. N. Boroffka (1998: a, b, 25) attributed it to the Andronovo V B type, close to type IV, which is characteristic of Central Asia during the Namazga V-VI period, and he dated it to 1800-1400 BC. Comparison with examples from Ulug-Depe and Parhai makes it possible to propose a date of 1800-1600 BC.

A bronze pin is of special interest (Fig. 68: 1). It is 18cm long, crowned with the figure of a horse. Pins with zoomorphic heads are widely known at Sapalli Tepe, Dzharkutan, Dashly-3, burials in Bactria, Hissar III and the Khak hoard (Kuz'mina 1966, tab. xvi; Askarov 1977, tab. xl.1, l.6, 5; Sarianidi 1977, fig. 43, 44; Sarianidi 1988, tab li, lvi; Askarov *et al.* 1983, tab. xxi.1; Amiet 1988, fig. 12; Ligabue *et al.* 1988, fig. 83). However, I am not aware of a horse-headed pin among the whole range of farming cultures. Stylistically, this image resembles to some extent the images of a horse found on a gold temple ring from the Andronovo cemetery of Mynchunkur (Kuz'mina 1994: 256, fig. on p. 5), on a knife from the Seyma cemetery (Bader 1970, fig. 52). The static posture, exterior, long tail and depiction of the mane are all similar.

Fragments of shield-shaped cheek-pieces were found at Zardcha-Halifa (Fig. 66), some of which have been reconstructed. These are of bone, 8cm in diameter, with a large central slot surrounded by a ridge and four solid tenons (Bobomulloev 1997: 127a, b, 4: 1, 2). They are assigned to type 1 of my classification and represent the most archaic form; they are characteristic only of the early Sintashta complexes of the Urals: Sintashta (Gening *et al.* 1992, fig. 57.8; Kuz'mina 1994: 171-189, tab. 4, fig. 37) and Bol'shekaragan (Botalov *et al.* 1996: 80, 81, fig. 17.10, 18.4). In Tanabergen (Fig. 64; Tkachev 1998, figs. 2, 10, 11) there are cheek-pieces of type 1 but without the ridge; in the Potapovka burial on the Volga they have the ridge but with additional slots (Vasil'ev *et al.* 1994, fig. 33.1, 42.3). A pair of bronze bits with rings and couplings at both ends, 11.5 and 12cm long, is connected with the chariot complex. Attempts to compare them with a bit from Kairak-Kum (Bobomuloev 1997) do not seem to be correct and I am unaware of any analogies.

Analysis of the Zardcha-Halifa material indicates that the greater part of the art may be assigned to the BMAC while the horse-headed pin and the cheek-pieces are characteristic only of the early Sintashta sites of the Urals. They help establish the zone where horses and chariot first appeared in Central Asia and the Zardcha-Halifa burial emerges as a reflection of the first wave of Indo-Iranian migrations to the south.

Of great importance is the discovery of the metal-working settlement of Tugai near Samarkand near the polymetallic deposits of the Zeravshan ridge (Avanesova 1996). Archaeologists uncovered a semi-subterranian house and metal-working complex with round hearths, furnaces for smelting ore, and traces of metal-working such as ore, bars, coal, and clay crucibles, as well as a bronze celt, stone axe, hammer and arrows. In addition to metal-working there is evidence for stock-raising as bones of cattle, sheep and goat were recovered. The cultural attribution of the complex is established by its ceramics which comprises 22 hand-made vessels (Fig. 69). They are of the Petrovka type, gray and black,

with ornament made by toothed stamp, sometimes in a caterpillar pattern or with a comb. Ornamental motifs include zigzags, triangles and often herring-bone at the base. Two vessels have traces of textile impressions. The fabric includes admixture of shell; two vessels have talc as an opening agent (Avanesova 1996: 122, fig. 43, 44).

The discovery of the Tugai settlement verifies the early wave of Andronovo migrations. The presence of talc, specific for the Urals, in the ceramics indicates the origin of the population who were searching for new sources of ore.

The date of the site can be established on the basis of six quality vessels found in a closed complex (the house). These comprise conical or semi-hemispherical cups, one of them black polished; others are red polished. These ceramics were brought from the neighboring settlement of Sarazm which is situated 27km from Tugai. N. A. Avanesova (1996: 120, fig. 41) assigned the material to the fourth layer. The site of Tugai makes it possible for the first time to synchronize the pastoral early Andronovo culture with the settled farming culture of Sarazm which had wide contacts with western Asia, especially Baluchistan and the Indus valley.

What is the absolute date of these sites? Chronological issues that form the basis of any historical constructions are currently at the center of heated discussion (Kuz'mina 1998). In Russian science the Bronze Age chronology has been established using the scale of Mycenae that has been developed in western scholarship; the steppe sites have been cross-dated to Mycenae according to the analogical method. In western archaeology, however, especially in that of the Near East, calibrated radiocarbon dates have provided the basis since the publication of Colin Renfrew's "Wessex without Mycenae" in 1968.

The basis of the chronology of the sites of the Novokumak horizon has been built on a series of synchronizations: 1) according to cheek-pieces and ornament from shaft grave IV at Mycenae, dating 1570-1550 BC, which provides a *terminus post quem* for the cheek-pieces of type 1; this establishes a date for the horizon of the 17th–16th centuries BC (Smirnov and Kuz'mina 1977: 40-50); 2) according to plaques from the Monteoru culture (Litvinenko 1996; Matveev 1996), and 3) according to segmented faience beads that are found in a number of European cultures.

Mycenae has been dated within a century on the basis of its synchronization with Egypt and the Near East, the revival of the schemes of G. Karo and A. Furumark, and the date of the volcanic eruption of Santorini established by radiocarbon dates. There is also a tendency to adjust the dates of the traditional chronology of the sites of Central Europe, the Reinicke A1 and A2 stages, on the basis of dendrochronology (Krause *et al.* 1989; Kroemer *et al.* 1993; Randsborg 1992; Kuniholm 1993; 1996). The dendrochronological adjustments worked out for Europe advances the traditional dates by one or two centuries but they still remain younger than the calibrated radiocarbon dates. Calibrated dates differ significantly from the historical chronology of Egypt and the Near East (Chernykh 1997) and there is considerable variation in their usage (e.g., the Sintashta cemetery dates 2250-1390 BC without calibration).

A series of new radiocarbon dates for the cemeteries of Krivoe-Ozero, Potapovka and Utëvka VI places the Novokumak horizon at the turn of the 3rd–2nd millennia BC (Vinogradov 1995; Anthony and Vinogradov 1995; Kuznetsov

1996; Trifonov 1996). Dates have also been received from Siberia (Kiryushin 1991; Orlova 1995; Matveev 1998); however, not all accept these new dates. There are ten radiocarbon dates for the settlement of Arkaim (two from the University of Arizona) and nine more from other sites of the Urals. According to G. Zdanovich (1997: 60), "the main zone of reliable dates corresponds to the 18th–16th centuries BC although there is another group, for Krivoe Ozero, that dated to the 21st-20th century BC." The date of fragments of a chariot from a grave at Satan is 1557-1255 BC (Novozhenov 1994: 160). The divergencies in dates do not permit a single conclusion.

The differences between the chronological systems for Central Asia proposed by Russian and foreign archaeologists are especially marked. The chronology of the Turkmenian sites has been worked out by V. M. Masson and his scheme is universally accepted. V. I. Sarianidi (1977: 158) assigns the completion of the BMAC in Afghanistan to the middle of the 2nd millennium BC. For Margiana he (1990: 5) proposes the following scheme: 1) Kelleli-19th/18th centuries BC; 2) Gonur-17th/15th centuries BC; Togolok-15th/9th centuries BC. A Askarov (1997, fig. 31) dates the northern Bactria periods as follows: 1) Sapalli stage-1700/1500 BC; Dzharkutan-1500/1350 BC; Mollali-1350/1000 BC (earlier he dated the Dzharkutan period to the 3rd quarter of the 2nd millennium BC, Kuzali to the 13th/12th centuries BC, and the Mollali period to the 11th/10th centuries BC (Askarov *et al.* 1983: 33, 39, 42, 44). L. B. Kircho and S. G. Popov have insisted on the traditional dates (1998) but V. M. Masson (1999) accepts the new calibrated chronology.

This chronology has been severely criticized by western scholars who insist on dating the sites approximately 300 to 500 years earlier and who date the BMAC to 2300-1500 BC (Francfort 1989: 241, 242; Hiebert 1993: 1994: 75-87; Lyonnet 1996: 16, 67; Götzelt 1996).

Regarding the settlement at Tugai, B. Lyonnet (1996: 60, 68, 120) disagrees with N. A. Avanesova and accepts the early date of the ceramics of the Sarazm type to the 3rd millennium BC. A. I. Isakov (1991: 113, 115) assigns the fourth Sarazm layer to 2300-1900 cal BC. The burial at Zardcha-Halifa has been assigned by S. Bobomuloev (1993: 63) to the early stage of Namazga VI and to the Dzharkutan stage of the Sapalli culture which A. Askarov dates to 1700-1500 BC (radiocarbon dates of 1650±60 BC). Later he (1997: 132) compared the complex with Shah-Tepe IIa and Hissar III and accepted a calibrated date for the Dzarkhutan temple of 2034-1684 cal BC; he assigned Zardcha-Halifa to 2100-1700 BC.

Thus, the date of the sites of the Novokumak horizon coincides on both the European and Central Asian scale: the traditional chronology sets it to the 17th–16th centuries BC according to synchronization with Mycenae while the redated Mycenae and the dendrochronological evidence places Bronze Age A2 to the 18th–17th centuries BC. The calibrated radiocarbon dates places their age in both Europe and Central Asia to the 21st-18th centuries BC. This last date is also supported by a new radiocarbon date for a cheek-piece from Monteoru (Zaharia 1990: 43).

The acceptance of the calibrated radiocarbon dates resolves the issue of the chronological priority of chariots between the Near East and the steppe as they

indicate the importance of the Sintashta sites in spreading the horse-drawn chariot in the Old World.

The discovery of the settlement at Tugai and the burial at Zardcha-Halifa allows us to synchronize for the first time the settled farming sites of the Sarazm IV type and the BMAC of the Dzharkutan period with early Andronovo. It supports the model of a migration of a group of steppe tribes from the Urals to the south where they carried their metallurgical skills, horses and cheek-pieces for harnessing chariots. This is all in accord with the hypothesis that the Andronovo culture was Indo-Iranian and it reflects an early stage in the migration of Aryan tribes to the south.

What is the further fate of these migrants? I. M. D'yakonov (1960) postulated the idea that part of the Indo-Iranians left their European homeland and settled in central Asia. The same idea was independently developed by Th. Burrow (1973) who proceeded from the observation that there are many loans from Dravidian and aboriginal languages in India in the Vedic language which are absent in Iranian. It follows that the Iranians replaced a related Indo-Iranian population who had come earlier. This hypothesis has been energetically supported by A. Parpola (1988). During the Arkaim discussion in 1999, C. Lamberg-Karlovsky stressed that traces of the Andronovo migration and their interaction with farming populations are found in Central Asia but do not extend to India while there is clear evidence of the active influence of the BMAC in Baluchistan and Pakistan which he labels the Oxus culture (Lamberg-Karlovsky 1994; 1996). This idea must be considered in the light of data from the Samarkand burial where the assimilation of steppe cultural elements with local farmers is evident.

However, Vedic texts do not support the notion that the Indo-Aryans who arrived in India were representatives of the Oxus culture. They were pastoralists, serving as nomads for half the year, moving in their vehicles with their herds or walking according to the *aśvamedha* rite after the king's sacred horse to conquer new lands (Rau 1983; Elizarenkova and Toporov 1995). In his article "Is Vedic archaeology possible?", W. Rau (1977) wrote that archaeologists could count on finding only temporary camps with a thin cultural layer and a handful of sherds of hand-made pottery in India. Even among the Persians who came to Iran in the 1st millennium BC, only six tribes settled down while four tribes remained nomadic (D'yakonov 1956: 187; Grantovsky 1998: 111-113). The economic and cultural types of the Aryans corresponds only to the material culture of the steppe pastoralists, especially those of the Andronovo culture.

The first wave of migrating Andronovans reached the Zeravshan already during the Novokumak stage. It is not known at present whether they continued further and entered India, coming into contact with the Harappan culture. It is also not clear whether they spoke a common Indo-Iranian language or whether they were divided into Nuristani, Indo-Aryans and proto-Iranians. In any case, judging from the similarity of their religious and mythological ideas, the cult of the horse and the chariot, the strata of elite chariot-warriors and the common set of weaponry, the culture of the individual Indo-Iranian tribes was still very similar by the 17th century BC when those Aryans neighboring the Hurrians appeared in Mitanni.

The second stage of Andronovo migration

The second stage of Andronovo migration comprises the 15th–13th centuries BC. The synthesis of different cultural components led to the unification of culture during the Petrovka stage. The large depositions of sacrificed horses and other animals and wealth disappear, burial rites become simpler and there is a standardization of metal and ceramic technology and ornament. Tribes settle in northern and central Kazakhstan while some groups reach Central Asia.

The Alakul' type was formed on the basis of the Petrovka type. The evidence of ceramics suggests that the Fedorovka-type sites emerged simultaneously in central and eastern Kazakhstan. Further development appears to involve a complex and difficult process of interaction between these two groups of people with one another and with neighboring alien cultures. Assimilation and integration led to the cultural unity of the Andronovo culture. The unity of the Timber-grave culture was formed in the forest-steppe on the basis of the Poltavka culture with influence from the Catacomb and Abashevo populations (Merpert 1985; Merpert *et al.* 1985: 10-28), and in the steppe the Catacomb culture was a major component (Malov *et al.* 1995; Otroshchenko 1990).

Once the situation had become stable and the Timber-grave culture was unified in the European steppe while the Andronovo culture was unified across the Asian steppe, there was a push for new territories. The Timber-grave people moved west along the river valleys deep into the forest zone, occupying a considerable portion of the Ukraine (Berezanskaya 1972; 1978; Berezanskaya *et al.* 1986) and the Crimea. A separate wave of Timber-grave people also moved to the south-east.

The Andronovans managed to master enormous territories (Map 9). They pushed north to the forest zone (Sal'nikov 1967), and settled right across the whole of Kazakhstan (Sorokin 1966; Margulan *et al.* 1966). The Alakul' tribes migrated from the west to central Kazakhstan which pushed a part of the Fedorovo population eastwards into eastern Kazakhstan and further to the Ob and the Minusinsk Basin. This route of the Fedorovo people is indicated by ceramic analysis: the purest complexes are found in central Kazakhstan. There is a group of cemeteries, similar in both rite and ceramics to those of central Kazakhstan but now in eastern Kazakhstan. Sites of the Ob region resemble those of eastern Kazakhstan; on the periphery along the taiga zone and the Yenisey there is the strong influence of local aboriginal cultures. Within the main Andronovo territory there was an intensive process of integration between the Alakul' and Fedorovo populations and this is seen in sites of mixed type (Kuz'mina 1985a). In the Urals a wide zone of mixed Timber-grave and Andronovo sites is formed (Chlenova 1981). The Andronovo influence spread as far as the Don and Dnieper region (Berezanskaya and Gershkovich 1983; Otroshchenko and Motsya 1989; Posrednikov and Kravets 1992).

Post-Soviet Central Asia, which is the center of the Eurasian continent, is extremely diverse in its natural and climatic conditions. It embraces four zones: 1) the steppes that extend northwards; 2) the Kyzyl-Kum and Kara-Kum deserts that occupy the central part; 3) the high Tian-Shan and Pamir mountains which are situated on the east and south-east; 4) in the south-west the low Kopet-Dag mountains that separate Central Asia from Iran, and along their northern slopes

there is a narrow strip of fertile lands; oases are also located at the mouths of the Tedjen and Murgab rivers and downstream on the Zeravshan.

The diversity of the ecological conditions, which changed many times over the course of the Eneolithic and Bronze Age, predetermined different directions of economic and cultural development and different orientations of the ethno-cultural relations of the regions involved. The northern and eastern areas of Central Asia formed part of Eurasia's steppe cultures, The southern areas belonged to the range of the cultures of the Ancient Near East. Central Asia, serving as a bridge between these two worlds, was the zone where contacts were realized between tribes belonging to different economic and cultural types and where, over the course of the whole historic epoch, lay the pivotal route of ethnic migrations, the road leading to Iran and India.

CHAPTER NINETEEN

THE SETTLEMENT OF PASTORAL TRIBES IN CENTRAL ASIA

While the south saw the development of the farming cultures of Anau and the BMAC, in the north in the steppes the Andronovo culture and its representatives established contacts with the farmers and gradually began their advancement southwards. We can discern three stages of the migration of the pastoral steppe tribes to Central Asia: stage I – Sintashta-Petrovka; stage II – developed Timber-grave and Andronovo of the Alakul', Fedorovo and mixed types; stage III – late Timber-grave and Andronovo with applied-roller ceramics. The number of the northern sites invariably grows and in the Final Bronze Age (13th)12th–9th centuries BC they occupy the whole territory of the region.

The Timber-grave and Andronovo tribes of the Alakul' type emerged in the late second and third quarters of the 2nd millennium BC in the Urals and western Kazakhstan, while the Fedorovo type tribes emerged in central and eastern Kazakhstan. They were extremely expansive which was conditioned by the peculiarities of the steppes' ecology and their economic and cultural type. The exhaustion of the pastures around a settlement would compel its inhabitants to change their location every 25 years. The pressure of the excess population on the limited resources of the steppes would require them to develop new territories. The Fedorovo tribes advanced into Siberia. In Kazakhstan the processes of active integration among the tribes and the formation of mixed types of sites were underway. But the principle direction of movement was into those regions of Central Asia that had already experienced cultural interaction and assimilation of the steppe tribes with both each other and with the southern farmers. This led to the formation of numerous and quite original types of sites. Their mixed character presents difficulties in their classification and causes debate among scholars as to their attribution.

The sites of the steppe population are united under the terms Andronovo (Chernikov 1957: 30; Zadneprovsky 1966: 213; Gryaznov 1970: 40; Askarov 1962a: 3,17; Gulyamov *et al.* 1966: 187, 213; Avanesova 1979; 1991); Tazabagyab-Andronovo (Masson 1959: 116,117; Avanesova 1985); of the steppe type (Kuz'mina 1964a: 147, 154; 1988: 35, 36; Mandel'shtam 1966: 242-243; Masson 1966: 208, 261; Itina 1977a: 232). It is advisable to apply the last term to assemblages from wind-eroded sites where the ceramic complex is not informative enough and does not contain diagnostic material. It should be emphasized that all the ceramics of Central Asia with the exception of the Fedorovo type are poorly ornamented, the decoration being usually located in one zone (over the shoulder), more rarely in two zones (over the neck and shoulder). This choice of zones reflects the traditions of either the Petrovo-type sites or the Timber-grave culture and differs from the Alakul' principle of placing ornament on the rim and shoulder with a gap on the neck and the Fedorovo one of decorating the rim, the

shoulder and the neck. Late Fedorovo pottery is marked by poorer ornament and a shifting of the ornamented zones. In accordance with the statistically stable aggregate of the dwelling types, the burial rite and the ceramics one distinguishes in Central Asia several independent cultures and types of monuments of the Andronovo cultural community.

Tazabagyab culture: The Aral Sea Littoral variant

This culture was discovered to the south of the Aral Sea in the desert over the ancient dried-up river-beds of the Amu-Darya (future Khorezm). Around fifty settlements have been discovered: Kavat 3, Angka 5, Bayram-Kazgan, Kokcha 15, 15a, 16, Dzhanbas 21 and the Kokcha 3 cemetery (Tolstov 1948, 1962; Itina 1961, 1967, 1977, 1978; Vinogradov *et al.* 1996). Large settlements are absent; the dwellings are located in twos and threes among the fields. The house is semi-subterranean of timber-frame type measuring 7-12 x l0-14 m. In the center there is a square (more rarely circular) hearth with clay sides, storage pits and querns. The entrance is a corridor-ramp leading to the open terrace.

As distinct from the other steppe cultures, Khorezm's economy was based on irrigation farming. The 150-200m long canals would irrigate small rectangular fields (Andrianov 1969). Cattle and particularly ovicaprids, horses and Bactrian camels were reared. The short-term sites in the sands point to a mobile type of cattle-breeding. The use of wheeled transport is evidenced by clay models of wheels. The source of ore was the Bukan-tau and Tamdy-tau mountains, where ancient workings and copper-smelteries were discovered (Itina 1977: 136, 137). The findings of a special ladle for pouring metal and stone molds are indicative of the household exchange type of metalworking. With regard to the types of articles, particularly adzes and figure-of-eight temple rings, Khorezm belonged to the western Andronovo metallurgical province and was especially close to the Elenovka-Ushkatta center.

The ceramics of Khorezm are hand-made and represented by the pots of the Andronovo type with a rounded shoulder or a ledge, the Timber-grave biconical pots, jars and specific vessels with a globular body and a narrow neck. Sixty percent of the pots are decorated with an ornament executed in indented (20%) or plain stamp and incision. Apart from the Andronovo and Timber-grave elements of the geometrical ornament, there are specific open triangles, and triangles with a fringe.

The cemetery of Kokcha 3 contains around a hundred burials in earthen pits (there were no kurgans). The dead lie flexed, their head to the west, men on their right, women on their left side. There are double burials of mixed sex. At the head stands one, rarely, two vessels; women occasionally wear bracelets, temple rings, beads. The cults of Khorezm are also evidenced by figurines of the horse and camel.

The cultural attribution and origin of Khorezm's sites are disputed. A. Askarov (1962a: 3,17; 1966: 187, 213); Gulyamov *et al.* (1966); Zadneprovsky (1966: 213), M. Gryaznov (1970: 40), and N. Avanesova (1962: 57-59) assign these sites to the Andronovo culture. On the other hand, S. Tolstov (1962: 57-59) and M. Itina (1977: 139, 140, 176) regard them as a special culture formed from the

migration of the Timber-grave and Andronovo tribes, whose synthesis had taken place already in the Urals. On arrival in the fertile lands of Khorezm the steppe tribes entered into interaction with the farming population—representative of the indigenous culture of Suyargan. The existence of a distinct Suyargan culture now appears insufficiently substantiated, yet the general scheme is correct. The legitimacy of distinguishing the sites of Khorezm as a particular Tazabagyab culture is borne out by the statistically stable combination of characteristics marking it off from the Timber-grave and Andronovo cultures. In architecture we find the absence of large settlements and a special type of dwelling; in the burial rite it is the absence of burial mounds, stone and wooden structures, placement of men on their right side; in the ceramic complex it is a mixture of the Timber-grave and Andronovo forms of vessels, the specific type of pots with a globular body and a narrow neck, local types of ornaments, and, finally, it offers an absolutely peculiar economic and cultural type with irrigation farming, which is well-suited to the ecological conditions of Khorezm.

The Tazabagyab culture has been dated to the 15th–11th centuries BC. The upper date is determined by the time of the spread of the Amirabad culture, marked by applied-roller ceramics. In light of new data the genesis and chronology of the Tazagabyab may be refined. Typical of Khorezm, the biconical vessels, the bizonal application of the ornament, the prevalent patterns of herring-bone and opposed triangles, ornamentation by cones and oblique triangles, and ornament on the base are most fully analogous to the ceramic complex of the Petrovka-type sites in the Urals and western Kazakhstan, whence, presumably, came the migration. This enables us to revise the formative period of the culture to an earlier date.

The complex genesis of the formation of Khorezm's population is corroborated by the anthropological data. Most of the skulls belong to the population type known from the Trans-Volga and western Kazakhstan, where there are skulls close to the types of southern Turkmenia and Harappa. The series is extremely mixed which indicates the processes of assimilation (Trofimova 1961; Ginzburg *et al*. 1972: 86-88).

Located in alternating strips with the Tazabagyab sites, there are the summer sites of the Andronovo pastoralists, Dzhanbas 34 and Kokcha 19, with round dwellings (proto-yurts) and the ceramics of the Kozhumberdy and Sol'-Iletsk types. The same pottery overlies the Tazabagyab irrigation canal and cultural layer at the settlements of Kokcha 15, 16 (Itina 1977: 52, 57, 58, 79-82; 104-109; 119-121; fig. 22-24, 39, 40, 57, 59, 61). We thus may synchronize the developed stage of the Tazabagyab culture with the 2nd stage of the Andronovo culture of the third quarter of the 2nd millennium BC.

The population of Khorezm continued to maintain contacts with the farmers of the BMAC. At the settlements of Kokcha 15 and 15a and others there were found fragments of the light-clay wheel-made vessels with a conical bottom typical of the Namazga VI stage (Itina 1977: 69, 72, 193, fig. 18: 8; 1978: 525). In addition, of southern origin are the types of pin with a double-spiral head, earrings with cones, and clay figures. These findings afford a unique opportunity to synchronize the Tazabagyab culture with the culture of the ancient farmers, and, through it, also the Andronovo, and establish the presence of wide cultural ties of the population of Khorezm.

The Tazabagyab culture: The Lower Zeravshan variant

In the Kyzyl-kum desert north of Bukhara alongside the delta of the Zeravshan's Makhan-Darya and Lakes Gudzhayli-Gurdush and Tuskan, now desiccated, and in the sands of Kaptarnikum thirty sites and the cemeteries of Kyzylkyr and Gurdush (Gudzhayli) have been discovered (Figs. 45: 2-4, 6, 8, 11; 46). At Kashka-Dar'ya four sites are listed, at Dar'yasai—the Madami site (Gulyamov 1956: 149, 156; Gulyamov *et al.* 1966; Askarov 1962a, b, 1964, 1965; Kuz'mina 1968; Duke 1969; Avanesova 1985). All the sites are wind-eroded. The cultural layer is preserved at the sites of Paykent 6, Gudzhayli 9, and Bol'shoy Tuskan 3. The type of dwellings is not identified. Hearths/fires have been discovered, in Madami—stone hearths and a copper-furnace. Yu. Gulyamov (1956) noted the similarity with those of the Tazabagyab culture. A. Askarov (1962a: 3, 17; Gulyamov *et al.* 1966: 187, 213, map), Yu. Zadneprovsky (1966: 213), and N. Avanesova (1979, 1985, 1991) assign them to the Andronovo culture. M. Itina (1967: 76, 79, 1977: 232) and E. E. Kuz'mina (1988c: 307) substantiated their attribution to the Tazabagyab culture.

Just as in Khorezm, the economy is based on irrigation farming (canals have been discovered, querns are present). Ovicaprid bones have been found. The types of metalwork belong to the western Andronovo metallurgical province. Slag has been discovered and its metal composition is analogous to the ores of the Nurata mountains (Bogdanova-Berezovskaya 1962, pl.12; Kuz'mina 1966: 91, 92).

In its shape and ornament, the ceramics are analogous to those of Khorezm. Ninety percent of the decoration is executed in plain stamp. But the pots with a ledge of the Alakul' type outnumber the globular ones with a narrow neck.

In the five graves of the flat-grave cemetery of Gurdush and the Kyzylkyr burial the dead lie in earth pits in the flexed position, head to the west, accompanied by one or two vessels (Fig. 45: 9, 10), the women wearing bracelets, figure-of-eight earrings, beads on the boots, and necklaces of colored stones. The similarity of the culture-determining characteristics: type of settlement, burial rite and, most importantly, the ceramic complex, as well as the cultural and economic type makes it possible to include the monuments of the Lower Zeravshan in the range of the Tazabagyab culture. The Zeravshan culture took shape as a result of the settling to the south of either the western Andronovo tribes or the already full-fledged Tazabagyab populations. The newcomers replaced the more ancient population of the Zaman-Baba culture. Its participation in the ethnogeny manifests itself in the preservation of egg-shaped vessels and small pots with inflated sides and a cylindrical neck, in the type of stone laurel-leaf arrows and various beads of marble, cornelian, turquoise, and lapis lazuli, including cross-shaped ones.The date of the sites is set in the third quarter of the 2nd millennium BC based on analogies with Khorezm and the absence in the ceramic complexes of applied-roller ware.

Sites of the Central Zeravshan

The ethno-cultural map of the Samarkand region is exceptionally diverse. In the Muminabad cemetery the Alakul' rite of burying in the flexed position, head to the west, comes together with the biconical vessel of the Timber-grave type and

a rich variety of decorations (bracelets, temple rings, rings, numerous beads sewn onto clothes and shoes, a mirror with a handle-loop and Fedorovo trumpet-shaped earrings (Lev 1966; Askarov 1969, 1970).

In the Chakka cemetery, the typically Timber-grave burial rite (kurgan, flexed position of the dead, head to the north) occurs along with a biconical vessel of the Timber-grave type as well as typically Andronovo bracelets with a conical spiral and a trumpet-shaped earring (Krikis 1975). Of the same mixed character are the burials of Siab (Fig. 85) and Saygus (Dzhurakulov 1986) and the ceramics from the site in the Engels kolkhoz and in the overlying layer of the Sazagan II settlement of the Neolithic period. At this settlement there were discovered hearths, animal bones, an Andronovo trumpet-shaped earring, and Fedorovo-type ceramics, which combine with the typologically later pottery of the Burgulyuk culture (Dzhurakulov and Avanesova 1984: 32-39).

The syncretic type of monuments does not allow us to identify stable characteristics of ritual and ceramics specific for a particular culture or its variant. This provides no grounds for accepting the differentiation by Avanesova (1985: 39) of the Zeravshan's monuments of both the Samarkand and Bukhara regions, as a single Zeravshan variant of the Andronovo-Tazabagyab community, but enables one to only assert the integration process of different groups of the Timber-grave and Andronovo population in the third quarter (particularly at its end) of the 2nd millennium BC.

Analysis of Muminabad's bronzes with its high tin content makes it possible to suggest the workings of cassiterite in the Zerabulak mine (Naumov 1972). The source of tin for the whole of the Zeravshan was the rich deposit of Karnab, where the ancient mines of Karnab, Lapas and Changali were discovered as well as a nearby settlement, at which four dwellings of metallurgists with stone foundations were revealed as well as hearths analogous to Andronovo examples. In addition, stone tools and ceramics were found (Parzinger and Boroffka 2001: 12-17).

To the group of sites in the vicinity of Samarkand, the chance findings at the settlement of Dzham, south-west of Samarkand, can also be attributed, including articles of the BMAC type: two vessels, a flat mirror and a mirror with a protruding handle and a side bearing a geometric ornament, a pin with a deer at the top, a double-edged adze as well as an Andronovo double-bladed arrow with a protruding plug; besides, a complex of Andronovo ornaments, possibly originating from a burial, included Fedorovo trumpet-shaped earrings, a temple ring with open ends, and beads (Avanesova 2001: 63-73, fig. 2-4).These findings bear out the existence in Central Zeravshan of the BMAC farmers and Andronovo-Fedorovo population (Fig. 84: 1-11).

The Tashkent Oasis

Sites from this region are very poorly studied. The oasis, which was located at the crossroads of migration routes, was the zone of active contacts.

The Timber-grave culture

To the Timber-grave culture belong: the kurgans of Yangiyul with a burial in an earthen grave in the flexed position on the right side, head to the east,

accompanied with ocher and a late Timber-grave unornamented pot; three burials in Saraagach Minvody where the dead lie flexed, head to the north, together with unornamented pots of the late Timber-grave type; a kurgan with inhumation and vessels on the Nikiforovo lands in Tashkent; the grave of Orekhovskoe with a Timber-grave type biconical pot bearing herring-bone ornament (Fig. 47; 6) and the possibility of interpreting the semantics of Andronovo art and rituals in the light of Indo-Iranian mythology and ritual practice Terenozhkin 1940: 91; Oboldueva 1955: fig. 62). Also to the Timber-grave circle of sites belong the axe and adze from the Chimbaylyk hoard (Fig. 114: 17) including a copper ingot. The metal composition is indicative of the existence in the oasis of an independent metalworking center which utilised the polymetallic deposit of Karamazar (Kuz'mina 1966: 93). The Tashkent oasis was the eastern outpost of the distribution of the Timber-grave community.

Fedorovo type sites of the Andronovo culture

To the Andronovo culture of the Fedorovo type belong several burials in Vrevskaya that contained the charred remains of animal (?) bones and vessels including a vase-like pot ornamented with a fine-indented stamp (Fig. 45: 7; Voronets 1951: 68; Litvinsky 1962: pl. 109).

The late Fedorovo population dwelt also in the mountains surrounding the Tashkent oasis. On the Chirchik river in Aurakhmat and Iskander inhumation burials have been discovered in kurgans with a stone cairn. The women wear four to five bracelets with cast conical spirals. They are typical of the early Andronovo metallurgical province and date back to no earlier than the 13 century BC.

In Brichmulla and Gazalkent there are also kurgans with inhumations (Voronets 1948; 1951: 68, 69; Litvinsky 1962: pl. 109; Kuz'mina 1966; 71, 72; Rakhimov 1970: 41; Duke 1979: 44, fig. 45). Late Andronovo pots were found in Zangiata on the Tashkent-Chimkent road. Information about the other sites of the oasis is incomplete and the ceramic assemblage is not distinctive enough to establish its cultural origin. These are the sites of Serkali, burials of Khodzhikent and Kyzyl-Tu, the discovery of vessels in Angren, Ak-Tepe II, Childukhtaron, Brichmulla, Akhangaran (Litvinsky 1962: pl. 109; Maksimova *et al.* 1968, fig. 8; Rakhimov 1970; Duke 1982: 83, 84; Avanesova 1985: 38; *Drevnosti Charvaka* 1976: 36, 41, fig. 8: 17). These enable one to include the oasis in the range of occupation of the steppe tribes.

Neither the early Fedorovo, nor the early Timber-grave complexes have been revealed so far. The date of the monuments is the late third quarter of the 2nd millennium BC. The upper margin is the 11th century BC which coincides with the spread of the new culture of Burgulyuk (Duke 1969, 1979, 1982a; *Drevnosti Tuyabuguza*: 72-80).

Andronovo sites of the Fedorovo type in Kirgizia

Some of the Andronovo tribes changed over to full mobile pastoralism that allowed them for the first time to reach the mountain pastures. Arpa, the highest Andronovo mountain cemetery, is located in the Tian-Shan mountains at a height of 3000m above sea level. A Fedorovo settlement was discovered in Prigorodnoe

near the town of Bishkek, and a vessel was found at Issyk-Kul' (Bernshtam 1952: 19, 20; fig. 7; Kozhemyako 1950: 103, 104; fig. 16, 17).

In Arpa fifteen kurgans were identified with pebble and earthen banks, 12-13m in diameter and 0.3-0.6m in height, covering over round, square or rectangular enclosures of stone slabs set on edge. The burial rite was cremation. The graves contain 2-3 vessels each; in one there are two bracelets, multi-lobed-shaped beads and ribbed paste strings. In Prigorodnoye the above-grave construction is not preserved; the dead were buried in a pit, in flexed position on the left side, head to the west. In the grave there were found temple rings, a vessel, and a shell.

The stone constructions, the rites of cremation and inhumation, and the ornaments are typical of the Fedorovo type sites. The polished pots are decorated with the typically Fedorovo ornament in the form of oblique triangles, pennants, meanders, and X-shaped figures executed in indented stamp. The vessel from Prigorodnoe has the decoration applied over three zones; on the pots from Issyk-Kul' the rim and neck zones are united which is a peculiarity of the Andronovo pottery of Central Asia, thus allowing one to suggest the possibility of differentiating in the future the Tian-Shan type of monuments of the Fedorovo line of development. The Tian-Shan sites are dated to the third quarter of the 2nd millennium BC on the basis of analogous perforated shell beads and strings from Andronovo and Timber-grave sites.

The genesis of the Tian-Shan sites is related to the Fedorovo sites of central Kazakhstan, which was connected with Kirgizia by the Chu and Ili rivers. The Tian-Shan complexes provide the earliest evidence of the development of pastoralism in the high mountains.

The penetration of Kirgizia by a group of the Alakul' type is demonstrated by the small collection of ceramics from a site near the Belovodskaya fortress (Kuz'mina and Mokrynin 1985). In southern Kazakhstan in Semirech'e the Kapal cemetery has been discovered whose ceramics display a prevalence of Alakul' characteristics (Karabaskokova 1991).

The Semirech'e-Fergana type

This type of monument is represented in Kirgizia, southern Kazakhstan and southern Fergana. Therefore it is more appropriate to refer to it as Semirech'e-Fergana type.

Early monuments have been recorded in north-eastern Semirech'e: the cemeteries of Talapty I, II, Kuygan II, Mynchunkur III, IV (Karabaskakova 1987; 1989; 1991). These display a mixture of the Alakul' (vessels with a ledge) and the clearly predominant Fedorovo features in the burial rite (cists, combination of cremation and inhumation) and ceramics (vessels with rounded shoulder). To the Fedorovo type belongs a temple ring with two horses analogous to the horses on a knife from Seyma, which indicates the date of these sites (Fig. 68: 4). They are genetically related to those of southern Kazakhstan. The later Semirech'e proper type is represented by the sites of three local groups: Semirech'e, north-eastern Tian-Shan and southern Fergana.
In southern Kazakhstan cemeteries have been examined at Kara-Kuduk, Alakul' and Koktuma (Maksimova 1961; Kushaev 1968), in Kirgizia – Tash-Tyube II, Tash-Bashat, Besh-Tash, Tegirmensay, Dzhazy-Kechu, Karak-mat,

Dzhal-Aryk, Kul'an-say, Kyzyl-say, Chon-Kemin (Fig. 73b; Kozhemyako 1960; Abetekov 1963; Kuz'mina 1970; Kozhomberdiev and Galochkina 1969; 1972; Galochkina 1977; 1996; Galochkina and Kozhomberdiev 1995); a large collection of ceramics and metalwork has been found on the Bol'shoy Chuyskiy Canal (Bernshtam 1950, pl. xlviii: 7-10) and also on the settlements of Bishkek, Kainda, Dzhal-Aryk (Terenozhkin 1935; Bernshtam 1950: 105, fig. xxix; xxx; Kozhomberdiev 1977; Kozhomberdiev and Galochkina 1969; 1972).

In Dzhal-Aryk traces of constructions were revealed, made of *saman* (clay with an admixture of straw), large fire sites, ash-pits and ceramics.

In these cemeteries different types of constructions occur side by side: square, round, oval and rectangular stone enclosures (3 x 3 to 5 x 5 m) are predominant; occasionally, they are co-joined (Fig. 1: types III A; IV A; VII A; VIII A) or have several extensions. In the center of the enclosure there is a burial pit (0.7-1.4-1.4-2.2 m^2) or a stone cist, and in one case (Alakul') a wooden *srub* (framework). Sometimes the top of the grave is covered with stones. The pits are occasionally filled in with crushed stone, the walls and the bottom are coated with clay (Besh-Tash).

In Kazakhstan only inhumations have been revealed so far. In Kirgizia in the Kulan-say and Kyzyl-say cemeteries there are also only inhumations, the other burial grounds being bi-ritual — with cremation and inhumation co-existing within a single enclosure and even the same pit. The dead are normally placed in the flexed position on the left side, head to the west. Cremations have been identified in 70-80% of the graves.

The accompanying items for both rites are identical: vessels, bell-mouthed earrings, often coated with a gold leaf (Tash-Tyube, Tash-Bashat, Tegir-mensay, Kok-Tuma), earrings with a conical spiral (Dzhazy-Kechu), bracelets, round plaques, cast and forged beads, pendants, needles, awls, a single-bladed knife (Tash-Tyube).

The late Fedorovo type pots with a rounded shoulder are prevalent, less frequent—with a ledge; jars are also present. Most of the vessels are unornamented. The ornament (zigzags, notches, in one case—a rhombus) is applied to the shoulder, rarely on the neck, in plain or indented stamp.

At the settlement of Dzhal-Aryk the same pottery combines with rough vessels with swollen sides and rims of complex profile, occasionally with notches along the edge of the rim and zigzags and herring-bones over the shoulder, and in Kainda and places on the Bol'shoy Chuyskiy Canal also with vessels with applied-rollers of the Alekseevka and Dongal types. The chronology of the sites ranges from the 13th to 9th centuries BC, mainly, the 11th to 9th centuries BC. This has been determined, first, by the discovery of Alekseevka and Dongal type ceramics on settlements, a single-bladed knife, cast beads; and second, by the filling in and covering of graves with *pakhsa*, a custom that appeared in central Kazakhstan in the early Dandybay period (Margulan *et al.* 1966: 160-164).

Scholars unanimously assign the Semirech'e sites to the Andronovo culture. I distinguished them as a peculiar type and substantiated their assignment to the Final Bronze Age (Kuz'mina 1970: 44-48), which was accepted by I. Kozhomberdiev and N. Galochkina (1972: 39; 1977: 12, 36).

The settlement of Semirech'e would derive from central Kazakhstan. The Semirech'e type is likely to have formed as a result of the assimilation of the Fedorovo population that arrived here earlier with Alakul' groups. The mixed population inherited from their Fedorovo ancestors stone constructions, cremation, the shape of pots without a ledge and their technique of formation, beginning with the round bottom, bell-mouthed temple rings. The Alakul' traditions manifested themselves in the shape of pots with a ledge and the ornamentation in plain stamp. Contacts with central Kazakhstan continued in the Final Bronze Age when Semirech'e saw the distribution of ceramics with the applied-roller and the custom of filling in and covered graves. The Semirech'e burial grounds are most similar to the burial ground of Aydarly in central Kazakhstan. Stone cists within square stone enclosures revealed flexed burials with a westward orientation of the head. Unornamented ceramics prevail, and vessels with applied-roller and the Dandybay type are rarely found (Margulan *et al.* 1966: 183-186, pl. xviii; xix; fig. 93, 94).

In contrast to central Kazakhstan, where in the Final Bronze Age the Begazy culture took shape under Karasuk influence, this influence is barely traceable in Kirgizia, contrary to the opinion of A. N. Bernshtam (1950: 106), who singled out a Karasuk stage there. Only in the Vorontsovka cemetery was there found a single-bladed knife with a T-shaped section of the handle and one Karasuk vessel; and at the settlement of Dzhail'ma several Karasuk fragments are included in the complex of late Andronovo ceramics with applied-roller decoration.

The late Semirech'e monuments constitute the direct genetic basis of the Iranian-speaking Saka people, which is borne out by the continuance of Andronovo traditions in the Early Iron Age and by the continuity of the anthropological type.

The economy of the Semirech'e tribes was based on mobile pastoralism which is demonstrated by the topography of the majority of the cemeteries located on mountain slopes and in the high mountains. Seasonal nomadic movements predetermined the possibility of further migrations of the Andronovans and a change-over to nomadic stock-breeding by the Saka people.

The other pivotal branch was metallurgical production. To the Semirech'e tribes belong the hoards of southern Kazakhstan: Alekseevka, Kamennoe plateau, Turksib (Akishev and Kushaev 1963) and Kirgizia: Sukuluk I, II, Sadovoe, Issyk-Kul', Shamshi, Tuyuk, Karakol I, II, and numerous chance finds (Figs. 43a, b; 74-77; Bernshtam 1941; 1950; 1952; Zima 1948; Kibirov *et al.* 1956; Kuz'mina 1961a; c; 1965c; 1966: 94-98; 1968; Vinnik and Kuz'mina 1981; Kozhomberdiev and Kuz'mina 1980; Degtyareva 1985).

The types of articles are diverse: lop-headed axes with a cock-comb butt, fluted and wedge-shaped chisels, adzes with a projection, sickle-choppers, sickles with a coiled hub and rims, celts, celt-hammers, celt-spades, pick-axes, various knives, spears—socketed and shafted, a pole-ax, daggers, double-bladed arrows, and ornaments. They are dated to the 13th–9th centuries BC based on the co-occurrence in the complexes of the types, which find analogies in the Final Bronze Age complexes of the Eurasian steppes (Kuz'mina 1965; 1966: 94-95). It enables one to establish the existence of the wide cultural ties of Semirech'e in the Final Bronze Age. The hoards of Sukuluk II, Karakol II

and Issyk-Kul' are typologically differentiated as a later group dating to the 11th–9th centuries BC.

In terms of typology the metalwork of Semirech'e belongs to the eastern-Andronovo metallurgical province (Kuz'mina 1965; 1966: 95) and constitutes within its bounds an independent metallurgical seat. It is documented by the findings of a casting mold (Aleksandrovskoe), smith's hoards (Sukuluk II, Karakol II) and the specific composition of the metal corresponding to the polymetallic ores of the deposits of Aktash, Ketmen'-Tyube, those on the river Chu, and on the Issyk-Kul', near Alma-Ata.

The appearance of family hoards, incorporating various types of implements, reflects the social stratification of the population of Semirech'e. That the hoards were buried suggests that the Final Bronze Age was a period of intensified military clashes among the pastoral tribes over ore deposits and fertile pastures. These processes were related to the ecological crisis that accelerated the change-over to nomadic pastoralism and the development of new ecological niches in the mountains, that required vertical nomadic movements through the passes. As a result new routes were blazed, in particular, into Xinjiang along the Ili river and through the Dzhungar gates, along the way of the future Great Silk Road (Kuz'mina 1996; 2001; Sala 1999).

Sites of the North-eastern Tian-Shan

In the mountains of the North-Eastern Tian-Shan there were discovered the settlements of Talapty, Turgen' I, II, Uzunbulak and Asy (Fig. 73a). In Asy at a height of 2400m above sea level a large house was excavated. The walls of this semi-subterranean house were formed from stones and fortified with posts; hearths and ceramics were found in the center (Mar'yashev 2001). In the Oy-Dzhailyau and Tamgaly ravines cemeteries were excavated at Kul'say I, Uzunbulak I (Fig. 73a), Kyzylbulak I, II, Tamgaly I-IV (Mar'yashev and Goryachev 1993a, c; 1999; 2001; Rogozhinsky 1999).

The sites can be assigned to two stages. At Tamgaly rectangular and rounded stone enclosures were discovered, occasionally burial mounds formed from cobbles (types III A, IV A, VII A). In the center there was a stone cist. The burials comprised inhumations, the dead lying flexed on the left side, head to the west. Of particular interest are three burials in large clay vessels. An analogous rite is described in the Vedic literature of the Indo-Aryans. Cenotaphs are numerous.

In the graves there were found vessels, round temple rings, and beads. The ceramic complex is diverse: type I – pots of the Fedorovo type with a rounded shoulder and rich ornamentation, executed by oblique netting in plain or indented stamp. The decoration (oblique triangles, pennants, X-shaped figures, flutes) is applied over three zones; type II is represented by coarse pots with a rounded shoulder, type III by jars. The last two types are either devoid of decoration or ornamented on the upper part by horizontal zigzags applied in plain stamp. One vessel is decorated with an applied-roller. The date of these cemeteries is set to the 13th–12th centuries BC on the basis of the Fedorovo type temple rings, Fedorovo traditions of pottery-making, along with the predominant ceramic complex characteristic already of the Alekseevka type of

the Final Bronze Age. Typical of this time is also the trapezoid shape of some of the cists.

The second group comprises the cemeteries of Kulsaj, Uzunbulak and Kyzylbulak I, II. In them there were revealed rectangular, often interlinking, enclosures of stones placed horizontally in 2-3 rows or of vertically set slabs (types IV A,B, VII A,B). The graves contain frames made of logs of the Tian-Shan spruce or are overlaid with wood. The main burials are cremations, but in the peripheral graves, particularly children's, the inhumation rite is customary. There are known one single and one double burial of the cremated remains placed into large clay unbaked pots (Goryachev 2001: 53, fig. 7: 1,2).

Analogies to this rite are known in the Tamgaly VI cemetery in the Tian-Shan, Shet I in central Kazakhstan, in northern Bactria and northern Pakistan (see below).

In the graves there were found ceramics, bell-mouthed earrings, pendants, beads, and plaques with a loop (Goryachev 2001: 56, fig. 9).

The ceramics comprise pots with a rounded shoulder of the Fedorovo type, more rarely are those with a ledge, basins and jars. The pottery is unornamented. This ceramic complex is typical of the Final Bronze Age cemeteries of the whole of Semirech'e, which permits one to date these burial grounds to the 11th–9th centuries BC. To the same period is assigned the pottery of the neighboring settlements (Turgen I and Asy), comparable with the ceramics of the Dongal and Trushnikovo types in eastern Kazakhstan (Mar'yashev 2001: 96).

A. Mar'yashev and A. Goryachev (1993; 1999; Goryachev 2001: 72) suggest that this group of sites should be singled out as a distinct Kul'say culture; they note analogies in the Fedorovo sites of Siberia and central and eastern Kazakhstan (Mar'yashev 2001: 96). I deem that these cemeteries constitute just a local variant of the Andronovo Semirech'e type, with which they are linked by all the culture-determining characteristics: burial rite, ceramics, ornament. The origin of these sites appears to be associated mainly with central Kazakhstan, since in Siberia and eastern Kazakhstan the inhumation rite was predominant.

The importance of the discovery of northern Tian-Shan sites consists in the fact that here we can trace the dynamics of the development of high-altitude nomadic pastoralism. It is further essential that here one has established an indisputable association of the settlements and cemeteries with the petroglyphs, which for the first time provides reliable grounds for dating these petroglyphs and linking them with the Andronovo culture (Francfort *et al.* 1997; Mar'yashev and Goryachev 1998; Mar'yashev *et al.* 1998; Rogozhinsky 2001).

Sites of southern Fergana

In southern Fergana the cemeteries of Vuadil', Karamkul', Arsif, Kashkarcha, Yapagi, Chek, Tashkurgan, Urukzor were discovered; ceramics have been found at Shor-tepe, Osh and the Osh region (Gamburg and Gorbunova 1956;1957; Gorbunova 1972; 1979; 1995; Piotrovsky 1973; Ivankov 1988). The chance findings of celts, celt-spades, bracelets with horns, and bell-mouthed earrings (Figs. 70: 3,4; 114: 11,12; Zadneprovsky 1962; 1994; 1997; Litvinsky 1962; Kuz'mina 1966) are associated with these sites.

In the cemeteries different types of constructions are combined: round, square and rectangular stone enclosures predominate; occasionally, we find linking ones (see Fig. 1: A, IV A; VII A); rare are burial mounds with a bank of earth and crushed stone (type II A) surrounded by a stone circle; also known are stone cists without an enclosure. The burials were deposited in stone cists, sometimes overlaid with slabs. A peculiar feature of the Fergana burial grounds are burials in catacombs (Yapagi, Kashkarcha, Uryukzor). All the burials follow the inhumation rite, the dead lying flexed, head to the west (Karamkul', Yapagi) and in one grave (Vuadil')—to the east. Each grave contains a vessel and sometimes ornaments: bell-mouthed earrings (Vuadil'), earrings with a conical spiral (Yapagi, Arsif, Kashkarcha), a mirror (Yapagi), a bracelet (Kashkarcha). a bracelet of beads (Vuadil'); in Kashkarcha there is also a double-bladed knife and an awl, in Vuadil'—an arrow.

The vessels have a rounded shoulder and a short neck. Up to 50% of them are ornamented, the ornament being applied over the shoulder by carving or in plain, very seldom, indented stamp in the shape of zigzags, herring-bones, triangles and imprints. This ceramic is a late derivative of Fedorovo forms. In Vuadil' and Kashkarcha there were also found vessels with applied-roller ornament, characteristic of the Final Bronze Age. In Tashkurgan pottery of the Chust culture was discovered.

The sites are dated to the Final Bronze Age, primarily, 10th–9th centuries BC on the basis of the ceramic complex, the button from Kashkarcha and the double-bladed arrow with a hidden socket from Vuadil'. B. Gamburg and N. Gorbunova (1957) attributed these cemeteries to the late Andronovo culture, B. Litvinsky (1962: 287-289; 1983: 157) to the Kayrak-Kum culture, N. Gorbunova (1995: 23) to the Kayrak-Kum variant of the Andronovo culture. I have emphasized their closeness to the Semirech'e type sites of Kirgizia (1970: 45). Their origin is likely to be associated with the southward movement of late Andronovo tribes from central Kazakhstan or Semirech'e. N. Gorbunova (1995: 23), when analyzing the burial rite in the catacombs, specific to Fergana, emphasizes the possibility of a southern component in the ethnogeny.

The culture of Fergana of the Final Bronze Age probably formed as a result of an amalgamation of the late Andronovo population with representatives of the Chust culture. Most of the cemeteries are located on the mountain slopes, which points to a semi-nomadic lifestyle of Fergana's pastoralists.

Fergana Valley: Late sites of the Kayrak-Kum Type

On the bank of the Syr-Darya in the Kayrak-Kum desert, seventy settlements and industrial complexes have been discovered as well as the cemeteries of Khodzhi-Yagona, Dakhana, and Dashti-Asht (Litvinsky 1960, 1962, 1963; Saltovskaya 1978: 95, 96). Some of the settlements belong to the early lron Age. The Bronze Age complexes have been discovered at settlements 6, 12, 16, and 35. To the Kayrak-Kum type also belongs the Ak-Tangi cave and the ceramic finds from the Bol'shoy Fergana Canal and nearby town of Suleyman-Tau, and numerous examples of metalwork: celt-spades, trumpet-shaped earrings, bracelets with conical spirals (Zadneprovsky 1962: 51; 1999; Litvinsky 1962; Kuz'mina 1966: 94). Generally, the settlements are not large: 0.1-0.3ha, but there are some of 3ha. All of them are half-eroded. The dwelling type has not been identified.

Series of stone hearths have been revealed which makes it possible to reconstruct the typical Andronovo dwelling up to 20m in length. Outside the settlements' boundaries production complexes have been discovered where agglomerations of ore and slag have been found weighing up to 1.5-2 tons. At settlement 16, molds for a pick were discovered and an axe with a cock-comb (Figs. 74: 3; 113: 28). The staple of the economic and cultural type was metallurgy and metalworking. Judging by the scale of work metallurgy was treated as a specialized craft. The copper sources were the Naukat and Karamazar deposits. The Fergana metallurgical center belonged to the eastern Androvovo metallurgical province, characteristic of which are lop-headed axes with a cock-comb, picks, celt-spades, arrow of proto-Saka type, trumpet-shaped earrings, bracelets with concial spirals (Kuz'mina 1966: 94).

The second component of the economy was cattle-breeding. There have been found the bones of cattle, ovicaprids and the horse. Indicative of hunting are the bones of Gazellas subgutturosa; a fishhook attests the presence of fishing.

The ceramics of the Kayrak-Kum type are hand-made, occasionally executed in a textile pattern. The pots have a rounded shoulder and a short inverted rim, often of a complex profile. Apart from this, there occur vessels with globular bodies. On late sites one also finds vessels with horizontal handles and kettles. Ten percent of the pottery is decorated, half of the ornament being executed in combed stamp. The ornament is located in one zone under the rim, rarely also on the shoulder. Primitive patterns such as zigzags, herring-bones, and nail impressions are predominant.

In the cemetery of Khodzhi-Yagona, stone cists were found built from edgewise-placed slabs, oriented northwards. Inhumations are accompanied with vessels analogous to those from the settlement, a bracelet, a plate, and beads (Litvinsky 1962: 117-118, pl. 55). In the Dakhana cemetery the burials are made in stone cists formed from horizontally-laid slabs. The cists protrude above the surface and are oriented to the west and south-west. In inhumation burials were found one vessel in each, a bronze trumpet-shaped earring, and a stone button (Litvinsky 1960; 1962: 158-164, fig. 39-40). The Dashti Asht cemetery dates to the end of the period. At ground level under the stone cairns, 4-12m in diameter and 0.4-1.5m in height, stands a stone cist built from slabs set edgewise or flat containing a burial with the dead lying flat on their back, head to the west. In the burials vessels were found of the Kayrak-Kum and Chust culture, an earring, and a plate (Saltovskaya 1978: 95-6; Litvinsky 1962: 246, 248; 1963: 109, 121, 124).

B. A. Litvinsky (1962: 246, 248; 1963: 109, 121, 124) designated all the Fergana monuments as belonging to the Kayrak-Kum culture, assigning to it also the complexes of the Tashkent oasis and the Makhan-Darya. This attribution appears imprecise (Itina 1967: 78; 1977: 233; Kuz'mina 1966: 94; 1968: 308). Later (1983: 157) he only assigned the Fergana sites to the Kayrak-Kum culture. N. Gorbunova (1995: 23) assumes that all the Fergana sites, including the southern Fergana cemeteries (see below), can be united into the Kayrak-Kum variant of the Andronovo culture. The diagnostically important characteristics – large houses, burials in stone cists oriented westwards, technology of ceramic manufacture employing a textile pattern, shapes and ornaments of the ceramics—all of these are Andronovo characteristics. We thus may single out the Kayrak-Kum sites as a special type of the Andronovo community. The

existing differences in both ritual and ceramics, from my point of view, reflect not cultural but chronological peculiarities. The early Andronovo characteristics are absent in the Kayrak-Kum ceramics. The dating of the sites to the 12th–9th centuries BC is determined on the basis of the cock-combed axe and the ceramics with a complex-profiled rim. A date of the early 1st millennium BC for the Dakhana cemetery is based on the find of a block-like button and for Dashti-Asht and Takyri-Yagona on the evidence of vessels from the Chust culture. Kayrak-Kum ceramics have also been found on the Chust settlement of Tashkurgan. The genesis of the Kayrak-Kum-type sites is likely to be associated with migrations of the eastern Andronovo population, which is indicated by the burial rite and the eastern Andronovo types of metal articles: cock-combed axes, and trumpet-shaped earrings. Particularly instructive is the similarity with the sites of the Semirech'e type.

CHAPTER TWENTY

RELATION OF THE ANDRONOVANS WITH THE POPULATION OF XINJIANG AND CENTRAL ASIA

It is reasonable to presume that Andronovo influence extended as far as China. In the Anyang culture we find the momentous achievements of a world civilization—metallurgy, wheeled transport and horse-breeding—already in their developed form; the Yellow River displays no preceding development. Pursuant to the ancient tradition created during the formation of the Chinese state, civilization emerged there independently. This traditional hypothesis of autochthonous development has been embraced by most Chinese archaeologists (Chêng Tê-K'un 1961; Chang Kwang-Chih 1959; 1965; 1968).

In accordance with another hypothesis put forward by M. Loehr (1949; 1957; 1965) and the outstanding Russian scholar S. V. Kiselev (1960) (and accepted by Li Chi (1957), W. Watson (1961), E. Kuz'mina (1973), Ping Ti Ho (1975), S. Kuchera (1977), M. Kryukov, V. Safronov, N. Cheboksarov (1970), and A. Varenov (1983)), the formation of Chinese civilization was stimulated by a western impulse. In the Eurasian steppes metallurgy, wheeled transport and horse-breeding go back to the 4th millennium. BC, while the types of celts, spears and single-edged knives of Anyang find their prototypes and analogies in the Andronovo and Seyma-Turbino complexes.

Now it has been established that metal appeared in China in the pre-Anyang period on the northern periphery in the cultures of the 'significant others' (Linduff 1996b), people, ethnically non-Chinese (Prušek 1971; Wu En 1985; Lin Yün 1986). These cultures have been systematized by K. Linduff (1994; 1995; 1996a; 1996b; 1997; 1998). The Qijia culture in Gansu (2500-1900 BC) has yielded the oldest barley and wheat, horse, forged copper awls and rarely cast bronze awls, knives, celts, gold rings, a mirror, plaques, and earrings (Debaine-Francfort 1995: 320, fig. 19, 61). In the cultures of Zhukaigou (phases 3, 4, 5) in Inner Mongolia (2000-1500 BC), Lower Xiajiadian in the north-east of Inner Mongolia and Hebei (2000-1600 BC); Erlitou (periods 3,4) in the Central Plain (1750-1530 BC), (Chang Kwang-chih 1968) and Yueshi in Shandong (2000-1600 BC) there are incipient signs of the productive economy (pig, horse) and metallurgy. In China alongside metal there appeared wheat, barley and sheep, all cultivated in the Near East and diffused in the 3rd millennium BC into the steppes; the horse was domesticated in the steppes. This testifies to a north-western impulse. The multi-ethnic population of northern China apparently played a pivotal role in the spread of the productive economy, horse-breeding and metallurgy, into the Central Plain from the north, the steppes (Linduff 1994; 1995a; 1997; 1998; Fitzgerald-Huber 1995; 1997).

Relations with the north may have been realized via Xinjiang and along the steppe corridor of Gansu (Map 15). In the north Xinjiang is connected with

Siberia by a pass through the Altai mountains. In the west it is linked with Fergana by the Tersek Davan Pass and by an easily passable route along the Ili river through the Tian-Shan with Semirech'e. The ecological conditions of eas-tern Turkestan are very diverse: from the north it is circumscribed by the Altai mountains, from the south the Pamirs, Kunlun and Altyn mountains, from west to east the Tian-Shan separates Dzungaria from the Tarim Basin; most of the territory is occupied by the Taklamakan Desert but in places fertile river and lake valleys are suitable for farming, while areas of steppe may be used for stock-breeding (Petrov 1966; 1967). This determined the diversified character of the economic and cultural types of the region. The Afanas'evo culture was the first in Xinjiang with a productive economy. It is represented by a cemetery near Urumchi and Ke'ermuqi (Keremchi) in the Altai district (Wang Binghua 1996: 75; Molodin and Alkin 1997). In terms of the funeral rite and implements similar to the Afanas'evo culture we have the Gumugou (Qäwrighul) cemetery; the absence of pottery makes it impossible to assign an exact attribution (Debaine-Francfort 1998; Mair 1995; Mallory 1995; Mallory and Mair 2000; Kuz'mina 1998; Khudyakov, Komissarov 2002: 31-33). The calibrated date of Gumugou is 2030-1815 BC. The population raised cereals, sheep, goats, cows and Bactrian camels, produced textiles of a European type (Barber 1998), wore the traditional dress of the steppe-dweller: a cap, caftan, trousers and boots, and used forged copper articles. The population belonged to the Caucasoid anthropological type (Alekseev 1988; Han Kangxin 1994; 1998; Chikisheva 1994). The Afanas'evo culture is genetically related with the Pit-grave and, partially, Catacomb cultures (Kiselev 1949; Vadetskaya 1986; Tsyb 1984; Novgorodova 1989). The arrival of representatives of the Afanas'evo culture in Siberia, Tuva and Mongolia is viewed as the first wave of the migration of the Indo-European-Tocharians eastward (Semenov 1993), the creators of Gumugou being also numbered among them (Jettmar 1985; Mallory 1995; 1998; Mallory and Mair 2000; Pulleyblank 1996; Renfrew 1998; Kuz'mina 1998).

Northern Chinese populations may have received metal, wheat and barley, wheeled vehicles, the sheep and the horse from the Afanas'evo tribes, who came from the west. The words for all these were borrowed into Chinese from Indo-European, presumably Tocharian (Pulleyblank 1996: 1-24). It is likely that the rites of domestic animal sacrifice, familiar in the European steppes from the 4th millennium BC, were also adopted. In Siberia the Afanas'evo culture was succeeded by the Andronovo culture of the Fedorovo type, which came from eastern Kazakhstan. In the Fedorovo burial grounds reminiscences of the Afanas'evo ceramic tradition can be distinctly traced, but genetically these ethnoses differ. As already mentioned, at the early stage of Novy Kumak Andronovo tribes organized large-scale metallurgical production. The history of Andronovo metallurgy is closely associated with that of Turbino-Seyma, studied by E. Chernykh and S. Kuz'minykh (1989). Turbino-Seyma bronzes are an assortment of types, comprising celts, adzes, double-edged knives-daggers, single-edged knives, often with a figured handle, spears, including those with a socketed shaft, hooks and bracelets. Turbino-Seyma bronzes are distinguished by the use of tin bronze and the casting of thin-walled celts, chisels and socketed spears with an all-metal socket. The invention of a strong bronze alloy, which enabled the production of implements with a cast socket, was a momentous

innovation for the period. The abundant cassiterite deposits of eastern Kazakhstan provided the source of tin.

Turbino-Seyma bronzes form part of the complexes of entirely different cultures united by a system of rivers. From eastern Kazakhstan, where a great number of chance finds are concentrated, tin and bronze came by the river Irtysh eastward to the Altai along the Ob (Elunino, Tsygankova Sopka) and to the north of the Altai along the Om, the Irtysh's tributary (Rostovka, Sopka 2, Omskiy Klad), and also by the Irtysh to the north where the Ob and the Irtysh converge with the basin of the Ural rivers. From there metal would find its way to the Kama (Turbino) and further to the Volga (Seyma). This 'tin' road preceded the Great Silk Road which would connect Asia and Europe.

What is the origin of Turbino-Seyma bronzes? E. Chernykh and S. Kuz'minykh (1989: 259-261; 270) dated them to the l6th century BC and presumed that the complex formed in Siberia as a result of the interaction between the culture of the hunter-fishers of Baikal and that of the Altai's horse-breeders and metallurgists. A clan of armed nomad-metallurgists would carry out distant raids on horseback and spread their products in the west. V. Bochkarev (1986) established the wide European relations of the bronzes and determined the chronological sequence of the complexes: Turbino-Seyma-Rostovka and Samus' IV, Turbino being synchronized with the Abashevo culture. O. Kuz'mina (2000: 65-134) confirmed the relationship between the metallurgy of the European Abashevo culture and Turbino and demonstrated that many types of early Andronovo metal from Sintashta advanced traditions of Abashevo metalworking (adzes, double-edged and single-edged knives, spears, shafted arrows, hooks, bracelets). This bears out the role of the European traditions for the metalworking of Turbino-Abashevo-Sintashta. However, there is a group of bronzes of eastern origin at Seyma (Chernykh 1970: 155-173). In Sintashta two articles of tin bronze alloyed with lead (Pb) and antimony (Sb) were found, which points to their being exported from eastern Kazakhstan (Zaykova 2000). That is also the likely source for the single-edged knife with a representation of an argali known from Turbino and one from Seyma's one with a pair of horses (Bader 1964: 115-123, fig. 113; 1970: fig. 52).

This allows one to pose a working hypothesis concerning the formation of Turbino-Seyma bronzes as a result of the interaction between the population of Eastern Europe (above all, Abashevo and, partially, Catacomb tribes) and early Andronovo tribes of the Fedorovo type in eastern Kazakhstan. There bronzes have already been recovered from the Kanay cemetery which preserve the Eneolithic traditions, and the early Marinino stage of the Fedorovo type has been established (Tkacheva 1997: 12). The acceptance of the calibrated C^{14} dates of the Abashevo (Mikhaylova and Kuz'mina 1999: 119) and early Andronovo sites of the Novy Kumak stage compels one to assign Turbino to an earlier time and date it to the turn of the 3rd–2nd millennia BC. It may be presumed that it is the early Andronovo tribes of Siberia and eastern Kazakhstan that were instrumental in the appearance in China, in the northern contact zone, of tin and bronze articles, stone and clay molds, the technique of casting celts and spears with a concealed socket, as well as types of adze, the single-edged knife and the ring-headed dagger in Erlitou in Henan (Linduff 1994: fig. 3, 18) and the dagger from Zhukaigou, phase 5 (Linduff 1997: fig. 6 bottom). The type of twisted-butt

daggers with animal figures on the handle was widely developed in China (Lin Yün 1986: fig. 49, 17; Linduff 1996a: fig. 9; Chzhun Suk Be 2000: fig. 2, 1-6). China's socketed spears are analogous with Andronovo spears, which go back to Abashevo-Turbino prototypes (Loehr 1956; Varenov 1987; 1989). The pitch-fork-shaped spear with a hook from Shenna, Qinghai (Wagner 2001) resembles the spears from Rostovka and from the Altai (Fig. 109: 15, 16; Chernykh and Kuz'minykh 1989: fig. 29, 30).

Having received this initial western impulse, Chinese metallurgists began to develop their own production. On the Yenisey in the 14th–13th centuries BC Andronovo-Fedorovo tribes were ousted by the newly arrived tribes of the Karasuk culture. In eastern Kazakhstan and Semirech'e the development of the Andronovo culture was still under way. In the 13^{th}–12^{th} centuries BC pottery with applied-roller and many types of metal articles, common from the Danube to the Altai, spread here, and the activity of the metallurgical centers of Semirech'e and Fergana intensified. Relations with Xinjiang stepped up. Xinjiang's sites are diverse and include: agricultural settlements, stock-breeders' sites, cemeteries, hoards and chance finds (Jettmar 1985; 1992; 1996; Molodin and Alkin 1987; Antonova 1988; Debaine-Francfort 1988; Kuchera 1988; Khavrin 1992; Kuz'mina 1996a, b; 1998; 2000; Zadneprovsky 1992; 1993; 1994; 1995; 1997; Semenov 1993; Molodin and Alkin 1997; Molodin 1998; Shui Tao 1998; Ke Peng 1998; Mei and Shell 1998; 1999; Mallory and Mair 2000). Of particular importance are the works of Debaine-Francfort and Mei and Shell. Xinjiang's population belonged to different anthropological types, including Pamir-Fergana (Andronovo) (Han Kangxin 1998). The monuments and pottery are diverse and attempts to provide them with a local origin and chronological classification (Chen and Hiebert 1995; An Zhimin 1998) are so far unconvincing (Komissarov 1997). There are Andronovo sites in Xinjiang: in the Sazi cemetery in Tuoli on the border with eastern Kazakhstan burial mounds composed of stone and an earthen bank were discovered and a Fedorovo vessel was found (Mei and Shell 1999: 573, fig. 3: 1); in the cemetery and settlement of Tacheng (Chöchäk, Tarbaghatay District) Andronovo pottery with stamped geometrical ornament in the shape of a herring-bone, triangles and zigzags was recovered. A large jug decorated with herring-bone and a small jug ornamented with nail impressions (Mu Shing In 1996: 27, fig. 14), analogous to the vessels of eastern Kazakhstan, have been published (Fig. 109: 17, 18). An adze, a pair of earrings, beads and a copper ingot were also found there. At the agricultural settlement of Xintala in the Tarim Basin (the radiocarbon date is 1700-1300 BC) two archaeological layers were discovered. In the lower one painted pottery was discovered together with vessels with comb-shaped geometrical ornament, a stone mold for casting an awl, and an awl and a knife; and on the surface a celt and a socketed arrow were found (Debaine-Francfort 1998: 16; Mei and Shell 1998: fig. 3: 1; 1999: fig. 7).

Metal articles of the Andronovo type were discovered at other sites in Xinjiang (Figs. 54; 74: 7; 75: 1, 13, 17, 21; 76: 8; 77: 4, 10, 13, 15, 16; 109: 4-7, 11-15). In the Qizilchoqa cemetery of the Wupu group (Hami) (C^{14} date is 1350-1000 BC) a chisel, a socketed arrow, a mirror with a handle and beads sewn on the boots were found (Debaine-Francfort 1988: 18-19, II: 5). In Yanbulaq (Qumul group) (C^{14} date is 1110-525 BC) 76 burials were excavated and 94 bronze articles were recovered: single-edged knives, socketed arrows, awls,

rounded plaques with punched ornament (flat and with an eyelet). A celt and a ring-headed knife were found at the Lanzhouwan settlement of the Nanwan group (C^{14} date is 1385 ± 75 BC). A celt, knives, an arrow, an awl, a mirror with a central projection, earrings and beads were excavated from the Nanwan grave (C^{14} date is 1050 BC). At the Qaraqocho settlement in Turfan (C^{14} date is 945-100 BC) a sickle and awls were discovered.

Chance finds are also known in eastern Turkestan. A celt and an arrow or javelin were discovered in Kroran by Sven Hedin (Bergman 1935: table xvi 1, 7), an asymmetrical celt was found in Xinjiang, a celt-spade and a flanged adze in Urumchi (Debaine-Francfort 1988: figures 9, 3, 5). In the area of Tacheng and Tuoli (Mei and Shell 1999: 573, fig. 4) two axes, four sickles, an adze, a celt, a celt-spade, a chisel and a spear were recovered, part of the articles being made of bronze containing 2-10% tin. In the Tian-Shan near Yili an adze was discovered; in Yining—a chopper-sickle; in Nileke—a celt; in Xinguan—a chisel; in Jimusa'er and Qitai two axes were found; in Hami—a celt and a sickle; in Kuysu in Balikun—another ax; in Chaqimale in Huayuan near Hami—an arrow and two knives: ring-headed and with a deer's head.

The hoard discovered in Agarshin in Toquztara is very interesting (Fig. 75). It was discovered in 1975 at a depth of 1 metre (Debaine-Francfort 1989: 200, fig. 20, table 11, 5, 6; Ke Peng 1998: fig. 1-6; Wang and Cheng 1989: 95, 96). The complex was found in the vicinity of graves with stone slabs. It contained a red-fired vessel and 13 [12] bronze articles: three axes with drooping butt-ends, three sickles, five chisels and a celt-hammer. An Zhimin (1998, photo 2-5) includes three more adzes. Originally, the hoard was attributed to the Warring States period, to the developed Iron Age (Wang Binghua 1989: 200). C. Debaine-Francfort (1989: 200) pointed out the possibility of synchronizing it with the Andronovo culture, but she attributed it to the Saka period. Ke Peng (1998: 580) assigned it to Andronovo and dated these finds to 1500-1000 BC. I set the hoard to the Andronovo culture and dated it to the 13th–11th centuries BC (Kuz'mina 1994: 241). The comparison of Xinjiang's bronze artifacts with those of Andronovo permits us to specify their chronology and origin (Khudyakov and Komissarov 2002: 34-35).

In the cemeteries of Wubao and Lafuqiaoke (1165-890 BC) bronze single-edged knives and ornaments were found (Wang Binghua 1996: 77).

Thus, metallurgy in China emerged as early as the turn of the 3rd–2nd millennia BC under the influence of the Eurasian steppes. It was mediated not by the ethnically Chinese tribes of China's northern periphery ('significant others' according to K. Linduff 1996b), but, initially, by the tribes of the Afanas'evo culture and then the Turbino-Seyma and Andronovo. Borrowed were the technology of making a bronze alloy, the use of gold and the casting of spears and celts with a concealed socket in two-part molds. Particularly active were the relations between Semirech'e, Fergana and eastern Kazakhstan and Xinjiang, where an Andronovo population settled and all the specific types of the implements of the Semirech'e metallurgical center were in general use.

Other innovations of Chinese civilization were horse-breeding and wheeled transport. Horse bones are represented in the metal-using cultures of the early 2nd millennium BC (Qijia, Siba and Longshan), but their role was negligible and there is no evidence of domestication (Linduff 2000a, b). Judging by the depic-

tions (Linduff 2000b: fig. 1, 2) and, particularly, engravings denoting the horse in Chinese oracle-bone inscriptions, it was the wild Przhevalsky horse (Mair 1998). Its range in the historical period embraced the whole of the Eurasian steppes, including Mongolia. The Przhevalsky horse is untamable. Since the number of chromosomes of the domestic and Przhevalsky horses is different, the latter could not be the ancestor of the former. The domestic horse may have originated from the tarpan in the Pontic-Caspian steppes, where already in the 4th–3rd millennia BC its cult emerged and the horse was represented in art and ritual sacrifices. In southern Siberia the domestic horse is familiar to the Afanas'evo culture. But initially the domesticated horse would only be used as food (Bökönyi 1995; Kuz'mina 2000; Linduff 2000a).

The Afanas'evo culture was probably also familiar with wagons, which had solid wheels made up of three parts assembled by mortise and tenon and with a protruding hub. Draught animals were a pair of bulls or oxen (Leontiev 1980: 65; Vadetskaya 1986; Gryaznov 1999). The similarity in construction of the Old World's carts and wheels in the late 4th - mid 3rd millennia BC gave rise to the hypothesis of their monocentric origin in the Near East (Childe 1954; Piggott 1969; 1983; Littauer and Crouwel 1979). This type of transport is also familiar to the Andronovo culture. For now the appearance of the cart in China is evidenced by its representations in petroglyphs in Xinjiang and Inner Mongolia (Kezierqueqia (Qizilchoqa) near Qumul in Xinjiang, dating back to 1350-1000 BC (Mallory and Mair 2000: 142, 143, 324, 325: fig. 64)). Horse bones have been found in Xinjiang on sites of the latter half of the 2nd - early 1st millennium BC: Shirenzi, Lanzhouwan, Nanwan, Wupu, Kezierqueqia (Qizilchoqa) (Debaine-Francfort 1988: 18-21; Jettmar 1992), and cheek-pieces of steppe type were found in Shirenzi and Nanwan.

The most important innovation of the first quarter of the 2nd millennium BC was the spread of the light war-chariot with two spoked wheels, harnessed to a pair of horses. The oldest finds of chariots and horses in warriors' graves are known from the Urals and on the Volga (Gening 1979; Kuz'mina 1994; 2001; representations are known from Anatolia and Syria (Littauer and Crouwel 1979; Moorey 1986). Having emerged in the formative period of the Andronovo culture at the sites of Sintashta and Petrovka, chariots dominated the steppes in the third-quarter of the 2nd millennium BC in the Timber-grave and Andronovo cultures, which is evidenced by cheek-pieces, representations on vessels and on petroglyphs. The representations of chariots in Xinjiang (Cheremisin and Borisova 1999: 129-134, pl. i; ii) are analogous to the Andronovo chariots of Kazakhstan and Semirech'e and are executed not in the Near Eastern manner in profile but in the Eurasian style en face (Littauer 1977; Novozhenov 1994), which indisputably corroborates their origin in the north-western steppes (Fig. 93: 10-13).

It is interesting that the graph denoting the chariot in the oracle-bone inscriptions (Shaughnessy 1988: fig. 4) resembles the pattern in petroglyphs of Central Asia (Fig. 54: 13, 18; Novgorodova 1981). Chariots proper were discovered in the 1930s at the imperial cemetery of the Shang dynasty and near the palace in the capital of the Yin kingdom in Anyang and later in its neighborhood near Beijing, in Xiaotun, Dasikong, Baijiafen, Xibeigang, and also in Liulihe, etc. (Kaogu Xuebao 1947 #2; 1955 #5; 1979 #1; Kaogu 1961 #2;

1972 #4; 1977 #1; 1987 ##5, 12; 1998 # 9; Wenwu 1977 #5; Cheng-Te-K'un 1960: 71, 260, pl. xviii c; xxv d, map 1; Watson 1961: 64, pl. 48; Dewall 1964: 124-127; Ping-ti Ho 1975: 354-357; Li Chi 1977: 113-115, fig. 19; Kuchera 1977: 133-140, 173, fig. 64-67; Kozhin 1977; Kryukov *et al*. 1978; Varenov 1980: 164-169; Shaughnessy 1988: 191-194; Linduff 2000a). Beside the graves of the kings and elite there were discovered the *chemaken* pits (literally – 'a pit with a chariot and horses'). Their date is 1250-1100 BC. They contained weapons, a chariot whose wheels were placed into segmented grooves analogous to those of Sintashta, and two horses, laid, as in Sintashta, on their side parallel to one another (Fig. 112: 1). A quadriga was found but once (Xiaotun M 20). Chariots with four horses were typical of the following Zhou dynasty (Komissarov 1980; Shaughnessy 1988; Linduff 2000a). Sometimes a charioteer or a groom was buried in a *chemakeng*.

Cheek-pieces are rectangular, with a central orifice (Fig. 111: 24,25), made of bronze (a Chinese innovation). The harness, as in Andronovo, has a nose-strap. In contrast to the Near Eastern wheels, the Chinese ones are multi-spoked, like those of Andronovo. Other peculiarities of construction of the Chinese chariots are also close to Andronovo, as far as one may judge from the petroglyphs. This points to the steppe origin of chariots in China (Dewall 1964; Kozhin 1969; 1977; 1988; Li Chi 1977; Kuz'mina 1973a; 1977; Piggott 1978; 1983; Varenov 1980; Komissarov 1980; Shaughnessy 1988; Linduff 2000b; Mallory and Mair 2000). The northern tribes served as mediators in their transfer to Anyang. This is borne out by the ritual oracle-bone inscriptions, which record the seizure by the Shang army of rich booty in northern and western China: chariots, horses and weapons (Ping-ti Ho 1975: 225; 356-357; Shaughnessy 1988: 214; 233; Linduff 2000b).

Apparently, together with the horse and the chariot Yin China also adopted the art of horse training, their name, and religious and mythological concepts associated with them. The word 'horse' *ma* is an old Eurasian migrational term (Polivanov 1968; Pulleyblank 1966: 11, 12), and the name of the chariot stems from the Proto-Indo-European 'wheel' and came to Shang China via either Tocharian or early Iranian (Pulleyblank 1966: 30; Lubotsky 1998; Bauer 1994; Mallory and Mair 2000: 126). The cult of the chariot and the horse and the rite of its sacrifice, particularly at the funeral of a king or military elite, is characteristic of the Indo-Iranians, and archaeologically it is attested in the Andronovo culture. Chinese myths about the connection of the emperor with the winged heavenly horses, which rendered him immortal, the horse coming out of water, the thunder chariot and the sun chariot used by the solar god for travelling over the earth, arise from the Indo-European and, particularly, Indo-Iranian mythology (Bussagli 1955: 17-22; Waley 1955; Dewall 1964: 121; Yuan Ke 1965: 176-177; Pulleyblank 1966: 32; Kuz'mina 1974: 83, 84; 1977: 45), and the names of fanciful horse-griffins were adopted from the Tocharians or, more likely, Indo-Iranians (Izushi 1930: 346-387; Waley 1955), while the images themselves were incarnated by the Iranian peoples in Scythian animal-style art, and in folklore they have survived till the present time (Kuz'mina 1977).

Thus, the analysis of the relations between the Andronovo culture and Shang China enables the following conclusions to be drawn: 1) cultural relations between the steppes and the Central Plain were established in the 2nd millennium

BC; at that time sections of the future Great Silk Road (Map 16) were established, along which metal, the horse and the chariot reached the Celestial empire; 2) since cultural borrowings were reflected in the Chinese language in the words adopted from Indo-European, first and foremost, Indo-Iranian, this serves as an important—and independent—argument in favor of recognizing the Andronovans as Indo-Iranians. 3) the established relations permits one to refine the Andronovo chronology by synchronizing it with the Chinese.

The lower date of the Andronovo type axes is determined by the discovery of a bronze model of an axe with an oval socket, reinforced with a raised-border evolving into a comb, in a cremation burial in the Stary Tartas IV cemetery belonging to the Fedorovo Yenisey type (Molodin *et al.* 1998: 294-299, fig. 2b). The complex of the grave with a richly ornamented square Fedorovo vessel, comparable with the Alakul', and horse bones fixes the date of the axe as no later than the 14th century BC.

Of particular interest is the tomb of the ruler Fu Hao, who was a consort of the king Wu Ding (*c.* 1200 BC). The tomb is situated in Xiaotun at the imperial cemetery in Anyang (Henan Chutu 1981: 147, 148: fig. 136-181; Linduff 1994: 418; So and Bunker 1995: 36). Alongside a set of Chinese articles, including those with inscriptions, the complex comprises a twisted-butt knife, a bronze mirror of the Andronovo type, jade rings and bracelets resembling Seyma types, and stone figurines of people and horses, comparable with Andronovo plastic art. These articles are probably of northern origin. In the complexes of Anyang two types of items can be distinguished: 1) local articles, including those with the emperors' names; 2) imported pieces of northern origin: Andronovo temple-rings of the Fedorovo type made of gold alien to China, socketed two-bladed arrows and spears atypical of China, and single-edged knives with a zoomorphic handle.

The axe (Figs. 74: 7; 109: 4-7). Three axes were recovered in the caches at Agarshin in Xinjiang (blade fragments); in Tacheng, in Tuoli; in the east in Dzhimusaer, in China and Balikun. They belong to a specific Andronovo type. Axes are also found in southern Siberia (Fig. 109: 1-3). The main finds are concentrated in eastern Kazakhstan, Fergana, and Semirech'e (Fig. 74), as well as in the hoards from Shamshi, Sukuluk, Issyk-Kul', Alekseevka, and Tuksib (Chernikov 1960: 161; Kuz'mina 1966: 11-14, table II; 1994, fig. 43a; Kozhumberdiev and Kuz'mina 1980, Avanesova 1978, 1991: 14, fig. 13). The axes of this type developed from Eastern European and early Andronovo lop-butted types. The type is characterized by the angular cross-section of the blade, a shaft-hole, with a terminal lug at the butt, and patterns in relief on the butt. In early samples comb patterns on the handle were not very prominent. The axe from Jimusaer belongs to this type. In later samples the comb pattern is clearly marked, an ornament in the shape of a spruce or a net sometimes decorates the butt. Such ornament is present on the axes from Agarshin, Tacheng, Alekseevka, Sukuluk, Kirgizia and are kept in the University of Bishkek. There is a cross on an axe from the Altai and from Shemonaikhe (Fig. 109: 2, Frolov 1996: fig. 1.2). There is notching on the celts from Urlanova (Kiryushin and Ivanov 1996: fig. 2).

The date of origin of the type is determine by hoards, the discovery of stone molds for axes in settlement # 16 in Kayrak-Kum, and two axes and ceramics with applied roller in the settlements of Bes-Tyube (Litvinsky 1962: 12, 213,

table 36). Identical ceramics were found with an axe in the settlement of Krest'yanskoe IV in the Altai. From this region also come large sickle-scythes of Sosnova-Maza type in Timofeevskoe, and a sickle that has European parallels from Mayorovka (Ivanov and Isaev 1999: 83, fig. l). This evidence places the date between the 13th and 9th centuries BC. Possibly, the type of the axe from the Baicaopo grave that belongs to the Western Zhou was created under the influence of Andronovo axes (Lin Yun 1986: fig. 55.3). This type is remarkable for having a straight butt, but just like the Andronovo ones, a cock-comb, an oval shaft-hole and a six-angled blade. The date of the Chinese sample does not contradict the chronology of the Andronovo types.

The adze. In Xinjiang three adzes make up part of the Agarshin hoard, another three were found in Tacheng (Figs. 43a,b; 75: 18-23), and one to the east, in Urumchi. Flanged adzes were known in Siberia and northern Kazakhstan. The major discoveries are concentrated in the Altai, eastern Kazakhstan, especially in Semirech'e, and in hoards from Shamshi, Sukuluk, Sadovoe, Alekseevka and Tuyuk (Chernikov 1960: 164, table lxiv. 9, lxvii. 5; lxxvii. 3, 4; Kuz'mina 1966: 18-20, table iii. 9, 10, 14-17; 1994). The date of this type is the 13th–9th century BC. This dating is based on the following archaeological evidence: hoards and the discoveries in Sary-Ozek, where adzes were found with sickles of the Sosnovaya-Maza type; finds in the settlements of Malokrasnoyarka, eastern Kazakhstan, Stepnyak, and others in northern Kazakhstan (Chernikov 1960: 82; Zdanovich S. 1979: 12) where adzes and ceramics decorated with applied-roller design were recovered.

Socketed adze with bevel. A unique sample of this type was found in Xinjiang in Ksinuan. The tool without a doubt has a distant analogy to the single-cast flanged adzes and represents the local development of the type. A tool from Regar in Tadzhikistan is a distant analogue of the above-mentioned sample (Kuz'mina 1966: 23, table iv.7)

Flat socketed chisel (Figs. 43a,b; 109: 12-16). Three chisels were part of the Agarshin hoard in Xinjiang. One was found in Tacheng; the other one was found in the east, in the Qizilchoqa settlement. The chisels have a round socket with a lug and a flat blade. The type is distributed across Eurasia from the northern part of the Black Sea region to southern Siberia. Examples have been found in numerous excavations in eastern Kazakhstan and in Semirech'e in the hoards from Shamshi, Sukuluk, Sadovoe, Alekseevka, and Tuyuk (Chernikov 1960: 70, 80; Kuz'mina 1966: 26, table iii: 3-6). This category was developed in Eastern Europe at the beginning of the Early Bronze Age, and is represented by forged chisels with a twisted socket. The next step of development is represented by a chisel with a single-cast ornamented socket without a bevel such as the one from Rostovka (Chernykh and Kuz'minykh 1989: fig. 23. 5). The existence of this form led to the production of cast tools with a bevel and socket. The beginning date for the chisels was set by the discovery of a mold for chisels and a knife as well as by numerous Western analogies in the hoards of Sosnova-Maza, Krasny Mayak, Kardashinka and ceramics found in the settlements dating from the 13th–9th centuries BC.

A chopper-sickle (Figs. 43a; 75: 1-7). In Xinjiang two sickles were included in the Agarshin hoard; four were found in Tacheng; one in the east, in Hami; and one in the settlements at Qizilchoqa and Turfan. The sickles are massive, cast in an open mold, have a curved profile, a slightly curved inward blade and a wide heel with a hole sometimes decorated with a spruce design. Chopper sickles are distributed from the Volga, where they are represented in the Sosnova-Maza hoard, to southern Siberia. Many discoveries come from eastern Kazakhstan and Semirech'e including the hoards of Shamshi, Alekseevka, and Turksib (Chernikov 1969: 38, 44, table xxxvi.19; Kuz'mina 1966: 54, 55, table xi). The start date is the 13th–9th centuries BC which has been established on the basis of Western analogies and discoveries from settlements such as Malokrasnoyarka where ceramics with an applied-roller were found. The discovery of a sickle in the Kent settlement in central Kazakhstan (Fig. 42: 9) is of great importance, since it represents a type with well defined dates of origin: a notched spear, a bone cheek-piece, and a knob with a circular ornament (Varfolomeev 1991).

The celt. Several types of celts have been found in Xinjiang. This tool category appeared in the Seyma complex and was further developed during the Saka period. In the late Bronze Age four-sided or oval celts with a beveled socket and no ornament replaced the celts of the Seyma type, six-sided, with or without eyes located below the socket and always generously decorated.

Celts with oval sockets reinforced with a bevel and with two eyes are represented in the west, in Nileke; in central Xinjiang in the settlements of Xintala; and in the east, in Hami. The double-eyed type was formed in Seyma (Fig. 31) and is familiar from Andronovo archaeological sites, especially in eastern Kazakhstan (Kuz'mina 1966: 20-22; 1994: fig. 31; Chernykh and Kuz'minykh 1989: fig. 19, fig. 31). The Xinjiang samples represent a late degradation of the type; the proportions, the cross-section of the blade, and the geometric ornament are changed. The samples can be dated to the end of the final Bronze Age.

The celt with an oval socket and a cast bevel originates from Kroran and is dated to the end of Bronze Age according to analogies with items in the Sadovoe hoard in Kirgizia (Kuz'mina 1966, table iv.13).

Celt-hammers (Fig. 77: 13-15) were found in the Agarshin hoard and have analogies in the Kirgizian hoards from Shamshi and Sadovoe (Kuz'mina 1966: 23, table iv.8). The late Bronze Age celts from Xinjiang are reminiscent of a stone mold fragment of a celt from Zhukaigou in northern China (Chzhun Suk Be 2000: fig. 13: 7). A celt with the characteristic Sadovoe net ornament on the eyed socket survived there. It possibly came to China from the west. According to the Andronovo analogies, the age of the site cannot be older than the 13th century BC. A celt with an open socket was found in Xinjiang, in Tacheng. It belongs to a type of tool dating from the final Bronze Age (Chernikov 1960: 84, table x. 3, 4; lxiv. 8) according to the discovery of Karasuk curved bladed knives in the Palatzy hoard.

Celt-spades (Figs. 76, 77). Different tools of this category were excavated in Xinjiang: spade-shaped celts with a concealed socket (Type I) were found in Tacheng and Urumchi; in the settlement of Keremchi molds for celts with a protruding socket (Type II) were discovered. The centers of production of Type I that yielded tools with an internal socket were Fergana and Semirech'e. Single finds of such types were made in northern and eastern Kazakhstan as well as in southern Siberia (Chernikov 1960: 83, 84; table lxv. 4; Kuz'mina, 1966: 24-25, table v; Silvi Antonini and Bajpakov 1999, fig. 33). A mold of this type was found in the Samus' IV settlement (Chernykh and Kuz'minykh 1989: 154, fig. 80: 7). The beginning date for the type is defined on the basis of the mold from Samus', a cemetery on the river Kurchum, with a knife with a hollow handle and curved blade of Karasuk type, and, most importantly, another example from a dwelling (#9) at the Chaglinka settlement where there were ceramics with applied-roller designs.

Type II celt-spades with a protruding socket, sloping shoulders and blade facets are known from excavations at Lebedinovka, Dzhappa, in Fergana. A transitional type with extended facets but a concealed socket originated in eastern Kazakhstan and the Rostovka settlement in Siberia (Kuz'mina 1966: 22, table vi; Zadneprovsky 1996: 17, fig. 16; Chernykh and Kuz'minykh 1989: 63, fig. 22.4,5). The origin and chronology and their connections with the celt-spades of China have been discussed. A. V. Varenov (1999) stressed that the celt-spades of Semirech'e and the Altai have major differences from Chinese ones that have a six-faceted or square socket opposed to the round steppe model. Only the samples from the tomb of the Fu Hao grave at Anyang have a round socket, which points to a northern steppe origin for it as well as a number of other items, as K. Linduff has suggested (1995).

The origin of this type is not clear to me. If we refer to the fragment of the celt from the Abashevo settlement of Shigona and the Rostovka celt of this type, we can decide for a western Seyma origin, proposing that the tools of Type II were their derivatives and transitional from Type I. However, in my opinion, the possibility that celt-spades evolved from Chinese tools cannot be disregarded. The Chinese tools served a prestigious ceremonial function; generally, they were generously ornamented, sometimes having a blade inlaid with nephrite.

The single-blade knife (Fig. 111: 18-22). This category is widely distributed in Xinjiang, in the complexes dated to the end of the Bronze Age, and across Europe. The type of knife with a ring found in the Lanzhouwan settlement in Chaqimale, as has been mentioned before, dates back to the knives known from archaeological sites of the end of the 3rd–2nd millennium BC in northern China and in the Seyma-Turbino complexes of Eurasia. In the final Bronze Age these knives are found in settlements with ceramics with an applied-roller, particularly in the clearly dated settlement of Kent in central Kazakhstan (Fig. 42: 12; Varfolomeev 1991).

The double-winged socketed arrow (Fig. 109: 13,14): Type I—with a protruding socket; Type II—with a concealed socket. Both types are widely known in Xinjiang in the settlements of Xintala, in Kersang, in the cemeteries of Nanwan, Qizilchoqa, Yanbulaq, Chaqimale, which are concentrated among agricultural

communities in the east. It is impossible, however, to say whether the objects belonged to the local population or to their enemies—the pastoralists. They have analogies with materials from late Andronovo sites. A number of arrows with a concealed socket have been found in Kazakhstan in the settlement of Kent, for instance, and in Fergana in the cemetery of Vuadil' (Kuz'mina 1966: 33-37, table 5) dated to the end of 2nd or the beginning of the 1st millennium BC.

Double-winged arrows appear in the early Andronovo burial ground of Sintashta (Gening *et al.* 1992, fig. 171, 185, 186, pl. 45); they developed further in the late Bronze Age, when arrows with protruding as well as with concealed sockets become widespread (Avanesova 1975; 1991). The arrows in the Saka-Scythian period developed on the basis of Bronze Age types. It is important to realize that in Yanbulaq arrows of the Andronovo type are found alongside special Xinjiang types (Mei and Shell 1998: fig. 2.2-6).

Socketed arrows (Fig. 54: 27-29) are not characteristic of China. While studying the military art of China, A. V. Varenov (1987: 199, fig. 7) connected their sporadic discovery in Anyang with those discovered in the archaeological sites of Baode and Shilou located in the northern periphery of the Shang Dynasty. The discoveries in Xinjiang contribute to this number.

A single-bladed knife (Fig. 111: 13) with a zoomorphic handle with the head of a deer from Chaqimale near Hami, as has been said earlier, belongs to a large group of knives present in the northern regions of China, in the Ordos, in Hebei, and Shanxi. Their appearance in rich graves in the Central Plain at Anyang, particularly in the Fu Hao tomb (Linduff 1997), and in the period of the Western Zhou are connected with northern peoples of the Karasuk culture who were ethnically different from both the Andronovans and the Chinese (Chlenova 1972; Wang Binghua 1996: 77; Lin Yun 1986: 245, fig. 49.17; Chzhun Suk-Be 2000, figs. 1.2, 2.1-5). As we said earlier the prototypes of these knives date to the Seyma-Turbino horizon.

Analysis of the non-standard artifacts from Anyang permits us to conclude that they find their closest analogies in the complexes of eastern Kazakhstan and Semirech'e. The similarity in the composition of types in Semirech'e and the Agarshin hoard is used as a special proof of this statement—all the above mentioned tool types are present in the hoard of Shamshi along with other types.

Chronological position of the hoards

The chronology of the hoards is established in the following manner:

1) Objects that have analogies in the western steppes are dated by the European chronology. These comprise chisels, sickles, and especially razors from the Shamshi hoard that had a very limited sphere of distribution. This evidence makes it possible to date these hoards back to the 13th -9th centuries BC (Kozhomberdiev and Kuz'mina 1980).

2) The discoveries of the types present in the hoards in assemblages such as the following: an axe mold from Kayrak-Kum; axes in the Altai; adzes, chisels, sickles, single-bladed knives in the settlements of Fergana, and eastern, central, and northern Kazakhstan, where such objects are found with ceramics with

applied-roller that are clearly dated to the 13th–9th centuries BC on the basis of a wide set of analogies from the Danube and the Ukraine to Anatolia (Troy VIIB) and Iran (Tepe Giyan). This fact determines the original date of these hoards as well as the Agarshin hoard.

The origin of the latter hoard, based on similarities with tools from Fergana and Semirech'e, can be defined as an import from Kirgizia, where all the categories of tools represented above have a long evolutionary development in the Andronovo culture. Ornaments from Andronovo complexes such as Fergana have analogies in Xinjiang. Beads were found in Xinjiang in the cemeteries of Tacheng, Nanwan and Qizilchoqa (the C^{14} date is 1350-1000 BC). In the latter burial grounds, a chain of beads was sewn onto a pair of boots. Boots were a remarkable feature of Andronovo tribal outfits; they were made of leather or felt and were decorated with strings of beads (see chapter on 'Dress').

Mirrors (Fig. 54: 2, 16, 17): Type I—a mirror with a protruding handle was found in the burial ground of Qizilchoqa. This type is present in Kirgizia in the hoards of Shamshi, Sukuluk, and Sadovoe (Fig. 110); in Fergana in the settlements of the Chust culture (Zadneprovsky 1962: 68, table xx. 4,5; Kuz'mina 1966: 68, table xiii). Type II—a mirror with a loop handle was found in the Yanbulaq cemetery (Mei and Shell 1998: fig. 4: 1). Analogies to this type have been found in burials of the late Andronovo culture in Smolino (Urals); in Elovka (Siberia); in Kara-Kuduk (southern Kazakhstan); in Yapagi (Fergana); in Kul'say, Kizylbulak (Semirech'e); in Muminabad (Uzbekistan), and other places. Examples are also present in the burials of farmers at Bustan. A mold was found in Fergana in the settlement of Dal'verzin that belongs to the Chust culture (Gorbunova 1995; Mar'yashev, Goryachev 1999: fig. 5.5; 9.15; Zadneprovsky 1962: table xx: 5).

The round, flat or concave mirrors appeared in the farming cultures of southern Turkmenia, Bactria and Margiana in the 3rd millennium BC. This type diffused further to the Zaman-Baba culture in Central Asia, and later to the Sintashta groups in the Urals. During the Andronovo period this type was known only in Central Asia (Muminabad). Different types of mirrors appear in the late Bronze Age: round with a protruding handle, square with a rounded loop. They are present in Kazakhstan together with ceramics with an applied-roller and in hoards from Semirech'e. Two mirrors with a loop handle were found in Shamshi (Fig. 33; 43a: 5).

In China this type can be found in the north, in Inner Mongolia and sometimes in Shang burials; four examples were found in the tomb of Fu Hao, a consort of Wu Ding (13th BC) at Anyang (Linduff 1994, 1996, Lin Yun 1986, fig. 51.5, 8, 9) where other items of northern origin are also present. A mirror of a smaller diameter was discovered at Houjiazhuang in grave 1005, dated to 1300-1028 BC (Juliano 1985: 38-43, fig. 1.4). These samples are "decorated with geometric ornament, foreign to the Shang art style, but with analogies in the decoration of Andronovo artifacts" (Kuz'mina 1988: fig. 2).

Round plates decorated with punched ornament along the edge from Yanbulaq (Mei and Shell 1998: figs. 5, 14) are also characteristic of Andronovo complexes. This fact gave me reason to accept the opinion of Lin Yun (1986), K. Linduff (1995; 1997; 2000a) and A. Juliano (1985) who support a northern and

western origin for the mirrors in China. Since the mirrors are concentrated in archaeological sites of late Bronze Age in eastern Turkestan and Semirech'e it would be possible to imagine that they reached China from that particular region. However, the discoveries of flat mirrors with a geometrical ornament in Erlitou and Yamatay in Qinghai are dated to a very early period. This makes the Andronovo hypothesis quite plausible. L. Fitzgerald-Huber (1995: 53, fig. 10a) suggests that they originated in Bactria.

Earrings (Figs. 54; 110). The type made of a spiral cone of wire is present in the burial ground of Yanbulaqe (Mei and Shell 1998: fig. 6.2). Identical earrings are found in the cemeteries of Ketmen'-Tyube and Tamgaly in Semirech'e and Arsif; and at Yapagi and Kashkarcha in Fergana. The latter samples are made of gold and silver (Kozhemeko 1960, Gorbunova 1995; Rogozhinsky 1999, fig. 17: 4) and are present in the Ob region (Avanesova 1991: 57-58) and central Kazakhstan in the cemeteries of Sangru II and Shoindykol (Evdokimov and Usmanova 1990: 78, table II)

Earrings with trumpet ends often made of gold or gilded constitute a specific Andronovo type. They are widely distributed in Andronovo areas and are connected mainly to the archaeological sites of the Fedorovo type. They are found in the cemetery of Borovoe in northern Kazakhstan, Sanguyr in central Kazakhstan, Tautary in southern Kazakhstan, Maly Koytas, Kytmanovo, and others in Siberia (Avanesova 1972; 1991: 43, 53). Many discoveries of this type of ornament have been made in eastern Kazakhstan: at Kyzyltas, Predgornoe, Zevakino, Berezovskiy (Tkachev and Tkacheva 1996: figs. 1. 3, 2. 4); and in Semirech'e: Mynchunkur, Tamgaly IV, VI, Kul'say, Uzunbulak, Kyzylbulak; also in Tash-Tyube II, Tegirmensay (Kuz'mina 1966; 75, table xiv; Rogozhinsky 1999: fig. 5: 1-3.9) and in Fergana: Vuadil', Dakhana (Gorbunova 1995). In Central Asia earrings with a trumpet end are found in the cemeteries of Tandyryul and Dashti-Kozi in Tadzhikistan, Muminabad, Bustan VI (Fig. 70: 9), in the peasant settlement of Sazagan (Kuz'mina and Vinogradova 1996, fig. 6; Avanesova 1997, fig. 13.18). In the West, I have information about only one golden earring from my excavations in the Baytu cemetery. N. A. Avanesova dated this type back to 14th–13th century BC. A. A. Tkachev and N. A. Tkacheva suggested that this type is older based on an association with a knife that belonged to the Seyma period. The dating of the Baytu complex reinforces the possibility of dating the beginning of earring production.

Most likely the chronological boundaries of this type are the 14th to 11th–10th centuries BC. The first date is defined by the associated discoveries of earrings and a socketed arrow in Vuadil' and bracelets in Sanguyr II. Earrings with trumpet ends are known in China: in the northern zone, in Dongbei (Larichev 1959), in Liulihe, Xiaoguanzhuang (Lin Yun 1986: 248, fig. 50.8, 9; Bunker 1993: 37, fig. 4; 1998: 611, figs. 3, 4, 11). E. Bunker has shown that the elite of the Shang in Anyang did not use gold, because nephrite was the prestigious material. This fact points to the western origin of golden earrings with funnel ends found in China. They could reach the elite of the Northern peoples from the Altai or, which is more likely, from Semirech'e and Fergana. This logical hypothesis contradicts the fact that earrings with trumpet ends from

Xiajiadian (Linduff 1996a: fig. 4: 2, 4) are dated back to 2000-1600 BC, and are thus older than the Andronovo ones.

The analysis of Semirech'e bronzes shows that this region was part of the Andronovo zone of influence. The number of Andronovo types decreases to the east. The influence of the eastern Kazakhstan and especially Semirech'e centers was crucial for the development of metal working in eastern Turkestan. The proof of this statement is the similarity of tools, casting technology (use of bipartite stone molds), and the metal composition of lead bronze.

The distribution of Andronovo types in Xinjiang was the result of the following:

1) Down-the-line exchange.

2) The arrival of bronze smiths from Semirech'e, probably proven by the Agarshin hoard with analogies in the Shamshi hoard.

3) Migrations to the east of the Andronovo population. This is supported by the cemeteries of Sazi and Tacheng.

Having received an impulse from Andronovo and maintaining contacts with the west, the population of eastern Turkistan put into operation their own metal workshops, which can be seen in the discovery of a copper ingot in Tacheng and molds in Keremchi and Xintala. The development of local types such as socketed adzes with a bevel and double-eyed celts underscore the idea of a local industry as well. The end of the 2nd millennium BC saw the beginning of separation of metal workers from the rest of the community in the steppe. They were making standard types of tools for exchange, as can be seen from the hoard of Sukuluk II with its 17 sickles. Other hoards found in Semirech'e and Agarshin have a similar character. The fact that they were hidden underground reflects the hostile environment of the steppe at that time.

This change can possibly be connected to important ecological and historical events in Asia at the end of 2nd millennium BC. The rapid drop in temperature impelled part of the population to adopt a new mobile pastoralist life-style. Cattle were an easy target and military action and social differentiation were initiated as a result. In times of war, valuable items were buried. The mobile life-style encouraged cultivation of new ecological zones and reinforced cultural and ethnic contacts.

This analysis shows that the part of the Silk Road (Map 16) leading from Xinjiang to the steppes of Eurasia was mastered already by pastoral groups in the Bronze Age. The peoples of the Andronovo culture initiated the process. Major objects of export were ready-made metal tools. These contacts were especially active in the Bronze Age, in the 13th and 9th centuries BC.

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The classification of Andronovo material reveals complex historic processes of autochtonous development, migration and integration. It is probable that a migration of the Alakul' people in the second quarter of the 2nd millennium BC, from western into central Kazakhstan caused part of the Fedorovo migration to eastern Kazakhstan and south Siberia. Another part of the Fedorovo people was assimilated by the Alakul' people, and as a result of this integration, syncretic complexes were formed. Moreover, the Sol'-Iletsk and Kozhumberdy types formed very early: in central Kazakhstan long contacts were of different

character, which conditioned the mixed character of the Atasu type; the Semirech'e type was probably formed rather late, as a result of population migration from central Kazakhstan.

A review of the numerous sites of these syncretic types, united in an integral chain across the major part of Andronovo territory permits one, following A. A. Formozov, to speak about the existence of an Andronovo culture unity.

The Andronovo materials surveyed so far provide a database for the analysis of the material cultural of the Andronovo tribes. Of central importance in the development of the stockbreeding cultures of the steppe ECT was the transition to a nomadic type of economy, the most basic innovation of Old World culture. That is why the study of the ECT of this region is of primary interest for examining its paleo-economic development and revealing the processes involving the emergence of mountain pastures and then the creation of nomadic stockbreeding in Eurasia, which explains the dynamics and intensive assimilation of new territories. A. J. Toynbee, who dedicated his *A Study of History* to the philosophy of history and who greatly influenced the development of modern historical schools, expressed the opinion that steppe peoples were a catalyst of all the processes in the history of civilization. Similarly, the head of the French 'Annales' school, F. Braudel (1969) considered the Eurasian steppe as a flashpoint that saw the explosion of steppe pastoralists cultural from Germany to China who punctuated the slow process of evolution in the Old World.

Finally, the separate categories of the material culture of the Andronovo tribes and their comparison with language data and historical traditions of the ancient Indo-Iranians will help resolve the problem of locating their homeland, reject speculative constructions, and give the floor to the Aryans themselves.

CHAPTER TWENTY-ONE

CULTURES OF NORTHERN BACTRIA IN THE LATE BRONZE AGE

BMAC sites in Uzbekistan

As already mentioned, the Sapalli variant of the BMAC formed no later than the first quarter of the 2nd millennium BC in northern Bactria as a result of migration from the south-west (Map 17). It comprises the following sites: on the Sherabad river—the cemeteries of Bustan and Dzharkutan and the settlement of Dzharkutan (the upper horizon; Fig. 88), on the Surkhan-Darya river—the settlement and cemetery of Mollali (Pugachenkova 1972; Belyaeva and Khakimov 1973; Askarov 1977, 1989; Askarov, Abdullaev 1983; Askarov and Ionesov 1991; Rakhmanov 1982; Rakhmanov and Shaydullaev 1985; Avanesova 1992; 1995a, 1995c; 1996; 1997; 2002; Shirinov and Baratov 1997). A. Askarov assigns the monuments to the Sapalli culture, the other researchers attribute them to the Namazga VI culture or the Bactria-Margiana Archaeological Complex. Recently A. Askarov and T. Shirinov (1993: 42) suggested that a Namazga historical and cultural community should be distinguished comprising the entire south of Central Asia, north-eastern Iran and northern Afghanistan. As mentioned above, I deem it more appropriate to use the term 'the Bactria-Margiana Archaeological Culture (BMAC)', considering the similarity of the historical destinies of the population of this region and the considerable differences in the cultural development from western Turkmenistan and eastern Iran.

The relative chronology of the sites was developed by A. Askarov (1977: 60-63), who singled out the following stages: I – Sapalli, II – Dzharkutan, III – Molalli. Later the Molalli stage was divided into III – Kuzali and IV – Molalli (Askarov and Abdullaev 1983: 40) and further into IV – Molalli and V – Bustan (Rakhmanov 1987: 13, Shirinov and Baratov 1997: 88). The accepted chronology of the stages are as follows: Kuzali: 1300-1200 BC, Molalli: 1200-1050 BC, Bustan: 1050-950 BC. They were succeeded by the culture of painted ceramics Kuchuk II-Yaz I.

The relative chronology is based on the stratigraphy and dynamics of the ceramic complexes. The absolute chronology is contestable (see below and Askarov and Shirinov 1993: 84-92 for a discussion). One can trace the genetic succession of the culture's stages, but at each stage some innovations come into being.

In the Sapalli period burials were placed within the precincts of the settlement in a ground pit or a catacomb blocked up with brick; burial was in the flexed position, men on their right side, women on the left. Occasionally, the deceased person was placed in a large vessel (Khum). Cenotaphs are familiar containing a clay dummy or a ram's skeleton instead of the deceased (Askarov 1973).

Beginning with the Kuzali stage relations with the Andronovo tribes are recorded, reaching their apex in the Molalli and Bustan periods (Kuz'mina 1972; Askarov 1989; Rakhmanov *et al.* 1985; Avanesova 1992; 1995; 2002). The burial ritual has changed. Discrete cemeteries come into existence. Burials are found in pits or catacombs, blocked by bricks or stones. The dead lie flexed, men on their right side, women on the left, head oriented predominantly to the west. There are also dismembered burials. The graves contain wheel-made BMAC vessels, sometimes clay or metal votive articles (vessels, spoons), as well as ovicaprid bones.

The fire-cult becomes widespread. Cremation has been revealed in the cemeteries of Dzharkutan IV, Bustan 3 and 6. In the Bustan 6 cemetery 17 of the 130 burials are interred according to the cremation rite. It is notable that it is in these burials that Andronovo ceramics of the Fedorovo type were found (Fig. 70; Avanesova 1995, fig. 12).

Evidence of a fire-cult has been discovered in 82 burials: fires, hearths, pits and vessels with ashes, ashes in the entrance to the catacomb with inhumation, small round clay altars (one—with a hand-made bird's head) with coals and ashes. In some constructions there were found pieces of red ocher and white plaster. Cenotaphs, occasionally containing a sheep skeleton, are numerous. In 17 graves 22 unbaked clay anthropomorphic figures were found.

Of considerable interest is the discovery in Bustan of three fires and in their vicinity three cists—one rectangular and two trapeziform. They are formed from bricks with the help of a clay solution and show signs of repeated fires that were then put out by water and oil.

Fire was made three times in the ritual and the burnt layers were covered over with sand and white gravel. In the boxes there were found calcined bones of a man and ovicaprid, the leg of a Molalli type wheel-made vase, a fragment of an Andronovo vessel, a cylindrical urn with a conical lid and a bronze earring with a hook. N. Avanesova (1995: 33-35, fig. 3, 4) interprets these constructions as a crematorium.

The Andronovo provenance of the fire-cult and the cremation rite is beyond dispute. Bustan's type of fires and crematoria goes back to the cult constructions discovered in the Fedorovo-type cemetery of Kinzerskiy in the southern Urals (Kuz'mina 1975: 222, 227). In the center of the cemetery in mound 33, the largest one, in a pit under the apex, there was a fire and animal sacrifices; another fire and sacrificial pits were revealed inside the circular rampart. In burial mound 17 under the bank, surrounded by a circle of stones placed in horizontal rows, there was a ring of red clay and ocher; and deeper yet, there was a solid red circle with a pit in the center. The pit's walls were burnt as a result of repeated strong fires. At the bottom of the pit there were found fragments of two vessels (one bearing a swastika on the base) and an animal's shoulder-blade; above there was a layer of pure ashes covered over with red clay and yellow ocher with traces of water and oil poured on. I interpret this construction as a crematorium.

In central Kazakhstan in the Shapat cemetery of the Atasu late stage type alongside the inhumation rite there was discovered a construction related to the fire-cult. It was a ground pit (2.0x1.6x0.5m) with a ledge in the western section 0.5m in height and 0.2m in width. It was filled with bones of cattle and

fragments of ceramics. The pit's bottom was burnt due to repeated fires and covered with a thick layer of coals and ashes (Varfolomeev 2002, part 2: 107).

In central Kazakhstan there are numerous occurrences of altars in the form of stone rings and fences containing a hearth with layers of charcoal and traces of water pouring, potsherds and wooden tools. Sometimes they occur near menhirs crowned with rams' heads (Margulan *et al*. 1966: 154-156; Margulan 2002: 331-335). In the cemetery of Bustan there were also discovered leg bones of a horse and the clay figure of a horse (Avanesova 1995, fig. 10), which testifies to the spread of the cult of this animal to Bactria. It is alien to the world of the farmers and is particularly characteristic of the Andronovans (Kuz'mina 1977).

The Andronovo ceramics are represented in Bustan (Fig. 70) by: 1) distinctive pots of the Fedorovo-type with a high neck and a rounded shoulder, ornamented in plain or indented stamp in oblique triangles over the neck and zigzag or x-shaped figures over the shoulder; 2) jars with convex sides and an unaccentuated narrow neck, decorated in zigzags underneath the rim, and 3) a vessel with a convex body, a short rim and ornamented in triangles over the shoulder (Avanesova 1995, fig. 12) (the last shape is typical of the Late Bronze Age). Of interest is also a vessel imitating the Fedorovo-type fluted ornament (Avanesova 1997, fig. 14: 1).

In the grave there were found distinctive Andronovo ornaments (Fig. 70: 1,2,5,6,8,9): bracelets with open ends, made from a convex plate, bracelets with conical spirals, trumpet-shaped earrings, plaques with punched ornamentation and plaques with a loop, various beads as well as a nail-like and a bi-spiral pendants, a pin and lazuli beads (Avanesova 1997, fig. 3: 4; 10: 1-4; 13).

No less conspicuous are the traces of contacts with Andronovans in the Dzharkutan complexes of the Late Bronze Age (Fig. 70: 28-30; Askarov 1989). In the cemetery of Dzharkutan IV cremations have been revealed, and in a grave of the Kuzali stage—an Andronovo bracelet. At the Dzharkutan settlement two large stone cists were investigated, 4x0.7m and 0.5m deep, formed from vertically dug-in stone slabs and covered over with stone slabs. The cists contained calcined human bones, charcoal, ashes and small fragments of Molalli type ceramics.

At the settlement of Dzharkutan A. Askarov discovered a large temple complex including storage and cult facilities. The area of the settlement is 35 x 35 m. It is a 25m long corridor, a small inner yard with a sacred well, a sacral platform on which the fire-altar and the depository of the holy ashes were situated. In its center there is a rectangular reservoir with a 10cm layer of ashes whose bottom was covered with a layer of fired red clay containing charcoal, bones, and potsherds. On the top of it was a layer with animal bones. In the upper horizons of the reservoir fill wheel-made ceramics of the Molalli type were found and sherds of Andronovo pottery (Fig. 88). Of particular interest is the discovery of mobile ceramic altars and cult vessels, made on the potter's wheel, light-slipped, but decorated in plain stamp and incision—ornaments typical of the steppe Bronze Age cultures. Similar pottery, apart from the temple, was found also in other sections in the overlying layer of the settlement (Rakhmanov 1982: 45-119; Rakhmanov and Shaydullaev 1985; Askarov 1989: 165; Askarov and Shirinov 1993: 61, 66-70, 82; fig. 22 I: 4-6; 43 I, III; 44 I: 17-19; 46-1; 64 I: 3; 74). There is a single fragment with ornamentation in isosceles

triangles, executed with an indented stamp (Askarov and Shirinov 1993, fig. 64 I: 3). The ornamented vessels are represented by supports with images of a swastika and an eight-spoked wheel (Askarov *et al*. 1993, fig. 43 I: 3; II: 10, 12; II: 4,5), pots with a wide neck and out-turned rim, underneath which there is a zigzag or pendant triangles hatched horizontally in indented stamp (Askarov *et al.* 1993, fig. 44: 18, 19). There are vessels with an out-turned and thickened rim which bears oblique notches, sometimes overlapping to form rhombuses or a net; often there is also a zigzag underneath the ridge (Askarov *et al*. 1993, fig. 22: 4-6, 461: 5-7; 12-14; Rakhmanov 1982, fig. 3, 5, 8). These decorations imitate the ornament of the steppe ceramics of the Late Bronze Age. Of the most profound interest are the wheel-made pots and particularly the cylindrical vessels with a thickened rim and an applied-roller in the upper section; the roller and the rim are ornamented in oblique notches or a net (Askarov *et al*. 1993, fig. 46 I: 1-4; 9-11; 74; Rakhmanov 1082: 16, fig. 1, 6). The applied-rollers with notches are a distinctive feature of the Alekseevka-type Andronovo ceramics. Their appearance on the pottery of Central Asian farmers reflects the interaction between the steppe and farming population in northern Bactria. To the late Andronovo forms also belong the single-bladed knives from Dzharkutan (Askarov *et al*. 1993, fig. 62 I: 2; 67 IV), and the dagger from Vakhshuvar (Fig. 53: 1; Rtveladze 1981).

What were the relations between the migrants—the Andronovo population and the indigenous farmers? A. Askarov (1989: 164) held that those buried according to the cremation rite were 'male and female concubines', later he came to the conclusion that the aborigines "would not adopt the backward material and technical basis of the northerners, syncretization occurred in the ideological concepts of these tribes." N. Avanesova (1995: 37) believes that the Andronovans, who brought with them the cremation rite, formed in the BMAC community a privileged social group. There is every reason to endorse these conclusions.

Northern Bactria provides a unique opportunity to trace the southward migrational process of the Andronovo population and its assimilation with the locals. Since the material culture of the aborigines was highly developed and adapted to the ecological environment, the newcomers adopted in its entirety the complex of their material culture, while retaining their ethnical distinction in the most important sphere—ideology: in the cults and burial rite. As is well known, the principle condition for maintaining ideology in traditional culture is the preservation of the language which conveys mythological concepts and ritual texts. For the understanding of the ethno-cultural processes in northern Bactria in the Late Bronze Age of crucial importance are the materials of the Dzharkutan settlement. They indicate that the northern migrants—Andronovans—not only preserved their language and beliefs but also disseminated their ideology among the aboriginal population. This is the only way to explain the appearance in the sanctum sanctorum—the temple, the altars and cult vessels, the Andronovo cult ornaments. There are no military clashes or traces of fires in northern Bactria. Obviously, the relations between the two groups here, as distinct from Turkmenia, were peaceful. Numerous ethnographic and historical facts evidence that in the process of peaceful assimilation of two ethnic groups there was at first a period of bilingualism, then one of the languages would absorb the other. (This was the pattern, for instance, of the turkization of the Iranian-speaking farmers in Central Asia). Since in the assimilation process in northern Bactria it was the ideological

concepts of the Andronovans that took the upper hand, it means that their language conveying ideology and ritual activity became the winner too.

If the hypothesis of the Indo-Iranian attribution of the Andronovo culture advocated in this work should be accepted, then the materials of southern Uzbekistan demonstrate the major pattern of the distribution of the Indo-Iranian language in Bactria.

Along with this type of migration (apparently, the principal one), there existed other models of ethno-cultural interaction. These models are prominently represented in the materials of southern Tadzhikistan.

Northern Bactria and Tadzhikistan

The natural conditions of Tadzhikistan are very peculiar: the territory is cut through by the tall ridges of the Pamir mountains and wide river valleys in the south. In ancient times irrigation farming was impossible in the valleys: it came into existence only as technology developed in the Early Iron Age. Ecologists have established that in the Late Bronze and Early Iron Age the climate was milder and more humid and the area of the fescue steppes vaster than today with wormwood-and-grass meadows being predominant (Litvinsky 1972: 181; Spiridonova 1989: 16). In the Bronze Age the valleys with their grassy meadows and the warm climate constituted ideal pastureland that enabled one to keep cattle in winter. In summer they could be driven up to the high mountains. This determined the primary orientation of the regional economy and the development of transhumance.

At the same time, the *bogar* (dry, semi-irrigation) type of farming was quite feasible on the mountain terraces with their brooks and abundant precipitation (P'yankova 1998: 163). Annual precipitation in the south is just 140mm, whereas in the mountainous areas it reaches as much as 800mm.

As a result of the diversity of natural and climatic conditions there arose a diversity of economic and cultural types that emerged in the process of adaptation to the ecological specifics by the representatives of the various archaeological cultures that populated Tadzhikistan.

BMAC Sites in Tadzhikistan

During its late stages BMAC populations pushed to the east and settled in the piedmont valleys of Tadzhikistan. The culture is represented in the upper reaches of the Kafirnigan river: by the cemeteries of Zarkamar and Tandyryul, burials in the late cemetery of Tup-Khona (D'yakonov 1950: 167, 176) and Kara-Pichok, and in the south of the valley—by two burials in Shah (Litvinsky and Sedov 1983: 80); in the upper reaches of the Vakhsh and Tairsu rivers—by the settlements of Dakhana, Teguzak, Kangurt-Tut; on the Kyzylsu river—by the cemeteries of Parkhar and Khodzha-Goib (P'yankova 1994: 355-372; 1998: 163-170; Vinogradova 1994: 29-47; 1997: 41; 2000: 89-109; 2001: 199-201; Götzelt *et al.* 1998: 115-144; Lombardo 2001: 271-280). The north-eastern outpost of the BMAC is Dzham (future Sogd region), not far from Samarkand, where BMAC vessels have been recovered, mirrors (a flat one and a round one with a geometrical ornament), a pin with a deer's figure, a double-sided sleeved adze as well as Andronovo type articles: a sleeved double-bladed arrow, bracelets, beads and

trumpet-shaped earrings (Fig. 84: 1-11; Avanesova 2001). To the same culture also belongs the layer of stage B at the settlement of Shortughai in Afghanistan (Francfort 1989). The stratigraphical data of Shortughai indicate that the BMAC period, containing the Fedorovo-type Andronovo ceramics (Fig. 91: B), is chronologically subsequent to stage A of the Harappa culture and is cut through by Bishkent-type burials, synchronous with the Fedorovo-type Andronovo ceramics and the late Andronovo ceramics with an applied-roller. At the settlement of Teguzak the lower layer belongs to the Neolithic Hissar culture. It is overlaid with a principal layer of BMAC which contains Andronovo ceramics. Above it pottery of the Yaz I – Kuchuk II type was found (Vinogradova 2000: 93, 94). The most comprehensive information has been recovered from the settlement of Kangurt-Tut: the Hissar layer is overlaid by the BMAC principal layer containing materials of the Andronovo (Figs. 89; 90) and Bishkent cultures, and on the top of it Yaz I – Kuchuk II ceramics were found. At the Neolithic sites of Tutkaul and Sayed, in the upper part of the Hissar culture layer, Andronovo ceramics were discovered.

In Tadzhikistan small settlements are situated on mountain slopes. The houses are located on the terraces: type I—a house measuring 18 x 6.7 m (Kangurt-Tut); type II—smaller constructions. The foundations of the walls are formed from horizontal rows of stones with the help of a clay mortar; above them there likely went a wall of clay with straw (*pakhsa*). The floor is occasionally faced with pebbles; round hearths were discovered. Type III houses were proto-yurts faced with stone. The large houses with stone foundations and proto-yurts are typical of late Andronovo architecture (Margulan 1979: 299).

The economy was complex. The *bogar* type of irrigation is documented by grain imprints of different varieties of barley and wheat, querns and grain-storage pits. Cattle (52%) and ovicaprids (19.5%) were reared as well as horses (19%), donkeys (5.6%) and camels.

The stone articles maintain the traditions of the Neolithic Hissar culture. The development of metal-working is borne out by the findings of stone casting molds. In Teguzak there were two molds for knives and awls, in Kangurt-Tut—a mold for a dagger with a support as well as a sickle with apertures in the handle, two single-bladed tailed knives with a bent back blade, ribbed and shafted daggers (Fig. 53: 25, 31). The articles are made of tin bronze, on occasion, with an admixture of lead. Apparently, the imported raw material came from the Zeravshan where tin was mined in Zorabulak (Askarov and Ruzanov 1990). Typologically and in terms of the alloy composition, the majority of the articles belong to the Andronovo metallurgical province (Kuz'mina and Vinogradova 1996). Ceramic production was highly developed. The vessels are made on the potter's wheel of clay with an admixture of fire-clay, baked in two-tiered kilns and coated with white, seldom red, slip and sometimes with vertical and horizontal polishing. Several types of ceramics are distinguishable: a vase on a foot, a large deep basin, a vessel with a globular body, a narrow neck and occasionally a truncated conical base area separated by a rib ('with a kneed bottom'); a pot with convex sides and a bent back ridge of small diameter, miniature pots, and also hand-made gray kitchen pottery and vessels for storage (Khum). This complex belongs to the Molalli and Bustan stages of the Sapalli variant of the BMAC.

The Andronovo pots are hand-made of clay with a heavy admixture of quartz, feldspar and limestone; they are fired gray or brown (Figs. 48; 89). The shoulder is rounded, the ridge is equal to or, more often, smaller in diameter than the neck. The majority of vessels are devoid of decoration. Ornament is applied in plain or large indented stamps over two zones: on the neck and shoulder. The ornament comprises horizontal zigzags, oblique triangles, including elongated and sometimes opposite ones, and pennants. Occasionally one finds ornamentation with dimples, imprints, and flutes. At the settlement of Dakhana the Molalli stage wheel-made pottery accounts for 86%, hand-made comprises 14%. Andronovo-type pottery is not present. In Kangurt-Tut the Molalli and Bustan wheel-made pottery claims 53%, hand-made—47% with the latter being fractionally represented by ceramic fragments of the Andronovo and Bishkent cultures. At the settlement of Teguzak in one of the prospecting shafts gray hand-made ceramics reaches as much as 43% (L.T. P'yankova assigns it to the Andronovo culture), but only a small part of it is ornamented.

These facts point to the increasing interaction between the farming and pastoral population.

The population's ideological concepts are reflected in clay anthropomorphic figures and a horse's head (Fig. 90: 15-17). Of particular interest are the ritual complexes. At Teguzak a ritual fire was cleared, fenced off by a stone wall. A large (7x3.6m) concentration of ash contained broken vessels; the rectangular altar towering in its center consisted of layers of orange-baked earth; on the outside it was coated over with clay. This complex resembles the fires of the cemetery from Bustan 6.

At the settlement of Kangurt-Tut four ceramic kilns were discovered. Two of them are circular, about 1m in diameter and 0.7m deep; they were used to bury a human skull and leg bones. In kiln #4 the skull belongs to a male and there were animal bones found. In the chamber of kiln #3 the leg of a vase was discovered, the remains of a funeral feast over the burial revealed cattle and ovicaprid bones. As determined by L. Yablonsky, the female skull is close to the Andronovo skulls of eastern Kazakhstan and those of the Tazabagyab culture (I express my gratitude to N. Vinogradova for this information). Nearby in a pit was the partial burial of a male of huge build lying flexed on the left side, head to the west (ribs and vertebra are absent, the leg bones have been moved). It appears it also belongs to an Andronovan.

The ritual of the BMAC cemeteries in Tadzhikistan is typical of the Molalli stage. There are dismemberments and children's burials within the precincts of the settlements. At the settlements of Kangurt-Tut and Tandyryul catacombs were revealed blocked up with stones rising above the ground or with clay. There have also been discovered ground pits and pits with an entrance shaft. On the floors of the chambers there are traces of pools, probably, resulting from pouring ritual water; also found are pieces of ocher and clay as well as ovicaprid bones and foot-bones. Cenotaphs are numerous, accounting in Kangurt-Tut for 90% of the graves. Some of them contain an anthropomorphic figure of unbaked clay, and in one grave there are figures of a man, woman and child between them (Fig. 90). There are paired burials (Shah, Nurek). The dead lie flexed, men on their left, women on the right side, head most often oriented to the north-east or south-west. Some dismemberments are also recorded of which only a skull and

the long bones of the arms and legs are preserved. In addition, there were found burnt bones and charcoal.

Of special interest is the discovery of grave 25 in the Tandyryul cemetery next to the BMAC burials. In a catacomb blocked up with stones there was found a woman's burial accompanied by ocher, a bead bracelet, a trumpet-shaped earring, an oval pendant, a lazuli bead, ribbed paste beads, and a hand-made gray pot with an everted rim and a rounded shoulder ornamented with flutes. Another hand-made pot with flutes was found in grave 2 together with nine wheel-made BMAC vessels (Kuz'mina and Vinogradova 1996: 39, 41, fig. 4: 2, 12). A fragment of an Andronovo vessel is present also in one more grave. Vessels with flutes are characteristic of the Fedorovo sites over the whole Andronovo range (Figs. 19: 11, 15; 20a: 3; 21: 13; 26: 3), while trumpet-shaped earrings are peculiar to its eastern territory (Kuz'mina 1966: 75, 76; Avanesova 1975: 67). In the west was found the only gold specimen in the Kupukhta cemetery (Kuz'mina 1963b). This type of ornament is familiar in sites of the Andronovo and BMAC circle of south Central Asia (Fig. 12), as well as from the looted BMAC burials in Afghanistan (Sarianidi 1993: 17, fig. 24).

The graves contain wheel-made and occasionally hand-made vessels, analogous to the ceramics found on the settlements. The burial in Khodzha-Goib yielded a clay vessel having numerous parallels in southern Bactria (Götzelt *et al.* 1998: 118, fig. 2: 3). In three graves at Tandyryul and Kangurt-Tut there were found vessels of the Bishkent culture (Pl. 10), in Nurek there was found a knife with a curled blade.

To the circle of farming cultures belong the finds from Parkhar of a vase and two silver children's bracelets ornamented with rosettes (Fig. 114: 13, 14) Götzelt *et al*. 1998: 132, fig. 4: 3; 5); a gold pendant ring with cones in Nurek (Fig. 114: 3), lazuli and other stone beads and miniature bronze votive articles; in Kangurt-Tut: an ax-adze, a spear, a knife, a razor, a pitchfork, a small cup, a mirror, and an earring. Their analogies are known in southern Uzbekistan (Ionesov 1990).

To the farming culture may be assigned chance discoveries from southern Tadzhikistan (Fig. 114: 16, 18-20). The copper axes from Sangvor and Arakchin belong to the Iranian type and have analogies in India in the late Harappan layer at Chanhu-Daro, the cemetery of Shahi-Tump and in layer III of the settlement of Mundigak; they date back to the late 3rd–early 2nd millennium BC (Kuz'mina 1966: 8-9, pl. I: 1,2). The ax-adzes were dated to the same time (Kuz'mina 1966: 14-15, pl. I: 7, 8). The type with a protruding sleeve is represented in Sarazm and Dashly 3 (Isakov 1991, fig. 78; Sarianidi 1977: fig. 32) (a late miniature imitation is present in Kangurt-Tut). From Kara-Pichok in the Hissar valley comes a bronze mirror with a handle, typical of the BMAC (Fig. 114: 5). In the Dangar region stone weights were found, near Kulyab—two stone batons. In Nurek there was found the neck of a silver vessel (Fig. 114: 1) whose analogies are present in the Fullol hoard in Afghanistan (Tozi and Wardak 1972). These findings indicate cultural ties with the farmers of the BMAC culture and Iran and Afghanistan going back to the early 2nd millennium BC. The ties with Iran in the late 2nd–early 1st millennium BC are demonstrated by the dagger with an incrusted handle from Ramit (Fig. 114: 10) Kuz'mina 1966: 52, 53, pl. vii, 9; Pogrebova and Chlenova 1970) and the bronze vessel with a spout from Fatmev (Lukonin

1977: 40, fig. 50), whose date—10th–8th centuries BC—is determined by the discovery of clay ornamented vessels in Talysh, Luristan and the cemetery of Sialk B (Aliev 1960, pl. lxxx; lxxxiii; ci, ciii).

The establishment of early ties between the farming regions of Iran and Afghanistan with southern Tadzhikistan may have been accounted for by its abundant common salt reserves.

Analysis of the burial rite, ceramics and accompanying articles of Tadzhikistan complexes enables one to assign them beyond doubt to the Molalli and Bustan stages of the BMAC and to suggest the population's migration from the west, where this culture formed and its early stages are represented.

Adaptation to the specific mountainous conditions determined the culture's peculiarities which allows us to distinguish southern Tadzhikistan as a separate local variant of the BMAC. Its distinctions include: type of small settlements with a scattered construction pattern; presence of all three types of dwellings; blocking up of the graves not with bricks, but with stones and clay; *bogar* type of farming; a serious role of cattle-breeding; wide distribution of the typically Andronovo weapon types (arrows, daggers), working tools (sickles, single-bladed tailed knives) and ornaments (trumpet-shaped earrings, large beads) as well as their production technology employing two-piece stone molds. Great importance for Tadzhikistan in the Late Bronze Age is proven not only by cultural but also ethnic contacts with the pastoralists of the Andronovo and Bishkent cultures which is indicated by the discovery of burials and ceramics of these cultures on the BMAC sites and of imported wheel-made pottery on the pastoralist's ones (Pl. 10). There is no doubt as to the peaceful character of the interaction between the representatives of the different cultures. There are no signs of violent destruction of the farmers' sites, and it is not only material culture articles that are widespread but also those of mutual borrowings pertaining to cults and peculiarities of burial rite. Such symbiosis reflects a most active process of ethnic assimilation and is possible only under the conditions of the adoption of a new language and general bilingualism.

Bishkent-Vaksh culture

The culture bears the names of the two valleys where sites have been discovered, the Bishkent by A. Mandel'shtam and the Vakhsh by B. Litvinsky. In actual fact, the sites represent two variants of a single culture. The Bishkent-Vakhsh culture is the most outstanding cultural formation of Central Asia, which reflects the synthesis of the cattle-breeding and farming population in the Bronze Age. The monuments are located in the Bishkent valley on the Kafirnigan river and in the valleys of the rivers Vakhsh and Kyzylsu. These areas are very suitable for cattle-raising.

The culture is known from a single settlement, Tashguzor (Fig. 91: 1-22), and numerous cemeteries: on the Kafirnigan – Tulkhar, Aruktau, Bishkent I, II, III, Isanbay, burials at Shakh; on the Vakhsh – Vakhsh, Tigrovaya Balka, Oykul', Dzharkul', Amu-Darya, Kyzlar-Kala; on the Kyzylsu – Makonimor Ittifok, Guliston, Gelot, Maidapatta, Obkukh, three burials from the BMAC cemetery of Kangurt-Tut, the burials of Shulyupu, Teguzak as well as Karim-Berdy in the Hissar valley, on the outskirts of Dushanbe, at Hissar, etc; in northern Afghanistan on one of the mounds (tepes) of the settlement of

Shortughai, in the upper layer, burials of the Bishkent culture have been discovered (Mandel'shtam 1966; 1968; Litvinsky 1964;1973; Mukhitdinov 1971; Kuz'mina 1972; 1986; P'yankova 1982a,b; 1986; 1989; 1998; Litvinsky, Sedov 1983; Francfort 1989; Kuz'mina, Vinogradova 1996; Vinogradova 1997; 2000; Götzelt *et al*. 1998).

According to the stratigraphic information of the Tulkhar cemetery, the settlement evidence of Tashguzor and the evidence of ceramics three stages can be distinguished: 1) Andronovo-Fedorovo; 2) early Bishkent; 3) late Bishkent marked by the presence of ceramics with the applied-roller. At Tashguzor (Fig. 91: A) this layer is overlain with one containing Kobadian I ceramics from the Achaemenid period.

At the settlement there were found: 1) black-fired hand-made kitchen vessels; 2) ceramics of the Bishkent type with white slip, including that with an applied-roller on the shoulder of the pot; in small numbers there is 3) wheel-made ceramics of the BMAC of the Mollali-Bustan stages, among the articles was the leg of a vase of the Mollali type; 4) sherds of Andronovo type.

The burial rites of the Bishkent culture are extremely diverse. The most ancient of them (type I) was found in the cemeteries of Tulkhar and Babashov. These comprised kurgan and stone constructions over an earthen pit; the deceased were cremated. The graves contained hand-made ceramics. This is a typically Andronovo rite of the Fedorovo type. A peculiarity of these burials was small stone settings in the figure of a swastika or a circle with a cross.

On the Kafirnigan the typically Andronovo elements are: round stone enclosures (Aruktau, Bishkent III), square stone cairns (Tulkhar, Aruktau), burials in stone cists (Tulkhar, Bishkent II), and stone-filled graves (Aruktau).

The survival of the cremation rite is demonstrated by burials in a pit in keeping with the inhumation rite, but with ashes and pieces of coal around the skulls.

Type II in Tulkhar is represented by burials in the flexed position on the side in a pit with a downward passage or dromos, that had been blocked up with stones. A fire might be made in the entrance and ashes and pieces of coal deposited in the chamber. In the graves round hearths were constructed for female burials and rectangular hearths for males. There are also dismembered burials in small cists. By the deceased were hand-made ceramics of the Bishkent type accounting for 70% of all the ceramics, and imported wheel-made ceramics of the BMAC accounting for the remaining 30%.

The latest – III type – is represented by catacombs with the entrances blocked up with stones; these contained flexed burials and hand-made ceramics of the Bishkent type.

In the various types of graves were the bones of sheep or ram, metal articles, and rarely ornaments, stone arrowheads and beads.

The type III burials in Kafirnigan are fully analogous to the cemeteries on the Vakhsh and Kyzylsu. The burial rite and ceramic complex here was more standardized. The burial grounds have from 10 up to 130 constructions. These are round, rarely, square, burial mounds with a stone circle (sometimes – double) measuring 2-15m in diameter. Inside there is a catacomb, the entrance to which is blocked up with stones. The dead lie flexed, men on the right, women on the left side. There are double burials of a man and woman. The rite

of the ritual fire is evident, sometimes forming a ring around the grave. A large number of constructions are cenotaphs. Inside the catacomb there are usually placed the ribs of a sheep or ram, rarely metal articles, stone maces and arrowheads.

A distinctive feature of the Bishkent culture is its ceramics. Thirty-percent of the pots in the graves are wheel-made BMAC vessels; 70% of the complex is the Bishkent type pottery. Most of these vessels imitate the shape of the BMAC types but they are hand-made. Several types of ceramics maintain the traditions of the Zaman-Baba culture. This complex consists of round-bottomed kitchen ware, fired black, and typically Bactrian light-slip vessels in the shape of pots, basins, (shallow) pans, vases and, most importantly, vessels of cylindrical and bi-conical shape. The last types survive in Bactria through the Achaemenid period and constitute a peculiarity of the Kobadian I type ceramics (D'yakonov 1953;1954; Kuz'mina 1972).

The late type of the Bishkent ceramics include vessels with the applied-roller, occasionally decorated with notches, which imitate the characteristically steppe type of pottery of the Final Bronze Age.

The economic and cultural type of the Bishkent culture was complex. At the settlement there were found imprints of barley grains, pestles, grinders, which is indicative of farming. Stockbreeding is reflected by the bones of cattle, ovicaprids, the donkey, the horse, and the custom of placing sheep bones into the grave. The topography of the sites suggests that the economy was based on stockkeeping and in part on mountain *bogar* farming, i.e., the use of land semi-irrigated and only in spring. The population would use mountain pastures and was semi-settled.

The origin of the culture is open to debate. B. Litvinsky and L. P'yankova believe that the culture is genetically related to the BMAC and reflects a change-over of a part of the farming population to pastoral stockkeeping. A. Mandel'shtam and E. Kuz'mina, on the other hand, hold that it was created by Andronovo pastoralists and, possibly, representatives of the Zaman-Baba culture. They came to use the ceramics of the neighboring farmers and also began making hand-made pottery, which imitated in shape that produced on the potter's wheel.

Of decisive importance is the evidence concerning the burial rite. The early monuments of the Bishkent culture maintain the characteristic features of the Andronovo Fedorovo burial tradition: burial mound, enclosure, stone cist, cremation, swastika, and the hand-made ceramics. Later there appeared graves with a downward passage and catacombs. The origin of this rite in Central Asia remains debatable. It is known both in the Bactria-Margiana culture, but its genesis there is unclear, and in the Zaman-Baba culture where it may be a heritage of the Catacomb culture of the European steppe. In types II and III of the Bishkent burials Andronovo features are preserved: burial mounds and stone enclosures, small cists, the position of the deceased and the custom of double-burial, the round and rectangular shape of the sacrificial hearths, the vivid manifestations of the fire cult. As long as the burial rite is an ethnic indicator of a culture, which is upheld even during long-distance migrations to another ecological niche, and wheel-made ceramics are quickly borrowed by new-comers, there are serious grounds to believe that the creators of the

Bishkent culture were by origin Andronovo pastoralists, who came into contact with representatives of the BMAC, which is also expressly indicated in the farming culture of Tadzhikistan and Uzbekistan. The new Bishkent culture arose as a result of this symbiosis. Its advanced stage is represented by the cemeteries in the valley of the Vakhsh river, marked by a stable combination of cultural characteristics. This culture became one of the components in the formation of the cultural complex of Bactria in the Early Iron Age, and this was the ceramic complex that continued its development in Bactria in the Achaemenid period (Kuz'mina 1971c; 1972a; Sarianidi 1977; Cattena and Gardin 1977). Another component was the culture of ceramics with the applied-roller of the Final Bronze Age of the Central Asian steppe. The Iranian-speaking people of Bactria formed as a result of the interaction of the aboriginal population with different groups of new-comers.

The Andronovo culture in Tadzhikistan

In northern Bactria, various traces of the Andronovo tribes' presence were identified. In the Vakhsh valley near the Kirov sovkhoz a settlement measuring 400 sq m in area was discovered (Fig. 83; Litvinsky and Solov'ev 1972: 41-47). Two thin layers were found separated by a sterile layer 0.5m thick.

In the lower layer, round hearths were uncovered, 0.5m in diameter, surrounded by a stone ring, around which animal bones and ceramics were concentrated. The vessels are gray, of good quality, often polished. Predominant are the typically Fedorovo pots with a rounded shoulder and everted rim. Twelve percent of the vessels are ornamented, 60% of the ornament being executed in indented stamp. Some pots bear ornament over three zones with the zones of the rim and neck united which is generally typical of Central Asia ceramics of the Fedorovo type and the Tazabagyab culture. There occur pennants and isosceles triangles but absolutely predominant are elongated oblique triangles (Fig. 13 AI, 1; II, 2, 5; III, 1), which constitute a distinctly Fedorovo ware in Tadzhikistan. One pot (Litvinsky *et al*. 1972: fig. 19 B 2) with swollen sides and a short narrow neck, ornamented with oblique opposite triangles, finds analogies in the Tazabagyab culture (Itina 1977, fig. 20: 2,3; 65).

The layer also yielded stone implements and fragments of casting molds indicative of metalworking.

Determination of an analogy for the vessel from the Vakhsh, settlement of Kokcha 15, is of decisive importance, since imported Namazga VI ceramics was found at this site, which sets the complex's date as the 15th–13th centuries BC (Itina 1977: 145) and makes it the earliest Fedorovo complex of Tadzhikistan to date.

In the site's upper layer, clay pottery was found with an admixture of gravel, half of it was fired red-and-yellow to a fabric template. The shapes of the pots cannot be restored. Half of the vessels are ornamented in indented stamp in the form of elongated triangles and pennants thus reflecting the genetic succession with the previous layer. The other half are decorated in plain stamp in the form of zigzags, herring-bone and isosceles triangles (Litvinsky *et al*. 1972, fig. 20A). The date of the upper layer is determined by the finding of a yellow clay vessel with a spout (Litvinsky *et al*. 1972: 14, fig. 19A, 1), which finds analogies in the ceramics of the late sites in the Kara Kum and other sites of the turn of the 2nd–

early 1st millennium BC (Litvinsky *et al*. 1962: 255). Of the same date is the stone mold (Litvinsky 1972: 45, fig. 21: 1), designed probably for casting a chisel with a wedge-shaped razor and a roller round the sleeve, peculiar to the Final Bronze complexes of Kazakhstan (Chernikov 1960 fig. lxiii, 1).

Andronovo ceramics with comb-made ornamentation was found in the Hissar valley at Pakhtabad. Fragments of Andronovo pottery were collected by A. Vinogradov in northern Afghanistan on the left bank of the Amu-Darya (Fig. 50: 54-57). It is also present at Shortughai (Fig. 52: 24-33). In addition, sherds of Andronovo-type ceramics were discovered by A. Ranov on the left bank of the Vakhsh river at the settlement of Karabura (Litvinsky 1972: 46) and at the Dzhilikul' crossing (P'yankova 1998: 17 o). On top of that, Andronovo ceramics and bronze articles were found in the Vakhsh's upper reaches near Nurek in the upper layer of the settlements of Tutkaul and Sayed, belonging to the Hissar culture (Ranov and Korobkova 1971: 146; Yusupov 1975: 139). An Andronovo burial was discovered in the Nurek area at the Sharshar pass near the town of Dangara at the ancient cemetery at Kirov (P'yankova 1999: 288). Andronovo sherds were identified in a layer of the Bishkent culture at the settlement of Tashguzor (P'yankova 1999, fig. 10). In the south of Tadzhikistan at the confluence of the Kyzylsu and Pyandzh rivers at the ancient town of Saksanokhur there has been found a hand-made vessel and a wheel-made pot of the Biskent culture (Fig. 83: 19; Litvinsky and Mukhitdinov 1969: 169, 161; fig. 1, 2). The hand-made vessel has a widely swollen body and a narrow neck. Underneath the neck there are oblique hanging triangles applied in indented stamp, below along the body there went a strip of hatched zigzags. Analogies to the ornament and shape of the vessel are known in Khorezm in the cemetery of Tagisken (Itina and Yablonsky 2001: 94-101; fig. 82: 507; 83: 517: 94) dating from the 9th–8th centuries BC.

To the Andronovo culture also belong three cemeteries of Tadzhikistan: Dashti-Kozi (Isakov and Potemkina 1989; Bostongukhar 1998), Kumsay (Vinogradova and P'yankova 1990; Vinogradova 2000) and Tuyun (Vinogradova 2000).

The Dashti-Kozi cemetery is located in the foothills of the Turkestan ridge. In the upper reaches of the Zeravshan river, on its right bank, 27 graves were explored. It is difficult to judge their structure because according to the field diaries and drawings the outlines of the grave pits and *dromoi* were not established which challenges the credibility of their publication (Fig. 48: 4-14, 20, 22-23, 26; Bostongukhar 1998). Moreover, though it was only in burials 25 and 25 (1) that catacombs were identified, the publication (Isakov and Potemkin 1989: 145) reconstructs all the burial structures as catacombs. The entrance to the shallow entrance pit is blocked up with stones. Prevalent are single burials strongly flexed on the left side, head to the west with deviations. There were also identified: a burial of a mother and child, paired heterosexual burials of various dates, and one triple burial, dismembered backbones and a child's skull. Before the burial in the entrance pit one would make a fire and deposit ocher; a vessel was placed by the deceased, women have ornaments, several graves contain sheep bones. In catacomb 25 there was revealed the simultaneous burial of an adult male and female with eastward orientation of the head. The dead are lightly flexed, some of them have one arm extended. There are accompanying articles. T. Khodzhayov has established that three women and two men belong to the southern Mediterranean type, two men, distinguished by a great height—to the

Andronovo type. Another male Andronovan is buried with his head to the east along with two aboriginal women in grave 12 without accompanying articles but with sheep bones. The rite's distinctions in grave 25 reflect the ritual character of the complex, or the fact that the dead were either foreigners or victims of an epidemic. Apart from this, in the cemetery there were discovered shallow ritual pits with traces of repeated fires and oil poured on (Bostongukhar 1998: 84 - 87).

In the female burials there were found bronze or gold plaques for plaits, trumpet-shaped earrings, bracelets, mirrors, large ribbed bronze beads, lazuli beads, bronze beads used as decorations on red boots. Three rich burials were identified ## 3, 15 and 25 (1), that contained women wearing 3-4 bracelets on their wrists, gold temple rings, earrings with a hook, a wreath of beads, a mirror with a loop, a pendant, and dresses decorated with beads (Bostongukhar 1998: 69, 74, 75, 83, fig. 36, 45). The bronze has a considerable content of tin and lead.

The ceramics are hand-made of gray and yellow-and-orange color executed in clay with an admixture of fired clay and large gravel. The principle form is a wide-mouthed pot with an accentuated neck and a rounded shoulder. The body's maximum width is 2/3 that of the height, for some pots it is at mid height which is a late feature of the Fedorovo pottery. Some pots are of elongated proportions and have a narrow mouth making them close to jugs characteristic of the Final Bronze Age. Half of the pottery is ornamented in plain or combed stamp, the ornament being located in one zone over the shoulder: hatched isosceles triangles with an upward—or downward-pointed apex, vertical or horizontal herring-bone—on two vessels it goes over the rim and shoulder; zigzags going down from the rim; one pot has flutes over the neck which is typical of Fedorovo ceramics, but the proportions of the vessel are elongated (Bostongukhar 1998: figs. 2, 3: 7; 25: 8; 26: 2; 28: 11; 30: 10; 31: 26, 27; 32: 24; 36: 6).

Contrary to the view of A. Isakov and T. Potemkina, this pottery neither in terms of technology nor of types has any similarity with the late Alakul' ceramics but belongs to the late degraded Fedorovo tradition, finding its closest analogies among the vessels of Tadzhikistan cemeteries.

Of interest is the material recovered from burial 7: this paired burial yielded an Andronovo pot, a Molalli-type pot and a similarly-shaped one (Bostongukhar 1998: fig. 28: 10; 27: 1), finding analogies in the wheel-made pottery of Tadzhikistan, in particular, in the cemetery of Kumsay (Vinogradova and P'yankova 1990: fig. 5: 2, 3). The narrow-mouthed pot from burial 9 (Bostongukhar 1998: fig. 30, 11) has a typological similarity with the ceramics of the Late Bronze settlement of Yakke-Pareang (Itina 1977: fig. 82: 24; 25) and the mausoleum in Tagiskena (Itina *et al*. 2001, fig. 87: 570, 573; 88: 574) in Khorezm.

Another Andronovo cemetery of the Fedorovo circle is Kumsay, which was discovered in the piedmont territory of the Hissar valley (Fig. 49: 1-3, 15-18, 24, 27; Vinogradova and P'yankova 1990: 98-112; Vinogradova 2000: 90, fig. 4). Twenty-one catacomb-type graves were excavated; the top grave was marked with a few stones, the entrance to a catacomb was blocked up with stones. The burials are strongly flexed, head to the north-east, women on the left side, the adolescent on the right. By the head there is a vessel; women wear ornaments.

Six graves yielded hand-made clay ceramics with an admixture of lime and clay fired gray. There one finds pots with an open mouth, a rounded shoulder,

occasionally, wide sides or of elongated proportions. Two vessels are decorated with flutes over the shoulder; the rest are ornamented in indented stamp in two zones—over the rim or neck and shoulder in the form of two rows of horizontal zigzags or opposite triangles (Vinogradova *et al*. 1990, fig. 5: 4-7). This is the pottery of the late Fedorovo tradition.

In the five children's graves there were found red-and-orange vessels with white slip made on the potter's wheel. These are two pots, an open basin, and a narrow-mouthed jug (Vinogradova *et al*. 1990: fig. 4: 12; 5: 1-3). This pottery finds analogies in the farming Molalli stage cemeteries of southern Tadzhikistan (P'yankova 1989a, fig. on p. 169 I).

Women's ornaments are represented by temple pendants with a hook and one spectacles-like pendant, wide, open bracelets, large bronze beads and polytypic paste beads and large bronze ribbed beads. They were used in the embroidery of boots. According to I. Ravich's conclusion, the decorations contain 10% tin and 5-10% lead. Typically and in terms of their composition and casting technique, they are characteristic of the late Andronovo complexes of the Zeravshan and Tadzhikistan (Vinogradova *et al*. 1990: 109).

In the basin of the Kyzylsu river the Tuyun cemetery has been discovered (Fig. 71: 10, 11; Vinogradova 2000: 105, fig. 19). The burial of an adolescent girl was made in a catacomb in the flexed position on the left side; nearby there are two children's skulls and a Fedorovo hand-made vessel with a rounded shoulder, ornamented in indented stamp with pendants over the rim and neck. There were found a silver pendant with a hook, paste beads on the skull and large bronze ones on the legs.

N. Vinogradova and L. P'yankova (1990: 110; 111; P'yankova 1998: 70; Vinogradova 2000: 105) assign the cemeteries of Tadzhikistan to the Zeravshan type of the Andronovo-Tazabagyab community singled out by N. Avanesova (1985: 40) and they suggest a migration of this population from the Zeravshan. A. Isakov and T. Potemkina (1989: 165) view southern Kazakhstan as the original territory. Both suggestions are wrong. The southern Kazakhstan sites of Tautary and Kuyukty have nothing in common with those of Tadzhikistan (a fence, a flat grave, cremation, richly ornamented pottery including articles with a ledge on the shoulder). The differentiation of the Zeravshan variant does not appear convincing either, since the burial rite and ceramics of the mid Zeravshan sites are very diverse and reflect the presence along with the Fedorovo traditions of Alakul' and Timber-grave ones as well as of the BMAC farming culture (the Dzham hoard; Fig 84: 1-11). One can only assert the typological similarity of metal alloys and the set of ornaments represented on the mid Zeravshan and in the cemeteries of Tadzhikistan: Fedorovo trumpet-shaped earrings, wide open bracelets, large beads with a rib, and stone beads. But ornaments do not constitute a culture-determining characteristic. Of decisive importance are the ceramic complexes. As for the burial rite in a catacomb, this reflects the influence of the BMAC culture. As long as the center of this culture is situated in southern Tadzhikistan and Uzbekistan, the formation of Tadzhikistan's peculiar cemeteries is probably to be situated in the west where the oldest Andronovo settlement is located at the Kirov sovkhoz (lower layer) and where Andronovo features are prominently represented in the cemeteries of Tulkhar and Babashov. From there also originate the evolution of the catacomb, the blocking up of the

entrance with stones, the custom of making fires in the entrance and placing ashes in the chamber. It is precisely the Bishkent culture that is characterized by a combination of imported BMAC pottery and local hand-made ceramics. But in Bishkent the synthesis of the Andronovo and farming traditions led to the formation of a new synthetic culture, represented by the Vakhsh cemeteries.

How old are the Andronovo sites? The most ancient evidence is the discovery of an Andronovo sherd in the post-Harappan layer at Shortughai. At the Vakhsh site a lower layer was identified but its ceramic complex is analogous with the pottery of the majority of other sites. Fedorovo materials were found on the BMAC sites at the settlements and in the cemeteries of Dzharkutan, Bustan 6, Tandyryul, Teguzak, Kangurt-Tut, Shortughai and at the Bishkent culture settlement of Teguzor (Pl. 10), which allows one to synchronize these cultures. The chronology is determined by metal articles.

The dagger with a butted blade finds numerous analogies all over Kazakhstan including in the complexes of the settlements with the applied-roller type of ceramics: Alekseevka, Chelkar, Elizavetinskiy priisk, Stalinskiy rudnik (Fig. 53: 24, 25, 30), Atasu, Il'inka, Kent (Krivtsova-Grakova 1948, fig. 20; Orazbaev 1958: pl. viii,13; ix,4-6; Zdanovich S. 1979; Margulan 1979, fig. 136,3; Matyushchenko 1973, fig. 2, 5; Gening and Eshchenko 1973, fig. 4, 10; Varfolomeev 1987, fig. 6, 27; Kadyrbaev *et al*. 1992: fig. 20: 3) as well as the late Timber-grave complexes of the Volga region and Ukraine as far as the Danube region (types 34, 36 according to E. Chernykh 1976), including the following hoards: Malye Kopani, Golovurovo, Loboykovo, Kabakovo, Sokoleny, Voloshskoe, Krasny Mayak, which indicate that the Central Asian examples date to the 13th–10th centuries BC.

The daggers of Tulkhar, Vakhshuvar and Dashly 3 (Fig. 53: 1, 6, 10) are characteristic of eastern Kazakhstan (Chernikov 1960: 164, pl. lxiv, 2-4); another variant is present at the settlement of Novonikol'skoye (Zdanovich 1988, pl. 10, 21). Variants comparable with the single-bladed knives with a bent back blade of Kangurt-Tut and Nurek (Fig. 53: 11, 31) are known in the Urals in the Veselovskiy hoard together with an Andronovo-type axe, a chisel, a spear and a sickle (Obydennkov 1996: 109; fig. 3: 18) and in Semirech'e. The Nurek type of knife is represented at the central Kazakhstan settlements of Karkaraly and Kent along with applied-roller ceramics (Margulan 1998, fig. 134: 7; Varfolomeev 1988, fig. 3). Various types of sleeved arrows with a protruding or hidden socket pertain to the category of weapons that had developed in the Andronovo culture since the Sintashta period and right to the Late Bronze Age, when variants analogous with those from Central Asia are represented in the complexes with the applied-roller ceramics all over the Andronovo range: Alekseevka, Sargary, Shortandy-Bulak, Kent, Malokrasnoyarka and others (Krivtsova-Grakova 1948, fig. 33, 1; Zdanovich 1988, pl. 10, 8-10; Varfolomeev 1988, fig. 4, 27; Margulan 1988: fig. 127: 8-10; 190). For the most part, these articles date back to the 13-11th centuries BC, several types survived till the 10-9th centuries BC. The attribution of the monuments to the Final Bronze Age is borne out by the recovery at the settlement of Dzharkutan of a cylindrical seal (Meytarchiyan 1984), belonging to the same style as the seal with a rider from Merv (Kuz'mina 1971) and a number of seals from Southern Bactria, published but not dated by V. Sarianidi (1998c).

Another basis for determining the age of the Andronovo sites in northern Bactria is the ceramics. The shape of most of the vessels with a rounded shoulder and a wide and tall mouth, the ornament in indented stamp by oblique net in the form of horizontal zigzag, herring-bone, oblique triangles, pennants and meander are typical of the Fedorovo tradition. But there also occur vessels of elongated proportions or with a globular body or a low mouth. The main differences from the classic Fedorovo pottery are found in the ornamentation. A large percentage of pots are altogether devoid of ornament, the ornament is simplified and applied over one zone—mouth or shoulder, often different zones bear the same motif. These irregularities are peculiar to the late Fedorovo ceramics of the whole Andronovo range. Particularly typical of the late Fedorovo pottery is the pattern motif of very elongated, often, opposite oblique triangles and wisps of oblique lines. They are known on the late Fedorovo ceramics of the Urals and the Tobol, often co-occurring there with the applied-roller type of ceramics and the pottery of the Cherkaskul' and Lugavskaya cultures which is absolutely uncharacteristic of Central Asia (Obydennov 1977: fig. 10; Obydennov and Shorin 1995: fig. 39, 46; Stefanov and Korochkova 2000: fig. 27).

Similar ornaments are represented on the pottery of the late Andronovo sites of central Kazakhstan: Egizek, Belasar (Margulan 1998: fig. 32; 37), Ikpen' III, Shapat (Tkachev 2002 part 1: fig. 36; part 2: 180) and eastern Kazakhstan: Izmaylovka (Akishev 1987: fig. 29; 47), where these ceramics were found along with the applied-roller pottery of the Dongal type and the Begazy culture and are dated to the pre-Saka epoch of the 9th–8th centuries BC according to the discovery of a wedge-shaped chisel, arrows and the most ancient bits and cheek-pieces. Also typical of Izmaylovka is the construction of stone cists, and the presence in the grave of a funerary fire and ocher.

Vessels with a spout recorded for northern Bactria in the latest complexes were found in central Kazakhstan at the settlement of Tagibay-Bulak (Margulan 1998: fig. 140: 1) and in the cemetery of Krasnye Gory (Tkachev 2002, 2: fig. 195) together with ceramics with applied-roller decoration of the Dongal type and these are dated to the 10th–9th centuries BC by the discovery in Krasnye Gory of two-ring iron bits.

This date serves as the upper limit for the Bronze Age sites of northern Bactria. The main part of the BMAC and Andronovo sites containing the Alekseevka type pottery with applied-roller decoration and bronze articles characteristic of the Eurasian steppes from the Danube to China should be placed back in the 13-11th centuries BC.

The time of the first arrival of the Fedorovo tribes in the south of Central Asia is not known. Possibly, they advanced in several consecutive waves. But judging by the multitude of sites (over 25) the peak of their migrational activity fell within the Late Bronze Age—the time of numerous and multi-directional movements all throughout Eurasia's steppes.

The question whence the Andronovo tribes came to northern Bactria remains open. Most likely, it was from the north or north-east, as is suggested by the prevalent types of the burial rites: round and rectangular stone enclosures, cists and ground pits, co-occurrence of cremation and inhumation, the Fedorovo type of pottery with a rounded shoulder but poorly ornamented, often located in one or two zones, the abundance of unornamented pottery, and finally, the fact that

the Bactrian metallurgical center undoubtedly belongs to the eastern Andronovo metallurgical province characterized by distinctive types of knives, daggers, celts, and particularly, ornaments: trumpet-shaped earrings, horned bracelets, large cast beads as well as alloys with a high tin and, often, lead content.

The relations between the aboriginal farmers and the pastoral newcomers were amicable. The peaceful co-existence must have been promoted by economic and cultural specialization: the Andronovans were semi-settled cattle-breeders and suppliers of bronze articles in exchange for which they would receive farming produce, stone beads and wheel-made pottery.

In the north—among the Andronovo sites proper—traces of interaction with the farmers have been identified: discoveries are known of stone beads, especially of lazuli and turquoise, executed by the jewelers of Namazga VI-BMAC on sites of the steppe zone of Central Asia (Gurdush cemetery, sites at Makhan-Darya, etc.) (Gulyamov *et al*. 1966, p.202, pl xxiii, xxiv); similar stone beads now and then occur from the Urals to Siberia at the sites of Alabuga, Ushkatta, Keembay, Ural-Saj, Aksayman, Borovoe, Nurtai, Rostovka, Sopka 2; common at the Kozhumberdy and Atasu types of Andronovo sites are plaques with complex patterns, imitating bronze and stone seals of the farmers of Margiana and Bactria of the Namazga VI period (Margulan 1998: fig. 191; Tkachev part 2: fig. 137, 167); a Namazga-type pin with a bi-spiral head was found in Khorezm (casting mold from Kokcha 15a), in northern Kazakhstan (imitation from the Borovoe cemetery) (Kuz'mina 1988c). However, the number of imports in the north in the 15th–14th centuries BC is so negligible that it points to the sporadic character of contacts with the farmers. It was only in the 13th–11th centuries BC that the pastoral tribes began to occupy extensively Central Asia's deserts and high mountains.

The 13th–9th centuries BC mark the transition to the mountain pasture type of cattle-breeding, the mastery of riding skills, the appearance of iron and other cultural innovations as well as active advancement to the south (Map 10). The applied-roller ceramics, often with 'moustaches', spreads in the steppe (Fig. 51). It is typical of the Noua culture in Romania, the late Timber-grave Sabatinovo and Belozerka stages in the Ukraine, the IV-Khvalynsk (Ivanovo) stage in the Volga region, the late Andronovo monuments of the Alekseevka type, represented in the Urals, all over Kazakhstan, the Altai region and Semirech'e as far as Mongolia (Krivtsova-Grakova 1948; Terenozhkin 1961; Margulan *et al*. 1966; Margulan 1979; Leskov 1970; Orazbaev 1958; Zdanovich S. 1979; Potemkina 1979; Chernikov 1960; Mogil'nikov 1976; Bernsham 1952; Chernykh 1983; 1992; Kuz'mina 1964a; Tsybiktarov 1998). It appears also in Central Asia.

It was specifically in the Late Bronze Age that contacts between the farmers and the steppe intensified.

In the cemetery of Kulevchi VI in the southern Urals, two cremation burials were excavated. The bottom of the pits was heavily burnt, above it was a clay layer followed by that of charcoal. In each grave were discovered the calcined bones of humans and animals, sheep ribs and two vessels apiece: one was a richly ornamented Fedorovo vessel, the other a large basin imitating wheel-made pottery (Vinogradov 2000: 30, 31, fig. 9). Wheel-made pottery was identified at the settlement of Chernoozer'e on the Irtysh (Viktorova *et al*. 1974: 22, 23, fig. 2: 2). Pottery of the late Namazga VI-Molalli and Bustan stages made on the

potter's wheel or imitating it in shape was found at the late Fedorovo settlement of Pavlovka (Fig. 72) in northern Kazakhstan (Malyutina 1985; 1991), in the late Tautary cemetery in southern Kazakhstan (Maksimova 1962), at the settlement of Bien in Semirech'e (Karabaspakova 1987: 96) and in central Kazakhstan at the settlements of Kent and Myrzhik and in the Tasyrbay cemetery (Varfolomeev 1991: 15, 17) in combination with Alekseevka ceramics. The co-occurrence in Kent of a large number of articles that can be reliably dated by the European scale to the 13th–10th centuries BC provides grounds for establishing the chronology of Namazga VI and the BMAC. Wheel-made pottery along with Alekseevka ceramics was recorded also at a number of settlements in the Altai region: Kalinovka, Kureika 3, Pereezd, Burla 3, Molokovo II, Chekanovskiy Log (Ivanov 1987; 1989; Udodov 1988; Kiryushin and Luzin 1990; Kiryushin *et al*. 1990, p. 117, 122; Udodov 1991, 75; Tishkin 1998: 92; Demin and Sitnikov 1998: 94). Noteworthy is the fact that it is present only in the regions of ore deposits along the trade routes.

Andronovo sites of the Pamirs

The Andronovo late Fedorovo tribes also occupied the high mountain territory of the eastern Pamirs. Here have been discovered the Mashale rock shelter, the Kurteke cave, the cemeteries of Karadimur, Kokuybel'su, Yuzhbok and the late cemeteries of Kyzyl-Rabat and Zhartygumbes (Fig. 83: 20; Litvinsky 1972: 29, 30, 90; Litvinsky and Ranov 1964; Ranov 1962: 7, 8; Babaev 1980: 75-87; 1984: 104-106; 1989; P'yankova 1998: 154). In the Karadimur cemetery a complex square construction was revealed with double stone walls filled in with clay and an entrance-ramp. In the center there is a grave oriented to the south-east and covered with stones. Inside the grave there is a pot and fragments of several more vessels. The Karadimur construction resembles the mausoleums of the Dandybay culture. In the other graves the burials of cremation and inhumation are set in primitive stone constructions and accompanied with vessels.

The ceramics are coarse. There are jars and pots with a rounded shoulder, unornamented or with poor decoration applied over the shoulder in the form of a meander in coarse-indented and plain stamp.

In terms of the burial rite and ceramics, the Pamir sites are reminiscent of the late Fedorovo traditions and typologically are in part comparable with the pre-Saka complexes of Semirech'e. They date from the 11th to the 9th centuries BC. The few bronze articles are made of the high-tin Andronovo bronze. The spear from Yuzhbok is forged from arsenical bronze. The topography of the cemeteries points to seasonal cattle drives. The Kurteke cave, where an arrowhead was found, served as a shelter for hunters.

The Pamirs have also yielded petroglyphs, among which are representations of chariots: Tekketash and Akdzhilga (Mandel'shtam 1961; Zhukov and Ranov 1972; 1974).

For the late Andronovo population of the Pamirs the way to India was open through the passes into the Indus valley.

The Andronovo culture in Southern Bactria

Andronovo monuments were discovered by the Soviet-Afghan expedition. Andronovo ceramics are represented in the oasis of Dashly (Sarianidi 1977, fig. 66) and on the southern bank of the Amu-Darya in A. Vinogradov's collections (fig. 50: 54-57). These comprise sherds of hand-made ware decorated with triangle imprints and in plain stamp in the form of vertical herring-bone and isosceles triangles. The applied-roller ceramics is absent; the likely date is the 15th–14th centuries BC, though a later date is not ruled out.

Andronovo materials were discovered at the settlement of Shortughai (Francfort 1977; 1989, Kuz'mina 1992a). H.-P. Francfort separates the identified construction horizons into two stages. The first is Harappan.

The ceramics are wheel-made and includes the specifically Harappan shapes and ornamentatal motifs (Francfort 1989: pl. 32-38, 43, 46-47, 52-54, 59-61) as well as the seals, beads, and shell artifacts typical of the civilization in the Indus valley (Francfort 1989: pl. 80, 81, 1-14, 75). As it appears, the common transport types and the uniformity of a range of ceramic forms and metal artifacts testify to active ties between the inhabitants of the Harappan colony and the southern farming population of Central Asia in the first stage of the monument's occupation. The common types allow one to synchronize Shortughai (stage A) – Harappa-Namazga V-VI – Mundigak IV – Shahr-i-Sokhta III-IV – Yahya IVB – Bampur V-VI – Kulli-Shahdad-Hissar IIIC. In advocating a long chronology, H.-P. Francfort dates the first stage to 2200-2000 BC when the settlement was abandoned.

The second stage of the monument reflects a new culture which spread from northern Bactria. It is a ceramic complex finding analogies in Dashly and Sappalli. In the upper (IV) stage of the second period there were discovered burials of the Bishkent culture containing the type of ceramics of the northern-Bactrian BMAC variant, made on the potter's wheel, together with hand-made pottery (Francfort 1989: pl. xi, xxv) which is also characteristic of Tadzhikistan cemeteries (P'yankova 1989, fig. 61-63, pl. 77: 15, 17; 78, 4). In addition, Andronovo ceramics of the Fedorovo type were found (fig. 52, 24-33). These are hand-made, occasionally polished, vessels without ornamentation and fragments decorated with the ornament peculiar to the late Fedorovo complexes, executed in indented and plain stamp on an oblique net (Francfort 1989: 80.242, pl. 58, 1, 3, 4, 12-15, xxvi, 3).

A special typological group consists of the hand-made pottery with an applied-roller underneath the ridge or ornament imitating such a roller (Francfort 1989: pl. 58, 6-9, xxvii, 1). Of the material articles, correlating with the steppe ceramic complex are the following: a bronze double-bladed arrow with a hidden sleeve (Francfort 1989, period IV, pl. 78, 3), and metal artifacts (Francfort 1989: 208, pl. 75) made of bronze or a compound alloy with arsenic and tin (periods III, IV), in contrast to the stage A articles, executed from copper and arsenical bronze, which is a hallmark of the metallurgical production of all the farming centers of Central Asia and the Zaman-Baba culture. As for the sites of the Bishkent culture, they, as already mentioned, are characterized by the same co-occurrence of articles of arsenical and tin bronze as in Shortughai; the latter as a rule belong to Andronovo types (Kuz'mina 1966: 85-91; Terekhova 1975; Ruzanov 1982; P'yankova 1989: 86). According to the conclusion of the paleo-

botanist G. Wilcox (Francfort 1989, 180, pl. 65), in Shortughai's upper layers one finds cereals of Northern Eurasian origin: millet and hexastichous barley, identified in Kangurt-Tut.

Of interest is the stratigraphic position of the Andronovo ceramics. One sherd was found in the upper (II) period of the Harappan settlement, all the others belong to the second stage: some in period III and twice as many in the last—period I—of the monument's occupation where they co-exist with the Bishkent closed complexes (Figs. 52: 24-33; 91: 23-27). The following succession of cultures is in evidence: (stage A) = periods I and II = Harappa = Namazga V; stage B = period III = northern Bactrian variant of the BMAC and Andronovo; period IV = BMAC = Andronovo = Bishkent. H.-P. Francfort, recognizing the continuity of the settlement's occupation after the departure of the Harappan population, which is borne out from his point of view by the preservation of some traditions of ceramic manufacture and construction (large-format brick), and advocating the long chronology, dates stage B to 2000-1700 BC, using the C^{14} calibrated dates and emphasizing the incompatibility of his chronological scale with the one accepted in our Russian scientific tradition. As for the 16 dates he obtained (Francfort 1989, 241, pl. 81), they do not look overly convincing in view of their great spread and overlap: period I – 4075-3725 (2850-2090 BC), period II – 4375-3710 (3340-2060 BC), period III – 3620-3050 (2850-940 BC), period IV – 3640-3535 (2160-1680 BC). The same is true for the series of dates for the sites of the Andronovo and Bishkent cultures (Appendix). Therefore it makes sense to refer to the comparative historical analysis and synchronization of the complexes. The relative chronology and synchronization of the monuments of Shortugai's early stage, offered by H.-P. Francfort, are unquestionable. The advocates of the long chronology just as well have no doubts as to the lower date – late 3rd millennium BC which is well consistent with the beginning of the Namazga V stage according to V. Masson's chronological scale (1956) accepted by the majority of local scholars. However, I judge that there are no good grounds to assign the time of the Harappans' residence in Shortughai only to the beginning of the Namazga V period, whose end is determined as 1700-1600 BC, being synchronous with the most recognized upper date of the existence of the Mohenjo-Daro civilization (Bongard-Levin and Il'in 1985, 92-95; Elizarenkova 1989: 432, 434; Possehl 1990; 1993; 1994; 1999). V. Masson (1959: 109ff), in pointing out a crisis of urban civilization in the late Namazga V period, emphasized that in the Namazga VI period the life of urban centers went on and crafts reached an even higher level. V. I. Sarianidi (1977: 151-5) sees during this period the florescence of urban culture both in Margiana and in Bactria—the florescence that determined the formation of the Bactrian state in the pre-Achaemenid period.

The chronological system of the south of Central Asia is based on analysis of the stratigraphy of a large number of sites which provided a successive thick formation of layers bearing evidence to the long-lasting existence of the Namazga V and Namazga VI stages (Pl. IV, V). The upper chronological reference point is the Achaemenid period – the 6th century BC. The succession of the manufacturing traditions of the Bactrian white wheel-made ceramics from the Bronze Age to the Achaemenids is incontestable (Kuz'mina 1971c; 1972a; 1972b). This thesis was reliably corroborated from an independent analysis of a mass of ceramic material (Sarianidi 1977: 116; Cattenat and Gardin 1977). This rules out

the possibility of dating the end of the Namazga VI period to 1700 BC. The chronology of Namazga VI and its Bactrian variant has been refined through the discovery of the co-occurring steppe and farming ceramics at the settlements of Shortughai, Dzharkutan, Kangurt-Tut, and Teguzak, at the settlements and in the cemeteries of the Bishkent and Andronovo cultures: Dashti-Kozi and Kumsay. Of crucial importance in determining their chronology as 13th–11th centuries BC is the discovery of applied-roller ceramics dated according to the European scale.

Andronovo metal is known at the farming settlements of Bactria and Margiana: it is represented by a dagger from Dashly 3 and arrows from Togolok 15 and Shortughai as well as the chance finds of knives, daggers, sleeved spears and a baton in the form of the upper part of a horse from southern Bactria (Sarianidi 1977: fig. 36; 1990, pl. xc, 9; Francfort 1989: pl. 78, 3; Amiet 1977: fig. 15, 8; Pittman 1984: fig. 32). Of undoubtedly Andronovo provenance is a trumpet-shaped earring from northern Afghanistan (Sarianidi 1993: 17, fig. 24). Also interesting is a ceremonial bronze axe among the chance finds in the cemeteries of southern Bactria (see Ligabue *et al*. 1988, 164, fig. 101). The blade ends with a horse's head with the mane upright (Fig. 95: 5-8). This representation of a horse is peculiar to the Andronovo staffs (cf. 55: 6, 7). The northern steppe origin of this stylistic manner is indisputably borne out by numerous representations on the petroglyphs of Kazakhstan (Pyatkin and Miklashevich 1990, fig. 1, 2). It was also from there that the horses themselves would be brought to Bactria.

Metal articles of the types characteristic of the late Andronovo metallurgical province spread as far as northern Hindustan: these include a celt from the settlement of Ghaligai in Swat (Stacul 1967: fig. 12h) and a celt from Kurukṣetra—the battlefield of the Aryans, described in the *Mahābhārata*—which, in D. Gordon's view (Gordon 1958, 138, fig. 1), was brought by the Aryans from their original home.

The advancement of the pastoral tribes to the south is likely to have accounted also for the appearance at the settlement of Pirak in Baluchistan of figures of horses and Bactrian camels (Jarrige and Santoni 1979: 177-179, fig. 94-95; Fig. 104) and the distribution in the north of Hindustan including Thor (Fig. 34: 15) of representations of chariots on petroglyphs, stylistically unlike the profile of those from the Near East but similar to the Andronovo examples designed schematically (Kasambi 1968: 123; Kuz'mina 1980c: 34; Lal 1961, figs. 5, 6; Jettmar 1985).

In the late 2nd millennium BC in the south of Central Asia, in Iran and Afghanistan, decoration of pottery with applied-roller ornament became common. Vessels with rollers were found in Tepe Giyan (Figs. 51; 57: 5-8) whence originate the typically steppe two-ring bits, cheek-pieces and plaques with a loop (Contenau and Ghirshman 1935: 8, 13), which Ghirshman at first associated with the migration of Iranian horsemen from the steppes. Hand-made ceramics with applied-roller decoration is present in Afghanistan at Tillya-Tepe (Sarianidi 1972, fig. 7.2, 9.1, 12.1, 22.4). Analogous pottery is part of the complexes of the 11th–9th centuries BC in Turkmenia (Yaz I), Uzbekistan (Kuchuk), Tadzhikistan (Karim-Berdy, where a Kazakhstan-type celt was found) (Masson 1959; Askarov and Al'baum 1979; Vinogradova and Kuz'mina 1986). The distribution in the south of the fashion to ornament pottery with applied-rollers, which is

technologically unjustified on wheel-made ceramics and represents an imitation of hand-made vessels, and the appearance of metal articles, belonging, in terms of both their type and composition (bronze with a high tin content) to the production of the northern metallurgical seats and having no prototypes in the Near Eastern cultures, point to the main direction of migrations in the 12th–9th centuries BC which was from north to south, from the territory of the steppes.

The culture of the Barbarian Occupation Period

The final of Yaz I-Kuchuk II, the ancient farming culture of northern Bactria of the barbarian occupation period, is demonstrated by the settlement of Karim-Berdy and the upper layer of Kangurt-Tut and Teguzak (Vinogradova and Kuz'mina 1986: 138-146, fig. 9: 4, 5, 11; P'yankova 1996: 195; 1996: 88-112; Vinogradova 2000: 93, 105, fig. 20). The settlements are located on the mountain sides in the system of the Kyzylsu river. Karim-Berdy measures 500 x 300 m. Here were discovered an oval stone hearth and a rectangular structure with walls constructed of horizontal stone rows up to 0.65m high.

The first group – 60% of the ceramics – is wheel-made, a vessel fragment is red-and-brown, on the outside it is coated with a white slip. One finds here pots with a narrow mouth, deep bowls, pots with a biconical body and sometimes with an applied-roller, vessels with vertical walls and a complex-profiled ridge. The second group is represented by hand-made ceramics: pots with an applied-roller, vessels with a spout and round-bottomed pots. A special third group consists of wheel-made vessels, small in number, painted in red against a light background.

In Kangurt-Tut's upper layer there are vessels with a spout and a handle-support, painted fragments, round-bottomed pots and large vessels (*khum*) with a truncated conical base, maintaining the traditions of the Namazga VI stage of the BMAC culture.

In Karym-Berdy, a bronze celt-adze was found (Fig. 53: 26). Analogous articles are known in eastern Kazakhstan, in the Palatzy hoard an example of this types was found together with a dagger with a mushroom-shaped top belonging to the Karasuk culture and a bracelet with conical spirals typical of the Begazy and later Andronovo complexes (Chernikov 1960: pl. x: 3, 4; Chlenova 1972: pl. 61: 8, 9). Tadzhikistan monuments belong to the wide range of cultures represented in northern Bactria: Kuchuk II (Askarov and Al'baum 1979; Sagdullaev 1985; Shirinov and Shaydullaev 1988), in southern Bactria: Tillya-tepe (Sarianidi 1989), in Margiana: Yaz I (Masson 1959) and on the whole are synchronous with the cultures with the applied-roller ceramics in Fergana: Chust (Zadneprovsky 1962), though in the latter's complex there is only hand-made pottery, wheel-made vessels being absent.

The chronology of the monuments is debatable. Western scholars assume the formation of the culture of the barbarian occupation period in the third quarter of the 2nd millennium BC (Kohl 1984: pl. 2; Hiebert and Lamberg-Karlovsky 1992). Most of the domestic researchers accept the date of the early 1st millennium BC. As grounds for this date—no earlier than late 2nd–early 1st millennium BC—serve: 1) applied-roller ceramics similar not to the Alekseevka type but to the later Dongal-Nur type, which is substantiated stratigraphically; 2) types of metal artifacts finding a wide range of analogies from the Ukraine to

Siberia where they were identified on the sites of the Karasuk culture and are known as far as China during the Zhou period. A large number of ceramic forms and types of metal artifacts were directly adopted in the Early Iron Age.

	Dzharkutan	Kuchuk	Kangurt-Tut	Teguzak	Tashguzor	Shortughai
Yaz II – Kobad I		+			+	
Yaz I - Tillya	+	+	+	+		
Applied-roller ceramics	+				+	+
Bishkent			+		+	+
BMAC	+	+	+	+	+	+
Hissar			+	+		
Harappa						+

Table 13: Stratigraphy of the settlements of Northern Bactria with Andronovo ceramics

Site	Trumpet-shaped earring	Wide bracelet	Large bronze beads	Plaque, mirror with a loop	Stone beads	Earring with hook
Muminabad	+	+	+			
Chakka	+					
Sazagan	+					
Dzham	+		+			
Dashti-Kozi	+	+		+	+	+
Kumsay		+				+
Tuyun						+
Tandyryul	+		+		+	
Nurek					+	
Bustan 6	+	+	+	+	+	+

Table 14: Co-occurring ornaments of the Andronovo and BMAC types

CHAPTER TWENTY-TWO

TRANS-CASPIA AND TURKMENIA

The north-east coast of the Caspian Sea, connecting Europe and Asia, played a significant role in the history of Trans-European migrations. Now it is a desert. In ancient times the ecology of the zone was determined by seasonal transgressions of the Caspian Sea: when the water level in the sea rose, the level of the water table rose as well making the region suitable for seasonal pasturing of herds. Although palaeo-ecologists differ as to the chronology of these transgressions, one may presume that by the late 3rd–early 2nd millennium BC there had occurred the Turali transgression. To this period belongs a large number of sites of the Poltavka culture of the Volga region which are also found on the Mangyshlak peninsula (Kuz'mina 1976a; Vasil'ev (ed.), 1995 Galkin 1978, 1998). There are no data about their advancement further south; attempts to assign to this culture the small collection of hand-made ceramics with herring-bone ornament found at the early settlement of Kelleli, Margiana (Masimov 1979: 121, fig. 6: 30-36), appears insufficiently substantiated due to this complex being small and indistinctive.

In the 2nd millennium BC the Caspian regression was underway, reaching its maximum in the last quarter of the 2nd millennium BC, when a xerothermal climate led to desiccation and cooling. This forced tribal movements further to the north and east from the Timber-grave–Andronovo contact zone of the Volga-Ural steppe. This route is demonstrated by chains of sites near springs and ancient wells (Maps 4a; 13; 18; Fig. 44). One group of sites is concentrated on the north coast of the Aral Sea near Aral'sk (Formozov 1947, 1951; Vinogradov 1959; Vinogradov *et al*. l973; Glikman *et al.* 1968). Other sites stretch in a series from the Emba along the Caspian eastern coast in the Sam desert, on Mangyshlak alongside the Ust Urt, abundant in springs, over the Krasnovodsk peninsula and the water-rich central Uzboy to reach the border of the desert near the farming oases of southern Turkmenistan (Kuz'mina l963). Here begins a third group of sites, located alongside the border of the oases and desert eastwards over the lowland valley of the Kopet-Dag (Figs. 49; 50: 1-39). Further on in the north-eastern steppes ceramics have been found all the way downstream of the Murgab as far as the delta (Fig. 50: 40-53). Odd collections are known from Kelifskiy Uzboy. At these sites there were found tanged stone arrowheads, a bronze javelin (Bala-Ishem) and a spear (Asgabat; Fig. 53: 3,4).

The ceramics discovered at the sites are coarse, hand-made and represented by jars, pots with a rounded shoulder and a broad neck, pots with a ledge on the shoulder, sometimes vessels with a narrow cylindrical neck. The vessels lack decoration or are decorated only in the upper section or only along the rim or the shoulder. There ornament is executed in plain stamp or incized. The absolutely predominant pattern is vertical, more rarely horizontal, herring-bone. The disco-

ery of fragments with triangles hatched in bands and impressions underneath the rim are singular. Though absent at a number of sites, ceramics with an applied-roller constitutes an imposing group (Figs. 49: 29; 50: 8, 12, 14, 23, 24).

The ceramic complex from the sites is not distinctive enough to assign it to the Andronovo or Timber-grave culture. It is more appropriate to use the cover term 'sites of the steppe type' (Kuz'mina 1964: 147; Mandel'shtam 1966a: 243). The regional and chronological distinctions are traced only in the ceramics of the north Caspian downstream of the Uil and Sagyz rivers, and the north Aral Sea where we often find vessels with a ledge on the shoulder and the richer Alakul' type decoration. It may be possible to distinguish a special variant of Murgab ceramics (Fig. 82). The complex of early Andronovo-Kozhumberdy type pottery was found in a grave at Yakhirbay 3 (Cattani 2004, fig. 5) and Togolok 1.

The criterion for establishing the chronology of the complexes is the presence of the applied-roller, characteristic of the pottery of the steppes of the Late Bronze Age (13th–11th centuries BC). This conclusion is supported also by the stratigraphy of the settlements of the Namazga VI period. On arrival at the foothill territory pastoralists came into contact with the neighboring farmers and their vessels appeared at the settlements. In accordance with the stratigraphy of the settlements two stages of interaction are identified: the late third quarter of the 2nd millennium BC and the 13th (12th)–11 centuries BC, the upper date being the 11th century BC, when the Yaz I culture emerged in Turkmenia.

Ceramics without the applied-roller were found only at the settlement of Anau on the southern hill in Layer C (Namazga VI), overlain by Layer D (Yaz I) (Fig. 52: 4,5,10,18,20,22; Pumpelly 1908: 142, 143, pl. xv,7-9). In the upper section of the Namazga VI layer at Tekkem-depe, pottery pieces were found with a ledge on the shoulder and incised ornament in the form of triangles between the rows of oblique notches (Fig. 71: 1-8, 14; Shchetenko 1999: 109; 1999c: fig. 2; Fig. 71: 1-8). These vessels may belong to either the Alakul' or the Alekseevka type. At the other sites of the foothill territory—El'ken-depe, Namazga High point (period 5-7), Sermancha, Tekkem (Kuftin 1954: 25; Marushchenko 1959: 60-62, fig. v; Ganyalin 1956: 3; 1959; Shchetenko 1972: 530; 1999a: 108-110; 1999b: 323-335)—vessels were found only in the overlying layer (Fig. 52).

At Tekkem underneath the burnt layer which ended the settlement of the Namazga period, garbage layers were revealed with new pisé houses abandoned again by the farmers. Later the ruins were occupied by pastoralists who erected a rectangular dwelling of the steppe type with vertical posts (Ganyalin 1959). In the house and the surrounding premises there were found animal bones as well as stone maces and pestles, including those with cones, whose analogies are well known, among other cultures at Namazga. The ceramics discovered in the overlying layer of the farmers' settlements was represented by hand-made vessels, occasionally made to a textile pattern, of pot/jar shape. Ornament was on 38% of the pots: crosses, oblique notches, herring-bones, and pearls over the rim, and now and then herring-bone and triangles, including fringed ones, over the shoulder. A number of the vessels are decorated over the shoulder with applied-rollers with notches. It is a classical complex of the Alekseevka type that determines the date of the pastoralists' occupation of the settlements of southern Turkmenia.

Of the same date are the metal articles – double-edged knives with a guard, single-bladed knives (Namazga, Tekkem), a fragment of a mold for casting a pin

and double-edged knife from Namazga VI (Fig. 71: 13), as well as a metalworker's assemblage from Tekkem: a furnace, three stone molds (Fig. 71: 12) and a blank mold lids, ore, an anvil, a stone axe, a bracelet, a fragment of a single-bladed knife and plate with a loop. The molds are designed for casting knives with a guard and plates with loops (Shchetenko 1999a: 109; 1999b: 323-5, fig. 2-4).

All these articles are typical of the wide steppe zone of the Late Bronze Age. The findings at Tekkem and Namazga prove that the pastoralists, having arrived from the north, maintained in the south along with cattle-breeding the other pivotal branch of their economy, metalworking.

On the Murgab and its delta the pastoralist's pottery (Figs. 52; 71) was found in great numbers at the settlements of Auchin, Takhirbay 1,3,13,15, Gonur I, Adzhi-Kuyu 8, Kelleli, Togolok 2,3,8,12,13.17,21,31, possibly Taip (Masson 1959; 27, 116; pl. xi; Sarianidi 1975, 1978: 549; 1977: fig. 65, 66; 1990: 54, 55, 110, plate xii: 14, 15; liv; Kuz'mina *et al.*1979). A site was explored near Gonur (excavations by Hiebert 1989).

What were the interrelations between the steppe and the farming population? V. Sarianidi presumes that the farmers peacefully co-existed with the cattle-breeders. In contrast, A. Ganyalin (1956), A. Marushchenko (1959), E. Kuz'mina (1963: 154), and A. Mandel'shtam (1966a: 242) hold that the cattle-breeders would intervene in the oases and war was one of the reasons for the end of some of the settlements. It is demonstrated by the appearance of fire on the settlement of Tekkem whose ashes were occupied by the peoples from the steppes.

More likely, the character of interaction would vary and the exchange of cattle and metal for grain and craft articles would alternate with a period of hostilities. It is this character of interaction between the pastoralist and farming tribes that was typical throughout all the subsequent history of Central Asia.

The downfall of the Namazga VI culture makes it possible to suggest that the internal crisis of the farming culture facilitated the conquest of settlements and in some cases the pastoralists would arrive at the already deserted towns.

What is the cultural origin of the new-comers? The features characteristic of the early Andronovo (Novokumak, Alakul', Fedorovo, Kozhumberdy) and early Timber-grave (Berezhnovka, Pokrovskiy) ceramics are absent in Turkmenia. Few fragments are comparable with the late Alakul' and Timber-grave but the absolute majority of the pottery no doubt goes back to the Late Bronze Age and is related to the late Timber-grave pottery of the Ivanovo type (Agapov *et al.* 1983) and to the late Andronovo vessels of the Alekseevka type, which combines ceramics with an applied-roller on the shoulder with vessels ornamented poorly, and predominantly with herring-bone, or completely lacking decoration. In the collections that I am familiar with, the Nur and Dongal types of ceramics of the 11th–9th centuries BC, the applied-roller technique under the rim is not typical. It is no wonder since in this period in Turkmenia there already existed the Yaz I culture.

It should be stressed that in the period of the applied-roller ceramics the steppe culture from the Danube to the Altai Mountains was uniform due to the increased mobility of the tribes and the establishment of active latitudinal ties. (The dissenting point of view (Kutimov 1993: 314-322) seems unfounded to me and is invalidated by the conclusions of V. Otroshchenko (2002)).

Instrumental in establishing whence came the massive stream of the pastoralist population into southern Turkmenia is the analysis of the cemeteries.

At Ust'-Yurt in Sarakamanzhastik two kurgans were discovered. The mounds are formed of earth and stones; the burial was placed in a stone cist in the flexed position on the left side, head to the east, with an unornamented vessel. At Mangyshlak in Ayrakty one flat grave was explored, the dead lying flexed, head to the south, with fragments of a vessel ornamented in plain stamp (Galkin 1998: 20, 21). In the Bol'shiye Balkhany desert archaeologists have explored the cemeteries of Patma-say and Karalemata-say, in the foothills of the Kopet-Dag west of Kyzyl-Arvat the cemeteries of Parau I and II (Fig. 47: 1, 2, 9, 12, 13; Mandel'shtam 1966a: 240-242; fig. 52; 1966b: 105-108; fig. 39, 40). These cemeteries consist of several mounds with a stone bank, 6-10m in diameter and 0.7-1m in height, in one case with a stone circle. The grave pit is formed of earth or has a stone cist overlaid with stone slabs on which are placed coals and, in one case, a bull's skull. The dead lie in the flexed position on the left side, head to the east or north-east; in Gyzylgy-kum the skeleton is burnt. Each grave contains one jar-shaped vessel, one of them (Patma-say; Fig. 47: 9) is decorated with impressions underneath the rim, another (Parau)—with zigzags; the rest are unornamented. The stone structures and the role of fire in the rite point to Andronovo influence. However, the eastern orientation gives grounds to relate the cemeteries to the late Timber-grave culture. The anthropological type of the newcomers is proto-Europoid, characteristic of the pastoralists of the Eurasian steppes. The same is true for the skull from Takhir-bay 3 (Ginzburg and Trofimova 1972: 69, 70).

Thus the settling of Trans-Caspia and western Turkmenia in the 12th–11th centuries BC was realized mainly by the Timber-grave population who, as the migration progressed, incorporated part of the western Andronovans (corporative migration). The migration went from the west through the Timber-grave–Andronovo contact zone on the left bank of the Volga and southern Ural. One migration route went along the Emba; another—from the midstream of the Ural to the west of the Aral Sea, then further alongside the Uzboy and to the south. On the Murgab the immigration may have followed the central Amu-Darya. The cartography of the sites and the superposition of the maps of the later seasonal migrations demonstrate their coincidence. Hence, pastoralists as early as the 12th–11th centuries BC developed the traditional routes of nomadic migrations that functioned up to the 19th century (Vinogradov *et al.* 1973: 102, 103; Gorbunova 1993-94: map on p. 2).

The topography of the sites in the deserts of Trans-Caspia near the wells permits us to conclude that already in the early fourth quarter of the 2nd millennium BC there formed not only seasonal transhumance but also the fully nomadic type of cattle-breeding. Its prerequisites would slowly take shape in the culture of the Andronovo and Timber-grave tribes, who developed the skills of specialized cattle-breeding, invented yurts and wells. The farmers of Central Asia were not familiar with these innovations. Their ceramics are never found in the desert and there is absolutely no evidence of their migration to the north and participation in the ethnogeny of the Iranian-speaking Saka people and Scythians, whereas the path marked by the steppe sites reflects the actual route along which the migration of the cattle-breeding tribes to the south was realized, from the Volga and Urals, where one should seek its genesis, since the cultural elements represented in Turkmenia had there a centuries-old history of preceding development.

PART THREE
THE GENESIS OF THE DIFFERENT BRANCHES OF INDO-IRANIANS

CHAPTER TWENTY-THREE

MODERN STATE OF THE PROBLEM OF INDO-IRANIAN ORIGINS

The Introduction provides the opposing views of Indo-Iranian origins that have been voiced in linguistics and archaeology over the course of more than two centuries. During the last decade since the completion of the earlier Russian edition of this book, discussion has continued unabated.[4]

A triumph of Russian Indo-Iranian studies was the international symposium of 1977 in Dushanbe on "Ethnic problems of the history of Central Asia in the early period". Among its participants were leading linguists, historians and archaeologists: I. D'yakonov, V. Abaev, V. Livshits, I. Steblin-Kamensky, G. Bongard-Levin, B. Litvinsky, E. Grantovsky, I. Aliev, M. Pogrebova, K. Smirnov, E. Kuz'mina, V. Sarianidi, V. Gening, A. Askarov, I. Masimov, the anthropologist V. Alekseev and others. The general thrust of these studies was the localization of the Indo-Iranian homeland in the steppes and their subsequent migration to Central Asia (Asimov 1981: 44-52).

Also in attendance were Indian scholars, S. S. Misra, B. B. Lal, B. K. Thapar, R. C. Gaur, L. Gopal, and A. H. Dani (Pakistan), and European researchers, B. and R. Allchin, R. Ghirshman, K. Jettmar and V. Brentjes. The idea of an Indo-Iranian migration from the north predominated and the Aryans' culture after their arrival in India was correlated with the Painted Gray Ware culture.

The establishment of this hypothesis for an Indo-Iranian migration was a break-through in Russian science which had for years labored with the concept of autochthonous development. The symposium of 1977 brought euphoria. The Indo-Iranian attribution of the Timber-grave and Andronovo cultures received universal recognition.

However, 1980 saw the beginning of a heated discussion about the new concept formulated already in 1972 by the prominent linguists T. Gamkrelidze and V. V. Ivanov (1980; 1984). Assuming connections between the IE languages and those of the Caucasus and ancient Near East, they moved the original homeland to 4th millennium BC Eastern Anatolia, whence the Indo-Aryans (IA) went to Mitanni and India, and the Iranian Scythians, not until in the 8th century BC passed through Central Asia northwards into the steppes following the other Indo-Europeans. This hypothesis was dismissed by Soviet archaeologists. Many Near-Eastern borrowings were called into question by I. D'yakonov (1980).

Proceeding from completely different considerations, C. Renfrew in 1987 localized the Proto-Indo-Europeans in Anatolia, a center of inception of the

[4] The chapter was finished in 2004, and I could not here make full use of a number of important recent publications: Bongard-Levin 2003; *Scripta gregoriana (Sbornik v chest' G. M. Bongard-Levina),* Moscow, 2003; *Tsentral'naya Aziya. Istochniki, istoriya, kul'tura.* Moscow, 2003; *U istokov tsivilizatsii*, Moscow, 2004; Transoxiana 2004; Fussman *et al*. 2005; Kogan 2005.

Neolithic economy from where they passed in the 7th–6th millennium BC through the Balkans to settle in Europe bringing along farming and cattle-breeding skills. In doing so, according to his Model A, they immediately went eastwards to India, while according to Model B the original homeland of all the Indo-Iranians was localized in the steppes whence they later moved into Iran and India.

C. Renfrew's critics pointed out that the distribution of cultural innovations is often conditioned not by migration of a new population but by cultural borrowings.

A. and S. Sherratt (1988) expressed an alternative opinion holding that IE settlement and the Anatolian-Pontic interaction took place not in the 6th millennium BC but only after the secondary products revolution of the 4th millennium BC. In 1990 I. M. D'yakonov (D'yakonov 1990: 53-65) also placed the original homeland of the pre-Proto-Indo-Europeans in the 6th millennium BC in the Near East believing that S. Starostin had established ancient ties with the Caucasian languages and those of the Near East. He assumed a migration of the Proto-Indo-Europeans through the Balkans and Danube and linked it with the distribution of Linearbandkeramik culture. The Indo-Europeans continued to develop in Europe, and as for the Indo-Iranians, I. M. D'yakonov (1995: 123-130) acknowledged them to be the creators of the Andronovo culture linking their migration with the spread of this culture over the south of Central Asia.

In 1989 J. P. Mallory published *In Search of Indo-Europeans*, in which he most strictly and with much reasoning advocated the concept, expressed as early as the 19th century, of the localization of the IE original homeland in Europe, underlining the role of the Pontic steppes, the place of domestication of the horse.

In 1990 in Delhi, a conference was held at which a group of nationalistically-charged intelligentsia declared that the hypothesis of the Aryans' migration was created by imperialists, whereas India was the original homeland of the Indo-Aryans and that these were the founders of the high civilization of Harappa. This hypothesis is widely discussed and very popular in today's India.

What is the state of the problem of Indo-Iranian origins today? Laying absolutely no claim to the comprehensiveness of analysis of this question I will focus only on a few points that are significant from my perspective.

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Over recent years the proceedings of several international conferences have been published as well as some fundamentally important monographs: T. Ya. Elizarenkova (1995), T. Ya. Elizarenkova and V. N. Toporov (1995), E. A. Grantovsky (1998, the book was prepared by S. V. Kullanda), O. N. Trubachev (1999).

There are still three principal hypotheses under discussion. Whereas the 1996 Philadelphia conference (Mair 1998) was marked by the debate between J. P. Mallory (1998) and C. Renfrew, at the conference of 1999 at Arkaim C. Renfrew made a remark that their positions were getting closer.

Hypothesis I: T. Gamkrelidze (1990: 5-14) apparently adheres to his previous standpoint. But V. V. Ivanov in his report at the presidium of the Academy of Science in Moscow on 11 Sept. 2001 suggested that the Indo-Europeans did not penetrate through the Trans-Caspian deserts, but around the Pontic and he suggested that Marija Gimbutas's hypotheses were no longer relevant, the range of the early Indo-Europeans being greater than the territory of the Pit-grave culture and that it coincided with the range of the horse in which he includes the Near East. Moreover, he emphasizes the importance of the horse and chariot in Arkaim, but assumes a migration of the founders of this culture from the south, from Mitanni where horse-training was for the first time developed by the Mitanni Aryans (Ivanov 1997: 22, 23).

In his article of 2002 he made the next important step. He speaks of Irano-Finno-Ugrian connections in the names of metals, admits the Yenisean or Tocharian, but predominantly (Indo-)Iranian or Eastern Iranian Proto-Scythian attribution of Sintashta, yet he cites very interesting not only Iranian but Indo-Aryan etymologies, e.g., Dary-al, Ur-al, Ar-al.

Hypothesis II: The hypothesis of C. Renfrew (1990; 1999; 2002a, b) has also undergone a transformation. He has accepted some objections of his critics, linked the most ancient events of IE history with the Balkano-Danubian and North-Pontic region, underlined that M. Gimbutas' hypothesis supported by D. Anthony (1986; 1995) for the role of the warrior-horsemen as the distributors of the IE speech in Europe has been questioned, and he flatly rejects the IE migration suggested by V. V. Ivanov and T. Gamkrelidze from the south-east through the Trans-Caspian deserts. Most importantly, C. Renfrew observed that he "no longer argues the case for hypothesis A" (Renfrew 2002b): "elements of consensus seem to be emerging. There is wide agreement with Kuz'mina's view (1994) of the significance of Andronovo culture", which "very probably represents the distribution of Indo-Iranian speech in the early second millennium BC" (2002: fig. 5). This marked the crossing of the second or Ural fault line (Mallory 1998b: 188) "and the steppes zone became a bridge across the Eurasian continent" (2002: 15). But further C. Renfrew emphasized that in the way of the final solution to the Indo-Iranian problem was "the third of Mallory's 'fault lines', the Central Asian line", as long as "archaeologically there is all too little trace of the 'coming' of the Indo-Iranians to the Iranian Plateau and to India" (Renfrew 2002: 15, 16).

Hypothesis III: J. P. Mallory (1996; 1997; 1998a, b; 2001; 2002; Mallory and Mair 2000), in a range of works focusing on the origin of the IE peoples, paid much attention to the Indo-Iranian ethnogenesis. He looked into the general theoretic problems and methods and from this standpoint gave a critical analysis of the proposed models. He underlined that the previously suggested dates of the break-up of the IE community were groundless since the terms related to the wheeled transport and the horse were common Indo-European (Mallory 1996: 8-11), but noticed at the same time that "the specific model proposed by Marija Gimbutas could also stand some readjustment" (Mallory 2002: 3, fig. 7).

J. P. Mallory (2002: fig. 5) drew a chronological scale of the development of the IE languages and presumed "that the Yamna culture reflects a Graeco-Armenian-Indo-Iranian continuum" (1998: 187), he acknowledged that "in general sense Andronovo culture (in the widest sense of the term) makes a reasonable fit with the culture and the geographical positioning of the Indo-Iranians prior to their descent into their historical seats in Iran and the Indian subcontinent" (also 2002: fig. 7; Mallory and Mair 2000: 263; 313).

He drew three geographical 'fault-lines' of IE expansions: the second line goes along the Urals and was crossed by the Indo-Iranians only after the formation of Sintashta in 2000 BC, and the third line is the BMAC boundary, to the south of which evidence for the Andronovans disappears (Mallory 1998, 182, 191 fig. 2;5). "We find it extraordinary difficult to make a case for expansions from this northern region to northern India…, where we would presume Indo-Aryans had settled by the mid-second millennium BC" (Mallory 1998: 192,193). The scholar proposed a way-out: the Andronovo shepherds came into contact with the BMAC farmers, forced on them their language but adopted their higher material culture which they brought to India together with horses and chariots. He wittily described this process in the form of a Kulturkugel (1998: 192-194; fig. 6a,b; 2001: 360, 361, fig. 3a; 2002: 13, 14 fig. 8), "where the material culture of the Indo-Iranian Andronovo culture is shed on impact with BMAC although the language trajectory continues".

"In discussing the spread of the Indo-Iranian languages over greater Iran and India…we are currently working with a model of elite dominance that is not easily accommodated by traditional archaeological argument. We have the steppe lands occupied by the presumably Indo-Iranian (or Iranian) Andronovo horizon of cultures *c*. 2000-900 BC." To the south stretches the BMAC territory, whose population, according to the archaeological data, kept contacts with the pastoralists but was not related to them genetically (Sarianidi 1998). "Steppe tribes (Andronovo) rose to position of social dominance in the BMAC culture and carried their own language (Indo-Iranian) but accompanied by the new material culture (BMAC) south into Iran and the north-west approaches to India" (2002: 13,14). And in conclusion he writes: "I am not denying the possibility of military conquest, but I do not see it as so effective a means of linguistic acculturation as the attraction of a new social order, military or otherwise…we should expect a variety of dispersal mechanisms operating at different times and places" (2002: 23).

As for other hypotheses, A. Sherratt (1997; 1999: fig. 1) demonstrated that in the 4th–3rd millennia BC, a long distance exchange was established, whose center was the regions of the Near East and which "included in its orbit the 'barbarian' periphery stimulating there the domestication of the camel and horse and the invention of the chariot." At the same time the center of IE origins was "the lands around the Black Sea" (1999: 269), while the Indo-Iranians "probably move over quite long distances bringing their languages and beliefs (though not their pots!)" (1999: 278). Though there were migrations such as the Andronovo expansion, "most of the connections between cultures involved a network of regular contact for the exchange of goods, ideas and occasionally personnel." (1999: 279).

An unsuccessful attempt to bring back to life the localization of the IE original homeland in Central Asia, abandoned already in the 19th century was made by the linguist J. Nichols (1997). She proceeded from the fact that from the 1st millennium BC the Turkic and Mongolian migrations went from the depths of Central Asia to the west. But such an analogy is methodologically unacceptable. As already mentioned, due to the adverse ecological conditions in the north of Central Asia, dominant there for a very long period of time, there was only a hunter-gathering economy and there are no traces of a westward migration through the Urals (this fact also invalidates the earlier hypothesis proposed by V. V. Ivanov and T. Gamkrelidze for the Central Asian migration of the Indo-Europeans from Anatolia).

A special position in the discussion was held by V. I. Sarianidi (1987; 1989a, b; 1990), the discoverer of the BMAC—the last unknown civilization in the Old World. Sarianidi explored towns with palaces and temples in which he found clear traces of making fire and performing libations which he linked to the cults of fire and of the sacred drink haoma in Iranian religion. This led him to the conviction that the creators of the BMAC were Iranians. Originally he believed that they had come from eastern Iran. Later, however, Sarianidi (1998a, b; 1999; 2001a, b) accepted a Syrio-Hittite origin for the BMAC glyptics and established Near Eastern and Greek connections for other categories of material culture; he became a proponent of the hypothesis of T. Gamkrelidze and V. V. Ivanov. He presumes a migration from the Near East for the creators of the culture of Bactria and Margiana and persists in his categorical rejection of the Indo-Iranian attribution of the Andronovo culture.

The claim that the BMAC population was Iranian-speaking and particularly that there were Zoroastrian cults was challenged by a range of scholars. This criticism was the subject of a special edition of the *Bulletin of Ancient History* (1989, #1). H.-P. Francfort (1994; 2001), I. S. Klochkov (1997), and E. V. Antonova (2000) believe that stylistically and semantically BMAC glyptics derive from the Elamite world, as was shown by Amiet (1998): "Iconic symbolic system of the Oxus civilization is not consistent with the IE or II hypothesis" (Francfort 2001: 134-155) while Zoroastrianism is not known until the Yaz I period. S. Salvatori (1995: 38-55) demonstrated wide ties of BMAC allowing one to adjust its chronology and noted that they do not reflect ethnic movements but bear witness to intensive contacts in the Near East which was labelled by P. Kohl (1989) as an 'economic world system'.

V. I. Sarianidi's hypothesis was criticized by G. Fussman (2001: 88-94) from a different angle. He refers to the book "Les texts vieil-avestiques" by J. Kellens and E. Pirart (three volumes), where they showed, following other scholars, that the language of the *Rigveda* is very close to the Old Avestan texts, so that the latter must be considered a dialect of a common Indo-Iranian language. This hypothesis is currently under discussion by linguists.

G. Fussman (2001: 93) suggests assigning the time of Zarathustra possibly to 1200-1000 BC, the break-up of the Indo-Iranian community to 1800-1500 BC; the Yašts and Vidēvdāt —to 600-500 BC. However, the Norwegian scholar O. Skjærvø (1995: 155-186), also emphasizing the closeness of the *Avesta* and

Rigveda, dates the earlier part of *Avesta* to the 14th–11th centuries BC, and the Yašts to the 10th century BC.

Running counter to V. I. Sarianidi's hypothesis is not so much the debatable chronology of the *Avesta*, but the total absence of references to temples there; sacrifices to gods are performed in the open air and the god of fire, Agni, carries the sacrifices to the heaven, therefore "the Amu-Darya culture has little in common with the Aryans."

Giving V. I. Sarianidi due credit for the discovery and exploration of the BMAC, I hold, however, that he has failed to take into account the fundamental condition of ethnogenetic reconstructions: to consider the Indo-Iranian problem comprehensively—in his work the issues of the origin of the Dards and the Scythians, of the Indo-Iranian-Finno-Ugrian contacts are not even raised. The economic and cultural type reconstructed according to the data of the *Avesta* and *Rigveda*—pastoralism, mobility, absence of towns and crafts—are not consistent with the by far higher level of the BMAC culture. This makes the Iranian attribution of BMAC very improbable (see also the next chapter).

Actively engaged in research on the BMAC problem was C. Lamberg-Karlovsky (1987; 1994a, b; 1996; Hiebert and Lamberg-Karlovsky 1992) who showed that it pertained to the circle of the cultures of the Near East which had an extensive network of communications. The BMAC ties were orientated to the south, particularly, to Baluchistan.

F. Hiebert (1994; 1998: 143, fig. 2) noted connections between the BMAC and the Andronovo culture, "but no steppe nomadic complex has been found on the Iranian plateau… Thus, the notion of the nomads from the north as the original Iranians is unsupported by the detailed archaeological sequence available."

C. Lamberg-Karlovsky has dedicated a special article to Indo-Iranian origins (2002). He confronted the works of E. Kuz'mina and V. Sarianidi who "working on the contemporary but very different Andronovo and Bactrian Margiana archaelogical complex of the 2nd millennium BC, have identified both as Indo-Iranian, and particular sites so identified are being used for nationalist purposes. There is, however, no compelling archaeological evidence that they had a common ancestor or that either is Indo-Iranian… and the identity of the Indo-Iranians remains elusive" and further (p. 74): "Not a single artifact of Andronovo type has been identified in Iran or in Northern India, but there is ample evidence for the presence of Bactrian Margiana materials on the Iranian plateau and Baluchistan."

Leaving minor inaccuracies out of consideration, I will highlight several serious mistakes made by C. Lamberg-Karlovsky, which distort the historical development in the steppes. *Fig. 2*: the Abashevo culture does not pertain to the Andronovo culture. In contrast to the Pit-grave, Poltavka and Catacomb it is located not in the steppes, but in the forest and forest-steppe zone from the Don and Central Volga to the Urals and genetically belongs to the circle of the Central European cultures of the Fatyanovo type corded ware ceramics (O. Kuz'mina 1992). *Fig. 3*: the Abashevo culture chronologically precedes Andronovo and is one of the components in the formation of Sintashta (Zdanovich 1988; Smirnov and Kuz'mina 1977; Kuz'mina 2002; Kuz'mina O. 2000; Tkachev V. 1995; 2000). This rules out the simplified concept of the

single line of development of Andronovo on the basis of the steppe cultures and compels one to presume bilingualism of the Sintashta founders (Kuz'mina 2003).

The Afanas'evo culture does not make it into the 4th millennium BC and is chronologically linked to Andronovo in which its vestiges are traced (Vadetskaya 1986).

There are no Andronovo sites in Tuva.

The Timber-grave culture dates not from the 3rd, but from the 2nd millennium BC and is formed from the same cultural blocks as Andronovo (Otroshchenko 2001).

The BMAC in northern Bactria survived till the Late Bronze Age and provided the basis of the culture and ceramic complex of the Achaemenid period (Kuz'mina 1976; Sarianidi 1977; Cattena and Gardin 1977). The upper date of Namazga VI must also be raised.

Lamberg-Karlovsky suggests (67, 73) that the Andronovans might have spoken Ugrian, Dravidian or Altaic languages. Linguists have argued, however, that the farmers of Turkmenistan may have spoken Elamite or a cognate Dravidian language (McAlpin 1981; Witzel 1999b), speakers of the Altaic languages reached the west from the depths of Asia only in historical times (Poppe 1965; Baskakov 1969); the homeland of the Ugrian peoples was in the forest zone around the Urals (Napol'skikh 1997; ECUIE 2001).

The Indo-Iranian family includes not two (fig. 1), but three groups: the Indo-Aryans, the Proto-Iranians, and the Dards and Nuristani, who were the first to leave for the north of Hindustan and preserved an archaic culture and mythology (Fussman 1972). Proto-Iranian split into Western (Median, ancient Persian, and others) and Eastern (Scythian, Ossetic, Saka, Pamir and others), and the direct genetic relation between the Scythian and Saka culture of the 7th–6th century BC and the Bronze Age culture of the Eurasian steppes identified by the retrospective method proves the Indo-Iranian character of the latter.

C. Lamberg-Karlovsky (p. 67) also looks into the issues of Indo-Iranian social structure, where we come across the usual charges against all the Marxist science unveiled on both V. I. Sarianidi and E. E. Kuz'mina. However, neither V. I. Sarianidi nor I have ever written about military democracy or chiefdoms. The assumption that the rich burials with horses, weaponry and chariots belonged to the warrior-charioteers, whose special status forms a specific feature of the Indo-Iranian community, was made by K. F. Smirnov and myself (Smirnov and Kuz'mina 1977) after a thorough analysis of the elite burial mounds.

The question which I believe requires an answer is that the views of myself and of V. I. Sarianidi were politically motivated. I categorically reject this insinuation. V. I. Sarianidi came to the idea of Zoroastrians and, consequently, the Bactrian population being Iranian-speaking after his excavations in Afghanistan. As for me, I was a student of M. M. D'yakonov who was the first in Russia to come up with the hypothesis for the Indo-Iranian attribution of the Andronovo culture. The development of this hypothesis became the task of my working life. In researching this subject in the 60-70's I received great help from V. V. Ivanov, who then localized the Indo-Iranian homeland in the steppes and to whom I maintain my gratitude for his advice and whom I consider my guru even though, to my knowledge, his new concept regarding the Indo-Iranians is

not corroborated by any archaeological evidence. My research methods were published in 1986. There are thus no grounds for accusing me of political motifs.

Absolutely inadmissible is the tone adopted in his comments by Y. Hamilakis (in the same number of *Current Anthropology,* p. 76, 77). His text reminded me of the allegations against scholars launched in the USSR, which then usually led to them being placed in a concentration camp or at best losing their job (I am writing this out of my own sad experience).

Summing up the discussion I am pleased to state that D. Anthony, J. P. Mallory and C. Renfrew supported the localization of the Indo-Iranian homeland in the north. The same position is held by A. Sherratt and the overwhelming majority of Russian scholars. Problems remain with the correlation of the ethnos and archaeological culture. To me it is obvious that culture is an interaction of people in the process of labor and creative work, performance of rituals, in the course of military actions, social contacts and, most importantly, education and socialization of children. The only communication instrument in the society is the common language passed down to the next generation. Language and culture are therefore interrelated. The Indo-Iranians maintained their ancient historical tradition not only in the language itself but also in the texts, albeit framed in an epic or religious form. Scholars have no doubts as to the historical character of the information obtained (Sankalia 1973; Rau 1983; Elizarenkova 1995; Skjærvø 1995). It provides a unique opportunity to reconstruct the material culture of the Indo-Iranians based on the texts; this is quite fully reflected in the archaeological record, as well as in part some social facts, burial ritual, etc. Therefore, I strongly disagree with C. Lamberg-Karlovsky's (p. 74) opinion that the ethnic indicators are applicable to any other ethnos. In actual fact a high degree of similarity is traced only to the other Indo-Europeans, particularly Greeks, but specific features of the Indo-Iranian culture have also been identified (Kuz'mina 1986).

C. Lamberg-Karlovsky regards the inheritance of genes a more reliable criterion (I will come back to it later).

The point which I accept without reservations is J. P. Mallory's 'third fault line': absence of distinct traces of the Andronovans' migration outside the boundaries of Bactria and Margiana. This issue comes up in all the works on the Indo-Iranians and I will try to give to it the best answer I can in the next chapter.

Asko Parpola (2002a, b) in his latest works has developed his idea that the BMAC was already aryanized by the Andronovans, and its population formed a distinct group, the Dāsa (Parpola 1988: 216 f.; 1994; 1995). The controversial question about the Dāsa will not be discussed here. One of the Saka tribes was called Dāsa in the 1st millennium BC. In the *Rigveda* the Dāsa are depicted as enemies of the Aryans having marked Veddoid anthropological features. In A. Parpola's (as well as J. Mallory's) opinion, the Pit-grave culture was Proto-Graeco-Armeno-Indo-Iranian. He also assumes that the separation of the Indo-Iranians took place already in the third millennium BC, so that the creators of the Poltavka culture became Pre-Proto-Iranians and the creators of the Abashevo culture became Pre-Proto-Indo-Aryans. This is an erroneous statement, however. First, the language and mythology of the *Rigveda* and *Avesta* are very close to each other. This is evidence of long and close contacts between both Aryan branches. Secondly, as it has been said, the Abashevo culture belonged to the fo-

rest, not to the steppe cultural region. It was genetically related to the Fatyanovo culture and belonged to the Corded ware horizon of Northern Europe (Kuz'mina O. 2000). The founders of these cultures are regarded by many scholars (and A. Parpola is among them) as the common source for the Italo-Celtic, Germanic, and Balto-Slavic branches of Indo-European. Finally, as it has been repeatedly emphasized, the whole complex of features that distinguish Indo-Iranian culture from other Indo-European cultures cannot be archaeologically traced earlier than the monuments of the Sintashta and Potapovka types; the Indo-Iranian culture, therefore, could not be veritably correlated with an archaeological reality earlier than 2100 – 1800 cal. BC. If one wishes to engage in speculative constructions, only the creators of the Poltavka, on the one hand, and Catacomb, on the other, should be considered as the probable Pre-Proto-Indo-Iranian. The former culture developed from the Pit-grave culture under the influence of the Catacomb culture (Kuznetsov 2003). The genesis of the latter culture is still a subject of debate; it is obvious, however, that it was closely related to the Pit-grave culture (Kiyashko 2002). A. Parpola has connected the subsequent history of the Indo-Iranians with the steppe cultures of the 2nd millennium BC. The tribes of the Timber-grave culture he regards as Iranians, and the Andronovans as Indo-Aryans.

A. Parpola (2002a: 84; 85) assumes that around 2100 – 1900 BC the steppe tribes came from the north and established an elite dominance in Bactria and "the BMAC's expansion through smaller groups… to Shahdad in Kerman, to Seistan, and to Pakistani Baluchistan is attested by the impact of the entire cultural complex including burials into these areas… There is evidence of lively interaction with the late mature phase of the Indus civilization". Emphasizing that neither Andronovo pottery nor barrows typical of the steppe culture are found south of the line defined by the Kopet Dagh, Hindukush and Pamir Mountains, A. Parpola supposes that the IA language was brought to the south by the aryanized BMAC people, and the new Aryan rulers which had brought horses and chariots did not force the main population out, but adopted its culture, precisely as it happened in the Mitanni kingdom.

Some important considerations on the earliest history of the Iranians were offered by Ch. Burney (1999). He follows many other Indo-Europeanists in rejecting the Anatolian localization of the Indo-European homeland. He places it in Europe from where the Indo-Iranians spread to Kazakhstan and farther to Siberia and Central Asia. "There is now wide agreement that the archaeological record most relevant to this process of expansion from an earlier, most restricted homeland is discernible in the Andronovo culture" (Burney 1999: 7). This culture is an amalgam of different subcultures that were products of adaptation to different environments.

He repudiates (1999: 8) the excessively early dates for the disintegration of Indo-Iranian unity that were suggested by J. Harmatta (1992), R. Frye (1996: 60-61) and T. Gamkrelidze and V. Ivanov (1995: 827-828). "We are on firmer ground with the analysis of ethnic movements in the Andronovo zone in the 2nd millennium BC (Kuz'mina 1994: maps VII-IX)".

"Economic pressure, especially shortage of grazing, was the spur leading to mass movements S-E into India and S-W to Iran… migrations for whose success

the energy and skills of the warrior were prerequisite" (p. 10), with the especially important role of the horse.

I. D'yakonov has also supported the Indo-Iranian attribution of the Andronovo culture (1995a, b).

Summarizing, it should be noted that in spite of the serious disagreement, the Andronovan hypothesis gains an increasingly wide acceptance. However, not only its opponents, but also its adherents stress the "absence of distinct traces of the Andronovans' migration outside the boundaries of Bactria and Margiana" and regard it as "a kind of movement very unlikely to have had artifactual correlates" (Burney 1999: 8), since the pastoralists from the north brought the Indo-Aryan language but not the pots. What are then the perspectives of Vedic archaeology?[5]

[5] The new hypothesis of A. Askarov (2001; 2005) that the Andronovans were Turks is politically oriented and has no scientific foundation (about the Turks see Baskakov 1969).

CHAPTER TWENTY-FOUR

THE GENESIS OF THE DARDS AND NURISTANI

In the extreme north-west of the subcontinent of India between the Hindukush Mountains in the west and the Karakorum Range in the east lie the territory of Swat and the regions of Gilgit, Chitral, Dir. Gomal, and Gandhara situated a little to the south. Archaeological sites have been discovered along the river Indus and its tributaries, the Gomal and Kabul, along the river Swat which flows into the Kabul, and the numerous tributaries of the Swat. Mountain passes such as the Khyber, Gomal, Kuram, Tochi, and Burigal are open all the year round and link this region to the neighboring territories of Central Asia, Afghanistan and India (Müller-Karpe 1983: abb. 1: map). The first archaeological discoveries in this region were made by Aurel Stein. Since 1958 systematic excavations have been undertaken by the Italian Archaeological Mission led by G. Tucci (1959; 1977); since 1967 a Pakistani expedition of Peshawar University has also worked there (Timargarha (Dani *et al.* 1967)). Thirty-five cemeteries and seven settlements have been discovered so far. The most important cemeteries are Loebanr I, Katelai I, Butkara II (Silvi Antonini 1963; Silvi Antonini and Stacul 1972; Castaldi 1968), Kherai (Stacul 1966), Timargarha (Dani *et al*. 1967), Zarif-Karuna (Khan 1979), the rock shelter of Ghaligai (Stacul 1969; 1987), and the multi-layer settlements of Aligrama (Stacul and Tusa 1977), Bir-Kot-Ghundai (Stacul 1980), Balambat (Dani 1967), Gumla, and Hathala (Dani 1970-1971).

As the sites were situated on migration routes, the excavations have received a lot of scholarly attention, but the interpretation of materials has also generated considerable discussion (Litvinsky 1964; 1967; 1972; Kuz'mina 1972; 1974; 1975; Müller-Karpe 1983; Vinogradova 1990; 1991; 1995; 2001; complete bibliography: IsMEO 1982). A. H. Dani regarded the monuments of Swat and Gandhara as an integral Gandhara Grave culture. G. Stacul (1975: 328-330) assumed that the cemeteries of Swat formed a separate culture. Having compared the materials one becomes convinced that the monuments of both regions do belong to a single culture, but this culture had local variants.

The periodization is based on the study of the multi-layer settlements. In Ghaligai the cultural development from the 3rd millennium BC to the Islamic period could be traced (Stacul 1969: 62-64, 84). Period I was the time of the Neolithic culture of Ghaligai (strata 23-21). Its C^{14} dates are 2970 and 2920 BC (Stacul 1967; 1969; 1987: 167). During period II (strata 19-18, dated 2180 BC) Ghaligai developed under the influence of the Harappan culture and Mundigak IV. N. M. Vinogradova (1990: 43) has also suggested connections with Baluchistan. Period III was distinguished by the influence of Kashmir where a primitive culture (Burzahom I), characterized by hand-made ceramics, had emerged as a result of contacts with China. The ceramics were marked by imprints of matting

(Stacul 1987: 167). The culture of period III of the Ghaligai type is found on only a few other settlements, e.g., in Gumla. During Period IV relations with Kashmir continued to develop. In Kashmir the Burzahom II culture had emerged by that time; it was akin to the Chinese Longshan culture which, as many sinologists insist, formed under the influence of Hissar IIIB. That Swat had connections with the eastern cultures is now supported by the finds of articles of nephrite, among them ornaments *magatma* in the form of a perforated tusk, little talisman axes, and rectangular perforated stone knives (Stacul 1978: fig. 35: 1979). Grey-black polished pottery of various forms are certainly reminiscent of Hissar IIIB ceramics. It has been found in Swat in the settlements of Bir-Kot-Ghundai (44%), Loebanr III (43%) and other sites. The second group consists of handmade ceramics with an admixture of sand. The third group includes wheel-turned vessels of red clay with black painting. These comprise 19% of the vessels at Bir-Kot-Ghundai and 15% at Loebanr III (Stacul 1987: 103f.). The technology, forms, and ornamental themes (a pipala leaf, four-petal rosette) of these ceramics preserve the traditions of Harappan pottery. Some themes of painting correspond to those of the Cemetery H ceramics: stars, bird heads, labris (Vinogradova 1990: 45). Thus the Ghaligai material indicates complex and diverse cultural contacts. In some cases the involvement of new ethnic groups can be supposed.

According to G. Stacul, the cemetery of Kherai (Fig. 92) belonged to the end of Period IV. So far no analogies to the site have been found. The periods V-VII (strata 15-9) correspond to the period of the cemeteries at Swat and Gandhara. This was a new stage in the development of the region, and it was quite different from the previous period.

Stratigraphically, Ghaligai is very close in the patterns of development of the settlement of Gumla (Gomal valley), however, not completely. Stratum 1 represents the Neolithic period; stratum 2 preserves impulses from Sialk III-Hissar IB-IIA, Mundigak II-III, and Namazga III, which is supported by the similarity of many ceramic ornamental themes (a characteristic cross and a stepped pyramid) (Kuz'mina 1974d). The culture of Gumla of period III was established by people of the Harappan civilization, which had come from the Indus valley. The synthesis of the indigenous and the foreign (i.e., Harappan) culture became obvious during period IV (Dani 1970-1971: 150-169). At that time the settlement flourished. In the city encircled with walls there were signs of craft working. Ceramics were produced on a potter's wheel and ornamented using typical Harappan themes. The introduction of wheeled transport evidenced by the finds of cart, wheel, and models of harnessed oxen, indicated an intensification of cultural contacts including those with Central Asia (Kuz'mina 1974d). The settlement of Gumla was captured, burned and completely destroyed. The Aryan invasion has been considered as one of possible explanations of its fate. As A. H. Dani has suggested, it was the participants of the assault who erected a barrow cemetery on the ruins of the city. This cemetery is regarded as period V of Gumla (Dani 1970-71: 49-53, 169). Barrow 1 has a diameter of 6m and a height of 0.5m and its surface was covered with clay. Inside was a pit-grave, which was 1m deep. The embankment and the filling of the pit consisted of the archaeological layer of period IV through which the pit itself was dug. The dead were cremated and buried in pits under the barrows; ash, charcoal and burnt bones were lain onto the bottom of a grave or put into a vessel. Sometimes hand-made pots without

ornaments were put into the grave (Dani 1970-1971: 50, fig. 4, 5, 7; pl. 14-16). That animal bones were placed into the grave together with the remains of the dead is a distinctive trait of this cemetery. A skull and leg bones of bulls, a leg and other bones of horses have been found. Sometimes bull, horse, camel, and bird figurines, as well as wheel models, were put into the grave instead (Dani 1970-71: fig. 166; pl. 31: 1-4). Burial under a barrow, cremation, presence of horse, Bactrian camel, and their cult appear in the region for the first time. There are no traces of continuity with Harappa, hence it is a culture of newcomers.

Precisely the same picture has been revealed in the settlement of Hathala (Dani 1970-71: 56-9, fig. 166; pl. 18a,b; 31). The Harappan stratum (period B) is followed by a burial-ground. Here the barrows were made of hard clay, the graves had a round or horseshoe form (the latter reminiscent of a catacomb niche), bodies were cremated aside, and the ashes were placed on the bottom of the pit or in a vessel, covered with a quern. A. Dani (1970-71: 169, fig. 37) has compared the culture of these burial-grounds with the Gandhara culture and the cremation in Sarajhala near Taxila. He has demonstrated the difference in ceramics. The vessels are of diverse types, and some of them were produced on a potter's wheel. The firing is red inside, the surface is red or white, and one grey goblet has been found. There are no ornamented ceramics. The variation in pottery shows that the newcomers were not uniform. According to A. Dani, having destroyed Gumla and Hathala, they moved to the Indus valley and razed Mohenjo-Daro. Their own material culture was poor, and therefore it was easy for them to adopt the achievements of the indigenous population. Many types of pottery and urns were analogous to those from the cemetery of Timargarha and Swat.

The cemeteries have much in common. They are situated on the hills which dominate the river valleys. In some of them the number of graves is rather large, in Timargarha, for example, there are 270 graves. The cemeteries were used for a long time as indicated by the fact that graves stratigraphically overlapped one another. Sometimes the surface of the graves were marked with stone facings. Children burials were separate. A grave has two tiers. First, a round or rectangular pit (length 1.5-2m, depth 0.5-1.5m) was dug. In Zarif-Karuna round pits have also been found. The sides of the upper chambers were initially shored up with stone slabs which have been preserved in Timargarha and Katelai, or with wooden facings secured with posts (diameter 15-20cm) in the corners, which have been discovered in Loebanr I. Unbroken round and square stone slabs and heaps of stones upon the graves have been discovered in Timargarha. Thus the exterior of the cemetery strongly resembles the Andronovan burial-grounds. The sides of the pits were shored up with four stone slabs put on butt-ends or with a cist of horizontally-lain slabs. Pits are covered with a stone slab or several slabs. As a rule, bodies are oriented with the head to the west with a deviation to the south-west or sometimes to the north-west or to the south. Both cremation and inhumation were used. The dead lie in the flexed position, women on the left while men were on the right side. Sometimes double burials (*sati*) could be found. Triple burials are very rare. In Loebanr a grave with two cremations is divided with a stone wall into two parts, one for each of the buried (Silvi Antonini and Stacul 1972: pl. xci, xcii). Beside the head of the deceased a vessel or several vessels were put and sometimes big pots were placed by the legs. In the graves with cremation the ashes and burnt bones were scattered over the bottom

of a grave. The remains could also be placed into a ceramic box or vessel, but the most frequent variant were urns (with a hole or, during period II, modeled clay face urns). As in the graves with inhumation, ceramics were placed here in the western part. Fractional burials could also be found, but they were very rare.

Ceramics were either hand-made or produced on a potter's wheel. The surface color is grey or black-grey, but urns were often red. There was a great diversity of vessel forms. Almost all vessels lack ornamentation. Only in late graves does the pottery have carved geometrical ornamental design, sometimes infilled with white paste or surrounded with a dimple pattern. It is a characteristic trait, especially of the goblets, that the surface is goffered.

The rest of the tomb material is poor. It includes primitive flat figures, bronze ornaments (pins, temple pendants, rings, beads), stone beads, and a few tools: leaf-like knives with tangs, and two little knives, razors, hooks, a bone arrow, and iron articles, such as cheek-pieces (Silvi Antonini, Stacul 1972: pl. liv-lxiii).

There exist different opinions on the classification of the materials. At first (Castaldi 1968; Silvi Antonini 1969; Stacul 1975) an extensive range of analogies were drawn from Hissar III to Tagisken, but obviously the chronology could not be based upon such isolated comparisons. A periodization of the three burial-grounds has been suggested by S. Salvatori (1975). H. Müller-Karpe (1983) has discussed the whole image of the Swat culture.

A. H. Dani (1967: 25) distinguished three periods: I) single burials in a flexed position; II) urn cremation; III) inhumation, sometimes with double and fractional burials.

Another classification has been suggested by G. Stacul (1966: 66, fig. 8; 1969) and put into practice by Silvi Antonini and G. Stacul (1972). It was based upon the stratigraphy of the graves cutting one another, the statistical combinatory method of inventory, and the classification of the grave goods, especially the ceramics. The analysis of the distribution of the pottery types in the closed complexes of overlapping graves undertaken by N. Vinogradova (2001) has supported this classification.

The study of the three cemeteries permits one to distinguish three periods (Table 15). Fractional burials are characteristic of all three periods; cremation was a predominant custom during period I, while inhumation prevailed during periods II and III; during period III the prevalence of inhumation became absolute. Cenotaphs were characteristic of period I, and disappeared almost completely during the following two.

Period	Cremation	Inhumation	Cenotaph	Total
I	52	42	11	105
II	42	67	4	113
III	5	30	2	37

(after N. Vinogradova 2001: 13, table 3)

Table 15: Number of burials per period by type

The earliest burial-ground was Katelai (Table 16) where the burials of the first type prevail; the latest one was Butkara II.

A continuity of the development of the Gandhara-Swat cemetery culture could well be traced. It is evidenced by the gradual change of the burial rite, con-

tinuous development of ceramics and female figurines. Thus the population that settled there after the fall of the Harappan civilization was rather stable (G. Stacul and A. Dani suggest, however, that two waves of migration took place, the first one at the beginning of period I, the second at the beginning of period III).

Period	Katelai	Loebanr	Butkara II
I	75	41	2
II	40	90	18
III	19	16	16
Total	134	147	36

Table 16: Number of burials by cemetery by period.

The dating of the cemeteries has become a subject of discussion: 16th–8th centuries BC according to A. Dani (1967: 240), 14th–4th centuries BC according to G. Stacul who later changed the first date to 17th century BC, 11th–8th centuries BC according to H. Müller-Karpe (1983: 76). The stratigraphy of the settlement of Balambat helps to establish the upper date. In this settlement graves and a building dating from the end of period III are directly followed by Achaemenid buildings. The settlement of Ghaligai is followed by a stratum from Buddhist times. This date is also supported by the finds of iron articles such as an iron cheek-piece with three holes which belongs to a type widely spread over the Eurasian steppes and Sialk during the early Iron Age (Jettmar 1968). There exist also steppe parallels to vessels with spouts and round handles (cf. Vinogradova 2001: fig. 8: 14-19 and Moshkova 1992: tab. 32: 36, 37; 37: 48; 56; 62).

Period III vessels with a conical base are close in form to the Achaemenid pottery types from Central Asia (cf. Vinogradova 2001: fig. 8: 5; 8 and Kuz'mina 1976: fig. 2). This has already been noticed by C. Silvi Antonini (1969: 113). She suggested that direct contacts with Yaz II existed.

Absolute dates could be provided using the radiocarbon method, but unfortunately the C^{14} dates of the cemeteries often do not confirm the stratigraphical ones (Vinogradova 2001: tab. 9). The Timargarha dates are more reliable. According to A. Dani: period I: 1530±60 BC, period III: 940±60 BC. The dates of the Swat settlements are reliable also: period IV: 1510±60 and 1150±60 BC, period V: interval from 1230±60 BC to 790±135 BC (on the subject of chronology see Possehl 1994; Yule 1994; Pittman 1994; Vinogradova 2001: tab. 9). In general, it seems that the Swat cemeteries may be dated to the 16th–8th centuries BC, and the latest burials perhaps belonged to the Achaemenid period.

What is the origin of this culture and what is its ethnic attribution? G. Stacul (1971) has suggested a hypothesis that the bearers of the cremation rite had come from Anatolia to the Danube region from whence they were forced to leave for Swat under the pressure of Timber-grave culture barbarians of the Pontic steppes. The basis of this hypothesis was the migration model of R. Heine-Geldern (1956) and M. Gimbutas. It was supported by the similarity with several elements of a series of Danubian regional cultures from the Eneolithic to Hallstatt: cremation, face urns, cone carved ornament, female figures, and copper pins.

This hypothesis, however, is unconvincing. Migration theory considers a migration proved if 1) the compared sites are contemporary; 2) the analogues in closed complexes are substantial, not isolated; 3) a complex of ethnically

significant characteristics is distinguished; 4) the territories are neighboring or have connections with each other; 5) the historical reasons of the causes and character of a migration are given. The Hungarian hypothesis doesn't meet any of these requirements. The compared sites are not contemporary; the conformity of isolated, accidental, and ethnically insignificant characteristics is only formal. The meaning of the historical contacts between Hungary and Swat hasn't been demonstrated. Cremation was practiced within a very vast area, face urns have not been discovered in Swat in early cemeteries of period IA: they appeared later as a result of an independent development. Vessels decorated with cones and carved ornaments appeared only in period II; copper pins belong to the types that were widespread in the neighboring regions, especially in Central Asia.

In another work G. Stacul (1970) has suggested that there had been two waves of migration to Swat. Having accepted the hypothesis of K. Jettmar (1956) on the migration of Aryan tribes from the steppes via the Caucasus, G. Stacul assumed that the second wave started in Iran, and that it was Iranians who brought iron and the horse to Swat. A detailed analysis of the materials provided by M. N. Pogrebova (1977) has shown that though several Iranian vessel types have analogues in Swat, the ceramic complexes of Iran and Swat are quite distinct. Indirect connections between Iran and Swat had not resulted in the spread of iron there by the end of the 2nd millennium BC. "All these facts do not permit us to agree with Stacul that the Iranian population itself penetrated Swat by the end of the 2nd millennium BC" (Pogrebova 1977: 145).

G. Stacul believed the appearance of iron in Swat dates from the Achaemenid period, but actually the late contacts with Iran and the spread of iron (probably brought indirectly through Central Asia) took place in the 9th–8th centuries BC which is proved by the type of a cheek-piece from Timargarha (Jettmar 1967).

A. Dani (1967; 1978) also presumed that there were two waves of migration associated with the cemeteries. Those who had come first from the north (periods I and II) are considered to have been the Vedic Aryans, and those who came afterwards (period III) in the 10th and 9th centuries BC were the Kurus, who were genetically related to the former. This tribe is depicted in the *Mahābhārata*. A. Dani (1967: 3) dated the latest graves of Timargarha and Thana to the 9th–6th centuries BC and believed them to be sites of a pre-Achaemenid Gandhara which gives its name to the culture itself. As A. Dani and F. Durrani (1966: 165) assumed, the people of this culture came from the Trans-Caspian steppes to Iran and Afghanistan from whence they moved to Swat around 1000 BC, so that their language replaced the language of their predecessors.

B. and R. Allchin (1972: 303; 1973: 214, 215) believed that the culture of Swat was close to Giyan I and Sialk A and B and appeared in India with the migration of the Aryans. In the opinion of B. K. Thapar (1981: 299) the Gandhara grave culture had an Iranian origin and "is a good candidate for identification with the Rigvedic Aryans". The Indian scholar has stated that the cemeteries of periods I and II were traces of the first wave of the Aryan migration, and the cemeteries of period III were evidence of a second wave. At the Indo-Iranian symposium at Harvard University 2002, Rafic Mughal suggested a new periodization. He also recognized the Aryans as creators of the integral Gandhara grave culture.

The adherents of the hypothesis stating that the Gandhara and Swat population were migrants from Iran attach too great a significance to the spread of Grey

Ware. It is considered as an indicator of the Iranian ethnos which is believed to have existed since the 3rd millennium BC and created the cultures of Shah-tepe, Hissar III, and Tureng-tepe (Vanden Berghe 1964: 37; Young 1965: 72; 1967; Dyson 1965; 1967; Deshayes 1969). This hypothesis was already criticized in the first part of this book (Mandel'shtam 1964: 192-194; Kuz'mina 1972a, b; 1975b: 65; Lukonin 1977: 13-15; Pogrebova 1977a: 8, 16; Medvedskaya 1977: 169-175; 1978: 14-18; Grantovsky 1981: 245-272; 1998: 37-60; Cleuziou 1982). That this hypothesis is unsound could be proved by following facts: 1) during the 3rd and 2nd millennia BC the area of the Grey Ware was inhabited not by Indo-Europeans or Indo-Iranians, but by Hurrians, Elamites, Kutii, Lullubi and other peoples; 2) the Iranians appeared in Iran in the 9th century BC, according to the written sources (Grantovsky 1981); 3) Grey Ware was made on a potter's wheel, while the Vedic texts describe the production of hand-made pottery (Rau 1972; 1974; Grantovsky 1981; Kuz'mina 1986a); 4) hand-made ceramics with black-grey burnished surface is characteristic of the Andronovo culture.

Many have sought to set the origin of the Swat culture in Central Asia. C. Silvi Antonini (1969: 105; 1973: 243) noticed that some forms of ceramics resemble those in the BMAC and Yas II, but she has also noted connections with Iran. V. I. Sarianidi (1977) has shown several analogues of the BMAC and Swat of period V at Ghaligai. E. Castaldi (1968), having compared the ceramics from the cemetery of Katelai with the Tagisken pottery, concluded that the Tagisken population migrated from Khorezm to Iran where they mixed with the people of the Hissar III culture, and it was this heterogenous population that came to Swat. However, this hypothesis is unsound. First, the cemetery of Tagisken is dated to the 9th–8th centuries BC (Itina and Yablonsky 2001: 101), i.e., a half-millennium later than the earlier cemeteries of Swat and a millennium later than Hissar III. Secondly, the only thing Tagisken and Swat have in common is cremation, but the construction of the graves is different. Ceramic assemblages are also different, except that some vessels are encrusted with white paste. E. Castaldi is mistaken when she speaks of the genetic connection between the Tagisken culture and the earlier Andronovo culture. Tagisken was actually akin to the Begazy-Dandybay culture and was not Indo-Iranian. As for Hissar III, some forms of ceramics borrowed from there have been preserved in Swat, but the ceramic complexes, architecture, and burial rites are essentially different. Hissar III is a typical agricultural tell of the Indo-Near-Eastern region with its housing blocks and burials inside the settlement. So statements about the genetic connection between Hissar III and Swat have no grounds. These cultures were quite different.

Thus the search for the origins of the Swat culture has been conducted in two main directions: Iran and Central Asia. G. Tucci (1962: 28; 1977) has expressed a conviction that the origins of this culture may be found in Central Asia, and it belonged to the Dards. B. A. Litvinsky also adhered to this hypothesis (1964; 1967; 1972). He assumed that the culture of Swat was connected with the Bishkent-Vakhsh culture in Tadzhikistan and the population of Swat were the Nuristani (Litvinsky 1964; 1967). E. E. Kuz'mina (1972; 1974; 1975) sought parallels to the Swat materials in Tulkhar and suggested that these peoples were Indo-Aryans, as it had been previously stated by A. M. Mandel'shtam (1968) who had compared the burial rites of the cemetery of Tulkhar with the data from

the Vedic funeral rituals. But in the ensuing discussion G. Stacul and C. Silvi Antonini noted that although the burial rites had much in common, the ceramic assemblages were quite different.

An early cemetery of Kherai in Swat (Stacul 1966: 261-274), dating from the end of period IV, is of special interest for drawing ethno-historical conclusions. Mountain passes connect the mountain valley of Gorband with Tadzhikistan and Afghanistan, as well as with the Indus valley. Twelve graves have been excavated. The surface suffered from erosion, so it doesn't seem to be possible to judge whether mounds had been erected or not. The grave pits have a rectangular form 0.4-0.5 x 0.7-1.7m, a depth of 0.4-0.5m. Inside the graves there is a stone cist of four slabs of schist which is covered with one or three slabs. The buried lie in the flexed position on the right side, the head to the south-west. Beside the head one or two vessels were placed; sometimes there is also a pot by the legs. This burial rite is unparalleled in India and Iran, but is in all the details (including the west or south-west orientation) analogous to that of Andronovo (Table 17). The main part of the ceramics belong to class A: rough hand-made, asymmetric, ill-fired grey-brown pottery (Stacul 1966: fig. 4). Round or pear-shaped pots with inverted rim, deep bowls and cups with upright sides, and a vessel with beveled bottom (variant AIII, fig. 4 d) have been found. A single vessel of class B was made on a potter's wheel and covered with gray-black burnishing. Its form is the same as that of the vessels of class A VIII (fig. 4 f). Where else has such pottery been discovered? The pottery of the Bishkent-Vakhsh culture has been classified by L. P'yankova (1986: abb. 61-72; 1989: 57-77). Pottery found in Tadzhikistan is hand-made and often imitates the forms of the BMAC ceramics made on a potter's wheel. The greater part of the ceramics is covered with a white slip specific to the BMAC. Ceramics of this type are accompanied by red- and black-burnished pottery. Almost every type of pot has parallels in the earlier cemetery of Tulkhar in the Bishkent valley (Kuz'mina 1972; cf.: Stacul 1966: fig. 4 and Mandel'shtam 1968: table X: 2, 5, 7, 8; xii: 1, 2; xv: 1, 2; xxiii: 9 (Aruktau); Kuz'mina 1976a: table 2). Of essential importance is the resemblance of the cylindrical-conical and pear-shaped vessels that are a distinctive trait of the sites in Tadzhikistan. According to the opinion of archaeologists, the ceramics from the older cemeteries of Pakistan, especially of period IA (Vinogradova 2001: fig. 4: 3-5, 8, 10, 12), continues some of the previous traditions of the Kherai pottery. But the ceramic complexes are generally much richer and more diverse.

As it has been stated above, the evidence of cultural belief is of crucial importance to assigning an ethnic identification and origin for the population of Swat. These aspects of culture are often preserved, especially in the language, despite distant migrations. The analysis shown in Table 17 shows that all the parameters and all the elements of the burial rites of Swat and Gomal have close analogues in no other culture but the Andronovo.

In the post-Harappan barrows of Gumla and Hathala cremation burials under a mound have been discovered and figurines of Bactrian camel and horse have been found. Animal burials and horse burials in particular have also been uncovered. This was a typical Andronovan custom. As it has been demonstrated in Chapter 8, the chariot cult and chariot models in the Andronovan style also appeared in Swat. Veneration of the horse continued to exist in Swat in period

IIA. There have been found a pin and a lid with horse images from Katelai dating from that period (Fig. 93: 2,3; Silvi Antonini, Stacul 1972: pl. lii; liii).

	Andronovo	Swat
Separate burial ground	+	+
Barrow	+	+
Enclosure	+	+
Pit-grave with a frame of logs	+	+
Stone box	+	+
Cist	+	+
Position on the right or left side	+	+
Orientation west-south-west	+	+
Cremation	+	+
Scattered ashes	+	+
Ashes in a vessel	<+>	+
Sati	+	+
Figurine [1]	+	+
Sacrificial animals	+	+
Sacrifice of a horse	+	+
Cenotaph	+	+

Table 17: A comparison of the burial rites between Andronovo and Swat
+ feature, <+> feature occurs rarely, 1 = only in Bactria.

In the Swat burials all the details correspond to those of the Andronovan burials: around a grave a round or rectangular enclosure was erected; inside a rectangular grave pit comprising a stone box or cist or, very rarely, a frame of logs were built; both cremation and inhumation were practiced; bodies were placed in a flexed position on the side with the head to the west or south-west (this is the trait which distinguished the Andronovan rite from that of the Timber-grave culture where corpses were oriented to the east or north); double burials of a man and a woman (*sati*) were present (whether cremated or inhumed); sometimes a stone partition dividing two burials was built; one or two vessels were put beside the skull; animals, sometimes horses and very rarely camels, were sacrificed; ashes were customarily scattered over the bottom of the grave. The burial rite in Swat was distinguished by the placement of the ashes into an urn that was rather common. In Andronovo rectangular clay dishes in which the ashes were carried have been found (Fig. 19: 13, 20). But the remains were strewn in a heap or in a form of an effigy. The two latter customs recall the materials of the Bishkent-Vakhsh culture. It formed as a result of the synthesis of the Andronovan traditions and the BMAC. The descendants of the Zaman-Baba culture also participated in its formation. The latter has analogues to the box-type urns of the period IA (cf.: Silvi Antonini *et al.* 1972: pl. xliv, Gulyamov *et al.* 1966: table vii; xiv; xv). Cylindrical altars with a lid have been discovered in Dzharkutan (Askarov *et al.* 1993: fig. 51).

The analysis of figurines from Northern Bactria and Swat of all three periods leads to interesting conclusions. These figurines could be divided into several types that have however much in common: steatopygia is strongly emphasized,

hands are distinguished as two triangles; most figurines have applied breasts. Legs are either (the younger variant) represented unseparated as a triangle or divided. The head is round, but more often trapeziform. The nose is long, eyes are represented as dots, as often are also necklaces and diadems (Müller-Karpe 1983: abb. 36, 37). Figurines from Northern Bactria are larger. They are almost the same as those from Swat, except that the eyes are represented as horizontal lines; sitting figures have also been discovered (Vinogradova 1994: fig. 7: 1; 2; 19; Avanesova 1995: 40, fig. 8: 13; 10: 6; 12). Figurines from the temple of Dzharkutan (Askarov and Shirinov 1993: fig. 50: I: 9-11) and Kangurt-Tut (Vinogradova 2001b: abb. 3: 23) are an exact parallel to a statuette with a rectangular base from Loebanr, grave 66 (Müller-Karpe 1983: abb. 36: 8). In Central Asia the tradition of producing female figurines goes back to the Anau culture, and in the steppes it is present in Zaman-Baba (Gulyamov *et al*. 1966: table v: 5).

H. Müller-Karpe (1983: 105) regarded these figures as images of a goddess. The analysis of the *Taittirīya-Brāhmaṇa* shows another possible interpretation. According to the information of this text, a figurine was modeled after cremation from the ashes with clay. This figure was then worshiped as the deceased (Caland 1967: 104). A corresponding custom existed in ancient Rome where the Lares were revered (Dumézil 1966: 335). The Āśvalāyana-Gṛhyasūtra (4.5) explains that urns for the ashes of a woman body had applied decoration and urns for the ashes of a man had a relief image of a nose.

Animal figures, and particularly horse figures are similar in Bactria and Swat. A bird figure from Katelai (Silvi Antonini and Stacul 1972) is semantically equal to an altar with a bird head from the cemetery of Bustan VI which N. Avanesova (1995: 42, fig. 7) has legitimately interpreted as a sign of the Indo-Aryan cult of fire and the sun.

How then did the culture of Swat form? If the burial rite is regarded as the main argument, the origin of the Swat culture should be traced from the Andronovan area. Undoubtedly, a migration which took place was of the type III where the migrants preserved their language, mythology, and rituals, but also adopted some elements of foreign material culture.

The migration pattern in Swat is different from that in Bactria where the population of the Bishkent-Vakhsh culture had initially preserved many features of the burial rite, but then they acquired the custom of burying the dead in a catacomb. They began to use the ceramics of the indigenous farmer population of the BMAC. They even began to produce their own hand-made ceramics imitating vessels made on a potter's wheel. Though friendly relations were established with the farmers of Dzharkutan, some elements of the cultural pattern and rites of the newcomers were imposed upon the native inhabitants. This development is indicated by the materials of the cemeteries of Bustan. Probably the language of the migrants also became prevalent (elite dominance migration).

The agricultural civilization of Harappa was destroyed in Gomal and Swat. A hypothesis that its downfall was caused by an ecological crisis and flood is unacceptable. It seems that the fortified settlements had been captured by the newcomers who preserved their own burial rites. The ceramic complex, however, formed under the influence of the related population of Tulkhar during the migration from the steppes to the south through Tadzhikistan. In Gumla and Timargarha ceramics with white slip were in use (Dani 1970-71: fig. 37). This

technology had not been seen in Iran and India, but it was a characteristic trait of the BMAC from where it was borrowed into the Bishkent-Vakhsh culture. The forms of ceramics from the cemetery of Kherai in Swat are equal to those from Tulkhar. But the hand-made pottery from Swat (from Kherai and later sites) is burnished and its surface is black-grey which is a result of firing in a reducing atmosphere. This technology is a distinguishing characteristic of the Andronovo pottery. It should be stressed that (as it has been stated in Chapter 5) the Andronovan traditions of hand-made pottery have been preserved in north-west Pakistan and Afghan Badakhshan until modern times (Rye and Evans 1976).

This well-balanced working hypothesis, however, needs to be carefully examined if it is to become a strict scientific hypothesis. First, it is necessary to test the chronological classification of the Tulkhar materials suggested by K. Kaniuth and M. Teufer (2001) and to make the chronology of the Tadzhikistan cemeteries more accurate. Secondly, it is indispensable to compare and analyze in detail the ceramic complexes of the two regions taking also the technology into account.

Few metal articles seem to support the hypothesis on the migration from the north. In Kalako-deray miniature knives with tangs and notches at the base of the blade have been discovered. They belong to a classical steppe type of the 15th–13th centuries BC (cf.: fig. 29, 30 and Stacul 1992: 113, fig. 4). In Katelai in a grave of the lowest horizon a so-called 'razor' has been found. It has analogues in the steppes dating from the 13th century BC, as for example, in the Shamshi hoard (cf. fig. 43a and Silvi Antonini and Stacul 1972: pl. lvid); in Katelai in a grave of the highest horizon a massive adze has been found (cf. Chernykh and Kuz'minykh 1989: fig. 71 and Müller-Karpe 1983: abb. 29: 10). Golden and copper ear- and temporal rings from Swat have no use for diagnostic purposes, because they were extremely widespread in time and space. But their analogues are represented on the statuettes from Bustan IV (Avanesova 1995: fig. 15, 16). A golden ring with five little balls, one of them with a turquoise ornament, from the BMAC cemetery of Nurek (P'yankova 1998: 170) is analogous to an artifact from grave 122 at Timargarha (Dani 1967: 231-232: pl. xlix: b/5). We thus may date this grave not to the 6th–4th centuries but the 12th century BC, the date of the Nurek complex. Beads and pins with conical or spade-shaped heads have analogues in northern Bactria (cf. Vinogradova 2001: fig. 4: 45, 47 and Kuz'mina 1966: table xvi: 16-22; 36-41; 46-49; Askarov *et al.* 1983: table xxxiv: 3-5; xxxv: 7, 8).

Adzes with side projections (trunnions) have been discovered not far from Darrel in Shelozan (Heine-Geldner 1956: fig. 1) and in Manikhal (Jettmar 1961: fig. 1, 2). Most of the authors who studied these artifacts of Dardic culture have come to the conclusion that they reached India having moved through Iran probably from the Caucasus. B. A. Litvinsky (1964: 144) assumed that their route lay through Central Asia. The center of production of these artifacts in the 15th–13th centuries BC was situated in the middle Urals. A mold found in Zirgan, and the articles discovered in Elabuga and Milovka serve as proofs of this thesis (Tikhonov 1960: table i: 1; viii: 21; xvii: 10). The communication between the metallurgists of the Urals and Central Asia was quite active. Thus there was a probability of the adzes appearing from Central Asia to Pakistan. A cheek-piece from Timargarha is made of iron (Jettmar 1968) and belongs to a type developed in the Eurasian steppes in the 12th–9th centuries BC (fig. 39: 5,

7; Boroffka 1998: abb. 10, type III) for riding and was in use during the Iron Age. The most important evidence of the Andronovan origin are also the data on the appearance of the camel, horse, chariot, and their cult, and the style of the images of chariots in Thor and Godara (see Chapter 8).

The statement about the northern origin of the Swat culture is corroborated by the anthropological data which have been discussed in Chapter 11. Twelve skulls from the graves of Butkara II and four skulls from the settlement of Aligrama have been found. They belong to the Mediterranean type that is represented in Central Asia. B. A. Litvinsky (1972: 186) has underlined "a remarkable resemblance between a series of skulls from Swat and the Saka skulls from the Pamirs" which was first noted by B. Bernhard (1967: 317-385). It suggests a genetic relation between the two populations. Among the 25 skulls from Timargarha this type is represented, as well as a massive proto-Caucasoid type which was distinctive for the steppe Andronovans, a Veddoid (3 skulls) usual for the indigenous inhabitants of Hindustan, and a Mongoloid type (2 skulls) which might have appeared during Ghaligai period III from Kashmir.

The population of Swat formed over four millennia. But what was their ethnic identification? Some have identified the creators of the Swat graves with the Iranians (Castaldi 1968; Silvi Antonini 1973). Most scholars led by B. and R. Allchin (1972: 303) and B. K. Thapar (1981: 299) presumed that this culture had originated from Iran and belonged to the Rigvedic Aryans. A. Parpola (1994: 16, 17) assumed that the first wave of the Aryan migration could have started in the Danube region and the Early Gandhara Grave culture was proto-Rigvedic = proto-Dardic, and Late Gandhara was Late Rigvedic = Nuristani. Recently (2002a: 71-72) he has stressed that contacts between Ghaligai IV and the BMAC, and between Ghaligai V and Hasanlu V existed; he also has supposed that a part of the Indo-Aryans moved through the northern regions of Hindustan and the Gandhara culture area is equivalent to that of the Dardic language. The third group—S. Gupta (1972; 1979), E Kuz'mina (1972a, b; 1974; 1975)—has regarded the population found in the cemeteries as Rigvedic Aryans having come not from Iran, but from Central Asia.

The attribution of the culture to the Aryans is supported by the analysis of burial rites that are paralleled in the Vedas. The Aryan etymology of the toponyms in Gomal and Swat is another proof: Ved. Gomatī-Gomal, Suvāstu-Swat, Kubhā-Kabul, Sindhu-Indus, Kumu-Kurram (Stein 1917: 91-99; Toporov 1962: 59-66; Elizarenkova 1972: 12, 13; 1989: 440-443; Allchin and Allchin 1973: 218). But these facts indicate the common-Aryan, not the Vedic character of the Swat culture, and show that different groups of the Indo-Aryans—Dards and Nuristani among them—migrated to this region.

G. Tucci (1963; 1977) has demonstrated the resemblance of the ancient culture of Swat to that of its modern inhabitants—the Dards. He suggested that its origins should be searched for in Central Asia. K. Jettmar (1960; 1966; 1975: 466), having done the ethnographical research of the Hindukush population, concluded that the Dards and Nuristani have numerous survivals of the ancient Indo-Iranian culture. These traits emerged in the Andronovo culture and then they were conserved in the isolated mountain valleys. B. A. Litvinsky (1964: 142-151; 1967: 123-127; 1972: 144-149) has studied the problem of the origin of the Dards and Nuristani. As he has shown, the cemeteries of Swat and of the

Vakhsh valley have much in common. He took into account the archaeological, linguistic, and anthropological data and came to a conclusion that the ancestors of the Dards and Nuristani were a group of Aryans who had come from Central Asia. They settled in the mountain valleys and preserved their ancient culture.

The Dards and Nuristani (Kafirs is their obsolete name) form the third group of the Indo-Iranian peoples. Their languages conserve many relict traits which demonstrate their relationship with the Iranian languages on the one hand and the Indo-Aryan languages on the other, cf. G. Morgenstierne (1929; 1938; 1973), D. I. Edel'man (1965), G. Fussman (1972). G. M. Bongard-Levin (Bongard-Levin and Il'in 1985: 133), after Th. Burrow (1973), has assumed that there were several waves of migration of the Proto-Indo-Aryans. The Rigvedic Aryans formed one of these waves. They came to India before the 13th–12th centuries BC when this text might have been composed. The Dards and Nuristani came with one of the first of the pre-Vedic migration waves. "Their languages and beliefs possessed pre-Vedic traits which formed, however, after the Indo-Iranian community had split." To the same wave belonged the Vrātya "whose life and cults conformed to Aryan, but not yet Vedic norms regulating these spheres." This hypothesis suits the linguistic data on the dialect differentiation of the Indo-Aryan languages (Emeneau 1966).

E. Helimsky (1996) assumed that the people who spoke proto-Dardic and proto-Nuristani languages were Andronovans. But his views that all Andronovans belonged solely to this third group are erroneous for the Andronovan ethnos was numerous and diverse and related also to the Vedic culture. I. M. D'yakonov (1996) proposed a hypothesis that the tribes of the Timber-grave culture were Iranians, while the Andronovans were Indo-Aryans, Nuristani, Dards and at least a part of them were Iranians. D'yakonov supposed that the Aryans who came to the Near East were of Dardic origin, and were the first ones to have left the homeland. The migration of the Vedic Aryans to Hindustan took place later. This linguistic conception seems to be best supported by the archaeological data.

Some elements of the Swat culture are both Andronovan and analogous to those of the Vedic culture. These elements are burial rite, a chariot, horse, and camel cult, several traditions of hand-made pottery, and Andronovan types of metal articles. Other elements demonstrate the relationship between the Swat and the Bishkent cultures, such as a part of the ceramic complex (cylindrical-conical and pear-shaped vessels, white burnishing, female figurines, metal, ornaments). One may assume that during the migration to the south the Andronovan tribes either incorporated a part of the north Bactrian population (corporative migration) or adopted some elements of their culture.

The newcomers to Swat were not the Vedic Aryans. Their economy was distinctly different. The Vedic Aryans were semi-nomadic stock-breeders. The people who had arrived in Swat built fortified permanent settlements and developed a mixed economy where agriculture and stock-breeding were combined. The process of their settlement is illustrated by the decrease in the number of cenotaphs in their graves.

The formation of the Dardic and Nuristani ethnoses was a result of an integration with the indigenous population. Numerous features of the aboriginal culture, adjusted to the conditions of the mountain valleys, were therefore borrowed by the newcomers. The types of wheel-made ceramics were also adopted.

The substratum might have been formed by the Dravidians akin to the Harappans. A relict of the ancient Dravidian is Brahui which has been conserved in Baluchistan (Vorob'ev-Desyatovsky 1956; Andronov 1980). The second component could have been the Munda languages which are now spoken in the northern and eastern regions of Hindustan and belong to the Austroasiatic family (Bongard-Levin 1979; 1984; Bongard-Levin and Gurov 1988; 1990; Kuiper 1991; Witzel 2001).

S. A. Arutyunov (2003: 432-3) has noted that the population of the north India had fair skin and light eyes which sharply distinguishes it from the inhabitants of other regions. According to the anthropological data the Dards and Nuristani belonged to the migration wave that preceded the arrival of the Vedic Aryans to India.

Their difference from the Vedic Aryans is most clearly manifested in the mythology. G. Fussman (1977) has discovered in north Pakistan very archaic religious beliefs and rites reflecting the common-Indo-Iranian notions which were alien to the creators of the Vedas. Here exists an ancestor cult and the common Indo-Iranian and Indo-European tripartite social structure, as well as cults of the most ancient common Indo-Iranian gods: Yama-Yami (Yama-Yamir), Indra, Gavesha, the protector of cattle, Dhiṣaṇa, the goddess of milk and fertility. The latter divinities witness the role of stock-breeding in the economy of these people and their ancestors. Some mythological characters are zoomorphic. Animal sacrifices are still practiced. Priests prophesy using juniper as a hallucinogenic substance. Many elements of this mythology and of these rituals are close to those of the Scythians (Kuz'mina 2002: 115).

A. Parpola (2002b: 291-294) has emphasized the resemblance of several Scythian and Nuristani customs: human sacrifice, scalp hunting, collecting enemies' skulls, severing and burial of the skulls of kinsmen.

Taking into account the archaic common Indo-Iranian features of their mythology, the Dards and Nuristani could be believed to have migrated to India before the Vedic Aryans came there. It was a separate wave. This hypothesis is also corroborated by the fact that the he-goat and a female divinity were worshiped of which there is no mention in the Vedas. As B. A. Litvinsky (1964: 147-148) has shown, in Tadzhikistan and especially in the Pamirs, there exists a mountain goat cult, a parallel to the analogous cult believed to be a specific trait of the Dardic culture (Jettmar 1960: 498). The significance of this cult is emphasized by the fact that the image of a mountain ram is the most widespread theme of the petroglyphs (Olivieri 1998).

Another significant Dardic cult is that of a goddess Markum, a protectress of women. She also rules the mountain goats. This cult still exists in the Hindukush and the Pamirs. B. A. Litvinsky (1964: 151) regards these facts as evidence of the active contacts between the ancestors of these peoples when they inhabited Central Asia in the Bronze Age. Some elements of this cult and a custom for women to wear a headdress ornamented with the goat horns still exist in Pakistan (Olivieri 1998).

The complex of the cited data allows the conclusion that the ancestors of the Dards and Nuristani came from the Andronovan steppes. Their route lay through Northern Bactria. They formed a separate group different from the Vedic Aryans.

CHAPTER TWENTY-FIVE

THE GENESIS OF THE INDO-ARYANS

As it has been already noted, the problem of the origin of the Indo-Iranians may be treated only as a part of the common Indo-European problem. A complex study of the origin of all three groups of the Indo-Iranian family is a strict requirement. These groups are: 1) Indo-Aryans, 2) Iranians, including the eastern branch – Scythians, Saka, Chorasmians, Sogdians, Bactrians and others, and the western branch – Medes, Persians, and Parthians, and 3) Dards and Nuristani (Kafirs).

When ascertaining the ethnic identification of the bearers of a given archaeological culture, the linguistic data are of course of crucial importance. The analysis of the language and the written tradition makes it possible for us to reconstruct the type of economy characteristic of the modern speakers of this language. Thus an opportunity arises for comparing the data of this reconstruction with the archaeological record. The archaeological data show where and when such a type of economy existed. If the results do not conflict the use of a series of verification methods allows us to correlate an ethnos with a given archaeological culture (Kuz'mina 1981; 1986).

A well-known fact should be taken into account is that agricultural and stock-breeding vocabulary (including words for bull, horse, cow, sheep, goat, and their young), names of metals, and words for wheeled transport are common-IE terms (Schrader 1926). The archaeological data witness the existence of the IE dialect continuity in the epoch of the spread of the productive economy. What should be noted here is that the disintegration of IE unity took place *not earlier* than the emergence of wheeled transport (i.e., at the end of the 4th and the 3rd millennium BC). The extensively long duration of IE unity suggested by some specialists should therefore be rejected.

The most important factor in the history of the Indo-Europeans, especially the Indo-Iranians, is the domestication of the horse, the horse cult and horse sacrifices being particularly significant (Ivanov 1974). The area of the horse in the 5th–4th millennia BC was in the steppes from the Danube to the Urals where the earliest horse bones in settlements have been discovered, as well as, most importantly, ritual complexes associated with the horse (Kuz'mina 1977; 2001c; 2003).

The other crucial factor in Indo-Iranian history was the use of the horse-drawn chariot and its cult. Chariots are many times described in the *Rigveda* and *Avesta*: gods ride in chariots over the sky; so do kings and warrior-charioteers.

According to the archaeological data, chariots appeared in Greece in Mycenae in the 16th century BC (Nefedkin 2001), in the Near East in the 17(18)th–16th centuries BC, though battle carts with equids were known earlier (Moorey 1996; Oats 2003), in the Urals in the 17(18)th–16th centuries BC (traditional chronology) or in the 21st-18th centuries BC (calibrated radiocarbon dates) (Gening 1977; Smirnov and Kuz'mina 1977; Kuz'mina 1994a; 2001b). The period of Indo-

Iranian unity in the homeland is synchronous with the spread of the chariot, i.e., the first quarter of the 2nd millennium BC. The partition of Indo-Iranian unity took place already in the homeland. This is evidenced by the fact that in the Finno-Ugrian languages there are loanwords having specific traits which distinguish between an Indo-Aryan and Iranian language (Abaev 1977; Antilla 2000).

The terminus ante quem of the disintegration of Indo-Iranian unity and the separation of the Indo-Aryans is the 14th century BC. In 1370 BC a treaty between the king of Mitanni, Mattiwaza (old reading Kurtiwaza), and the Hittite king, Suppiluliumas, was concluded and there is an oath guaranteed by a series of gods including such Indo-Aryan divinities as Indra, Mithra, Varuṇa, and Nasatya. In the 14th century BC in the Hittite city of Bogazkoy a trainer from the land of the Mitanni named Kikkuli composed a treatise on horse training where he employed numerous Indo-Aryan terms (Thieme 1960; Mayrhofer 1966; 1974; Kammenhuber 1968). The first time the Indo-Aryans appeared in the Near East dates, however, from the 17th century BC when the Hurrians (non-IE) came from north-east Anatolia and founded the Mitanni kingdom. It was dominated by Indo-Aryans who had brought chariots, blood-horses, and the skills of horse training. The names of Mitanni kings known from documents of the Tel-Amarna archive in Egypt and from the cuneiform texts and seals of the Near East are Indo-Aryan. The Indo-Aryans formed elite charioteer squadrons (Yankovska 1979; 1981; 1987). Judging by the descriptions of their dress and weapons, which included a hood, a bow, and a quiver with shaft-hole arrows (Zaccanini 1978), the Aryans had come to Mitanni from the steppes. None of those features were known in the Near East but had analogues only in the steppes. This is an elite dominance migration pattern: the dominance is secured by the introduction of new chariot battle tactics. The dominant group was presumably small and soon assimilated.

The other chronological milestone of Indo-Iranian history is the 9th century BC when in the Assyrian and Urartian annals Iranian names, ethnonyms, and toponyms were recorded for the first time on the territory of Iran. The movement of the Iranians to the Iranian Plateau is believed to have started in the 11th century BC. Earlier Iran was inhabited by non-IE peoples such as Elamites, Hurrians, Kassites, Manna, Kuti, and Lulubi (Luckenbill 1927; Herzfeld 1941; 1968; D'yakonov 1956; Aliev 1960; 1962; Grantovsky 1979; 1998).

These indisputably established historical facts provide the foundation for reconstructing the history of the Indo-Iranian peoples by means of archaeology.

During the 2nd and the beginning of the 1st millennium BC a sequence of migration waves can be traced in Central Asia and north Afghanistan. More precisely, it was a gradual advance to the south of separate groups of the steppe population. In north Bactria three cultures emerged: the BMAC, Andronovo, and Bishkent. There is good reason to suppose that there were several types of migration that left different archaeological traces in the south.

Is Vedic archaeology possible?

Under this title W. Rau (1977) published an article where he stated that an archaeologist could find in India only traces of short-term Aryan camps with only a handful of fragments of hand-made pottery. But is it really so? Below we attempt to answer this question by reviewing the evidence for material culture, behavior, and anthropological and genetic data.

The Bactria-Margiana Archaeological Culture

The BMAC was a highly developed agricultural and urban civilization with specialized crafts. The potter's wheel was widely used. According to many linguists, it was created by Elamites or Dravidians. The movement of the Sintashta-type population is seen in the territory of the BMAC. This population formed as a result of synthesis of the East European cultures: Poltavka (Kuznetsov 1989), late Catacomb (Kiyashko 2002), and Abashevo (Kuz'mina O. 2002). Archaeological traces of this first wave of Aryan migration is found in the burial complex of Zardcha-Halifa (Fig. 65) which contains a rich set of costly artifacts of the BMAC and a pin with a horse image, bronze bit, and, most important of all, cheek-pieces which have analogues only in the Urals in the cemeteries of Sintashta, Kamenny Ambar (Fig. 66: 6), and Krivoe Ozero (Kuz'mina 2001: fig. 2, 3; Vinogradov N. 2003: fig 35).

The role of Andronovan ceramics increases in later sites in north Bactria and the percentage of horse reaches 19%. It seems that the synthesis with the neighboring Andronovan population was friendly and thus bilingualism might have existed in that region.

The settlement of metallurgists at Tugai belongs to the Petrovka period. Pottery from the adjacent settlement of Sarazm has been found there in an assemblage with ceramics of the Petrovka type. That this pottery was of Urals origin is corroborated by the presence of an admixture of talc that was a specific trait of the Urals ceramics (Avanesova 1996).

The appearance of the horse in Margiana is evidenced by the burial of a foal and other horses in a cemetery at Gonur that is perhaps connected with this early migration wave (Sarianidi 2001: 37-43, Dubova 2004) along with a bronze staff and axes with the representations of horses in Bactria (Fig. 95: 5, 8; Ligabue and Salvatori 1988: pl. 97; 101; Pittman 1984; Mahboubian 1997).

The role of Andronovan ceramics increases in later sites in north Bactria and the percentage of horse reaches 19%. It seems that the synthesis with the neighboring Andronovan population was friendly and thus bilingualism might have existed in that region.

These processes could be traced very clearly in the settlement of Dzharkutan and in the cemeteries of Dzharkutan and Bustan. Stone cists and cremation burials of the Andronovan Fedorovo type appear in the graves. A fire cult as well as a horse cult became widespread: burials of horse leg bones and a horse figure have been discovered. In the temple of Dzharkutan there was uncovered an altar that indicated a fire cult and perhaps a more important find of Andronovan ceramics and cult vessels was made. The latter are decorated with swastikas and wheels. "This is a characteristic Andronovan ornament" (Avanesova 1995a, b; 2003; Askarov and Shirinov 1993). As it has been said, these facts indicate not only the synthesis of the BMAC and Andronovo populations, but also the ideological prevalence of the Andronovans (Askarov 1993: 127; Avanesova 1995: 37). Thus, according to the classification that I have suggested, the elite dominance migration model is witnessed in Bactria: a migration of an ethnic group from a zone with a more primitive economic type to a more advanced one. Newcomers assimilated the indigenous population but adopted its material culture. The migrating group might have been small, but it was solid and had military superiority.

The main innovation in warfare of the Andronovans was the use of horses and chariots. But they "would mean nothing without trained personnel to manage horses and drive them" (Rathagar 1997: 227). New battle tactics and solidarity allowed the Andronovans to gain the leading positions in the community similarly to the Aryans in Mitanni. Their language might have become the lingua franca in Bactria.

This hypothesis is congruent with Th. Burrow's assumption (1973) that the Aryans were the first to begin moving to the south, while the Iranian migration started later. They adopted the material culture of the native population. These statements conform to J. P. Mallory's Kulturkugel model, M. Witzel and A. Lubotsky's hypotheses, and partly to that of A. Parpola if one leaves aside the problem of the Dāsas.

There is still no evidence that this first migration wave traversed the southern borders of the BMAC. However, the active contacts of the BMAC with their southern neighbors are well known (Sarianidi 1987; 1998: 138-139; Lamberg-Karlovsky 1994). In Iran in the province of Kerman in the Dashti Lut desert the kingdom of Marhasi existed at the end of the 3rd and the beginning of the 2nd millennium BC. Its population spoke the Elamite language. The large settlement of Shahdad has been discovered there, as well as 250 graves. Here there have been found numerous articles typical of the BMAC (Hakemi 1972; Hakemi and Sajjadi 1988; Amiet 1985).

Especially important data on the contacts of the BMAC have been revealed in Central Baluchistan in the Kachi Plain near the Bolan Pass that opens the way to India. Analogues of Bactrian artifacts have been found in cemetery VIII at Mergarh (Santoni 1984) and in cenotaphs in the adjacent settlement of Sibri. In Quetta a hoard has been discovered which probably originated from a cenotaph (Jarrige and Hassan 1989). Similar finds were also made in Damb Sadaat and Damboli (Possehl 2002: table 9, 1). Not far from Sibri there is the settlement of Nausharo that belonged to the Harappan culture. It is overlain by remains of architecture and other materials including BMAC elements. As it has been put by G. Possehl (2002: 231): "By 2000 BC the BMAC is a strong presence in Margiana and the Kopet-Dagh. The presence of BMAC artifacts in the upper levels of Mohenjo-Daro and Chanhu-Daro, which dates to circa 2000 BC, seems to indicate the penetration of the BMAC peoples into the subcontinent. There is also BMAC material in the Quetta Valley, Sibri, and Mehi, extending to Shahdad, Kinneman, and the Khurab, and the cairns near Yahya." A similar sequence of cultures has been traced in Bactria at Shortughai where a Harappan tepe was abandoned and a BMAC settlement with Andronovan materials sprang up beside it (Francfort 1989). V. I. Sarianidi (1987a: 55, fig. 2) has also noted the connections between the BMAC and the post-Harappan Jhukar culture.

How should these contacts be interpreted? J.-F. Jarrige, P. Kohl (1989), and C. Lamberg-Karlovsky (1994: 41, 45) legitimately regard them as a result of active trade and aspirations for control over the communications and the distribution of mineral resources. But these complexes are so close neighbors that it could be safely assumed that there was also a spread of the BMAC population. H. M. Pottier (1984: 63) believed that Bactrians inhabited Shahdad. V. Sarianidi (1994: 13, 16; 1998: 142) thinks that "Central Asia became a field of mass migrations which coincided with the migration of the II tribes" (but

Sarianidi, following T. Gamkrelidze and V. Ivanov, places their homeland in the Near East).

On the other hand, P. Amiet (1985; 1988) and C. Lamberg-Karlovsky (1994: 41, 43) indicate "a trend towards expansion in the Bronze Age Bactria" and a probable "movement of Central Asian people to Baluchistan and Shahdad."

As it has been already stated, the Near Eastern hypothesis on the origin of the Indo-Iranians is unacceptable, but the migration of the BMAC people to the south is very probable.

Thus a question arises whether there were Andronovans among the BMAC settlers in Baluchistan, or whether the settlers retained the Indo-Aryan language. The existing materials do not answer this question. Veritable signs of an Andronovan elite dominance migration have been revealed only to the north of the Amu-Darya. But that this very type of migration has been recorded allows us to regard it as a very probable example of the aryanization of farming populations first in Bactria and then in South Asia. The traces of Andronovan dominance in north Bactria and the traces of the BMAC movement to the south represent a reliable illustration of the Kulturkugel aryanization model suggested by J. P. Mallory and the similar hypothesis of A. Parpola.

A supposition made by M. Witzel (1999: 342-3) serves as a linguistic corroboration of this hypothesis. According to him, words for clay brick, pigeon, snake, and snake deity were probably borrowed into the Indo-Iranian language from the BMAC, and the word for ass from the Dravidian language. It is interesting to mention that on the stock-breeding sites of north Bactria the appearance of the ass and the use of mud-bricks have been recorded, while a snake deity cult was a specific feature of the BMAC religion and the corresponding images are many times found on seals. Several words borrowed by the Indo-Iranian language in Central Asia are religious notions: a mythological being *Gandharva*, hemp that was used to make a sacred drink, the soma-plant (*aṃśu-*), seer, priest (*átharvan-*), sacrificing priest (*uśig-*), sacrificial gift. "These words belong to the cult of Soma-drinking Aryans" (Lubotsky 2001: 302-304).

These terms show that the Indo-Iranians, having come into contact with the bearers of the Bactrian cultures, could have engaged native priests and the process not only of cultural but also of religious symbiosis began. This statement is supported by the synthesis of Aryan and indigenous elements in the temple of Dzharkutan. These data probably mean that the statement of V. I. Sarianidi that some Zoroastrian cults were of very ancient BMAC origin though rejected by everyone is not improbable. But the Iranian attribution of the BMAC must be positively rejected.

Thus analysis shows that the presence of Andronovans among the BMAC inhabitants and the partial aryanization of this population are rather probable.

The Andronovo culture

The Kulturkugel model of elite dominance migration, though enticing, does not represent the circumstances of the appearance of the Vedic Aryans' culture in India as it is depicted in Rigveda. According to this model, the Aryans of the BMAC gave up their traditional occupation as stock-breeders and adopted the culture of the BMAC. The Vedic Aryans, however, kept their traditional pastoral

economy and semi-nomadic way of life. They bred cows, goats, sheep, and horses, waged wars with kin clans and with native inhabitants aiming to capture livestock, pastures, and watering places. They fought in chariots. In the hymns of Rigveda the gods were invoked for victory and wealth, i. e., horses and livestock.

When W. Rau (1977) wrote about Vedic archaeology he meant the migration of a steppe stock-breeding culture from the north which brought the Aryan language to India.

The Vedic texts clearly show that it was not a massive all-encompasing invasion similar to the Huns and Mongol conquests when the entire population migrated and incorporated tribes of other ethnic groups (a mass corporative migration type). The Indo-Aryan migration is an example of another type, a type when small clans moved off. Greek colonies were founded in a similar way. According to the ancient sources, an assembly of citizens chose a group of young men and women who marched out after sacrifices. They kept their culture, language, and cults of the gods of their polis.

There were several Aryan tribal groups that participated in the migration: there are mentions of several names of tribes that spoke Indo-Aryan but had different customs and rites.

Separate groups of young men that had already passed the rite of initiation might have existed among the clans. They formed squadrons analogous to the medieval Persian *Gurks* (wolves) and German *Männerbünde*. There were only a few women, since many of them could not survive during the difficult travel. Some Aryans had indigenous wives. Aryans moved in covered carts, while chariots were carried disassembled. Sacrifices were performed before the departure. The most important of them, the *aśvamedha*, could be conducted only by a powerful king when he was about to march out in the first day of spring. Routes to India were already discovered by the Andronovans: through Afghanistan and Baluchistan, and a more difficult one through the Pamirs and Hindukush (see Chapter 4). What archaeological traces could the culture of the newcomers leave?

Settlements and dwellings

W. Rau (1997: 203-206) reconstructs their settlement (*grāma*) as 'a group of sheds surrounded by an enclosure', "the two ends of a *grāma* join together" (JB 3.331). This is a circle formed of carts and in the middle livestock is kept (Elizarenkova and Toporov 1995: 490). Similar camps, *maydans* (an Iranian word preserved in Russian), were made by Cossacks up to the 20th century if they had to spend a night in the steppe. Along with a cart (Andronovan dwelling, type 3), light sectional transportable dwellings that were proto-yurts were in use (Andronovan dwelling, type 2). After a day of rest the community continued on its way. Neither a temporary camp, nor a yurt nor cart would be expected to leave any archaeological signs.

W. Rau (1997: 206) states further that when conquering the plains of the Punjab and Ganges "the Vedic Indians by necessity must have been constantly on the move. Permanent settlements are not to be expected." T. Ya. Elizarenkova and V. N. Toporov (1995: 489) are also convinced that "stable settlements intended for long-term or even permanent residence were not known to the

Vedic Aryans… a permanently moving cart was changeless, while a fixed house was temporary".

However, it is not completely so. The Aryans sowed fields with barley and stayed there for several months waiting for the crop (Elizarenkova 1999: 111; Grantovsky 1998: 117). The word for house (*dám-*) is an ancient common-IE term used in the *Rigveda* (Lubotsky 1997: 660). L. Renou (1939) has shown that the entire terminology of house-building has an Indo-Iranian or Indo-European origin. It is a large stable house sunken into the ground, built of huge log-posts. It has hearths and a door. This is an Andronovan dwelling, type 1A.

I have no information that houses of the Andronovan types have been found in India. But in Baluchistan one can find enclosures and large dwellings of Andronovan type 1B with walls strengthened with massive stone slabs fixed in the ground vertically on the butt-end (Fairservis 1975; 1997). Houses of similar construction have also been found in the settlements in Swat.

Settlements consisting of several large houses built of wood or stone blocks are known from the cultural anthropology of modern Indo-Iranian shepherds. During part of the year the entire community lives there; the rest of the year a part of its members drives the herd to pasture.

Reconnaissance and excavations of settlements that consist of such houses is a common practice of the archaeologists of the Eurasian steppes. But if such a settlement is discovered in India its cultural attribution will be the main problem.

Ceramics

W. Rau wrote about the discovery of but a handful of fragments of sherds of the Vedic Aryans' ceramics. If only it was so! Actually, from the Vedic texts we know that in everyday life the Indo-Aryans used ceramics thrown on a potter's wheel by the *śūdra*, the indigenous craftsmen. (Later the similar situation is recorded in Iran under the Achaemenids: the Persians themselves did not practice such crafts (Dandamaev and Lukonin 1980). According to the *Śatapatha-Brāhmaṇa* (6.5.1.1-6; 14.1.2) it was only for cult purposes that an Aryan with his wife made with their own hands a ritual vessel, *ukhā*, following the precepts of their ancestors. An archaeologist would, therefore, have to select a handful of hand-made sherds from the hundreds of sherds thrown on a potter's wheel.

Are there such ceramics in India? As Vedic texts indicate, the Aryans used crushed sherds (grog) for making pottery. According to W. Rau (1989), they took it from the abandoned Harappan settlements. In this connection data about the settlement of Juderjo-Daro are of great interest. The site is situated in Baluchistan in the Kachi valley on the left side of the Indus. The settlement consists of several hills with their surface completely covered with Harappan ceramics made on a potter's wheel (Shar and Vidale 2001: 3, fig. 5, 6). Among them vessels and fragments of pots have been found, and they differ from the Harappan types (fig. 13, 14a, b). These fairly large, rather heavy vessels are molded of clay with an admixture of crushed sherds and fossil shells, well fired, with textile imprints. A globular pot is made on a pot turned upside-down, and has round sides, slightly everted rim, and a flat bottom thickened by additional application from below. Partly in form but, most importantly, in composition of paste (grog and shell admixture) and in a very specific technique of modeling on

a fabric template these ceramics are comparable with those of the Andronovo culture. The absence of ornament distinguishes it from the Andronovan pottery but this feature characterizes many late-Andronovan complexes and ceramics picked up in the desert. (In the Vedic sources stamp ornamentation is also mentioned rather rarely.) The traditions of ceramic ornamentation might have been kept by women in the homeland; during the migration the pottery skills could not be passed from mother to daughter and there also appeared many non-Aryan women in a clan; thus men began to make cult pottery and the ornamentation almost disappeared.

However, the ornaments connected with the cult of fire and sun, and swastikas and wheels that symbolized them continued to be used for decoration of other cult accessories and have been preserved on the ornaments of temples and in the applied art of India.

Hand-made kitchen ware has been recorded on late-Harappan sites but technologically it differs from the group described. The date of the latter is a subject of discussion (Shar and Vidale 2001: 52). W. Fairservis (1997: 66) mentioned finds of rough hand-made ceramics in Baluchistan dating from the middle of the 2nd millennium BC as well as pottery of the Kulli type. I have had no opportunity to acquaint myself with the pottery of Baluchistan personally, so I can draw no conclusions about it. But the search for single fragments of hand-made ceramics on the surface of the Harappan settlements and on the sites of camps seems to be worthwhile.

The farthest south that Andronovan pottery of the Fedorovo type has been found is the second tepe of the settlement of Shortughai in Afghanistan. It was discovered in a complex with pottery of the Bishkent culture. On the neighboring hill in the upper Harappan stratum a single fragment has been found. Obviously, a single sherd is not enough to solve the problem of the contacts between the inhabitants of the Harappan cities and the Andronovan stock-breeding settlers!

Today most of Aryan tribes that have preserved the nomadic way of life use imported pottery. “The Rigvedic tribes might escape archaeology for this very reason. Texts and excavated settlements don‘t go together” (Falk 1997: 77).

Metal articles

The weapons of an Aryan charioteer according to the description of a Mitanni text from Nuzi, in the *Rigveda* and *Atharvaveda*, is quite similar with respect to specific elements and these did not originate from nor have analogues in the Near East, Iran, and India. These elements are the leather hood used instead of a helmet, shaft-hole arrows, spears, and daggers. Metal artifacts have been recorded in the Sintashta graves and numerous finds of their late types have been made in Bactria north of the Amu-Darya. An arrow has been discovered in Shortughai, chance finds of arrows and knives are known in south Bactria. The major Andronovo-Fedorovo marker, a trumpet-shaped earring (Fig. 53), has been found in the same region. An axe with an image of a camel has been discovered farther to the south in Khurab. The original habitat of the camel is Central Asia; this axe therefore might have been imported from the north. In Kurukṣetra where the epic battle in which the Aryans participated took place a celt of Andronovan type has been found. D. Gordon (1958: 138, fig. 1) regarded it as a weapon of the immigrant Aryans. I hope, new finds of Andronovan weapons in south Asia will follow.

Horses and chariots in Hindustan

Since the cult of the horse and chariot is a key-note in the *Rigveda* as well as in other Sanskrit texts (Sparreboom 1985), the discovery of a horse and a chariot serves as the most important indicator of the presence of the Indo-Europeans. "As the horse and wheeled vehicle are linguistically so closely connected with Indo-Europeans... they may hold the key to what we call 'Aryan migration'" (Ratnagar 1999: 228).

Until quite recently V. Gromova's (1949) hypothesis on the origin of the horse has been generally accepted. As an ancestor of the domestic horse this hypothesis focused on the tarpan that inhabited the Pontic-Caspian steppes where the earliest and the most numerous horse bones were found (Bibikova 1967; 1970; Tsalkin 1970). From there, the horse was adopted by the farming cultures of the Danube region and the Balkan Peninsula (Bökönyi 1969; 1978; Nekrasov 1971; Benecke 1994). This fact has been considered as one of the most important lines of evidence for attributing the Indo-European homeland to the Ponto-Caspian steppes (Merpert 1968; 1974; Grantovsky 1970; Kuz'mina 1970a, b; Gimbutas 1970; 1977; Danilenko and Shmagliy 1972; Mallory 1979; Anthony 1986; Anthony *et al.* 1995).

The present state of research of the problems of the history of horse-breeding is analyzed in detail in *Prehistoric Steppe Adaptation and the Horse* (Levine, Renfrew and Boyle, eds. 2003). The recent supposition about an independent center of horse domestication in Kazakhstan at Botai has proved to be erroneous (Kosintsev 2003, Benecke and von den Driesch 2003). The origin of horse domestication in Eastern Europe still remains open to debate.

According to a widely accepted hypothesis suggested by S. Bökönyi (1994), the horse was initially bread as a meat animal and it was only the next stage that its use for transportation began.

The hypothesis that envisaged the fourth millennium BC population of the Pontic steppes as warlike horsemen who descended upon the farming population of the Balkan-Danubian zone, destroyed their culture and imposed Indo-European speech upon them, has been brought forward by the Ukrainian scholars (Danilenko and Shmagliy 1972; Telegin 1973), developed by M. Gimbutas (1970; 1977) and later supported by D. Anthony (1986; Anthony and Brown 1991). However, their statements have been subjected to a serious criticism. The identification of an artifact from Dereivka as a cheek-piece turned out to be erroneous (Dietz 1992), the age distribution of the horses doesn't conform to that of a domesticated herd (Levine 1999; Rassamakin 1999), the IE languages have no common word for a rider, and not until the last quarter of the 2nd millennium BC did the expansion of horse-riding take place (Kuz'mina 1981; 1994a, b). But the steppes from the Dnieper to the Urals were the perfect habitat for the wild ancestor of the horse. These animals were of great importance for the economy of the region. Their bones make up to 65% (Dereivka) and even 80% (Repin) of all mammal osteological finds in the Neolithic-Eneolithic settlements. For the population having already practiced the breeding of cattle, sheep and goats (a skill borrowed from farming cultures) there existed the most favourable conditions for the domestication of the horse (Shnirel'man 1980; Sherratt 1983).

N. Benecke (1993), having studied the bones of the ancient European horses, distinguished several centers from where they disseminated and concluded that

all ancient domestic horses in Europe derived from the domestic horses of the Eastern European steppes.

It was also there that the earliest forms of a horse cult, which is of special significance for the culture of the Indo-Europeans, has been undoubtedly ascertained (Mallory 1981). On the neolithic site of Varfolomeevka dating from the fifth millenniun BC (in the Volga region) there were found altars which consisted of numerous horse teeth with incisions, ornamented horse hobble-bones, bone figures of horses as well as the earliest stone horse-headed scepter.

The bone figures of horses have been found on the Eneolithic cemeteries of S''ezzhee and Lipovy Ovrag and on the site of Vilovatoe on the Volga; a stone scepter is known from Novoorsk in the Urals and the stone zoomorphic scepters belong to the Volga-Ural region (Kuz'mina 2003: 208-214, fig. 14. 1-4).

The earliest ritual horse burial in the Old World was discovered at the Eneolithic cemetery of S''ezzhee of the Samara culture on the Volga. There, skulls and legs of two horses had been placed on a ritual platform powdered with ocher. According to the traditional chronology this burial dates from the first half of the fourth millennium BC; the calibrated radiocarbon dating-method brings the date of the first Neolithic-Eneolithic remains, including the earliest distinguishable signs of a horse cult, some 500-700 years earlier (Vasil'ev 1981: 62-70, tabl. 7: 1, 13: 12, 15).

In the chronologically later Khvalynsk cemetery horse leg-bones have been found in graves and altars. The ritual burial of a horse skull and legs (together with its hide) was inherited from their ancestors by the bearers of the Pit-grave culture (the late fourth and third millennia BC). These burials have been found throughout the area from the Ural and the Volga to the Dnieper and the Danube. They usually are discovered under large kurgans. The ritual was transmitted from the Pit-grave culture to the Poltavka culture that was genetically related to the former. The Catacomb culture was also familiar with this ritual (Kuz'mina 1977).

The apogee of the horse cult in the steppes was reached in the Sintashta sites at the beginning of the 2nd millennium BC. Chariot-warrior graves with sets of arms and sometimes with chariots also contain burials of two horses (sometimes just the hide with skull and legs; Figs. 35; 60; 64). These burials have already been compared with the Aryan ritual *aśvamedha*, and the buried charioteers with the social group of *rāθaēštar-* 'standing on a chariot' in Indo-Iranian society (Smirnov and Kuz'mina 1977: 52-57; Bongard-Levin and Grantovsky 1983: 170-172).

A team working under the direction of the author has undertaken a complex analysis of the materials from the Sintashta-type burial-grounds of Tanabergen II and Vostochno-Kuraili on the lower Urals (V. V. Tkachev's excavations) and from the Pokrovskiy-type kurgans of Kruten'kiy and Uvarovka on the Volga (O. V. Kuz'mina's excavations). Paleozoologist P. A. Kosintsev has studied the bones. Archaeologists P. F. Kuznetsov and E. E. Kuz'mina have examined the archaeological complexes, analyzed the cheek-pieces, and suggested a reconstruction of a bridle. Anthropologist A. A. Khokhlov has given an appraisal of the skulls of the deceased. Using original methods already tested in Siberia, A. P. Buzhilova and M. B. Mednikova have revealed alterations of bones having been

the result of specific loadings. The evidence suggests the presence of riders and charioteers (Mednikova 1997).

All these facts attest that the Eastern European steppes were the major center of the domestication of the horse, and from the end of the 3rd or the beginning of the 2nd millennium BC war-chariots came into use there.

However, an important book titled *Die Indogermanen und das Pferd* has been published recently (Hänsel and Zimmer, eds. 1994). It includes articles on horse and transport written by leading Indo-Europeanists, and paleozoological articles citing data for the existence of an independent domestication center in Eastern Anatolia (Becker 1994).

N. Benecke (2002) confirmed the existence of the steppe domestication center. The metrical data allowed him to conclude that horse-breeding in Germany between 3300 and 2700 BC "was initiated by animals which had been imported from Eastern Europe" (2002: 187). But having analyzed domestic horse bones from Turkish Thrace (2600-2300 BC) and taken into account new data, he suggested that "horse husbandry in the Southern Balkans started in the middle of the 3rd millennium BC. Presumably, the use of horses as transport animals may have been taken over from Anatolia."

Although J. Boessneck and A. von der Driesch (1976) and H.-P. Uerpmann (1990) had denied the presence of domestic horses in Anatolia, S. Bökönyi (1991) assumed their existence there. A question whether the horses of the Eneolithic settlements of Norsun-Tepe and Tulintepe (the late 5th and the early 4nd millennia BC) were wild or domestic, remains open. It is of essential importance, however, that in Troy the bones of domestic horses appear only in the 6th stratum, not before 1700 BC, and only in the 7th stratum do they become numerous. C. Blegen explained this as a result of the migration of the first Indo-Europeans from Europe.

The solution of this problem should be of course left to the paleozoologists. But if the hypothesis of an independent center of horse domestication is confirmed, what would that mean to the discussion on the origin of the Indo-Europeans and especially of the Indo-Iranians?

T. Gamkrelidze (1994) admitted Eastern Europe as a single center of the origin of horse, where in the Volga region horse was present in the 5th millennium BC, and from the Ukraine (in the 4th millennium BC) it spread via the Trans-Caucasus and the Danubian zone to Anatolia (after 3500 BC), where it has been found in Norsun-Tepe, Demirji-Hüyük and Jerymkaya, as well as the earliest known mention of a horse on a tablet from Kül-tepe – the Assyrian colony of Karum-Kaneš.

T. Gamkrelidze states further that in the Ancient East horse-breeding was an innovation borrowed from the Indo-Europeans along with a word for it. Horse and the cult of the horse were adopted from the Indo-Europeans also by the Mongolians and Chinese. As Gamkrelidze (p. 41) has supposed, it is possible to trace the trajectory of the horse-drawn carts spreading from the Near East in an easterly direction to Central Asia, then to the north to Fergana, Siberia and Mongolia. This distribution "largely coincides with the roots of spread we propose, which took Indo-Europeans from the Near East across the Iranian plateau to Central Asia and farther to the north-east."

V. V. Ivanov's (1999; 2002) views on the history of horse-breeding are quite different. He assumes that the region of the horse domestication was the Near East, while Nagar was the center of horse-breeding. From Mitanni where chariots were extensively used, horses and chariots were brought to the north to Arkaim by the eastern Iranians – Proto-Scythians. Thus V. V. Ivanov is placed for an insoluable contradiction: it has been established that the Indo-Iranians in Mitanni had already evolved into a distinct group of Indo-Aryans. Even if they had come to the Urals from the Near East they would have spoken Indo-Aryan, not the Eastern-Iranian, Proto-Scythian, which by the beginning of the 2nd millennium BC had not yet emerged. The supposition about Eastern-Iranian and Proto-Yenisean bilinguism in Arkaim has also proved to be erroneous. According to archaeological data, the Eastern European post Pit-grave cultures such as Poltavka, late Catacomb and Abashevo played the most important role in the formation of the Arkaim culture, while in the cultures of the forest zone the Proto-Ugrian, not Proto-Yenisean, component was of negligible importance. (The division of the Uralic languages into Yukaghir, Finno-Ugrian and Samoyedic subfamilies, according to the Moscow linguistic school, took place during the 5th and 4th millennia BC, cf. Militarev 2003: A genealogical tree of the languages of the world).

As far as Nagar is concerned, J. Oates (2001; 2003) has shown that it was a center of trade and of breeding large asses and Kunga-hybrids of an ass and a she-onager, which were used in the Near East together with oxen as transport animals (Figs. 95: 3, 4; 96: 6-8). Their images have been for a long time misinterpreted by researchers as horses and untamable onagers. Bronze cheek-pieces which, as it has been formerly admitted, were used for harnessing horses, have been found *in situ* with the skeletons of large Syrian asses at Tell-Haror and Tell-Brak (late 3rd or early 2nd millennium BC) (Clutton-Brock and Davies 1993). On the basis of these facts, as well as the graves of asses in the settlements and evidence of written sources, J. Clutton-Brock (1992) has concluded that it was an ass that was predominately used in the ancient Near East.

As for the domestic horse, there were rare finds of its bones in the Northern-Syrian settlements of Tell-Leilan, Brak-Nagar (end of the 3rd and the beginning of the 2nd millennium BC), in Zagros (Godin Tepe) and later in southern Palestine (Arad) (Oates 2003: 117). Seemingly, in the beginning of the third millennium BC on the Jemdet-Nasr clay tablets and during the Ur III period (the late 3rd millennium BC) a Sumerian word for horse *anše.zizi – anše.kur.ra* – 'ass of the mountains' appeared. Most scholars believe that it derived from the Indo-European root, as the corresponding word in the Caucasian languages also did (Herzfeld 1968: fig. 2; Gamkrelidze 1994: 39: Hänsel and Zimmer, eds. 1994: passim). To Ur III times belong also a Sumerian fable about a rider and his horse (Gordon 1962) and a hymn dedicated to the Ur III King Šulga (2094-2047 BC) in which the king is called 'a mule, a horse of the highway, a stallion' (Falkenstein 1950).

From the beginning of the 2nd millennium BC we find depictions of riders on clay plaques originating from several Near-Eastern towns (Fig. 96: 4; Moorey 1970). Judging by the exterior there are horses represented on some of the plaques. But they are bridled with a nose-ring which was used to harness oxen and asses, and the rider sits on the animal in the usual way of sitting on an ass. R. Moorey suggested that these riders were of Anatolian origin.

Horses are mentioned more frequently in the documents from Mari and Kaneš (first quarter of the 2nd millennium BC) (Kuz'mina 1977; Nefedkin 2001; Oates 2003).

In the Code of Hammurabi (1792-1750 BC) there is no mention of the horse, but it could be found in his letters (Herzfeld 1968: 3). W. Nagel (1966: 23-25) cites written evidence about chariots. War carts (perhaps chariots) are mentioned in the eastern Anatolian ruler Anitta's inscription (*c.* 1800 BC). The Assyrian king Shamshi-Adad (1815-1781 BC) asks the horse teams from northern Mesopotamia from the river Habur to be sent to him. In the correspondence of the king of Mari Zimri-Lim (1781-1759 BC) with the king of Carchemish a delivery of horses from the south-eastern part of Anatolia is one of the subjects. In an inscription from the time of Hattusilis I (1650-1600 BC) chariots in the Hittite army are mentioned. Obviously in the first quarter of the 2nd millennium BC eastern Anatolia and the upper Habur region were the main source of still rare and hence extremely expensive horses for the states of the Near East where they were called 'asses of alien mountain countries' (Yankovskaya 1956).

But in a letter to the king of Mari Zimri-Lim, a superintendent asks him to drive in a mule-drawn cart, not on horses (Kupper 1957: 35-37), a remark which suggests an insignificant role of the latter animal.

Thus by the end of the 3rd and the beginning of the 2nd millennium BC the horse became familiar to the inhabitants of the Near East, but it remained an exotic animal. This fact is confirmed by the practically total absence of bones and authentic pictures of horse, as well as its name. The horse was bridled the same way as the ass and the ox which was little effective and did not permit the use of the horse in the economy and warfare (Kuz'mina 1977: 32).

In Asia Minor the evidence proving that the horse was known is more numerous. According to the traditional hypothesis on the origin of the Indo-Europeans it is during the 2nd millennium BC that the Anatolian languages emerged from common Indo-European and the Hittites and Luvians moved to Asia Minor, the horse, its common Indo-European name, and its cult came with them (Nefedkin 2001: 52, 53). P. R. Moorey (1986: 201-203) assumed that they brought chariots to eastern Anatolia from the Ponto-Caspian steppes. Authentic archaeological data verifying the appearance of the horse cult in the Near East are also connected with the Hittites. They worshiped a rider god Pirva who has been compared to Slavic Perun and Lithuanian Perkunas (Otten 1951; Ivanov 1969) and sacrificed horses on the burial of a king or a queen. After the cremation of the royals, horses were killed, and their heads were interred with the royal ashes (*Keilschrifttexte aus Bogasköy* 30 N 24). Burials of horse skulls unparalleled in the Near East have been discovered in the burial-grounds with cremation and inhumation at Osmankayasy, Ilica and Bogazköy dating from the 17th to the 14th century BC (see bibliography in Kuz'mina 1977). There are no analogues to this ritual found in the Near East, but it is typical for the Indo-Europeans and its roots go back to the steppe in the 5th millennium BC.

The earliest wheels with four spokes (19th–18th century BC) in Anatolia belong to four-wheel battle-cars drawn by four equids (on the seals and prints from Kül-tepe (Kaneš), and a model from Açemhüyük) and to two-wheel battle-cars (seals from Kül-tepe, stratum 2, and Syrian cylinders of the 18-17th century BC) with two equids, harnessed with nose-rings, which doesn't permit one to

consider these equids as horses (Littauer and Crouwell 1979: 48-52; fig. 24, 25, 28, 29, 32) and to interpret (as it has been done by Littauer) these vehicles as chariots.

A question still remains open to debate whether the origin of the horse-drawn chariot was in the Near East or in the Volga-Ural region. Chronologically, the priority of the steppes should be recognized, if the radiocarbon dates are accepted. There are battle-cars known in the Near East, but there are still no cheek-pieces, no chariots and no authentic images earlier than the 17th century BC (it is interesting that according to the conclusion of paleozoologists W. Herre and M. Röhrs (Bittel 1958), the horses of Osmankayasy had come to Anatolia from the steppes).

Difficulties remain in stating the priority of Anatolia or the steppes in the invention of the chariot. It is possible, however, that after four-wheel carts with an ox harness had spread from the Near East during the 4th millennium BC, the independent development of wheel transport began. While in the Near East mules and asses became draught animals, and bronze bit and cheek-pieces were created for them, in the steppes attempts were made to harness the horse, and the intensive development of the types of cheek-pieces took place. If this assumption is right, then the hypothesis that the bronze cheek-pieces found in the Near East imitate those of the steppes (Kuz'mina 1980: tab.) is erroneous and the resemblance of their forms was conditioned by their function. Subsequently, a special type of rodlike horn cheek-piece was created in Anatolia and in south-eastern Europe (Mozsolics 1953; Smirnov 1961a; Hüttel 1978; Kuz'mina 1989; Boroffka 1998; Nefedkin 2001). The Danube region was a contact-zone with the steppes. Tempting though it is to connect the formation of the rodlike cheek-piece zone with the migration of the Indo-European Hittites and Luvians from the Balkans, this conjecture cannot be proved. But the mediate links (via the Danubian region) of the Mycenaean Greeks with the steppe zone seem to be indisputable, which is supported by the analysis of the cheek-pieces (Smirnov and Kuz'mina 1977; Nefedkin 2001).

It is impossible to compare the design of the earliest chariots. The steppe vehicles are too fragmentarily preserved to permit reconstruction, and in the Near East there remain nothing more than models and images. The number of spokes differs in the Near East (4) and in northern Eurasia (8-12), but on the vessels and petroglyphs from the latter region there are often only 4 spokes represented, so this difference may express a stylistic convention (Littauer and Crouwell 1979: 72).

Numerous references to chariots and horses in the Near East date from the 15th century BC. They are primarily connected with the Indo-Europeans who had migrated to Mitanni in the 16th–15th centuries BC; their names occur, however, already in Hurrian texts of 17th century BC. Hurrians are non-IE people who inhabited the southern part of the Armenian plateau, northern Mesopotamia and Syria. They were the native population of the kingdom of Mitanni, where the Indo-Aryans established their rule (Herzfeld 1968: 23). The Mitannian Indo-Aryans promoted skills of training and harnessing horses to chariots. This is attested by a 14th century BC Hittite treatise on horse-breeding written by a groom Kikkuli. It contains Indo-Aryan horse-breeding terminology. Additional proofs are offered by the names of kings and a description of chariot squadrons.

From the 15th century BC on the chariot battle tactics became firmly established. It is not thanks to the Mitanni Indo-Aryans that the horse became familiar to the peoples of the Ancient East (they had been already acquainted with it) but the Indo-Aryans brought blood-horses specially bred for chariots and taught the inhabitants of the Near East to treat, train, and harness horses to chariots. Thus, for the first time in history it became possible to use the horse effectively and to develop chariot tactics as the Near Eastern koine in warfare. During the 15th and 14th centuries BC chariots appeared in the Trans-Caucasus, where bronze models of the Near-Eastern type have been discovered (Pogrebova 2003).

Iran and Bactria do not seem to have been involved in the invention of the chariot. Speaking of the horses in Iran one often refers to the equid bones, found between Susa layers 1 snd 2 and to the image on a vessel fragment from Susa belonging to the beginning of the 3rd millennium BC. But it obviously represents a wild equid (Potratz 1938: 35; Hančar 1956: 14, 405). Bones of two equids (it is not clear whether they were wild or domestic) have been found in Tell-i Iblis in layers 1 (3500 BC) and 4 (3000 BC) (Moorey 1986: 197). There is also an interesting find in Tell-i Malyan in southern Iran (2100-1800 BC)—equid jaws with marks of deformation caused by a bit (Azzaroli 1985: 21, 38). But in light of the Syrian data it might rather have been a mule. Most paleozoologists do not include Iran, Afghanistan and India in the zone of the domestication of the horse (I am grateful to R. Meadow for this information).

On a seal from Hissar IIIb not a chariot, as R. Ghirshman (1977: 14-16) supposed, but a cart with cross-bar wheels is represented (Littauer and Crouwell 1977: 99-100; Fig. 96). But R. Moorey (1969: 430) suggested that the wheels of this cart are of an archaic type which was in use in Susa: it is a composite wheel put together from three fastened sections. The species of equid depicted on the seal cannot be identified. On a Bactrian vessel in the Louvre (Fig. 96: 10) there is a picture of a four-wheel cart with cross-bar wheels and a carriage with two solid wheels fashioned from several segments. Each cart is harnessed with two oxen (Schmidt, E. 1937: 158, fig. 118; Amiet 1988: 161, fig. 6). The seal and the vessel date from the end of the 3rd and the beginning of the 2nd millennium BC.

The same type of a four-wheel cart as well as a covered two-wheel cart harnessed to a couple of oxen or camels were in use in Turkmenistan during Namazga IV, as it can be concluded from the finds of clay models (Fig. 94). Only during the Namazga VI period two important innovations were introduced. These were the spoked-wheel and horse. Clay models of wheels with spokes drawn have been found at Namazga-depe, Tekkem-depe, and Elken-depe, while horse bones has been discovered in Namazga, Tekkem, Takhirbay 3 and Kelleli 1 (Kuz'mina 1983d).

R. Ghirshman (1977: 31) regarded silver and bronze trumpets (Amiet 1988: 173, fig. 19a, b; Sarianidi 2001: 55, 56) as a proof of an early introduction of battle-chariots in Iran and Bactria. Acoustic analysis has shown, though, that they produce a very weak sound reminiscent of the call of a hind, so they could not be used in a tumult of a battle, but rather they were used to luring and hunting deer (I am grateful to Prof. Bo Lawergren from the laboratory of Acoustics and Archaeology of Music of the City University of New York for this communication).

As stated above, the horse as well as the chariot came to the southern part of Central Asia from the Urals in the beginning of the 2nd millennium BC, which is uncontrovertibly documented by the finds in Zardcha-Halifa and Dzharkutan of cheek-pieces of a specific type which have also been found in Sintashta, Kamenny Ambar and Krivoe Ozero (Fig. 66; Kuz'mina 1999; 2002: fig. 2; Vinogradov 2003: fig. 35). Probably the same is valid for the emergence of the horse in the BMAC, indicated by the graves of a decapitated foal and horses in the cemetery of Gonur and of a horse in the settlement of Dashly 19 (Sarianidi 1977: 148; 2001: 37, pl. 12: 7) and by the images of horses (or their heads) on the ceremonial bronze axes from the early 2nd millennium BC (Fig. 95; Pittman 1987: fig. 32; Amiet 1988: fig. 96; Ligabue *et al*. 1988: fig. 98) and from the Mahboubian collection (Mahboubian 1997: fig. 15).

The horse-drawn chariot spread to China during the second half of the 2nd millennium BC with the Andronovan tribes. This assertion is supported by the find of a bronze bit with cheek-pieces with projections going back to the earliest Andronovan prototypes. This bit has been found in the cemetery of Nanshangen, grave 1, dating from the end of the 2nd millennium BC by the objects of Siberian types (Wagner and Parzinger 1998: 72, abb. 14: 20).

Thus the hypothesis of T. V. Gamkrelidze and V. V. Ivanov of the Near-Eastern origin of horse-drawn chariots in Arkaim and Siberia which had come there via Caucasus or Iran and Central Asia cannot be supported by the archaeological evidence.

What are then the signs of horses and chariots in India?

In the Harappan culture (the middle of the 3rd millennium BC) clay models of one-piece wheels, figures of harnessed oxen, and clay and bronze models of four- and two-wheel carts are known. The Harappan wheels differ from the Near Eastern because of their single-sided hub. An analogous type of wheel is known in southern Turkmenistan in the Namazga III period and in northern Pakistan in the Gamal valley at the settlement of Hathala in the Harappa layer IV (Dani 1971: 77-8, pl. 34). The four-wheel wagon type may be reconstructed on the basis of clay models of zebu bulls with four wheels, on fragments of a curved pole, and on clay rectangular platforms from the settlement of Banavali in Haryana (Bisht 1993: 119, pl. 10: 23, 24). They are comparable to models from Namazga V in Turkmenistan, but have holes for uprights along the edge instead of a solid border. Two types of two-wheel carts are represented: The first one has a curved platform with holes for uprights (Mohenjo-Daro, Chanhu-Daro). The second one has a seat placed over the axle (bronze model from Chanhu-Daro) (Mackay 1951: 97, pl. xxi: 13; xix: 1; Piggot 1970: 200-202; Allchins 1973: fig. 30). The traditional transport types have been preserved in India up to present times.

The question of dating the appearance of the horse and chariot in India still remains open to debate. The adherents of the Indigenous Aryan hypothesis insist that the horse was domesticated in the Harappan culture and cite the find of the horse bones from the settlement of Surkotala (Pusalker 1963) which is categorically rejected by paleozoologists (Meadow and Patel 1997).

Clay figures from Mohenjo-Daro (Lal 2002: 71, 72; fig. 3: 26, 27) and Lothal (Pusalker 1963) are regarded as images of horse. The appearance of chariots is suggested by clay models of wheels with a single-sided hub from the settlements of Kalibangan, Banavali and Rakhigarhi. The wheels are ornamented with 10 to

12 painted or relief lines representing spokes (Lal 2002: 72, fig. 3: 28-3: 30). However, R. S. Sharma (1999: 72) regards them as an ornament.

Debate has arisen regarding a bronze model from Daimabad on the river Gadavari. It represents two zebu bulls harnessed with a yoke and a pole to a platform with two one-piece wheels. On this platform stands a naked man holding onto the rail; there is a figure of an animal (a horse?) placed upon the rail; two more figures stand on the edge of the platform (Dhavalikar 1982: 361-366). Excavations have shown that the Daimabad hoard containing a cart and figures of an elephant, rhinoceros, and buffalo is connected with a late-Harappan complex which consists of ceramics, seals, and their impressions (Joshi and Bisht 1994: 42, pl. xx). The cart is not a chariot, and its type resembles a *biga* depicted on a Bactrian vessel from the Louvre. The interpretation of the image as a canopied *ratha* with spoked wheels (?) painted on a sherd from a Pre-Indus fabric period I in Banawali (Bisht 1993: 116, pl. 10: 7) seems to be dubious.

The acquaintance of the Harappan people with the horse at the beginning of the 2nd millennium BC cannot be totally excluded (and their active contacts with BMAC support this point of view), but India cannot be the homeland of the horse, nor of the chariot, since India lay outside the habitat of the wild ancestor of the horse.

From where did horses and chariots come to India? There can be only one answer: from Kazakhstan and Central Asia. This thesis is proved by the fact that the images of a chariot in Hindustan are made in the northern Eurasian style. In the Old World two zones of representation of wheeled transport existed. In the Near Eastern zone a cart or a chariot were depicted on seals, vessels, and in monumental art in profile. In the northern Eurasian zone, a vast region from Scandinavia to Mongolia and China, the images on vessels, and petroglyphs were made full-face (Bussagli 1955; Anati 1969; Kozhin 1960; Littauer 1977; Sher 1980; Kuz'mina 1980b; Novozhenov 1994; Francfort 2002). The latter manner is represented on the petroglyphic images of chariots in India (the second half of the 2nd millennium BC). Over twenty regions with a total number of over a hundred sites have been distinguished. Each site consists of several caves ornamented with painted or engraved pictures. Seventy-five percent of the sites are situated in the north of the country. In some of them images of horses and chariots have been discovered, e.g., in Chibarnalla, Chatur-bhu-Nash, Dharampuri (Novozhenov 1994: 22, 23, fig. 9; Brooks, Wakankar 1976: 1-32), Tekkalakot (Shchetenko 1979: 105, fig. 15: 10); some have been found in Central India (Lal 1961: fig. 5, 6); and a younger type—a chariot drawn by four horses in Morhana Pahar and Mirzapur (Allchins 1973: fig. 3) and a four-wheel carriage drawn by a couple of horses in Mirsapur (800 BC) (Kasambi 1968: 123). A two-wheel cart harnessed to a pair of zebus is depicted on a vessel from the settlement of Inamgaon of the Jorve culture in Central India (16-11th centuries BC) (Shchetenko 1979: 159, 176, fig. 39). Also horse bones have been found in Navdatoli.

The chariots of Chibarnalla belong to the third variant of the two-wheel carriages from Kazakhstan—a variant with additional lines on the edges of a pole. The carriages of this type are represented on the petroglyphs of Koybagar, Arpauzen and Ksan in southern Kazakhstan (Kadyrbaev and Mar'yashev 1977: 162, 163, fig. 10, 30, 89, 102), in Karatau and Eshkiol'mes in Semirech'e

(Mar'yashev and Goryachev 1998: tabl. 11: 6, fig. 102, 103, 106-110, 118) and in Akdzhilga in the Pamirs (Zhukov and Ranov 1974: 63-67, fig.).

Remarkably, in Chibarnalla a sun-headed man with a bow shooting at an enemy is represented. This finds numerous analogies on the enumerated petroglyphs which were situated on the routes of communication in the center of Asia.

The path of the horse-drawn chariots to India can be traced by the finds of horse bones and horse and chariot images on objects and petroglyphs in northeastern Hindustan in Gamal and Swat. On the upper Indus and its tributaries related objects have been discovered. On the ruins of the Harappan settlement at Hathala a cemetery consisting of kurgans was built. The corpses were cremated. The ashes were accompanied by the skulls of bulls, bull and horse leg-bones, and clay figures of these animals and of a two-humped camel, as well as by models of wheels (Dani 1971: fig. 166, pl. 31: 1-4). In the Swat valley at the cemetery of Katelai (period VI) a grave of two horses with a copper pin with a horse figure has been discovered. In the settlement of Bir-Kot-Ghundai a fragment of a vessel (period IV) with an image of a horse and in Loebanr an urn-lid with a horse figure have been found (Silvi Antonini and Stacul 1972: 288, 291 pl. liic; liiia; lxxiib; cliv; Fig. 93). Horse bones have been found in the rock shelter of Ghaligai and in the settlements of period IV: Loebanr III, Aligrama and Bir-Kot-Ghundai (Olivieri 1998: 67). According to paleozoologist A. Azzaroli (1975: 355) the two stallions from Katelai belong to the Oriental breed. Horse burial in the cemetery was an Indo-European and especially Indo-Iranian rite. Its origins and analogues were evidenced in the steppes.

Petroglyphs attest the chariot cult in Swat on the upper Indus in Thor on a caravan route to southern Asia (Fig. 93). K. Jettmar (1985: fig. 6) discovered a petroglyph representing a chariot with two four-spoked wheels drawn by a couple of horses and a man with a bow behind it. Three images were explored in the rock carvings of Godara I (Olivieri 1998: 67,69,73, 74, fig. 15). They represent two-wheel carriages drawn by a couple of horses (spokes are not depicted on the graffito). Both researchers believe these chariots date from the prehistoric times. But they could be dated more accurately by analogy with the finds from Kazakhstan and Central Asia. Chariots with a distinct picture of a pole, yoke, wheels with four spokes, and two horses, and sometimes also with a figure of a bowman appear on petroglyphs from Arpauzen, Koybagar, Gabaevka, Saymaly-Tash, Tamgaly (Fig. 34; Kadyrbaev and Mar'yashev 1977: 162, fig. 51: 1, 72, 100; Sher 1980: fig. 107, 110; Novozhenov 1994: 111-122, fig. 77, 78; Mar'yashev and Goryachev 1998: 31-36, tabl. II).

The petroglyphs may be dated from the second half of the 2nd millennium BC. The important evidence supporting this date are the images on the vessels and on the slabs used for a second time in the stone cists, and the identification of the complexes including a settlement, a cemetery and petroglyphs. Using C^{14} and paramagnetic resonance methods the complexes in Semirech'e could be dated to the 14th–13th centuries BC (Rogozhinsky 2001: 40-41).

Russian scholars have repeatedly studied the cult of the horse and chariot in the Eurasian steppes in connection with the mythological beliefs of the Indo-Iranians, and interpreted certain plots studying the texts of the *Rigveda* and *Mahābhārata* (Kuz'mina 1973; 1977a,c; 1986b; 2001; Kadyrbaev and Mar'yashev

1977; Sher 1980; Samashev 1992). I regard the sun-headed figure as an ancient Indo-Iranian god of the sun and contracts, Mithra (Kuz'mina 1986: 119-121).

The similarity of the petroglyphs from India and from the steppes serves as an additional proof of their Indo-Aryan interpretation. The resemblance of the design of the chariots described in the Vedic texts has been analyzed in detail in Chapter 8. The graphical reconstructon has been suggested by S. Piggott (1950: fig. 32). There exist also steppe analogues for the set of arms depicted in the Vedas, Mihr Yašt of the *Avesta* and in the text from Nuzi.

The common Indo-European character of the Vedic rituals dealing with the horse (*aśvamedha*, *puruṣamedha,* etc.) as well as the role of the horse in the funeral rituals has been firmly established. There exists an enormous bibliography on this theme, but I would like to refer only to several publications (Lévi 1898; Nagelein 1903; Malten 1914; Oldenberg 1917; Dumont 1927; Koppers 1936; Kane 1941; Mayrhofer-Passler 1953; Dumézil 1954; Puhvel 1955; 1969; Molé 1963; Pusalker 1969; Ivanov 1969; 1974; Kuz'mina 1977; 2001; Mallory 1981; Polomé 1994; 1997; Renfrew 1998).

Thus recent discoveries of rock carvings in northern India represent a significant aspect of Vedic archaeology. The gradual spread of the rock carvings to other regions of the country might have reflected the aryanization of the population.

As for the prospects of finding ritual horse burials, there does not seem to be much hope of that. The Aryans came to a subcontinent with ecological conditions very unfavourable for horses, which were subjected to diseases and extinction there. The eating of horses ceased as their price grew. A religious ban to the bloody sacrifices was gradually introduced (Tull 1996: 39).

In Iran after the Iranians had come there Zarathustra also appealed for a rejection of animal sacrifices. That's why a discovery of hecatombs is scarcely probable.

But the established cult of horse and chariot is witnessed by their numerous images in Hindu temples, especially the temple of Surya in Konarak, and by the processions with gigantic chariots kept in shrines, especially the procession of the famous chariot of Jagannatha in the temple in Puri.

Burial rite

Every ethnic group, and hence archaeological culture, has its specific burial rite. The burial rite of the Vedic Aryans has been reconstructed on the basis of *Rigveda* (10.14-18), *Atharvaveda* (18.1-4), *Śatapatha-Brāhmaṇa* (13.8), and a number of later texts (Caland 1896; Pandey 1982: 190-210; Smirnov, Yu. 1997: 127-132).

The Aryans' cemeteries were situated remote from settlements. Around the grave a circular or rectangular stone enclosure was built, and above it a barrow was erected (the rite of *Pitṛmedha*). A pit grave served as a home for the dead, and was sometimes supplied with a framework of logs. The Aryans used both cremation and inhumation. If inhumed, the dead were buried in the flexed position, with the head turned to the west. But cremation was the predominant custom (Puhvel 1981: 409; Pandey 1982; Jones-Bley 1997: 198; 2002). The ashes were brought to the grave in a vessel (*kumbha*). After the cremation the bones

were taken from the ashes and washed in water and milk: "We now leave thee here rest in peace with water and sweet milk", and then the remains were placed in clothes; "may he enjoy the grace of gods when putting together the parts of his body" (Caland 1896: 104). There also occured the cremation of man and wife in one grave (*sati*). Vessels accompanied both cremations and inhumations.

A horse was sacrificed on the occasion of the burial of a king or *kṣatriya*. Cattle, goats, and sheep were also sacrificial animals. The most sacred part of the animal body was its skull.

Other rituals also existed. Sometimes the ashes were scattered, sometimes thrown in a river, sometimes buried under a tree. A partition of the corpse is sometimes mentioned, however, in obscure contexts. Probably it was a rite of exposure, similar to that of the Zoroastrians, "as long as but a bone is preserved, will he live a blessed life in the heavens" (Caland 1896).

Ceremonies conducted when one had died far away from home are of special interest. Sometimes the deceased was cremated without any rituals, while a cenotaph was erected in his homeland. In other cases thirty-three bones from different parts of the skeleton were taken, wrapped in a black goat's (antelope's) hide, and sent home to be burned. If it was not known where a man had died, a human figure was made of the stems of flowers; then it was wrapped in a hide, and burned (*Baudhāyana-pitṛmedha sūtra* 3.6.2). Finally, a corpse could sometimes be put into a vessel full of oil, and sent home where it was cremated (Caland 1896; Pandey 1982: 190-218; Smirnov, Yu. 1997: 127-132).

A custom of embalming or in some way preserving a corpse was maintained by the Scythians. According to Herodotus (4.71), they carried a king's body from one tribe to another before erecting his barrow.

Yet what could be the archaeological traces of the Vedic Aryans funeral ceremony in India? Unfortunately, they leave little hope for an archaeologist. The ashes of an Aryan in foreign parts were sometimes scattered; in other cases a body or a skull and bones or ashes were brought home and buried there; usually there was a commemorative cenotaph. Hence the traces of the first Aryans having migrated to India ought to be sought not there, but in their homeland where the cenotaphs are!

How are the Vedic rites related to the burial rites of other cultures?

The Andronovo burial rite (Table 18)

As it has been stated in the chapter on funeral rituals, the Andronovan cemeteries were situated outside the settlements. Graves were encircled with round or rectangular enclosures, and barrows were erected above them. Trench graves often contained frames of logs or stone cists. Andronovo was a biritual culture. An inhumed body was placed in a flexed position on the left side with the head to the west. But the main custom was cremation: the ashes were brought in a vessel (or on a plate as in the Urals) and poured out onto the bottom of a grave. As M. P. Gryaznov has shown, sometimes a figure was made with the ashes.

There also existed the rite of burying a male and a female in one grave. This analogue to *sati* could be found with both cremation and inhumation; sometimes cremation and inhumation were combined in the same grave. Both cremations and inhumations were furnished with vessels (most frequently two, but

sometimes only one, and very rarely more than two). They were placed beside the head of the deceased.

	Vedic	*Andronovo*	*Baluchistan*	*Harappa*
Separate burial-ground	+	+		
Barrow	+	+		
Enclosure	+	+		
Pit-grave with frame of logs	+	+		
Burial in a flexed position	+	+		
Position on a left side		+		
Orientation to the west	+	+		
Scattered ashes		+		
Ashes in a figurine	+	+		
Sati	+	+		
Animal sacrifice	+	+		
Horse sacrifice	+	+		
Cemetery in the territory of settlement			+	+
Mud-brick lined pit			+	+
Wooden coffin				+
Burial in supine position				+
Orientation to the north				+
Cremation in urn	<+>	<+>	+	<+>
Fractional burial in urn			+	<+>

Table 18: Comparison of burial rites
+ feature, <+> feature occurs rarely.

Animals were usually sacrificed and their hide with skull and legs placed in the grave. Cattle, goats and sheep were the usual sacrificial animals, and in large graves with weapons there is evidence of horse sacrifice.

Some of these rites are well-known in other cultures, Indo-European first of all, but their total combination characterizes only the Andronovo culture and the Vedic tradition.

Traces of rituals used when one died far away from his or her homeland are a distinctive trait in Semirech'e and especially northern Bactria, a starting-point of migrations to the south. It was there that fractional burials have been found. Burials of ashes in a vessel which were sometimes unfired, but just sun-dried have been discovered in Tadzhikistan in Tulkhar (Mandel'shtam 1968: 100, 101), and in Kirgizia in Kyzylbulak I, II (Goryachev 2001: 51, 53, fig. 7: 1, 2 – a *sati* cremation of a male and a female). And the most important thing is that cenotaphs are very numerous there, sometimes with a clay figure inside. Perhaps, it contained bones or ashes of the deceased. The numerous cenotaphs in the southern part of Central Asia are the best proof of the Aryan migration!

Burial rites in Baluchistan

Throughout the Near Eastern region during the Eneolithic and Bronze Age the predominant type of burial rite was inhumation in the supine or flexed position within the territory of the settlement. The walls of the graves were faced with mud-bricks. In Mesopotamia (Hassuna culture), in Iran (Tepe-Giyan), in Anatolia (Koroku-tepe and Alishar) the ritual of child burial in a vessel has been recorded (Alekshin 1986: 25, 32, 36-37).

In the pre-Harappan cultures of Baluchistan burials within the area of the settlement have been discovered. The position of the corpse is supine or slightly flexed. Some graves are marked by mud-bricks round the edge. Fractional burials (containing skulls and several bones, often in a vessel) have also been recovered. These finds have been found in Sohr Damb (Nal), Damb Buthi, and in the Kulli culture. In the latter culture a rite of placing the ashes into a vessel emerged. In northern Baluchistan in the Chalcolithic cultures of the Zhob valley post-cremation urn burials are widespread; "three distinct methods of disposal of the dead were prevalent side by side in the pre-Harappan cultures of north-western India. Thus while extended inhumation and fractional burials were predominant in south Baluchistan and Sind, post-cremation burial was common in the Quetta region and at least at one site (Mehi) in south Baluchistan" (Singh P. 1970: 32). These traditions were maintained in Baluchistan during the Harappan period. They are represented on the mound of Sutkagen-dor near the Makran coast. There, post-cremation urn burials have been found. The vessels contained calcined fragmentary human bones and pottery. This rite, though alien to Harappa, has been discovered in a late-Harappan complex at Tarkhanwala Dera near Chanhu-Daro in Sind. In Chanhu-Daro a vessel containing a skull has been found (Singh, P. 1970: 46).

Burial rites in the Harappan civilization

Harappan burials have been studied by P. Singh (1970) and Gregory Possehl (2002). Cemeteries were situated within the confines of settlements. In Harappa cemeteries R 37 (2450-2150 BC), Rupar, Kalibangan, Lothal, etc., the main rite was extended inhumation of a complete skeleton with the head to the north. The body was placed in the grave-pit, sometimes with a mud-brick lining or wooden coffin. Pits with common grave goods and an urn that did not contain bones nor ash have been found in Kalibangan. Pits with crushed bones have been found in Lothal, while post-cremation urns have been discovered in Harappa. M. Wheeler (1953: 54) interpreted them as post-Harappan.

In the cemetery of Lothal (phase III) apart from usual graves there were three graves without grave goods. In each grave a male and a female were buried. It is a prototype of the *sati* ritual. Since there are no traces of origin or analogues of this rite in India, S. R. Rao considered the buried foreigners, probably merchants from Sumer (Singh, P. 1970: 41).

The massacre in Mohenjo-Daro where unburied skeletons with traces of death by violence have been found (Marshall J. 1931: 79-90) still has no clear explanation. M. Wheeler (1968: 129-132) believed the skeletons to belong to Harappan people, who fell victim to the Aryans who had come to India and destroyed the prosperous cities. This hypothesis has been criticized and now is

rejected by most archaeologists. G. Possehl (2002: 164-165) concluded that the tragic massacre, which took place in the late Harappan period, should not be necessarily connected with the Aryan invasion. It is possible that the downfall of Mohenjo-Daro *c.* 1900 BC occured a considerable amount of time earlier than the first parties of the Aryans appeared in India. The probable late date of the *Rigveda* supports this point of view. Mackay (1937-1938: 647-648) assumed that the "culprits were hill peoples and those of the Indus frontier". As J.-F. Jarrige (1973) has demonstrated that after the Harappan city of Chanhu-Daro had been destroyed, the settlement was abandoned for a long time, and it was much later that the Jhukar culture emerged.

Burials in the post-Harappan cultures of North-Western India

Burials dating from after 1900 BC belong to an epoch of turbulent movements when one culture was replacing another (Piggott 1950: 214-243; Gordon 1958: 77-97). Post-Harappan burials have been excavated in the Punjab—cemetery H at Harappa, in Sind—at Jhukar and Chanhu-Daro, in Baluchistan—in Rana-Ghundai, in Nal-Shahi-Tump, and in Makran in Khurab. M. Wheeler (1947) proved stratigraphically that Cemetery H formed later than R37. In a lower stratum II of Cemetery H extended inhumations have been found. The usual position of the body was supine or extended on a side, with the head to the east or north-east. Fractional burials are also represented. In one case goat ribs which accompanied a human burial have been found.

In the following stratum II pot-burials have been discovered, i.e., vessels containing the remains of a cremation or of a fractional burial, the latter being the skull and long bones of an adult, and a complete body placed in the flexed position in the case of children. Initially the deceased was excarnated, and then the bones were collected and put into the pot for ceremonial burial.

Cemetery H is distinguished by its ceramics. Vessels were ornamented with figures of cattle, goats, peacocks, fish, stars, with the black paint on a red background. There have been no analogous ornaments found. M. Vats (1940) tried to explain these paintings with the help of the early Vedic texts implying thereby that the cemetery H people represented Aryan culture. But there is no convincing evidence to support this supposition.

According to anthropologists "there is a close affinity between the skeletons in cemetery R37 and those in the lower interments of Cemetery H; but both of these samples are different from the interments in the upper stratum of Cemetery H"; at the same time "the individuals from cemetery R 37 and the lower stratum of Cemetery H have a close biological affinity with the burials from the early Iron Age (800 BC) site of Timargarha in Dir District. This is strong evidence for biological continuity from the Bronze Age into the Iron Age" (Possehl 2002: 171).

Taking into account that the rite of fractional urn burial was typical to Baluchistan since the Eneolithic, it seems it is from there that one should seek the origin of the population of the younger part of Cemetery H. As G. Possehl (2002: 175) has concluded, referring to anthropologist K. Kennedy (1995), "the Harappans and their predecessors represent the population, or populations, that are quite stable", and "this stability has continued to the present day" in the

modern populations of the Punjab and Sind. Thus the major part of the population of North-West India remained the same for thousands of years. But the people of the Harappan period, were they the Vedic Aryans? Having compared their rites with the rituals reconstructed from the Vedic texts, there is only one certain answer: no!

Are there traces of migrations from the north in Baluchistan and India? In south Baluchistan stone rings and cists reminiscent of those from the steppes have been discovered (Faiservis 1997: 66). A late Avestan text Vidēvdāt (1: 2) which perhaps preserved an older tradition, relates that alien peoples along the river Harahvati burned their dead, as did also the Aryans of the *Rigveda* (Falk 1997: 86).

The cemetery of Shahi-Tump in south Baluchistan is of special interest (Stein 1931: 88-103; Piggott 1950: 215-219). It was built on the ruins of an abandoned village of the Kulli culture. Twelve inhumations and seven cenotaphs have been found there. The dead were buried in the flexed position on the left side with their hands in front of the face and heads to the west. Sheep or goat bones have been found. In one grave the deceased was placed in a supine position, one arm bent while the other one was extended. Two burials are supposed to be remains of warriors or chieftains. They have rich grave goods—numerous vessels beside the head; one of them has copper ornaments at the neck, a polygonal bead of ruby and, most important of all, a weapon (flint blade). The second has a rich necklace of beads of lapis, agate, and onyx; by his right shoulder lay three round sling stones, a small stone blade, and copper ax-head.

The Shahi-Tump axe belongs to a wedge-shaped type with round shaft-hole and asymmetric blade (Stein 1931: 96, pl. xiii, 135). This type was of Iranian origin, but during the late 3rd and early 2nd millennium BC it spread to the Caucasus (Deshayes 1960: 154, 191). Artifacts close to these in form have been discovered in Mundigak, stratum II (2 specimens), in Chanhu-Daro in a late Harappan stratum and in the post-Harappan site of Jhukar (Deshayes 1960: 80, 195). Deshayes assumed that their appearance in Baluchistan and India was a consequence of trade with Iran. But having compared an axe from Shahi-Tump with axes from the Kuban region, S. Piggott (1952: 213) interpreted this axe as a sign of the Aryan invaders that might have come from the north via the Caucasus. Two axes of this type have been found in Tadzhikistan in Sangvor and Arakchin (Fig. 114: 16, 19) Kuz'mina 1966: 8-9, pl. i: 1, 2). Taking into account that in that region not only axes, but also burial rites analogous to that of the Andronovo culture have been recorded, it might be suggested that the origin of the Shahi-Tump complex could have been connected with south Central Asia.

In India in Madhya Saurashtra a stone circle suggesting a burial has been found (Singh, P. 1970: 42). A question arises whether the rite of burying a man and a woman together (*sati*), which has been discovered in the cemetery at Lothal, was influenced by the ritual known in the Andronovo culture since Sintashta times. It is to be hoped that specialists in South Asian archaeology consider the data on burial rites of Hindustan in the light of the Andronovo culture.

The appearance of fractional burials in the southern part of Central Asia, a rite which had been practiced in Baluchistan since the Eneolithic, should also be mentioned. Probably, this ritual of exposing corpses which was known to the

Vedic Aryans and became predominant in Iran, the Iranians having turned to Zoroastrianism, had spread in consequence of the connections with Baluchistan.

In conclusion, it ought to be emphasized that the anthropological data indicate that in India the overwhelming majority of the population remained stable since Harappan times. This proves that the Aryans who came from the north were rather few. The fact of their migration, however, cannot be denied, as the Aryan funeral customs reconstructed on a base of the Vedic tradition correspond only to those of the Andronovo culture. The burial rite of south Central Asia agress most strictly with that of the Vedic Aryans. Numerous cenotaphs have also been discovered there. They might have been the graves of Aryans having left for India.

Anthropological and genetic data

The analysis of the Vedic texts indicates that it was among the Indo-Aryans who had migrated to India that the caste system formed, with its elite dominance, meaning that the members of the two higher castes Kṣatriyas and Brahmans were Indo-Aryans. There exist anthropological data which provide independent corroboration.

Research conducted by a joint Soviet-Indian program under the direction of Dr. Malhotra with the participation of M. T. Abdushelishvili, V. P. Alekseev, S. A. Arutyunov and I. M. Semashko permits one to divide the population of India into three main groups. 1) a Neo-Indian Europoid group—tall people with fair skin, straight hair, no epicanthic fold, and strongly projected nose; this group mainly includes the members of the higher castes from northern and north-western India (Gujarat, Kashmir, Haryana, Himachal) as well as the Parsis who had migrated to India; 2) a Palaeo-Indian group comprising people with dark skin, sparse hair cover, sometimes with marked epicanthic fold and close to the Veddoid type. “All these people without any exception belong to the lower castes or tribal groups”; 3) a Meso-Indian group occupies a transitional position and chiefly includes the members of medium castes (Arutyunov 2003: 423-424).

The creators of the Harappan culture were Europoids who migrated to the Indus from south-western Iran. They spoke a Proto-Dravidian language related to Elamite. Among the Harappan inhabitants a Veddoid admixture can be traced. This fact reflects the beginning of metisation of the population of Hindustan. The large part of this region was inhabited by Veddoids in antiquity. The latest data provided by genetics support these anthropological conclusions.

The new genetic research into mitochondrial DNA haplotypes has shown that “the ancestors of the present Austroasiatic tribal populations may have been the most ancient inhabitants of India. Based on Y-chromosomal RFLP data, we have also been able to trace footprints of human movements from West and Central Asia into India” (Madjumder 2001: 533). Research has come to the conclusion that “the ‘Caucasoid share’ in the gene pool is thought to be related predominantly to the Indo-European speakers. A commonly held hypothesis, albeit not the only one, suggests a massive Indo-Aryan invasion to India some 4,000 years ago. Recent limited analysis of maternally inherited mitochondrial DNA (mt DNA) of Indian populations has been interpreted as supporting this concept” (Passarino *et al.* 1996: 927-934; Barnabas *et al.* 1996: 409-922). It has

been shown that the "proportion of those [Aryan] genes (or genomic features, such as haplotypes or haplogroups) that 'characterized' the Aryan speakers should progressively decline from the highest *varṇa* to the lowest and the reverse trend should be observed with respect to those genes that 'characterized' the Indigenous Indians" (Bamshad *et al*. 2001: 931-2).

A large group of scientists led by Bamshad has performed genetic analysis of representatives of different castes of India. Complex analysis has shown that "20-30% of Indian mtDNA haplotypes belong to West Eurasian haplogroups, and the frequency of these haplotypes is proportionate to caste rank, the highest frequency of West Eurasian haplotypes being found in the upper castes... the upper castes being most similar to Europeans, particularly East Europeans... all five datasets show a trend towards upper castes being more similar to Europeans, whereas lower castes are more similar to Asians".

In the opinion of the researchers, it confirms the hypothesis that "the IE-speaking population from Western Eurasia came to India from the northwest and spread over the subcontinent," "they... admixed with or displaced the indigenous Dravidian-speaking population" and established the Indian caste system placing themselves "primarily in castes of higher rank." "Contemporary Hindu Indians are of proto-Asian origin with West Eurasian admixture. However, admixture with West-Eurasian males was greater than West-Eurasian females...," "women were presumably more likely to introduce proto-Asian mtDNA haplotypes into the middle and upper castes." ... "The majority of immigrating West Eurasians may have been males... the Kshatriya (an upper caste) whose members served as warriors, are closer to Europeans than any other caste" (Bamshad *et al*. 2001).

Discussion of the results of this research is beyond my competence, but I deem that they must be taken into account as another independent confirmation of the Andronovo hypothesis.

PART FOUR
THE GENESIS OF THE IRANIANS

CHAPTER TWENTY-SIX

THE GENESIS OF THE IRANIANS

The history of research on the Timber-grave culture

In this book it has been continuously emphasized that the Andronovo and Timber-grave cultures were genetically affiliated and their development was parallel.

The history of the East European steppes, as it is represented in the reconstructions of its dynamics, is divided into several stages. The Eneolithic cultures originated out of the Mariupol' horizon and resulted in the formation of the vast Pit-grave cultural horizon which extended from the Urals to the Danube (Merpert 1968; 1974). N. Ya. Merpert has regarded this entity as Indo-European. On the frontier of the steppes and the North Caucasus the synthesis of the Pit-grave and the Novosvobodnaya cultures resulted in the formation of the Novotitorovka kurgan culture. The people of this culture were semi-nomadic and traveled in wagons (Gey 2000). A. N. Gey (2000: 209) believes them to belong to one of the branches of the Indo-Europeans. He regards this culture as a probable component of the next culture to appear—the Catacomb. According to A. V. Kiyashko (1999; 2003) the latter culture formed in the southern part of the steppes on the basis of the Pit-grave culture transformed by influences from the North Caucasus.

But radiocarbon dates do not confirm this hypothesis: according to Kiyashko (2003: 37), C^{14} dates of the Catacomb culture are from the late 4th to the late 3rd millennium BC; and the Novotitorovka culture dates from the 27-22 centuries BC (Gey 2000: 197-198). It is impossible to accept the extra-long chronology of the Catacomb culture: highly developed types of four-wheeled covered wagons and two-wheeled carts are represented on these sites. The latter type was borrowed through Caucasus from the Near East where such vehicles were in use in the 3rd and the early 2nd millennia BC.

The Catacomb culture developed in the southern part of the steppes as a result of different migrations in many directions. At the same time the Poltavka culture formed farther to the north on the Volga. It developed immediately from the Pit-grave culture (Kachalova 1965; Kuznetsov 1989), perhaps under the influence of the Catacomb tribes.

The next culture is the Timber-grave. It was first identified by V. A. Gorodtsov (1905; 1907; 1916). On the basis of the stratigraphy of barrows he established the sequence of cultures: Pit-grave > Catacomb > Timber-grave. Despite numerous corrections this scheme is still valid.

The Timber-grave culture extended from the Urals to the left bank of the Dnieper, individual burials have been discovered to the west on the Dniester and Danube (Comşa 1976), and to the east in the north Caspian sands (Rykov 1926;

1936; Ivanov and Vasil'ev 1995: 157-159; Galkin 1978; 1998). Further, as it has been already said, Timber-grave burials (or Timber-grave with Andronovan traits) were discovered in the sands of Turkmenistan (Mandel'shtam 1966a, b), near Samarkand and Tashkent (Kuz'mina 1988b).

The density of population in the steppe and forest-steppe during the Timber-grave culture was the highest from the Eneolithic up to the 19th century AD. In the forest-steppe of the Middle Volga region alone there are *circa* 2000 sites (Kolev, Mamonov *et al*. 2000: 153). The explanation for this blooming of the Timber-grave and Andronovo cultures was the climatic optimum with warm and humid climate (Lavrushin and Spiridonova 1995; Ivanov 1996; Ivanov and Plekhanova *et al.* 2001). This stimulated a high biomass that resulted in population growth and allowed the steppe tribes to settle and to develop agriculture. Today the most prominent centers of the Timber-grave culture studies are Kiev, Dnepropetrovsk, Moscow, St. Petersburg, Voronezh, Samara, Saratov, and Ufa.

The Timber-grave culture is better studied than any other East European culture of the Eneolithic and Bronze Age. Its bibliography consists of hundreds of titles. They comprise chapters in the regional monographs for the Ukraine (Berezanskaya, Otroshchenko, and Cherednichenko 1986; Berezanskaya and Otroshchenko 1997), the Volga region around Samara (Kolev, Mamontov and Turetsky 2000); also monographs and collections of essays dedicated to different regions, acts of numerous conferences, synopses of dissertations.

The first monograph dealing with the systematization of the Timber-grave culture was the book by O. A. Krivtsova-Grakova (1955). She recognized that the Timber-grave culture formed in the steppes of the Volga left bank on the base of the Poltavka culture as distinguished by P. D. Rau (1928). The latter was directly connected with the Pit-grave culture. Krivtsova-Grakova (1955: 11) believed "the tribes of the Pit-grave culture belong to a homogenous ethnic group divided into separate tribes." She distinguished three local variants of the Timber-grave culture: Volga, Don, and Dnieper and Pontic steppes, assuming the gradual movement of the tribes from east to west. She also emphasized the contacts between the Timber-grave and the Andronovo cultures and the penetration of the Andronovan metallurgists into the territory of the Timber-grave culture (1955: 37, 38, 51-53). She distinguished the early (16th–13th centuries BC) and the late (13th–8th centuries BC) periods in the development of this culture. The latter is characterized by the applied-roller decorated ceramics. It was divided into Belozerka and Sabatinovka stages. It was later discovered that the chronological order of these stages had been inverted. The late Timber-grave sites became the foundation of the Scythian culture. Thus the lineal development of the cultures was reconstructed as Pit-grave > Poltavka > Timber-grave > Scythian. Consequently, their ethnic unity has been assumed. The work of Krivtsova-Grakova exercised enormous influence on the development of studies of the Timber-grave culture, as well as the Andronovo and other Bronze Age cultures.

N. Ya. Merpert (1958: 61-151) made a step further into the study of the Timber-grave culture. On the basis of his classification of burial constructions he distinguished four stages: 1) 16th–15th centuries BC; 2) 15th–13th centuries BC; 3) 13th–10th centuries BC; 4) 9th–7th centuries BC. He believed (1985: 6, 7) that the core of the culture formed on the aboriginal Early-Pit-grave base in the eastern part of the Timber-grave culture area, i.e., in the Volga-Urals regions.

There the Timber-grave culture tribes were closely connected with the Andronovan tribes akin to them. Contacts were intensified thanks to the use of the same metallurgical centers of the Urals. The influence of the Catacomb culture (which was of different origin) on the Poltavka culture tribes was of minor importance. The peculiarity of the local variants was determined by its contacts with the Caucasus and the retention of Catacomb traits in the south and the traditions of the Multi-roller Ware culture in the west, as well as by contacts with its western neighbors. Thus the area of the Timber-grave culture might be considered as a cultural-historical region (Merpert 1985: 8).

A valuable contribution to the study of the Timber-grave culture was made by N. K. Kachalova. She demonstrated that the Poltavka sites should be regarded as a separate culture (1965) and showed that its role in the formation of the Timber-grave culture on the Volga was crucial. She has also distinguished three local variants in the forest-steppe zone: 1) north-eastern (on the Middle Volga and the Urals) where continuity from the Poltavka culture could be clearly traced; 2) the Middle Don; 3) the north-western (Severskiy Donets, eastern bank of the Dnieper) where Catacomb culture influence has also been revealed. The epicenter of the formation of the Timber-grave culture was the regions of the Volga and the Urals, the steppe zone as well as the forest-steppe. The migration to the west started there (Kachalova 1977: 97). The periodization suggested by her is based upon distinguishing an Early Berezhnovka period where connections with the Poltavka culture are evident but there are no traces of Abashevo influence. She has synchronized the first stage with the pre-Andronovan Novokumak horizon, according to Smirnov and Kuz'mina (1977), the second stage with the Alakul' horizon, and the third stage with the Sabatinovka horizon. The fourth stage has been dated to the 11th–10th centuries BC though it has no dateable artifacts. This period is regarded as the final stage of the Timber-grave culture. Finally, the separate Nur type has been identified (Kachalova 1989). K. F. Smirnov (1964: 24-32) has regarded these sites as proto-Sauromatian. It is utterly impossible to share N. K. Kachalova's opinion in that they are not genetically connected with the late Timber-grave culture sites. The distinction of the Berezhnovka stage has also led to debate.

The discovery of the cemetery of Potapovka and the identification of a distinct Potapovka type was of cardinal importance for understanding the genesis and development of the cultures of the Volga region (Vasil'ev, Kuznetsov and Semenova 1991; 1992; 1994; 1995). These sites, rich in weapons and cheek-pieces, formed under the stimulus of the Sintashta tribes of the Urals. The analysis of the stratified barrow 25 at Novy Kumak and of the materials of the Sintashta and Petrovka types from the Urals, and western and northern Kazakhstan showed that the chronological position of these sites lay between the Catacomb and mature Andronovo cultures. But the most important thing is that they formed not on the base of a native substratum but rather as a result of the migration of East European cultures such as the Poltavka, late Catacomb and Abashevo to the Urals (Smirnov and Kuz'mina 1977). The same components participated in the formation of the Timber-grave culture on the Volga. V. S. Bochkarev (1991; 1995) introduced the notion of a 'common block' of cultures involved in the formation of the pre-Andronovan and pre-Timber-grave culture complexes and of the Volga-Ural center of culture genesis.

K. F. Smirnov and E. E. Kuz'mina (1977) attempted to demonstrate the Indo-Iranian identity of the creators of the Novokumak horizon that gained specialists' acknowledgement (Zdanovich 1992; Vasil'ev, Kuz'mina and Semenova 1994; 1995; Otroshchenko 2002).

But the genesis of the Timber-grave culture is a still a hotly debatable matter. There is argument over the location of the center (or centers) of its origin, on the one hand, and on the role of the components of which it consists, on the other. V. V. Otroshchenko (1996) and E. E. Kuz'mina (1999c) state that it was not the Volga-Ural region but only the south Urals where the center of cultural genesis lay. Ore mining in its deposits became the impetus for cultural innovations which are represented in the earliest and the most complete variant: fortified settlements, weapons, cheek-pieces, horse burials. The farther to the west, the weaker this impulse becomes.

The most contentious issues are the place of the Abashevo culture in the ethnic genesis of the Timber-grave population and the significance of the sites of the Pokrovskiy type which was named after the Pokrovskiy cemetery on the Volga excavated by P. S. Rykov. The head of the Voronezh school, A. D. Pryakhin, regards the Don region as a center of the formation of the Abashevo culture. Prestige burials with warrior grave goods (Vlasovskoe, Bogoyavlenskiy, Kondrashkinskiy, Selezni, Filatovo) are supposed to represent the Don-Volga Abashevo culture (Matveev and Pryakhin 1995). On the basis of this culture the early-Timber-grave sites of the Pokrovskiy type formed (Pryakhin and Matveev 1979). The Don region is considered to be a center of the formation of the Timber-grave culture (Matveev 1994). Its development has been divided into three periods, the last of them being characterized by applied-roller decorated pottery, and the scattered poor burials of the remaining population after ecological conditions had forced part of the population to migrate (Pryakhin and Matveev 1988: 159).

Another scholar from Voronezh studying the Don region, A. T. Sinyuk (1996: 207, 208), states that chariots appeared there as a result of an impetus from the Urals. In his opinion the sites of the Don region belong to the Pokrovskiy Abashevo culture, which is synchronous with the Pokrovskiy sites of the Volga region and with the Petrovka-Novokumak type sites of the Urals. He assumes that the Timber-grave culture of the Don had formed as a result of a synthesis of components of the following cultures: Pokrovskiy-Abashevo (which was the dominant one), Catacomb, and Timber-grave of the Volga region. The Saratov scholar N. M. Malov (1992) regards the Pokrovskiy sites as a separate cultural type belonging to a certain unity of Abashevo-Sintashta-Pokrovskiy cultures and synchronous with the Sintashta sites.

An archaeologist who has been studying the Abashevo culture more thoroughly than any other, O. V. Kuz'mina (1995), defends the opposite position. She considers the Pokrovskiy sites as an independent culture, Abashevo and Pokrovskiy cultures belonging to different stages of the Bronze Age that followed one another. There is not only terminological confusion but also a cardinal disagreement on how to define the role of the Pokrovskiy sites in the genesis of the Timber-grave culture.

According to the leading figure in the archaeology of the Bashkir republic V. S. Gorbunov (1976; 1977; 1986; 1990; 1992), the forest-steppe zone of the Urals was inhabited by the Abashevo tribes. Petrovka complexes are synchronous with

those of Pokrovskiy in the Urals (Gorbunov 1989: 85). Isolated early Poltavka and Sintashta sites have been recorded. According to the stratigraphy of the settlements, the Abashevans were replaced by people of the Timber-grave culture who might have come from the Volga region around Samara in the second quarter of the 2nd millennium BC (Sal'nikov 1967; Gorbunov and Morozov 1985; Gorbunov 1990; 1992). The culture blossomed during its second stage (15th–13th centuries BC) when the Timber-grave tribes intensified their expansion to the forest-steppe of the South Urals.

During the second and the third stages Alakul' groups penetrated the region of the rivers Belaya, Ural, and Sakmara. Mixed complexes have been revealed in the cemeteries. In the south Urals there emerged a zone of syncretic Timber-grave-Alakul' sites that reflect intercultural mixing (Yudina 1981; Kuz'mina 1987; Rutto 1989; 2000).

During the third stage (12th–11th centuries BC) the crisis of the culture began. Burials are poor and isolated, settlements with finds of applied-roller-decorated pottery are few. Population decreases abruptly. Tribes of the forest Mezhovka culture advance (Gorbunov and Morozov 1985; Obydennov 1986).

A. Kh. Khalikov (1969) who has studied the region to the north-west—Tatarstan and the Volga region around Kazan'—has distinguished three stages: 16th–15th, 15th–13th, and 13th–11th centuries BC. The Timber-grave culture tribes came there from the south and pushed out the people of the Abashevo and Pre-Kazan' cultures. The Timber-grave culture maintained contacts with the Andronovans. In the 13th–11th centuries BC Timber-grave applied-roller-decorated pottery appeared. Cherkaskul' tribes infiltrated from the east. As a result of the synthesis with them the sites of the Suskan type formed. The forest cultures of Pre-Kazan' and Pozdnyakovo advanced from the north and, at the turn of the 2nd and 1st millennium BC, the Timber-grave population abandoned the Middle Volga and Kama for the south. But it had exercised considerable influence upon the native population.

The most detailed periodization of the Timber-grave culture in the forest-steppe part of the Volga region have been worked out by the archaeologists from Samara (Vasil'ev, Kuz'mina O. and Semenova 1985, Mochalov 2000). Three stages and two types of sites of the final Bronze Age have been distinguished. The Potapovka type formed as a result of interaction between the local Poltavka culture, a descendant of the Pit-grave culture, the Abashevo culture and the early Petrovka population of the Urals. Now the influence of the late Catacomb population is also assumed (EK).

The first stage of the Timber-grave culture itself—the Pokrovskiy stage—reflected the continuing synthesis of the Poltavka and Abashevo components. In a series of sites there are no Abashevo features, an absence also characteristic of the Berezhnovka type of the steppe part of the Lower Volga region where the traditions of Poltavka prevailed.

The second period was characterized by standardization of burial rite and ceramics that lost Poltavka and Abashevo traits. The same processes characterize the Andronovan complexes of the Alakul' type. Their simultaneity is proved by the similarity of types of metal articles and cheek-pieces. This was the time of the maximum extent and the highest point of the two cultures. It coincided with the climatic optimum (15th–14th centuries BC).

During the third period the burial rite became simpler and ceramics coarser (increasing number of jars, simplification of ornament). These features are typical of the Alakul' and mixed Alakul'-Fedorovo complexes.

In a close interaction with eastern neighbors a culture of the Final Bronze Age of the Ivanovka type formed on the base of the Timber-grave culture. This type is close to the Alekseevka type. In the steppe part of the Volga region the sites of the Nur type (analogous to the Dongal type in Kazakhstan) mark the conclusion of the Final Bronze Age.

The Potapovka type was a result of the transformation of the Poltavka population with the participation of the Abashevo population. There is, however, no data that the latter preceded it. The recently discovered Corded Ware culture of Vol'sk-Lbishche might have been the third component (the settlement of Tenteksor of this culture has been found in the north-east of the Trans-Caspian region). Potapovka sites were the basis for the formation of the Timber-grave sites of the Pokrovskiy type (Kuznetsov and Semenova 2000: 130, 134).

The final Bronze Age is represented in the steppe part of the region by the sites of Ivanovka type. These complexes are widespread in the North-Caspian deserts (Vasil'ev, Kolev and Kuznetsov 1986). The area of settlements and the number of burials is small. It is a sign that the main part of population had left the region.

The tribes of the Andronovo forest culture, the Cherkaskul', advanced to the forest-steppe of the Volga region. As noted above, this culture formed under the influence of the Fedorovo type of the Andronovan sites in the Urals. Having come to the Volga region they settled with the Ivanovka population and created sites of the Suskan type (Merpert 1961) that date to the 13th–11th centuries BC. The descendants of the Ivanovkans were the creators of very few settlements and some isolated burials of the Nur type.

As for the Ukraine, the history of the Timber-grave culture in that region has been reconsidered many times. The opinions on the origin and the development of the Timber-grave culture population in this area are quite diverse. D. Ya. Telegin (1961) studied the stratigraphy of the settlement of Ushkalka and demonstrated that the sites of the Sabatinovka type precede those of the Belozerka type.

The works of A. I. Terenozhkin (1965) were of major importance for resolving the problem of absolute chronology not only for the Ukraine but also for the whole steppe. He studied the western links of the Ukrainian sites and established their chronology by coordinating it with the chronology of Europe. The monograph of V. S. Bochkarev and A. M. Leskov (1980) was essential for clarifying the history of metal-working, western contacts, and chronology. The identification of sites of the Maevka type was also a significant result (Kovaleva 1976; 1978; Kovalyova and Volkoboy 1976; 1978).

S. S. Berezanskaya (1982) gave a precise and well-supported survey of the history of the Timber-grave tribes. She ascertained that the left bank of the Dnieper was the western border of this culture. She has also distinguished two local variants: the steppe variant on the left bank of the Dnieper and the forest-steppe variant on the Severskiy Donets. The formation of the culture was interpreted as a result of a movement of a group of early Timber-grave tribes from the Middle Volga region to the Severskiy Donets. They had obvious

Andronovan traits (Berezanskaya 1982: 40, 41). They settled then as far as Kiev on the Dnieper. The Timber-grave culture tribes came into contact with the local tribes of the Multi-roller Ware culture. This synthesis is recorded in the complexes of the Maevka type. It led to the formation of distinctive Sabatinovka complexes. According to the stratigraphical data, the Timber-grave stratum in the settlement and the barrow graves is higher than the stratum of the Multi-roller Ware. They are in their turn covered by the strata of the early Iron Age cultures. S. S. Berezanskaya has distinguished two stages in the development of the Timber-grave culture in the forest-steppe region: the early and the late (Sabatinovka) one. The latter is characterized in the first place by the spread of applied-roller-decorated pottery and by active western contacts with the Noua culture. The Belozerka (the third) period of the Timber-grave culture of the Ukraine could not be traced in the forest-steppe region. At that time the tribes of the northern cultures (Bondarikha and Lebedovskaya) settled there.

S. S. Berezanskaya's conclusions on the ethnic identity of the Timber-grave culture are of great importance. Having taken into account that, according to linguists, Iranian hydronyms are widespread in the Ukraine (Toporov and Trubachev 1962; Strizhak 1965), and that these hydronyms are of pre-Scythian date (Grantovsky 1970), she superimposed the map of the hydronyms onto the map the Timber-grave culture. Their areas appeared to be the same. "The toponymical data indicate that the Iranian element was widespread over the Ukraine" (Berezanskaya 1982: 207). The neighboring cultures of the forest zone (Maryanovskaya, Bondarikha) belonged to Finno-Ugrians.

However, in 1984 N. N. Cherednichenko suggested another way of solving the problem of origins of the Timber-grave culture without assuming a change of population. He remarked that "all the variants are synchronous; there was no epicenter of formation; one should attempt to explain the formation of the Timber-grave culture in each region studying the local archaeological base" (1984: 45). In the Ukraine this is the Multi-roller Ware culture that is connected with the Catacomb culture. Metal articles are also original. N. N. Cherednichenko believed (as A. D. Pryakhin) that the substratum of the Timber-grave culture on the Don was the Abashevo culture.

He recorded the decrease of the number of sites and the lowering of the cultural level during Sabatinovka times. He has also studied the western contacts of the Timber-grave tribes of the Ukraine and that allowed him to make the chronology more accurate and to reveal Timber-grave culture burials in Romania. N. N. Cherednichenko assumed that the sharp fall in temperature, which had occurred in the 12th century BC, caused the mass migration of the Timber-grave population.

The interpretation of the Sabatinovka sites has changed as well. I. N. Sharafutdinova (1968; 1982; 1986) suggested that they be regarded as a separate culture (the term itself has been introduced by N. N. Pogrebova (1960)). This culture is not genetically connected to the Timber-grave culture but is affiliated to the Noua culture in Romania. This idea became a subject of a heated discussion (Leskov 1970) but by now it has gained general recognition. The sites are found on the left bank of the Dnieper, in the Crimea and farther to the Dniester and Don. Their northern neighbor was the Belogrudovka culture; on the Dniester they bordered upon the Noua culture, on the Danube upon the

Coslogeni culture. Ceramics include vessels with applied-roller-ornament with drooping ends ("moustache") which are analogous to those of the late Timber-grave culture in other territories, and numerous types of cups, jugs, two-handled bowls, all having parallels in the Noua culture. Characteristic is a specific set of weapons and celts of the Krasnomayatskiy metallurgical center (Petrescu-Dimboviţa 1977; Bochkarev and Leskov 1980). Identical bone articles including cheek-pieces are usual in the Sabatinovka, Noua, and Coslogeni cultures.

Thus there were "three components in the formation of the Sabatinovka culture: 1) the indigenous component—the Multi-roller Ware culture; 2) the eastern component—the Timber-grave culture; 3) the western component—the Monteoru culture (Sharafutdinova 1986: 115).

The Sabatinovka sites have also been studied by I. T. Chernyakov (1985). He identified the peoples of the Sabatinovka and Belozerka cultures (the latter being genetically connected with the former) with the historical Cimmerians whom he regarded not as Iranians but as Thracians.

V. V. Otroshchenko (1986) gave a different interpretation to the Belozerka culture. It has been considered that the Timber-grave culture went out of existence in the forest-steppe region in the 12th century BC, and that it was replaced there by the forest zone cultures. Belozerka sites are localized in the North Pontic steppes. They descend along the Dnieper (keeping to its left bank) and concentrate between the Dniester and Danube. Their date is controversial: 12th–8th centuries BC (Terenozhkin, Cherednichenko, Otroshchenko) or 10th–8th centuries BC (Leskov, I. N. Sharafutdinova). V. V. Otroshchenko (1986: 151) considered "the Sabatinovka type of sites as a culture inside the Timber-grave cultural unity…who were the tribes of the Timber-grave culture that had the decisive role in the formation of the Belozerka culture of the Dnieper's left bank and of the Sabatinovka culture of the North-West Pontic steppes." In the 12th century BC the Sabatinovka sites disappeared being replaced by those of the Belozerka culture. These events reflect the change of population and probably the mass migration of the late Timber-grave population to the steppes of the Dnieper region and the North-West Pontic steppes. There, on the basis of the Belozerka culture, emerged the culture of the Cimmerians. This people belong to the North-Iranian group of tribes as well as the Scythians and the Sauromatians.

V. V. Otroshchenko's (1986: 152) final conclusion was that "the tribes of the Timber-grave cultural unity as a whole belonged to the North-Iranian ethnos." In *The History of Ukraine* (1985: 526) the author states the Iranian identity of the genetically affiliated Timber-grave, Belozerka, and Cimmerian cultures and admits the presence of the Thracian ethnos in the culture of the final stage of the Bronze Age. This conclusion is supported by linguistic data. O. N. Trubachev (1968) established a group of Illyrian and Thracian hydronyms on the Dniester, Bug, and the Middle Dnieper.

A new volume of the *Prehistory of the Ukraine* (Berezanskaya and Otroshchenko 1997) develops these opinions. The basic points of the relative chronology are maintained there. The Iranian identity of the Timber-grave culture is recognized. A new interpretation of the history of the Timber-grave culture is suggested, though.

A monograph by V. V. Otroshchenko (2001) and the abstract of his doctoral dissertation "The History of the Tribes of the Timber-grave Unity" made a

significant contribution to the study of the Timber-grave culture as a whole. The quantity of sources is enormous: the author has taken into account 2423 settlements and 7624 burials of the entire area of the culture! According to the author, the Timber-grave cultural unity existed from the 18th to the 12th century BC and included two cultures. The Pokrovskiy Timber-grave culture formed on the basis of the Sintashta culture, which in its turn had formed on the base of the Abashevo culture, and of the sites of the Potapovka type and then the Don-Volga Abashevo culture. The Pokrovskiy culture is characterized by an elite group of charioteers and by burials oriented to the north and north-west. Otroshchenko regards this culture as Indo-Aryan. The Berezhnovka-Maevka culture is the second one. It formed on the basis of sites of the Novokumak type and of the Multi-roller Ware culture that was the descendant of the Catacomb one. This Timber-grave culture is distinguished by the east and north-east orientation of its burials. It was created by North Iranians. The stimulus to its formation was the Sintashta culture. The two cultures are not synchronous. The Pokrovskiy culture disappeared by *c.* 1400 BC while the Berezhnovka-Maevka culture formed later and existed till *c.* 1200 BC. On the base of the latter, the Belozerka culture formed and was then followed by the Chernogorovka culture of the Cimmerians-Iranians. The population of the Timber-grave culture played a leading role in the formation of the Saka and Sauromatians.

The ecological and economic crisis in the steppes at the end of the Timber-grave culture was the cause of a mass migration of its population *c.* 1400 and especially *c.* 1200 BC to Iran. Their way lay through the Caucasus and Turkmenia.

This is the conception of V. V. Otroshchenko in broad outline. Its appraisal should be left to specialists of the Timber-grave culture. However, when appealing to modern views on Andronovo cultural unity and the genesis of the Indo-Iranians, several questions arise. The author uses such terms as "Sintashta culture" and "Novokumak type of sites". It is impossible however to distinguish the Sintashta culture, as it has been already stated. It is merely a conglomerate of sites where different components are combined in different proportions and there are no stable types. This was a period of bilingualism and of the formation of the Indo-Iranian language. As for the Novokumak type, it doesn't exist. K. F. Smirnov and myself (1977) distinguished a pre-Andronovan *horizon* between the Catacomb and mature Andronovo cultures, established its chronology, and have shown that the sites were created in the region of the mines of the Urals as a result of the interaction between the East European cultures. We have posed the question whether this population was Indo-Iranian and whether there was a distinct caste of warrior-charioteers. We were pursuing an aim to refute the Ivanov-Gamkrelidze hypothesis on the formation of the Indo-Iranians in Iran and the migration of the Scythians from there in the 8th century BC. The theses we have maintained seemed to have passed muster. They are in their main points in conformity with the conclusions of Otroshchenko. But in the last quarter of a century it has been stratigraphically revealed that in the Novokumak horizon the sites of the Sintashta type are the most ancient; they are directly followed by the Petrovka sites, which are genetically closely connected with them (Vinogradov 1995a; 1999; 2003; Epimakhov 1995; 2002; Tkachev 1995; 1996; 1998; 2003ab; Zdanovich D. 2002; Kuz'mina 2000; 2001).

One cannot agree with the interpretation and chronology of the Suskan (Lugavskaya) culture. They are based upon the erroneous conclusions of Yu. I.

Kolev (2000) who has assumed that not only Cherkaskul' but also the Andronovo Fedorovo population participated in the formation of this culture.

As for the interpretation of Indo-Iranian genesis, some of my conclusions do not agree with Otroshchenko's. Timber-grave cultural unity, though divided into two cultures, remained however monolithic enough. The Pokrovskiy Timber-grave culture, unlike the Andronovo and especially Fedorovo culture, has no specifically Aryan features. I believe the Sintashta and Potapovka reflect the period of Indo-Iranian unity while the whole Timber-grave culture, which had separated from the Andronovo culture, belonged to the Iranians.

It should also be noted that the citation of the 'passionarity' theory of L. N. Gumilev seems quite irrelevant in such an authoritative publication. It has been proved that though showy this theory is unscientific and ill-founded (Shnirel'man and Panarin 2000).

The culture of the Eurasian steppes in the Final Bronze Age

In the last quarter of the 2nd millennium BC an ecological crisis arose in the steppes. There occurred a sharp fall in temperature (Romashko 1986; Spiridonova 1991; Ivanov 1996; Lavrushin and Spiridonova 1995; 1999; Ivanov and Vasil'ev 1995). The output of the biomass diminished. Thick blankets of snow made it impossible for horses to obtain food for themselves and for the sheep from under the snow. These unfavorable ecological conditions led to extremely significant historical consequences, but their prerequisites had been forming during the previous centuries.

The most important innovation was that horse-riding became a common feature. As it has been already noted, herdsmen that grazed herds of horses were able to ride them. But there is no objective data on the existence of warrior riders in the preceding period. The appearance of horse-riding in the Final Bronze Age is evidenced by a new type of rodlike cheek-piece found over a vast area from the Carpathian to the Altai mountains (Rusu 1960; Hüttel 1981; Boroffka 1998; Dietz 1998). The bronze cheek-pieces of the Scythian time followed this pattern.

That horse-riding became widespread allowed the steppe inhabitants to attempt to overcome the crisis by developing a new type of economy: semi-nomadic *yayla*-type stock-breeding when a part of a community drove the stock off to remote pastures. This meant an increase in feed supply and hence a growth of herds. But as livestock is a kind of property one can easily alienate from its owner there arose a necessity of guarding it. It is out of this necessity that the appearance of warrior-horsemen was born. Consequently, new effective types of weapon were invented and the arsenal was augmented significantly. This also had as a result a material increase in metallurgical output and perhaps in its specialization as well as the first appearance of iron.

The final stage of the Bronze Age was the time of the most numerous finds of weapons and hoards in the whole steppe (Chernykh 1976; 1992; Bochkarev and Leskov 1979; Kuz'mina 1966; Chernyakov 1985, etc.). There are founders hoards of craftsmen and hoards belonging to separate clans. That they were buried indicates that the situation in the steppes was very tense which is also eloquently witnessed by the finds of skulls with signs of battle trauma (Mednikova 1997).

What was the culture of the steppes like in this period? As it has been said, at the dawn of research into the Timber-grave culture first period in its development was believed to be the Sabatinovka followed by Belozerka and then by Scythians. They were assumed to have been genetically connected. In the Andronovo culture the latest period was called the Alekseevka period. This epoch was distinguished by applied-roller decoration on the pottery, sometimes with drooping ends ("moustache"). The spread of this ware over a vast area including the Danube, Troy, and Iran has been demonstrated (Kuz'mina 1967). It has been suggested that sites with such ceramics be regarded as part of an Applied Roller Pottery cultural unity (Chernykh 1983; 1992).

Further studies have made this scheme more precise but they have also led to terminological confusions. It has been clearly demonstrated that the Sabatinovka sites are not a stage of the Timber-grave culture throughout the Ukraine as they are found only from the western bank of the Dnieper to the Dniester and farther to the Danube (Pogrebova 1960; Telegin 1961; Sharafutdinova 1968; 1982). Characteristic of these archaeological sites is their genetic connection with the Multi-roller Pottery culture and their active contacts with the Noua culture in Romania which has borrowed the types of kitchen ware from the former (Chernyakov 1985; Sava 2003). The bronze articles of the Galigrad type and bone artifacts with circular pattern (common in Noua), are also widespread. These peculiarities permits one to distinguish the Sabatinovka sites as a separate culture. The ethnic identity of the Sabatinovka population remains uncertain: some scholars consider the Timber-grave population as the main component and hence regard the Sabatinovkans as Iranians (Artamonov 1974: 94; Grakov 1977: 153; Dergachev 1997; Otroshchenko 1999). Some emphasize the western contacts of this culture with the Noua and Coslogeni cultures and assume a Thracian identity for Sabatinovka. I. T. Chernyakov (1985: 145, 148, 151) suggested a Cimmerian identity for the Sabatinovkans. He regarded them as Thracians and underlined the role of the Multi-roller Pottery culture in the formation of the Sabatinovka culture. By analogy to the Noua culture the date of this culture is supposed to be the 14th – 12th centuries BC (Berezanskaya and Sharafutdinova 1985: 498; Berezanskaya and Otroshchenko 1997).

In the Left-bank Ukraine sites of the Belozerka type formed on the basis of the Timber-grave. They date from the 12th – 9th centuries BC (Telegin 1961; Terenozhkin 1965; 1976; Chernyakov 1985; Otroshchenko 1986). Most archaeologists regard these sites as a separate culture but their genetic connection with their predecessor—the Timber-grave culture and with following Cimmerian culture—is by no means doubtful. Its Iranian identity is also accepted (Otroshchenko 1986: 152). A. I. Terenozhkin (1965; 1976) considered this population as Cimmerians-Iranians.

Applied-roller pottery has been unearthed in the Danube region and in the Carpathians in the Noua and Coslogeni cultures, then in Troy in stratum III B2 (Blegen *et al*. 1958; Dimitrov 1968). C. Blegen (1958: 2, pl. 282, 284, 285) dated this stratum to 1190–1100 BC. These ceramics have also been distinguished in post-Mycenaean strata in Mycenae, Athens, and Asine and belong to the period M IIIB–IIIC1 (according to the periodization of A. Furumark (1941), i.e. 1300-1230 and 1230-1200 BC). The appearance of this peculiar type of ceramics in the Mediterranean was explained by the migration wave of the "Sea Peoples"

which had reached even Egypt (Sandars 1978). It is possible that these "Sea Peoples" also included Iranians because the predecessors of the Scythians were known to Homer as "Milk-consuming" nomads. According to Homer (Iliad), the "Sea Peoples" included Thracians and the Palaeo-Balkan tribes settled in Asia Minor, such as the Phrygians. Herodotus (III: 73) wrote that they participated in the Trojan war on the side of the Trojans. The war is dated to the 13th century BC. Thus historical tradition supports the important role of the south-western group of the creators of the applied-roller ware in historical processes such as the Trojan war and the settlement of the Asia Minor group of IE peoples (D'yakonov 1968). They brought with them from the north the IE language, the cult of the IE gods, the art of riding, the worship of a rider deity and a horse, the architecture of dwellings with a gable-roof which has been preserved in the temples and rock tombs, and the costume which included the Phrygian cap (Akurgal 1961).

The monuments of the final stage of the Bronze Age in the east of the Pontic-Caspian steppe have been regarded as a separate Khvalynsk culture by several archaeologists (Malov 2001; Izotova, Malov and Slonov 1993) who followed the interpretation of P. S. Rykov (1927; 1936). Other scholars assign these monuments to the Ivanovka type (Vasil'ev, Kuz'mina O. and Semenova 1985). But everyone emphasizes the continuity of the tradition.

As I see it, since the monuments with applied-roller pottery were natural descendants of the mature Timber-grave culture and there was no population change recorded, it is sensible to regard these monuments as a final stage, or as a late type, of the Timber-grave culture.

Late roller-pottery complexes of the Nur type are believed to belong to the pre-Scythian period (Kachalova 1989).

In this book the periodization of the Timber-grave culture developed by the Samara specialists is accepted.

As for the Andronovo culture area, the history of its studies has been treated in detail in the first part of this book. Difficulties in classification consisted in that there were mixed complexes where the ceramics of the forest Cherkaskul' culture and its Mezhovka stage was found along with ceramics of the steppe Alekseevka type. Now the classification and chronology of the Andronovan forest-zone sites is well developed (Obydennov and Obydennova 1992; Obydennov 1997; Matveev 1993; Gening and Stefanov 1993; Gening and Stefanova 1994; Shorin 1994; Potemkina, Korochkova and Stefanov 1995). Their Ugrian identity is established as well as their contacts with the Indo-Iranians (Lushnikova 1990; Napol'skikh 1997; ECUIE 2001).

Sites of the Alekseevka type have been unhappily named Sargary and erroneously dated to the 10th–8th centuries BC (Zdanovich S. 1974b; 1979). It is a common tradition in archaeology to name a culture or a type after the first-found complex. This means that the complexes of the final stage of the Bronze Age should be called the Alekseevka type (Krivtsova-Grakova 1948). One may add that in Alekseevka the complex is pure (Evdokimov 1971; 1975a; 1984) while in Sargary there is an admixture of ceramics of the Dandybay culture. The name 'Sargary-Alekseevka culture' (Sitnikov 2002) is unsatisfactory as well. First, it is a tautology: the applied-roller pottery complexes of both sites are almost identical. Secondly, it requires one to separate a stage of the development of the Timber-grave culture from the culture itself. It deprives the culture of its dynamics

and ethnical identity. Improper also is the term 'Zamaraevo culture' (Orazbaev 1958) as the settlement of Zamaraevo yielded both the steppe pottery of the Alekseevka type and the forest-zone ceramics of the Cherkaskul'-Mezhovka culture. The term 'Zamaraevo–Begazy culture' (Avanesova 1979) is also invalid, since Zamaraevo is a specific complex where two genetically and ethnically absolutely different cultures are combined, and the cemetery of Begazy belongs to the culture which should be named Dandybay after the first-discovered monument (Rykov 1935). And neither type of sites (or cultures) coincides with the Alekseevka type with its applied-roller pottery and specific ethnos. The position of V. V. Evdokimov (Evdokimov and Varfolomeev 2002: 40) is unclear: he distinguished the Andronovan monuments of the Alekseevka type and then suddenly assigned them to the Begazy-Dandybay culture, however stressing the relevance of the term 'Dandybay culture' (p. 59) and the originality of the applied-roller ware culture (p. 87).

A. A. Tkachev (2002: 199) distinguished the Trushnikovo, Alekseevka-Sargary, and Dandybay cultures, which is also erroneous. Methodologically, it is permissible to speak only about the Dandybay culture alien to Andronovo unity and about the Alekseevka type of the Andronovo monuments with applied-roller pottery which is closely related to the Ivanovka type of the late Timber-grave culture, and to the Nur type on the Volga and Dongal type in Kazakhstan which succeeded them.

The date of the monuments of the Alekseevka type is the 13th – 11th centuries BC and is strongly supported by the similarity of the types of cheek-pieces and metal articles which are wide-spread from the Danube to Central Asia in the final stage of the Bronze Age. Materials revealed by S. S. Chernikov (1960) such as Malokrasnoyarka type belong to the Alekseevka type. The eastern border of the influence of the Alekseevka type lay in Mongolia where applied roller pottery—sometimes with moustache—has been found in the brick-graves (Fig. 109: 19; Tsybiktarov 1998: 92 – 93, fig. 80).

The distinction of the Dongal type of sites was a remarkable success of the Central Kazakhstan archaeology (Varfolomeev 1987; Loman 1987; 1991; Baysenov and Loman 1999; Evdokimov and Varfolomeev 2000; Tkachev A. 2002). They are analogous and synchronous to the monuments of the Trushnikovo type which had been identified earlier by S. S. Chernikov (1960: table xlviii, lxxxviib) in east Kazakhstan, and to the monuments of the Nur type on the Volga. They date from the 10th – 9th (8th) centuries BC and are genetically related to the Sarmatians and Saka sites of the Early Iron Age. In my opinion, N. K. Kachalova's (1989) statement that the creators of the Nur type came from Kazakhstan, is not corroborated well enough. The transformation of the closely related sites of the Ivanovka and Alekseevka types had a natural consequence in the formation of the complexes which were related as closely as their predecessors, on the eve of the Iron Age.

What was happening to the population of the Final Bronze Age? The ecological crisis resulted in a deep social and cultural crisis. The number of settlements decreased drastically. Between the Don and Danube it diminished to a fraction of what it has been (Otroshchenko 1986: 150). Burials become isolated and few. Ceramics became more coarse and lost their local peculiarities with parallel development in different regions. The vessels of the Pokrovsk and Alakul' types with a rib on the shoulder vanished, the shoulder of vessels became more round,

the proportions more elongated. Vessels with a closed neck appeared. Extended or more often applied-roller ornament appeared under the rim or on the shoulder of vessels. The ornamentation became poorer and the zonal division was broken. The pattern was confined to a single zone on the rim and the neck, or more rarely on the shoulder. Its forms were isosceles triangles, and as a rule horizontal or vertical herring-bone patterns, sometimes crosses, rhombuses, pinched ornaments, dimples, and finger-imprints. The latter elements became popular in the monuments of the Nur and Dongal types. Rollers were often covered with oblique nicks or crosses. There are vessels known where a roller is imitated with a stripe covered by nicks or crosses. The pattern was en-graved or made with the help of a plain stamp. Toothed stamps went out of use. In several complexes there are collars and complex-shaped rims, sometimes with oblique nicks. Vessels without ornament make a considerable part of pottery.

Throughout the large region from Eastern Europe to Central Asia the ceramic complex was almost homogenous. Though there existed local variants, the difference between them was minimal. That the monuments were so few and so similar renders it difficult to determine whether the unification of the culture was due to the migration of the Timber-grave culture population eastwards or of the Andronovo culture population westwards, or was a result of parallel development of closely related Andronovo and Timber-grave populations. The latter assumption seems to be the most probable, if one takes into account the conservation of the local distinctions in every region. But this doesn't exclude the possibility of migrations in latitudinal directions.

Not only ceramics but also other important components of culture became more unified. The unification touched the common types of dwellings including the light proto-yurts; bronze artifacts (chisels, sickles, knives-daggers with support, spears with notches, shaft-hole arrows, razors, badges with a loop), the types of cheek-pieces with three holes, the circular ornaments on the bone articles (Fig. 87), and finally the replacement of the settled complex economy of the flourishing Timber-grave and Andronovan complexes by the new semi-nomadic *yayla* type of stock-breeding. (As for the burial rite, the data are fragmentary. A common feature is that the small graves are poor. The orientation became unstable. There is orientation to the south which was unknown in the previous period).

These common diagnostic features of culture suggest the hypothesis that a consolidation of genetically related tribes occurred in the steppes. These tribes spoke different dialects derived from common Indo-Iranian. The Iranian language with numerous tribal dialects was the most successful one in this process. There are reasons to think that it was the Timber-grave culture tribes and those akin to them who were the main participants in this process, especially in the contact zone of the Volga-Urals. A catalyst for this process were the migrations in the steppes which had burst out in the 13th–12th centuries BC in the zone from the Danube to the Altai Mountains.

In the east the Karasuk culture tribes occupied the Minusinsk Basin already in the 14th century BC. They drove out the Andronovan Fedorovan population of the Yenisei variant. This population might have gone to the south-west incorporating other groups of the Fedorovans of Siberia on their way (a corporative migration). Their way might have lain partly through central Kazakhstan, partly

through Kirgizia and reached south Tadzhikistan. The influx of the Fedorovans and the formation of mixed types of sites has been recorded there for the Final Bronze Age. A part of the Andronovans moved across the Amu Darya to south Bactria (Shortughai). Another part of the Andronovans came to the Pamirs and could have penetrated the Upper Indus through the mountain passes.

In the 13th–12th centuries BC tribes manufacturing ceramics with applied roller appeared in Bactria. This pottery has been found as far as Shortughai.

The tribes of the Dandybay culture moved to the west in the steppes some time later (Map 9). They left burials in 30 cemeteries in Kazakhstan: Dandybay, Begazy, Sangru I, III, Buguly II, III, Aybas-Darasy, Aksu-Ayuly II, Dongal, Karagash, Shoindy Kol', as well as in Belasar and Balakul'boldy which A. Kh. Margulan has assigned to a transition period (Gryaznov 1952; Margulan 1979; 1998; Margulan *et al.* 1966; Tkachev, 1989; 2002; Varfolomeev 1991; Evdokimov and Varfolomeev 2002).

The burials of the Dandybay culture were often incorporated into the earlier cemeteries of the Andronovo culture. The burials consisted generally of a double round or square stone enclosure which was made of slabs put horizontally one upon another and bonded together with clay mortar. This enclosure was filled with stones. Sometimes the enclosure was made of vertical blocks. The slabs of a stone cists with a buttress towered in the center of this monumental construction. Sometimes the cist was trapeziform. Corpses were inhumed or cremated, their orientation was instable. Some of them were buried in supine or in flexed position. There were many vessels and rich grave goods in the burials. The graves were plundered. A single-bladed knife, a dagger with a support, hafted spear, shaft-hole two-bladed arrows (one of them with a stud), and hafted trilobate arrows, needles, pins, bronze bracelets (and one golden) with conic ends, a mirror with a loop, bronze and bone badges, and a little pipe with circular ornament. This ornament and especially the types of arrows, which have analogies in the Scythian complexes, provide a date for the Dandybay sites: 9th – 8th centuries BC. That the burial constructions are large and grave goods numerous, signifies the high social status of the buried (Korenyako 1990; Ismagil 1998).

The Dandybay sites are concentrated in central Kazakhstan but individual burials and vessels have been found in Semirech'e (Bien), Kirgizia (Kainda, Dzhail'ma, Vorontsovskoe burial), Khoresm (Tagisken), north Kazakhstan (Sargary), and the North-Caspian region (collections of V. D. Beletsky and A. N. Melent'ev (1972), I. B. Vasil'ev (Vasil'ev *et al.* 1986; Ivanov and Vasil'ev 1995: 157).

Two barrows of the Dandybay culture have been discovered on the eastern shore of the Caspian Sea (Balandina, Astaf'ev 1996). Under the barrows there are stone chambers inside the round double enclosures made of horizontally set stone slabs bounded together with clay mortar. Beside the barrows there are menhirs and fires. In one barrow the body is oriented with head to the west, in the other to the south. There is one vessel thrown on a potter's wheel and open vessels and pots with round shoulder which have no ornament or just have a zigzag or horizontal herring-bone pattern. There is also a pot with a roller with notches. There are no ceramics of the Dandybay type. (This fact prevented archaeologists from identifying this complex correctly.) The western limits of Dandybay culture influence are marked by the finds of the Dandybay ceramics in

the Il'evskiy cemetery and in camps in the Volgograd region (Mamontov 1980: 158), and in the collections from near Astrakhan'.

According to M. P. Gryaznov (1952), Dandybay sites belong to the Karasuk culture. It is impossible to judge the ethnic identity of this population which might have come from Central Asia. But a supposition could not be excluded that it was the first wave of the westward movement of the one of the proto-Turkic peoples. According to the linguists, the proto-Turks belonged to the Altaic language macrofamily which had separated from the Nostratic unity in the 6th millennium BC. Their homeland has been hypothetically localized in the Altai Mountains (Ramstedt 1957; Poppe 1965; Baskakov 1962; 1969, 2nd ed.). The Dandybay culture tribes as well as those of the Karasuk culture had very archaic technique of producing vessels. They made vessels by hollowing out lumps of clay (Gryaznov 1952: 147). This method has been preserved only by the Turkic peoples of Siberia such as the Yakuts and the Shorts. The Yakuts and the Buryats use elements of the Fedorovan ornamental complex which perhaps indicates their ancient contacts (Ivanov S. 1963: 154–158). This suggests a proto-Turkic identity for the Dandybay population. But this hypothesis still needs to be proved.

In the cemeteries of Begazy, Buguly III, Sangru I, Dongal, Shoindykol', Enbek-Suygush, Balakul'boldy III, Aybas-Darasy, Aydarly, pottery of the Alekseevka type in a complex with ceramics of the Dandybay culture has been unearthed. Vessels with applied roller are the most notable in the cemeteries Begazy, Aydarly, Buguly III, Sangru, Aybas-Daraly, Kent, and Dongal (Margulan *et al.* 1966: table 18; Margulan 1979: fig. 78; 89; 110; 112; 118; Margulan 1998: fig. 26: 1; 56: 2: 79: 2; 85: 3; Evdokimov and Varfolomeev 2002: fig. 19: 1).

Alekseevka type ceramics are predominant in the settlements of Central Kazakhstan. In Kent the Dandybay ceramics constitute only 5.8% of the total complex, in Myrzhik – 1.7%. Few examples are from Atasu, Buguly II, Shortandy-Bulak, Upais, Ak-Mustafa (Varfolomeev 1989: 59; Kadyrbaev *et al.* 1992: 27; Evdokimov and Varfolomeev 2002: 57) and north Kazakhstan: Novonikol'skoe, Sargary, Pavlovka (Zdanovich S. 1983: 786; Zdanovich 1988: table 7; Malyutina 1985: 513, 514). The Alekseevka population in the Altai Mountains region was extremely numerous (Kiryushin, Ivanov *et al.* 1990; Shamshin 1986; 1989; Shamshin *et al.* 2000; Troitskaya and Sofeykov 1990; Udodov 1991; Ivanov 1993; 1995; 1998; 2005; Ivanov, Isaev 1999; Demin and Sitnikov 1998; 2002; Tishkin 1998; Papin *et al.* 2000, Sitnikov 2002). A pure Dandybay complex has been unearthed in the burial-ground Stary Sad (Molodin and Neskorov 1992).

Dandybay pottery has been found in the Alekseevka complexes in west Siberia in the Barabinskaya and Kulundinskaya steppes in cemeteries of Krokhalevka XIII (Troitskaya and Sofeykov 1990: 68) and in the settlements of Burla III, Kaygorodok, Novoil'inka, Rublevo VI, Kureyka III (Udodov 1991; Shamshin 1999; Ivanov 1993; Sitnikov 2002), and also on the Irtysh in the settlements of Prorva and Shauke II (Evdokimov and Stefanov 1980; Shamshin *et al.* 2000).

These finds are extremely important. First, they evidence the movement of the Dandybay tribes from the east to the west. Secondly, they indicate that the migrating population was sparse and mobile, while the late-Andronovan tribes of the Alekseevka type remained the majority of the steppe inhabitants. They assimilated the newcomers and it was their culture that became the base for the formation of the Iranian-speaking Saka culture.

The monuments of the Dongal type in Kazakhstan belong to the pre-Saka period.

Applied-roller pottery has been discovered in numerous settlements along with wheel-turned ceramics (late Namazga VI type). It has been found in Kirgizia in Bien, and in central Kazakhstan in Kent, Myrzhik, Domalaktas, Bayshura (Evdokimov *et al.* 2002: 57), and in many monuments of the steppe Altai (Kiryushin, Ivanov *et al.* 1990; Kiryushin and Shamshin 1987; Tishkin 1998; Demin and Sitnikov 1998: fig. 1). These finds witness the establishment of active contacts of the steppe peoples with the farming population of Central Asia in the Final Bronze Age.

The migrations of the late-Fedorovan and then the Dandybay and Alekseevka tribes followed east to west and farther on into Central Asia. Another migration wave moved from the north to the south. In the 13th – 11th centuries BC the fall in temperature led to the movement of the forest-zone tribes southwards in every part of the forest–steppe border. On the Ob the Elovka population occupied the previously Andronovan territory (Matyushchenko 1974). Irmen' tribes reached as far as east Kazakhstan; their pottery has been found in Malokrasnoyarka (Matveev A. 1985: 17). From the Irtysh and Tobol to the Urals and along the Volga there was a huge migration wave of the Cherkaskul'-Mezhovka population whose ethnic identity is defined as Finno-Ugrian (Obydennov 1986: 59; 1998; 1997: 142; Obydennov and Shorin 1995: 49, 163; Shorin 1988; Stefanov and Korochkova 2002: 94).

In the Timber-grave culture territory the tribes of the Pre-Kazan culture moved down the Volga (Khalikov 1969).

In the Volga-Kama region complexes of the Suskan type formed (Merpert 1958). Their formation was the result of interaction between the local Timber-grave population and the Cherkaskul' population who had migrated there. The cemetery of Taktalachuk belongs to them (Kazakov 1978; 1979). The interpretation of these sites as the result of contacts between the Fedorovo and the Timber-grave tribes in the 15th century BC (Kolev 2000: fig. 4–17) proves to be erroneous. In fact, in the settlements of the Suskan type (Suskan, Lebyazhinka II, V, Poplavskoe, Nizhnyaya Orlyanka, Ekaterinovka) the ceramics of the Cherkaskul'-Mezhovka tribes is represented. These tribes had come from the forest zone. These sites date from the Final Bronze Age (not earlier than the 13th century BC and even later). This date is defined by the finds of applied-roller pottery, goblets, celts with front loops, daggers with supports, and cheek-pieces (sometimes of the Suskan type). N. Ya. Merpert's (1958: 119–134) comparison of the Suskan complex with Zamaraevo and his interpretation of these complexes as belonging to the Final Bronze Age are absolutely correct. He has also noted that during this period the Andronovo and the Timber-grave cultures became closer to each other (1958: 129, 130).

The same process of migration of the late-Cherkaskul' population to the south is recorded in the Volga-Don region where the forest-zone (but not the Fedorovan) pottery has been unearthed together with the applied-roller ceramics of the Ivanovka type in the settlements Erzovka, Sukhaya Mechetka. Cemeteries of pre-Scythian times have also been discovered (Mys'kov 1992).

Kiev scholars reconstructed a significant change in the situation in the Ukraine. Belozerka tribes moved southwards from the forest-steppe and settled

in the Pontic steppes as far as the Danube, replacing the Sabatinovka population (Chernyakov 1985: 150; Otroshchenko 1986a: fig. 34).

Iron appeared in the Pontic steppes rather early thanks to the influence of western neighbors. A part of the Belozerka tribes settled in the Crimea (Leskov 1970). Isolated sites have been discovered in the foothills of the Caucasus (Belinsky *et al.* 2000; Otroshchenko 2001: 190).

Numerous migrations in many directions in the last quarter of the 2nd millennium BC resulted in the Timber-grave population abandoning the forest-steppe zone. A part of them went to Turkmenia via the north Caspian region (Otroshchenko 2003: 89) or through the Timber-grave-Andronovo contact zone which lay a little farther to the north. In the chapter on Turkmenia the complexes with Timber-grave/Andronovo features have already been characterized. The Timber-grave culture traits are evidently prevalent there. The culture of the pastoralists underwent a transformation which led to the formation of a new cultural unity. That was the culture of the Saka and Scythians whose names became known to history.

In the Ukraine the transition period is represented by sites of the Chernogorovka type (8th–7th centuries BC) and of the Novocherkassk type which replaced the former. Archaeologists regard them as the monuments of the Cimmerians and Scythians.

In the Volga-Urals region sites of the transition type were distinguished by K. F. Smirnov (1964: 174-188, fig. 2-4). He emphasized the common trends in the development of the Timber-grave and Andronovo tribes at the end of the Bronze Age and stressed the changes in the territories of tribes which occurred when they turned to the semi-nomadic economy (p. 180, 181).

In Kazakhstan the quantity of the monuments dating from the transition period is modest. The cemeteries of Krasnye Gory in central and Izmaylovka in eastern Kazakhstan might be taken as examples. In the former a stone enclosure filled with crushed stone with a pit in the ground has been studied. There was the skeleton of a man (aged 25-35 years) in a flexed position on the right side with head to the south. There are signs of trauma on the bones (Tkachev 2002: 139–145, fig. 193–195). An altar has also been discovered. It is an enclosure with a vessel, fragments of pottery, and burned bones of animals inside. Beside the altar there is a pit with two skulls and hooves of horses and two iron bits. A vessel has a lip; the pottery belongs to the Dongal type. The bits are characteristic of the Saka culture. In Izmaylovka ten burial constructions of the transition period have been revealed (Fig. 107; Ermolaeva 1987a, 1987b: 65-94, fig. 27-47). These constructions consist of round stone enclosures each with a small mound and a box in the center and two separate boxes which contain the remains of burials oriented with the head to the west. Two enclosures are square and have a log-frame or stone constructions with the orientation of the body to the east. They are remarkable for the abundance of grave-goods. Such constructions are characteristic of the Dandybay culture. The ceramic complex includes both vessels of the Dandybay and Dongal types and jugs with swollen sides and thin neck. The latter two groups have analogies in the early-Saka complexes. One pot is ornamented with a roller and vertical herring-bone pattern. Such finds as stirrup bits, cheek-pieces with two or three holes, horse-attire badges of different types, and bullet-like arrows are also of interest. They belong already to the Saka culture. The complex

date from the 9th–8th centuries BC. Such and similar monuments demonstrate that the Saka-Scythian culture formed in the womb of the Bronze Age.

The genesis of the West Iranians

The 1960s were marked by the abundance of archaeological excavations in Iran which led to the discovery of outstanding monuments and brilliant works of art (Map 18). In the region of Lake Urmia in Iranian Azerbaijan, C. Burney examined the multi-layer settlement of Haftavan-Tepe (Burney 1970), while O. Muscarella (1968) and R. Dyson (1967) excavated Dinka-Tepe. R. Dyson (1965) also excavated the key multi-layer site of Hasanlu following the project of the Pennsylvania University. In 1967-1976 the expedition of the British Institute for Iranian Studies led by D. Stronach (1969) excavated the large tepe of Nush-i-Jan in Media. In 1961-1962 Iranian archaeologists excavated the cemeteries of Marlik (Negahban 1996), Kaluraz (Hakemi 1968), and Khurvin in the region to the south of the Caspian Sea. The excavations in Khurvin were continued by the Belgian mission (Vanden Berghe 1959; 1964). A collection from the latter site was gathered by madame Y. Maleki. A collection of bronze works of art from Amlash and a magnificent goblet with a mythological scene were acquired by the Louvre (Amiet 1968). The Iranian archaeologist H. Samadi excavated the cemeteries of Klardasht, Garmabak, and Tamajan in Mazanderan and Guilyan. These works made it possible to date the bronze artifacts from Amlash to the 12th–11th centuries BC (cf. also the important studies by R. Boehmer 1965 and K. Maxwell-Hyslop 1988).

Since 1928 numerous original artifacts from grave robbers in Luristan have been obtained by different museums of the world. There were idols, figurines of riders and horses, weapons, and cheek-pieces ornamented with animal style images.

The discoveries in Luristan can be dated on the basis of the studies of the stratified settlements of Tepe Guran, Godin Tepe, Surch-i-Dum and especially Babadzhan-tepe and of the cemeteries of Tepe Guran, Bard-i-Bal, War-Kabud, Bani-Surmach, Bad-Hora and others, and for the first time a scientific classification system has been worked out. These studies were carried out by the University of London (C. Goff 1969) and especially by the Belgian Mission (Vanden Berghe 1959; 1968a, b, c, d; 1972), as well as by Iranian specialists (Maleki 1964) and others.

The appearance of new materials and the finds of beautiful toreutics induced many scholars to study not only the archaeology but also the art of Iran. Books on these matters began to appear in abundance: *Archaeologie de l'Iran ancien* by L. Vanden Berghe (1959) and *À la decouverte des civilisations de l'Iran ancien* by the same author (1968); *Perse (Proto-Iraniens, Mèdes, Achémenides)* by R. Ghirshman (1962, 1964); *L'art de l'Iran* by A. Godard (1960); *Iran ancien* by E. Porada (1963, 1965); *Iran I: des origins aux Achémenides* by J.-L. Huot (1965); *The Medes and Persians* by W. Culican (1965). P. R. Moorey (1971) published his *Catalogue of the Ancient Persian Bronzes in the Ashmolean Museum*, in which he dealt with the bronzes of Luristan. For several years an exhibition "7000 ans d'art en Iran" traveled across Europe.

Archaeological studies have focused on the creation of a chronological classification. The stratigraphy of settlements and cemeteries, the use of C^{14} dates, and the finds of imported objects (including seals with names of historical persona-

lities) became the basis for this classification. L. Vanden Berghe (1968a, b, c, d; 1972) developed such a classification of the Luristan materials. C. Goff's contribution was also significant. She based her chronology upon the stratigraphy of Tepe Guran and identified the creators of bronze articles with the Kassites. P. Calmeyer (1969) undertook the analysis of the style of the bronze articles aiming to distinguish foreign influences. He also believed the creators of the bronzes to be the Kassites.

L. Vanden Berghe (1968a, c; 1972) distinguished bronzes from different times (2600 to 600 BC). He divided the Iron Age into three periods: 1) 1300/1250-1000 BC when bronze prevailed; 2) 1000-800/750 BC when bronze and iron coexisted; and 3) 800/750-600 BC when weapons were made from iron, but ritual articles were still made from bronze. Art flourished during the period of ethnic movements *c* 1200-800 BC. It reflected different cultural influences from Elam and Assyria that resulted in the formation of an original Luristan style. L. Vanden Berghe suggested that the creators of the bronzes were different peoples: the Elamites, Guti, Kassites, Urartians, Mannaeans, Assyrians, Medes and even Scythians. He believed that around 1200 BC the Iranians invaded Iran and assumed (after R. Dussaud and R. Ghirshman) that the images on the Luristan artifacts from the 12th to 8th centuries BC represent pre-Zoroastrian Ancient Iranian divinities.

The chronology of the north Iranian sites was developed by R. Dyson (1965; 1968; 1970; 1972) on the basis of the stratigraphy of the settlement of Hasanlu. The comparison of the complexes characteristic of the three stages of Hasanlu with other monuments of west Iran permitted him to distinguish three periods: Iron Age I-III. This epoch began circa 1300 BC, and R. Dyson referred to this period as 'the archaeological revolution' meaning the appearance of the Iranians.

The classification of ceramics from west Iran established by T. Cuyler Young (1965; 1967; 1969) was also of major importance. It was based upon the comparison of the ceramic complexes from the strata of the settlements of Hasanlu, Geoy-Tepe, and Tepe-Giyan with the cemeteries of Khurvin, Sialk and others. Thus three 'ceramic horizons' were distinguished. They characterized the emergence of a new integral culture that received the name of 'the grey (or black or black-grey) ware culture'. Young (as also R. Dyson) explained the spread of the black-grey ceramics with new forms of vessels characteristic of it (tea-pots and goblets with handles in the first place) as a population movement associated with the arrival of the Iranians.

In the development of this new culture three horizons were distinguished. 1) 1300-1000 BC: a horizon of early western grey ware; it is characterized by a significant cultural uniformity; 2) 1000-800 BC: a horizon of late grey ware when centrifugal trends and local developments are recorded; 3) 750/700-500 BC: a horizon of red ware which sometimes was painted or was engraved with triangular festoons. The ceramic complex of the Achaemenid empire descended from this tradition.

The work of L. Vanden Berghe (1959; 1964) contributed to the establishment of the hypothesis of the 'archaeological revolution' of the early Iron Age. He was the first one to emphasize the change of burial rite that took place in Iran at the beginning of the Iron Age. Throughout the region, burial under house floors fell out of use, and separate burial-grounds became the established custom. The

dead were buried in pits, faced with stones, or in stone cists and there were ceramics in the graves. Notable were large graves with precious vessels and objects ornamented with images in the animal style. This reflects the stratification of the society of the newcomers. Their nomadic way of life is evidenced by the burials of horses.

Numerous archaeologists from different countries participated in the complex elaboration of the problems of Iranian history and it became a considerable success of the archaeology of the sixties. The possibility of resolving important historical problems by means of archaeology was clearly demonstrated. The hypothesis on the migration of the Iranians was established on the base of the works of J. Deshayes (1969). He excavated the settlement of Tureng-Tepe and synchronized it with the settlement of Hissar III and dated the Iranian immigration to the end of the 3rd and the first quarter of the 2nd millennium BC. He thought that the creators of the culture of the south-west Caspian shore, who produced grey-black burnished ceramics on a potter's wheel, were the ancient Indo-Europeans or Iranians. This culture was later named the Gorgan culture by D. Stronach. It was this culture that the adherents of the hypothesis on the migration of the Iranians in period I of the Iron Age regarded as their homeland.

Russian scholars disagreed with this thesis. A. M. Mandel'shtam (1965: 192-194) denied the Indo-European or Iranian attribution of the Gorgan sites. He also drew attention to the fact that "the issue of concrete ethnic attribution of different archaeological complexes and its very possibility remains unresolved." Reviewing the publication of the Khurvin cemetery by L. Vanden-Berghe (1964) he stated that the synchronization of the cemeteries of Sialk A and B and Khurvin and the two waves of the Iranian migration remained unproved.

E. E. Kuz'mina (1973: 187; 1975: 118) expressed doubt that the population of north-western Iran in the 3rd and 2nd millennia BC could be identified with the Iranians. She was basing herself upon the data of I. M. D'yakonov (1956) that even in the beginning of the 1st millennium BC non-Iranian peoples such as the Mannaeans, Hurrians, Lullubi, Kadusi and others lived in that region. She rejected the Cimmerian or Scythian attribution of horse burials in Iran and regarded them as the first trace of the Iranian migration probably through the Caucasus.

M. N. Pogrebova (1977a: 8, 15-19) objected to the conclusions of T. Cuyler Young. She noted that between Hissar III and the sites of the Early Iron Age there was a chronological hiatus half a millennium long, even if one accepted the late date of stratum III. She also emphasized the fact that the uniformity of Iron Age I, suggested by Young, was merely an illusion. In Young's opinion, this uniformity must have been the ultimate evidence of the appearance of the Ira-nian ethnos. In reality, in Iron Age period I the cultural distinctions between regi-ons were marked. And what is more, many forms of grey ware derive from the ear-lier local forms of painted pottery. So Young's thesis that the cultural frag-mentation characterized the second period seemed out of touch with the evidence.

I. N. Medvedskaya (1977; 1978; 1982) analyzed the ceramic complexes of Iron Age I and demonstrated that several types (e.g., 'tea-pots') emerged in the Near East already in the 4th millennium BC; some ceramic types developed in Anatolia which means that they could not be treated as an ethnic indicator of Iranian culture. She also initiated a discussion concerning the absolute chronology and synchronization of the sites of Iran.

But E. A. Grantovsky became the chief opponent of the hypothesis that the grey ware spread as a result of the appearance of the Iranian ethnos (1970: 46ff., 362; 1981; Bongard-Levin and Grantovsky 1983: 180, 185; 1998: 61, 90). He emphasized that grey ware thrown on a potter's wheel could not possibly be an indicator of Aryan peoples including the Iranians, since this pottery was not known in their society, according to the *Rigveda* and the *Avesta*. In the Near East there existed large poly-ethnic ceramic provinces in different periods. Each of them included several countries, e.g., the Habur province which is inaccurately attributed to the Hurrians. He also noted that the ceramic complex of Iron Age I could not be directly derived from Gorgan. It reproduced partially the early types of north-western Iran where grey ware had emerged earlier than Iron Age I.

Considerable doubt exists as to the chronology. There was no iron during the first stage, and according to calibrated C^{14} dates, the second stage should begin about the 14th century BC, which means that it was 500 years earlier than the first mention of Iranians in Assyrian (9th century BC) and later Urartian sources as inhabiting west Iran. But the main point is that Hasanlu, the model site of grey ware and regarded as proxy evidence of the Iranians, is in fact the ancient city of Ida, which was the capital of the land of Ida. It is mentioned in an inscription of Salmanasar III (855 BC). From a stone cup (or a lid) found in Hasanlu and believed to date from a somewhat earlier time there is an ideographic inscription: "The palace of Bauri, the regent of the land of Ida" (Dyson 1972: 50, fig. 9). According to onomastic data of this region drawn from Assyrian sources, and particularly up to the annals of Salmanasar of 843 BC, the inhabitants of this country were not Iranians, but the ancient aboriginal population, probably the Lullubi (Dandamaev and Lukonin 1980: 68, 69; Grantovsky 1998: 56-57). E. A. Grantovsky (1998: 57-59) provides another example of grey ware undoubtedly associated with non-Iranians.

In the north-west of Iranian Azerbaijan German archaeologists W. Kleiss and S. Kroll examined a settlement and a grave with a stone cist in Seqindel. An Iranian archaeologist M. Mashkoor discovered there an Urartian inscription that was read by G. A. Melikishvili. It tells about the capture of a city of Lubliani, the capital of a land of Puluadi, ruled by a King Kadiauni, by the Urartians. These names are indisputably non-Iranian. The city is also mentioned in the annals of King Sarduri II in the middle of the 8th century BC.

Since the arguments of the Russian scholars are very convincing, it is impossible to identify the Iranians with the producers of grey ware in Iron Age I. The interpretation of the Gorgan culture of the late 3rd and early 2nd millennia BC as Iranian or Indo-European is even less acceptable.

What light do written sources shine on the appearance of the Iranians in the Iranian plateau and the routes of their migration?

During the last two centuries this problem has been the subject of study many times. The historiography of this issue has been summarized in the works of M. M. D'yakonov (1961) and E. A. Grantovsky (1970). Most important for this theme are a book by W. Geiger (1882), who based his conclusions on the evidence of the *Avesta*, the *History of Early Iran* by G. Cameron (1936), J. Marquart (1938), Herzfeld (1938; 1941; 1947; 1958), the *History of the Persian Empire* by A. Olmstead (1948), and R. Frye (1962). These works contain the analysis of written sources.

The contribution of Russian scholars to the study of the early history of the Iranian tribes was also significant. M. M. D'yakonov (1954; 1961) was a pioneer in reconstructing their economic and cultural type according to the evidence of the *Avesta*. He has shown that the potter's wheel was not known to the early Iranians and there was no special stratum of craftsmen in their society.

The works of I. M. D'yakonov (1956; 1968) and I. Aliev (1960) dealt with the history of ancient Iran and especially Media. M. A. Dandamaev (1963 and other works by this author) studied mainly the history of the Achaemenids. In a book by M. A. Dandamaev and V. G. Lukonin (1980) the former elucidated the economy of the country, while the latter brilliantly surveyed the formation of art of the ancient Iranian peoples: the Scythians and the Iranians of the Early Iron Age themselves. The monograph of I. M. D'yakonov (1956) remains a classic study despite the fifty years that have passed since it was first published. I. M. D'yakonov (1956; 1958; 1967; 1968) has shown that north-western Iran was inhabited until the 1st millennium BC by different peoples belonging to diverse language families. The north-west was inhabited by the Hurrians whose language was close to that of the Urartians. In Iranian Azerbaijan and Kurdistan there lived the Kutii whose language cannot be identified with any known Near Eastern language. To the south of them there lived the Lullubi who spoke a language related to Elamite. The language of the Kassites was also of this type. They were mountain pastoralists and metallurgists and inhabited the territory of Luristan. The modern Lures are their genetic successors who adopted the Iranian language and many cultural traits of the nomadic and horse-breeding newcomers.

There is information on a campaign of the Assyrian king Adadnerari I (beginning of the 14th century BC) against the Kassites, Kutii and Lullubi who were exterminated. In the 13th century BC Salmanasar I defeated the Kutii, and Tukulti-Ninurta proclaimed himself a king of Mitanni, Kutii and of all Nairi (i.e., Urartu). These documents contain no data on the existence of an Iranian element in Iran at that time. The annals of Elam depict the same situation. Tilhak-Inshushpnak (1165-1151 BC) led a campaign in Iran into the Zagros, but there is no mention of Iranians in its description. So a conclusion might be drawn that there is no data about a change of ethnos in Iran from the 3rd to the 1st millennia BC (Herzfeld 1938; 1968; D'yakonov 1956: 98-142, maps on pp. 99, 139). This region was inhabited by the Hurrians, Kutii, Lullubi, Kassites, Elamites and other peoples, but the written sources remain silent on the Iranians.

Unfortunately, the Assyrian eastern campaigns temporarily ceased in the 12th–10th centuries BC due to an internal crisis. Accordingly, the sources lack any information on the ethnic situation in Iran during this period (D'yakonov 1956: 137-138; Dandamaev and Lukonin 1980). Assyria fought campaigns against Media only from 834 to 788 BC. References to a country of Parsua, of a kingdom of Manna in Iranian Azerbaijan, and of a union of 'the strong Medes' appear in the 9th century BC. Herodotus (1.101) enumerated six Median tribes, three among them having an Iranian etymology: *arizantoi* ('the tribe of Aryas'), *stroukhates, paretakīnoi*. The latter were localized in the east—in Isfahan and in Central Asia. 'Arya' was the self-designation of different Indo-Iranian peoples (Indo-Aryans, Western Iranians-Medes and Persians). Darius I says in the inscription of Naqsh-i-Rustem that he is a "a Persian, a son of a Persian, an Arya, from

the family of Aryas". 'Arya' was also how the Eastern Iranians called themselves: it is often met in Scythian names and in Ossetic (Abaev 1949 I: 156).

These data are a decisive evidence of the spread of the Iranians in Iran at the beginning of the 1st millennium BC. However, three of six Median tribes mentioned by Herodotus have no Iranian etymology. Consequently, the newcomers subjugated and incorporated a part of the aboriginal population (elite dominance corporative migration).

In the beginning of the 1st millennium BC the toponymy of western Iran remained predominantly non-Iranian. This means that the indigenous population outnumbered the migrants and that the relations between the newcomers and the native inhabitants were peaceful (D'yakonov 1956: 159).

The process of consolidation of ethnically diverse population into one ethnos is reflected in the compound names of gods: Bag-Maštu, Bagbartu, Bag Teshub (Grantovsky 1977: 302-305; 1998: 30-33).

According to onomastic data, it was not until the 8th–7th centuries BC that all Median proper names have an Iranian etymology, and the gods worshiped by the Magi acquired Iranian names (D'yakonov 1956: 148, 151).

The analysis of the toponymy and onomastics and of the relations between Median and the languages of Central Asia led I. M. D'yakonov (1956: 74, 139, 150, 157) to conclude that the ethnos of the 'Aryas' was of Central-Asian origin and the nomadic horse-breeding tribes of the Iranians penetrated Iran from the steppes of the east. He assumed that separate Iranian tribes began moving to Iran by the end of the 2nd millennium BC, long before they were first reported to be present in the western parts of the country in the 9th century BC.

An opposite point of view was expressed by E. A. Grantovsky (1970; 1998) who suggested that the Iranians followed a Caucasian route of migration from the Pontic steppes. Having studied the toponymy of Iran, he interpreted several place-names in north-western Iran as being of Iranian origin. This gave him reason to think that the Iranians came mainly via Transcaucasia. Grantovsky stated that although Iranian names appear in the Near-Eastern written sources only in the 9th century BC, their migration through the Caucasus might be assumed to have been taken place earlier—in the 11th century BC.

Some of the Iranian etymologies suggested by E. A. Grantovsky were disputed by I. S. Aliev, I. M. D'yakonov and G. A. Melikishvili. This led to the conclusion that Grantovsky "has underestimated the role of the autochthonous population which still occupied large territories of the Iranian plateau", and the statement that "the movement of the Medes and Persians to Iran through the Caucasus rather than from Central Asia… could not be regarded as uncontroversial" (Dandamaev and Lukonin 1980: 40-41).

Thus the analysis of the written sources reveals the appearance of the Iranians in the 9th century BC, but does not conclusively answer the question whether they had come through the Caucasus or Central Asia. The lack of written data on the 12th–10th centuries BC does not allow to establish a firm lower date for the migration.

It is archaeology that must answer these two cardinal questions. But if the hypothesis about the relationship between Iranian migration and the spread of grey ware is unsound, what archaeological materials can be treated as ethnic markers of migration?

M. N. Pogrebova (1977) acknowledged that one of the important indicators of the appearance of the Iranians is the spread of horse burials and horse images in Iran, which reflected the ideology of the newcomers. Burials of horses have been discovered in the cemetery of Hasanlu IV. In a large grave (4m deep) there lay a warrior in the flexed position on his left side with his head turned to the north-east. Symbols of his status—a pectoral and leaf-shaped arrows—were placed beside him. Four horses were lain near him with their heads to the east. Two of them lay on the left and two on the right side. There was no space for a chariot in the grave. A bit and cheek-pieces were also found (Dyson 1965: 208-209). R. Dyson emphasized the difference between this and the adjacent ordinary graves. Its date, he suggested, was the 8th or perhaps the 9th century BC. R. Ghirshman (1964: 26, 280) compared this grave with Scythian burials but the Scythian invasions date from a later period.

In the neighboring cemetery of Dinka-tepe the skeleton of a horse with legs chopped off has been discovered. Adjacent graves are believed to date from the 10th–9th centuries BC (Muscarella 1962: 187). In the Caspian region in Gilyan there also have been found three 'horse' graves in the cemetery of Marlik. The grave pits measured 2 x 1m. They were faced with stone with clay mortar. It seems that initially a horse skull was buried in each grave, but there is nothing left but teeth. Bronze bits and harness badges were placed beside them. A rich grave has been discovered where horse teeth and elements of a horse harness are found (Negahban 1964: 15-16). Its estimated date, according to M. N. Pogrebova (1977: 137), is the end of the 2nd millennium BC.

In the cemetery of Kaluraz several graves have been found with horse and harness burials situated in the same graves as human bodies, but not close to them. An iron bit has been discovered there (Hakemi 1968: 63-65). These graves date from the very end of the 2nd or the very beginning of the 1st millennium BC (Pogrebova 1977: 137).

In 1991 the excavations initiated by Ali Hakemi in Marlik were continued by A. Shahidzadeh. A simple grave pit with the remains of a man and a horse has been found there. Analogous graves have been discovered by Ali Hakemi in Marlik and Rustemabad (Hakemi 1968). The complex of finds is close to that of Marlik and Sialk. Iron articles are sporadic; bronze objects, on the other hand, are numerous and reminiscent of Marlik. This helps in dating the site to 1200-1000 BC (Curtis and St. John Simpson 1998: 191).

A grave with a male and female bodies and a horse burial beside them belonging to the same grave were discovered in Central Iran. The complex dates from the end of the 2nd millennium BC (Young 1969: 288, 320). A little to the south, in the key Luristan site of Babadzhan-tepe, a pit in the ground was found at the entrance to the citadel. This pit contained a horse burial with iron bits and was covered with stones. The date of the burial in the citadel is the 8th–7th centuries BC (Goff 1970).

Moreover, two-ringed bits, cheek-pieces and horse harness badges have been discovered in the cemetery of Tepe-Giyan I (Conteau and Ghirshman 1935: pl. viii). In the cemetery of Sialk VIB two-ringed bits, three-holed cheek-pieces and looped badges have been found, as well as a cylindrical seal with an image of horsemen (Fig. 106: 1, 4-11; Ghirshman 1939: pl. lvi).

How could the genesis of the horse burials in West Iran be explained?

R. Ghirshman (1963: 42, 71, 72) dated all bronzes in Luristan to the 8th–7th centuries BC and regarded the Cimmerians as their creators. He compared the horse grave in Hasanlu with Scythian graves. This attribution gained wide acceptance. But E. A. Grantovsky (1970: 370, 372), M. N. Pogrebova (1971a) and myself (Kuz'mina 1973b, 1973c) rejected this hypothesis since the horse burials of Iran date from the time before the Scythian raids into the Near East and even before the Scythian ethnos formed in the steppes.

M. N. Pogrebova (1977: 114-134) distinguished a group of cemeteries in Transcaucasia in Azerbaijan (Kirovabad, Hanlar, Balukkaya, Hodzhaly and Mingechaur) where horse graves were discovered analogous to those of Iran. Some of the graves in these cemeteries have barrows and some do not. Grave pits were large and often had a timber frame. They were covered with logs or stones. Some graves had stone cists sometimes encircled by a stone ring. The roofs were in some cases set on fire. The dead lay in the flexed position. Incidents of supine burial and cremation were few. Most of the graves contained accompanying horse burials or horse bones.

In each steppe barrow in the cemetery of Kirovabad a single horse skeleton was found, while in barrow No. 7 there were two horse skeletons in the grave and three on the roof. In Hanlar very large pits with timber frames were discovered under the barrows. They contained main burials and accompanying graves and single or double burials of horses. In Mingechaur there were barrows with enormous pits; each contained only one male body with three to eight horses. In barrow No. 4 there were eight horses placed in the chamber, and six put onto the wooden roof. The size of the funeral constructions, the rite of burying the horses, and the rich grave goods distinguished these burials from the other—and rather numerous—funeral sites of this region. They have "no analogies in other sites of Transcaucasia; no doubt, they must have belonged to a privileged group of population" (Pogrebova 1977: 121).

In these barrows bronze weapons were found (spears, arrows, daggers, battle-axes), as well as elements of horse harness, ornaments, and ceramics. No iron articles were found. The analysis of the grave goods helps establish the date of the complexes to the (13th) 12th–10th centuries BC. The barrows of Mingechaur are younger: they date to the 9th–8th centuries BC (Pogrebova 1977: 126).

The rite of burying the dead in timber-framed graves and the horse burials characteristic of this type of sites of Azerbaijan have neither analogies nor prototypes in Trans-Caucasia. M. N. Pogrebova (1977: 132-3) suggested that they had originated from the late Timber-grave culture of the Volga region: "a group of migrants from the Lower Volga might have moved to East Trans-Caucasia by the end of 2nd millennium BC, mixed there with the indigenous population and mainly adopted its material culture." She emphasized the relations between the late Timber-grave culture tribes and Dagestan and further with Trans-Caucasia. This suggestion is confirmed by the finds of bronze badges and bit rings, as well as horn cheek-pieces and badges in Mingechaur in Transcaucasia. Pogrebova and other Russian scholars regard the Lower Volga as the territory of the Iranian tribes and the center of formation of horse-riding and the cult of horse. The analysis of materials undertaken by Pogrebova prompted her to draw a well-founded conclusion that the graves in western Iran with timber frames and stone cists containing burials of horses and harness of the steppe and Caucasian types may

be "linked with the slow and gradual movement of a compact group of Iranian-speaking population from the steppes of the Lower Volga through north-eastern Trans-Caucasia to north-western Iran (170, map 5). The infiltration which covered the late 2nd and early 1st millennium BC was rather slow. There are no traces of a counter-movement of population to the north. This hypothesis is supported by finds of ceramics, elements of harness and weapons (arrows, swords) of the Trans-Caucasian types in north Iran. These finds were made, for example, in the graves of Hasanlu, Marlik, Khurvin, and Sialk VI (Pogrebova 1977: 135; ch. 5).

The thesis supporting an Iranian migration from the steppes via Trans-Caucasia at the end of the 2nd millennium BC conforms with the early opinion of R. Ghirshman (1939) who suggested that the period of Sialk V reflected the beginning of the migration from the north, whereas the period of Sialk VI was the time when the principally new culture of the Iranians had already formed in Iran. One now has every reason to agree with this conclusion.

Finally, there is the question of route, specifically the probable use of a passage along the western coast of the Caspian Sea which was the same route employed by the Scythians when they fought their campaigns in the Near East.

In the late Bronze Age the territory of North Dagestan was the area of the Kayakent-Khorochoy culture. It was studied by A. P. Kruglov, E. I. Krupnov and many other scholars, and described in a monograph by V. I. Markovin (1969). The author has distinguished local variants (fig. 36) and classified the sites into three periods: I – 1300 to 1100 BC; II – 1100 to 900 BC; III – 900 to the pre-Scythian time. Settlements were situated high in the mountains, but in the apex of development they descended to the plains (Markovin 1969: 91). Many cemeteries with stone cists and flexed burials have been excavated.

All specialists agree that this culture was of indigenous origin and trace its traditions in the ethnography of modern Nakh-Dagestanian peoples (Markovin 1969: 78). But there is a fact that should attract attention: ceramics ornamented with applied-rollers with notches under the rim, sometimes with a "mustache" below, are widespread in the complexes of Kayakent-Khorochoy. V. I. Markovin classified them as type I and emphasized the affinity of these ceramics with the applied-roller pottery of the pre-Scythian period in the steppes (Markovin 1969: fig. 7: 6; 18: 4; 19: 1, 9; 20: 1, 2). There are also finds of ceramics with rollers with oblique notches or with indentations, and pots ornamented with shaded triangles under the rim and horizontal and vertical herring-bone decoration (Markovin 1969: fig. 3: 1,3,4; 5; 7; 21). They are also comparable with the steppe analogues. Aboriginal and very specific types of ceramics formed in Dagestan later (Markovin 1969: fig. 16-20). But the question appears whether the fashion of such ceramics was initially introduced into the North Caucasus area by the late-Timber-grave tribes that migrated to Iran via Dagestan. Since I am not a specialist in the Caucasus, I am unable to answer this question. But the spread of burial rites alien to the native tradition (wooden constructions in Khorochoy, cremation in Manas) speaks in favor of this supposition, which prompts V. I. Markovin (1969: 98, 99) to conclude that "separate alien tribes might have infiltrated into the area of the north-eastern Caucasian highlanders." Of essential importance are the finds of horse bones in the settlements, and primarily a burial of a horse skull in grave 35 in the cemetery of Tarki and two horse burials in Zandak

(Markovin 1969: 92-93, fig. 35: 2). The spread of riding is evidenced by an image of a horseman in the gorge of Kopchugay (Markovin 1969: 93, fig. 39: 7).

The question, from where riding and the horse cult could come to Dagestan, is answered by a find in grave 3 of the cemetery of Zandak of a horn cheek-piece with three apertures lying in the same plane, the central aperture being the largest (Markovin 1969: 93, fig. 38: 4). This type of cheek-piece, as it has been said, was popular in the cultures of applied-roller ceramics in the steppes of Eurasia in the final Bronze Age.

In stone cist 38 of the same cemetery (this cist is of later date than the previously cited, and belongs to the third period of the culture) an iron spear, a bronze dagger, badges of a horse harness, bits with double rings and a pair of three-looped cheek-pieces have been found. Bits and cheek-pieces belong to the type I of A. A. Iessen's (1953) classification. They have analogies in the Novocherkassk hoard; their date, according to the modern views, is the 8th century BC, which signifies the beginning of the Iron Age.

These data are likely to demonstrate that ethno-cultural contacts between the east Caucasus and the steppe became active already in the pre-Scythian epoch, and the route along the Caspian Sea could be used for the migration of the West Iranians to the south.

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The study of the materials from Central Asia renders the problem of the eastern route of migration of Iranians to the Iranian plateau relevant. I. M. D'yakonov (1956: 139, 150, 151) regarded such a movement from the north-east as the most probable route. He suggested that it began at the end of the 2nd millennium BC, long before first references to Iranians appeared in the Assyrian sources of the 9th century BC. A similar opinion was also voiced by G. Cameron (1936) and H. Nyberg (1938) and other scholars.

As it has been shown, the Caucasian route of the west Iranians was demonstrated by M. N. Pogrebova (1977).

Antique sources contain the toponym Sakasena – Saka-Sayana 'the land inhabited by the Saka' which is situated to the south of the river Kura**.** In Strabo's work (9.8.4) this toponym probably reflects the usual Iranian practice of designating all Iranian-speaking nomads by a general term "Saka" (D'yakonov 1959: 250f; Aliev and Pogrebova 1981; Pogrebova 1977; 1984; 2003: 129-137). In this case it may well mean a tribe that came to Transcaucasia and farther to Iran from beyond the Volga using the route which existed since the end of the 2nd millennium BC.

As for the eastern route hypothesis, there are also some supporting data to be cited. The migration of some Iranian tribes via Central Asia is indicated in the first place by Herodotus (3.90, 101) who records that the satrapy of Media included the tribes of the Medians, Paretakenoi and Ortokoribantioi. Already V. V. Grigor'ev (1871) and then M. Kiessling and J. Junge (J. Junge 1939) established that the latter is an exact translation of an Iranian name for one of the Saka tribes – the Saka Tigrahauda 'those who wear high hats' or 'pointed hats'. In such a hat the leader of the Saka Tigrahauda, Skunxa, is depicted on the Achaemenid relief in Bisutun showing the victory of Darius the Great. These Saka are localized from the Caspian region to Fergana (Litvinsky 1972: 161-163; Dovatur *et al.* 1982: 193). The find of a hat in a barrow from Issyk suggests Semirech'e as their

territory (Akishev 1978), and in barrows at Ak-Alakha (Polos'mak 1994; 2001: 157, 161) in inner Siberia high caps or hoods have also been found.

In any case the localization of the Saka Tigrahauda in the north of Central Asia or in Kazakhstan leads to a supposition that during the migration of the Iranian tribes to Iran in the late 2nd and the early 1st millennia BC a part of this people moved far to the west and was included into the Median union.

The participation of the Central-Asian tribes in the settlements of Iran is evidenced by the spread of two-humped Bactrian camels and their cult in Iran by the end of the 2nd millennium BC, which is demonstrated by numerous images (7000 ans: pl. xxxi: 3).

The initial habitat of the Bactrian camel was the southern part of Central Asia where they were domesticated in the 3rd millennium BC and were used to draw carriages (Fig. 94; Kuz'mina 1963; 1983). Bactrian camels were also known to the Andronovo people since Sintashta times (Kuz'mina 1963). The cult of Bactrian camel became popular in the BMAC, as numerous images on Bactrian seals suggest (Sarianidi 1999). That camels were worshiped by the Andronovans is evidenced by ritual burials in Aksu-Ayuly, Tel'zhan-Kuzeu, Milykunduk, in mausoleums of Begazy, by a figurine from Ushkatta and a head from Irtysh, as well as by numerous petroglyphic pictures in Kazakhstan (Fig. 34: 10) and Central Asia (Os'kin 1975: 34: 10, 11; 55: 8, 9). In the region to the west of the Urals, in the Timber-grave culture, camel was not known.

Only in the late Bronze Age did the other camel species, *camelus dromedarius* (with one hump), became known in Transcaucasia. The dromedary was domesticated in Arabia which in Arabic has a name of "the mother of camels" (Bulliet 1975). The Semitic word for dromedary—Hebrew and Phoenician *gāmālu*—was borrowed (with the animal) into the languages of the Caucasus—Georgian, Svan, Mengrelian (Bogolyubsky 1929) and with the intermediation of Greek and Latin it came to all Indo-European languages, except Indo-Iranian where the term (e.g., Avestan *uštra-*) was applied to the two-humped Bactrian camel which was borrowed by Finno-Ugrian and later probably by the Chinese (Schrader 1901: 405; Salonen 1955-56: 85-87; Redard 1964: 155-162; Mayrhofer 1986: 237; Burrow 1976: 143).

It is important to emphasize that the distribution of this species remained the same in the Achaemenid epoch: in Persepolis Bactrian camels are represented as a tribute from the Bactrians, Parthians, Arachosians and Areans (Schmidt 1953 I: pl. 19; 30; 33; 39; 41; 1970 III: 148-9; Dutz 1971: 204, delegations 4, 7, 13, 15).

The presence of Bactrian camels in Assyria is for the first time mentioned in an inscription of the king Tiglath-pileser I (1116-1090 BC) in Kuyunjik and in a document of Assur-Belkal (1074-1057 BC) stating his purchase of Bactrian camels from the merchants who traded with the eastern countries. Camels are mentioned in the annals of Assurnazirpal I, Salmanasar III, Shamshi-Adat V and Sargon II as a tribute from the east (Luckenbill 1927).

In Assyria at the beginning of the 1st millennium BC camels were depicted on the Black Obelisk in Nimrud, on the reliefs of the Balavat Gate and in Kujungik (Schäfer and Andrae 1925: 85-87). The Assyrians employed camels in warfare in order to intimidate their enemies.

Initially, the Bactrian camel was designated by the same word as dromedary – *gāmālu* – but with an indication that it had two humps. In the 11th century

there appeared the term *udru*, from Indo-Iranian *uštra* or from Dardic *uhtra* (Diakonoff 1995: 474). Thus the camel could not be borrowed from the Timber-grave culture, nor from the Caucasus, but only from the Iranian-speaking tribes of Central Asia at the end of the 2nd millennium BC.

No less strong an argument for the use of the eastern route are the data on the spread of horse-breeding. As it has been said, the horse was domesticated in the Eastern-European steppe and appeared in Bactria in the early 2nd millennium BC, and at the end of this millennium horse-breeding was already widespread over all pastoral cultures of Central Asia, including Yaz I. Petroglyphic images attest the cult of this animal in Kazakhstan and Central Asia. In the Caucasus the horse was known already in the 3rd millennium BC, but its cult and sacrifices appeared only in the second half of the 2nd millennium BC in the complexes that bear traces of Timber-grave culture influence (Pogrebova 1977; Kuz'mina 1977).

Thus horse-breeding, ritual burials of horses and horse images in art could appear in Iran both from the Caucasus and from Central Asia. Media became a centre of horse-breeding. From there, horses were brought to Assyria as a tribute. But one should note that along with the horse alfalfa, the best horse feed, became known in Iran. In the 8th century BC alfalfa was brought to Babylonia where it was named "horse grass", a word borrowed from Iranian. In Greece alfalfa was known as "Median grass". But the homeland of this plant was Central Asia, from where it could be brought to west Iran (D'yakonov 1956: 152). (In the 2nd century BC alfalfa seeds, as well as blood-horses, were exported from Fergana to China, cf. Bichurin 1950 II: 150).

There is one more category of finds that corroborates the Central-Asian path of the steppe peoples to the Iranian plateau, viz. two vessels found in Tepe Giyan in the upper part of layer I (Fig. 51: 57, 58; Contenau and Ghirshman 1935: 8, 13, fig. 51: 57, 58). They were apparently made on a potter's wheel, their base is conical and it is separated from the swollen trunk by a rib. As will be argued in the next chapter, such ceramics are characteristic of south Turkmenistan and are the diagnostic feature of the Namazga VI pottery. But the Giyan vessels are distinguished from those of Namazga by an applied-roller with lowered 'mustache', and even with oblique notches on one of them. This is the most characteristic peculiarity of the applied-roller pottery of the Eurasian steppes of the Alekseevka type. The combination of rollers with the Namazga form of vessels reflects the retention of the newcomers of their Central Asian path. The date of these pots is established according to both steppe and Turkmenian analogies as the 12th–9th centuries BC, undoubtedly earlier than Tagisken where the roller ornament is situated not on the shoulder but under the rim, a trait typical of Dongal vessels.

Thus the archaeological materials of Iran analyzed by M. N. Pogrebova and myself correspond well with the historical data on the migration of the Iranian-speaking people to Iran. The contradiction between the hypothesis of E. A. Grantovsky about the Caucasian route and M. D'yakonov's opinion on the migration through Central Asia is thus eliminated: it is obvious that both routes were used. The beginning of the migration may be believed to have happened in the last quarter of the 2nd millennium BC.

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While discussing the history of the cultures of Iran, it is necessary to point out that the group of sites of the Gorgan (the ancient Hyrcania)—Hissar, Tureng,

Shah-tepe—also includes settlements and cemeteries of north-western Turkmenistan to the north of the river Atrek in the region of Dahistan. Archaeologists discovered several settlements in this area in the 1930s, among them Madau. A. A. Marushchenko dated them to the late 2nd and the early 1st millennium BC and gave them the name of "the Madau culture". In 1951-53 V. M. Masson (1956) undertook excavations of Madau and Izat-kuli and called them "the culture of Archaic Dahistan" which he dated to the late 2nd and the early 1st millennium BC, basing his opinion on such finds as two-bladed shaft-hole arrows (Masson 1956: 420, 437-438, fig. 15, 36).

Wheel-made ceramics are predominantly represented by grey-black pottery, sometimes covered with white slip, and more rarely by red pottery. There are also small amounts of crude hand-made pottery with an admixture of crushed ceramics in the paste. One large pot is particularly interesting. It is decorated with an applied roller with oblique notches (Masson 1956: 411; fig. 25: 5). It has analogies with the applied roller ceramics of the foothill zone. V. M. Masson (1956: 427) compared the rest of the pottery with the ceramic complex of the foothill belt of Turkmenia and concluded that these two cultures belong to two cardinally different cultural and historical regions. The culture of Dahistan has closest analogies in and derived from Shah-tepe, Turgeng-tepe and partly Hissar, as well as in the synchronous Giyan II – I and Sialk V – VI. In the valley of the river Sumbar, which is the right-side tributary of Atrek, I. N. Khlopin (1983) studied the cemeteries of Sumbar I, II and Parkhay where there are catacomb burials in the flexed position and rich grave goods. The ceramic complex of the cemeteries is partly analogous to that of the Dahistan settlements. Many forms have prototypes in the earlier sites of Gorgan—Shah-tepe and Hissar III—and close analogies in Sialk V and Khurvin where metal articles and ornaments are also identical (Khlopin 1983: 40; fig. 10, 13). This is a good reason for including the cemeteries of Sumbar in the zone of grey-black ceramics of north Iran in the Early Iron Age. I. N. Khlopin thinks that the lifetime of this culture was extra-short, but his opinion has not gained general acceptance.

The discoverer of many outstanding sites of Turkmenistan, I. N. Khlopin (1969; 1970a, b; 1983; 1999) for many years passionately maintained the hypothesis that the ancient population of the southern part of Central Asia from the 7th millennium BC were Iranians. He attributed the culture of grey-black ware on the south-eastern coast of the Caspian Sea to the Iranian tribe of the Turanians and the culture of the foothill zone of the Kopetdag and Tedgen to the Aryans (Khlopin 1999: 75-77).

This hypothesis has been subjected to criticism many times (see Chapter 1), and the same objections marshaled against the position of G. Deshayes (1969), who assumed the migration of the Iranians from Gorgan in the 3rd millennium BC, can be applied when discussing I. N. Khlopin's point of view.

The genesis of Eastern-Iranian nomadic peoples: the Scythians and the Saka

In the 8th and 7th centuries BC the whole steppe was inhabited by nomadic tribes known to the Greeks in the times of Homer (Iliad XIII, 4-8). The Greek authors called them *Scythians*. In the Achaemenid inscriptions of kings Darius and Xerxes they were called *Saka* (Kent 1953). In the Chinese chronicles their name is transcribed as *Se*, which is a reflection of the form *Saka* (Bichurin 1950:

II 190). The Persians distinguished three groups of the Saka: *Sakā tyaiy paradraya* (*Saka* that live beyond the sea) referring to the Scythians, *Sakā haumavarga* (*Saka* that worship *haoma*), and *Sakā tigrahauda* (*Saka* that wear pointed hoods). A people known as the Daha were also known.

The Greek authors mention many Scythian tribes and their neighbors. They emphasize their common type of nomadic economy and culture. According to Strabo (1.2.27): "the inhabitants of the known countries of the north" were embraced "under the single designation 'Scythians' (or 'Nomads', to use Homer's term)". The poet Choerilus (Persika, fragm. 3) wrote: "the Saka, sheep shepherds, of the Scythian kin, live in Asia". Herodotus (7.64): "the Persians called them Sacae, since that is the name which they give to all Scythians". Pliny the Elder (6.19.17) reported the same: "Beyond the Yaxartes (Syr-Darya – E.K.) are some tribes of Scythians. To these the Persians have given the general name of Sacae… There is an uncountable number of tribes… Most notable among them are the Sacae, the Massagetae, the Dahae, the Essedones… the Arimaspi". Diodorus Siculus (Bibl. 2.43.1-5) repeated the same: "at first the Scythians possessed little territory for themselves; but later, having expanded gradually through fighting and courage, they acquired extensive lands, and their nation advanced great dominion and glory. For at first they dwelt entirely along the Araxes River (Syr-Darya or Volga – E.K.). But having one king of old… they won land for themselves in the mountainous country as far as the Caucasus, and in the plains… the rest of the country all the way to the river Tanais." The Scythians divided into many branches, "some tribes acquired the name of Sacae, others Massagetae, some Arimaspi; and several others in like fashion." Pseudo-Hippocrates (On Air, Waters, and Countries, 24) ranked the Sauromatae also among the Scythian peoples. Herodotus (4.117) noted that the Sauromatae spoke Scythian but a long since distorted variant.

Thus the written sources attest the existence of a conglomerate of closely related peoples who spoke dialects of one language. They were under the rule of the tribe of Scythians. The Greek authors emphasized the similarity of the economy, culture, costume, and arms of the steppe peoples. The images of the nomads on the Achaemenid reliefs show the same picture (Vanden Berghe 1959; Ghirshman 1963; Porada 1963; Dutz 1971).

The Greek poet Dionisius Periegetos called the Saka "of all marksmen the most skillful who make no shots on the off chance." And Clement of Alexandria (8.62) stated that both men and women of the Saka had bows and were able to shoot turning back when galloping a horse."

The earliest image of an archer-centaur is found on a Babylonian border stone from the British Museum. It might date from the 13th century BC. The centaur with a hood on his head and a bow in his hands is shooting (Sulimirsky 1970: 395, fig. 90). On a bas-relief from the north-west palace of Ashurnasirpal II (885-859 BC) in Nimrud there are two shooting mounted bowmen fleeing at a gallop. They have pointed caps on their heads and are clad in trousers and soft top boots.

Authentic data on the turbulent events in the Near East are given by the Assyrian annals (D'yakonov 1956; Aliev 1960). In the 8th–7th centuries BC, having come from the steppes, the Cimmerians defeated the kings of Urartu (Rusa I), of Assyria (Sargon II), of Lydia (Giges), and occupied the capital of the

latter, the town of Sardis. They also devastated Phrygia and even reached Ionia and took Ephesus.

Later the Cimmerians were defeated by the Scythians who established their own rule over Media and exercised hegemony over the Asian countries. They undertook campaigns against Syria and Palestine, while King Psammetichus of Egypt met them with gifts and prevailed on them to advance no further. The prophet Jeremiah wrote, horrified (5: 15-18): "Behold, I am bringing upon you a nation from afar…" "Their quiver is like an open tomb…" "They shall eat up your harvest and your food; they shall eat up your sons and your daughters… your fortified cities in which you trust they shall destroy with the sword." Herodotus (I, 106) wrote: "The dominium of the Scythians over Asia lasted eight-and-twenty years, during which time their insolence and oppression spread ruin on every side. For besides the regular tribute, they exacted from the several nations additional imposts, which they fixed at pleasure; and farther, they scoured the country and plundered every one of whatever they could."

The king of Media, Cyaxares, overcame the Scythians by luring them into a trap, and they returned to their native country. In 514 BC the Scythians defeated the king of the realm of the Achaemenids, Darius the Great, in the steppes.

The history of the Saka in Central Asia was no less dramatic. Diodorus (Bibl. II, 34, 1-4) related a legend told by Ktesios, a Greek doctor in Persian service, about a war led by the queen of the Saka, Zarina, with Media for the possession of Parthia. Herodotus (I, 205-214) related the victory of the queen of the Massagetae, Tomiris, over the Persian King Cyrus (550-530 BC) who had conquered all the countries as far as the Mediterranean Sea and created the mighty realm of the Achaemenids. The Saka squadrons covered themselves in glory serving in the Persian army. They fought in the mid battle on the plain of Marathon (Her. VI, 113; IX, 70) and distinguished themselves with bravery in the battle of the Thermopylae. In the battle of Plataea it was their horse that manifested the greatest courage.

The analysis of the political history of the Cimmerians and the Sako-Scythians, their relations with Assyria and Achaemenid Iran, the attempts of reconstructing the map of tribes, have generated an extensive bibliography. Its treatment, however, is not our aim. It is extremely difficult to establish reliable localization and genesis of every Sako-Scythian tribe, because, as Pliny the Elder put it 2000 years ago (6.19), "in regard to no other region (but the one of the Saka – E.K.) is there more discrepancy among the authorities, this being due as I believe, to the countless numbers and the nomadic habits of the tribes."

The origin and the language of the Saka-Scythians are relevant matters for the subject of this book. The linguists V. F. Miller (1887 vol. 3), V. I. Abaev (1949; 1965; 1979a), E. Benveniste (1938); I. M. D'yakonov (1956; 1981), having studied the hydronyms, toponyms, proper names, as well as separate words preserved by chance, proved that these peoples spoke the languages of the Eastern group of the Iranian family. The Scythian language was regarded as the ancestor of Alan, the latter being in its turn the ancestor of modern Ossetic. S. V. Kullanda (Kullanda and Raevsky 2004: 90-95) demonstrated that the Scythian language was closer to Bactrian than to Alan. Nevertheless, all these languages are East Iranian. Different Saka languages are ancestors of modern Pamiri languages of the Pamirs, north Hindustan and the Xinjiang region (Morgenstierne

1938; Pakhalina 1969; Steblin-Kamensky 1974; 1976; 1981; 1982; Oransky 1979b) and of the Khotanese Saka language of Chinese Turkestan known from the documents of the 7th–10th centuries AD. This language preserved a handful of archaic features (Bailey 1955; 1957; 1958; 1975).

Many East Iranian tribes named themselves *Arya* 'noble', as the Vedic Aryas and the Persian-Achaemenids. This nomination might not have reflected the self-consciousness of a gigantic Aryan unity, but rather it must have been a relic of the common origin of the tribes that had emerged from this unity. *Saka*, the other self-designation of East Iranians, means 'the strong' (Bailey 1958: 133).

There has been almost no discussion on the genesis of the Saka culture in Kazakhstan and Central Asia. It has been assumed that it formed on the base of the Andronovo culture (Bernshtam 1949: 349; 1950: 144; 1957: 18; Chernikov 1960: 112; D'yakonov M. 1961: 42, 64; Litvinsky 1962: 291-295; 1963: 129-133; 1967: 122-126; 1972: 156; 1977; 1981: 162; Kadyrbaev, Margulan *et al.* 1966: 408; IKazSSR 1977: 184; IKirgSSR 1984: 107, 140; Mar'yashev and Goryachev 1999: 56; Goryachev 2001: 60). But the cited data on the migration in the pre-Saka period and the assimilation of population of the Dandybay culture by the Andronovans should also be taken into account. K. F. Smirnov (1964: 182-188) demonstrated the preservation of Andronovo and Timber-grave cultural traditions in the cultures of the Sauromatae in the Volga-Urals region.

The question of the origin of the Cimmerians and the Scythians in the Pontic steppes is much more complicated. Aristeas of Proconessus in his poem "Arimaspeia" related that the Arimaspi drove back their neighbors, the Issedones, who, in turn, chased the Scythians out of Asia. The Scythians came to the Pontic steppes and forced the indigenous population, the Cimmerians, to depart for the Near East. Herodotus (4.11) tells almost the same story: "The wandering Scythians once dwelt in Asia, and there warred with the Massagetae, but with ill success; they therefore quitted their homes, crossed the Araxes, and entered the land of Cimmeria." The Araxes has been identified either with the Yaxartes (the Syr-Darya) or with the Volga (*Ra* of Ptolemy). These legends generated a hypothesis on the migration of the Scythians from the east. Another legend related by Herodotus says that the Scythians emerged on the Dnieper a thousand years before the campaign of the Darius the Great against them in 514 BC.

A disagreement concerning the interpretation of the ancient evidence arose. M. I. Artamonov (1966) and the head of the Moscow school, B. N. Grakov (1971), suggested that the basis of the formation of the Scythian culture was the Timber-grave culture, which came to Ukraine from the Volga region. And in the 7th century BC a new migration wave from the east contributed to the establishment of the Scythian triad under which the complex of weapons, horse-gear and the animal style was meant.

An alternative opinion was argued by A. I. Terenozhkin (1961: 204; 1976: 207, 209; Il'inskaya and Terenozhkin 1986: 24, 28). He suggested that the impulse from Central Asia was of crucial importance at the end of the Bronze Age. This impulse brought to Scythia the arrows, daggers, knives, and horse-gear of the Karasuk culture. The reason in support of this hypothesis was offered by M. P. Gryaznov's (1980) discovery of the Arzhan barrow in Tuva. There, early articles of horse equipment along with the objects of Scythian art have been

discovered. It has been suggested that the complex dated to the 8th century BC which is a considerably early date.

Now there are two schools of Scythology. Scholars from St. Petersburg assume that the Scythian culture formed in Central Asia in the 8th or perhaps in the 9th century BC. They even admit the probability of the influence of Chinese art on the formation of the animal style. The Central-Asian hypothesis, which has gained wide acceptance, is represented in the works of N. A. Bokovenko (Moshkova 1992).

The adherents of the Moscow school do not accept the extra-long chronology (Chlenova 1997) and see no reason to assert a purely Asian origin of the Scythian triad (Melyukova, Ed. 1989; Petrukhin and Raevsky 1998). They suggest that the most significant events in the formation of Scythian art were campaigns against the Near-Eastern cultures where the Scythians for the first time accepted several themes and compositions of the art of Urartu and Media (Pogrebova and Raevsky 1992). Fully accepting the conclusions of M. N. Pogrebova, I suppose that the second source of the formation of the animal style was the Bactrian artistic school (Kuz'mina 1977; 2002).

The aboriginal genesis of the Scythian culture in the Ukraine was established and proved by V. Yu. Murzin (1990), who has also distinguished the stages of its development.

The last word on the Cimmerian problem is a work of S. A. Skory (1999) who has demonstrated the genetic connection between the Cimmerian, the preceding Timber-grave, and the following Scythian cultures in the Ukraine in the forest-steppes of the Dnieper's left bank. This gave him reason to consider the population of the Timber-grave culture as Iranian-speakers.

V. V. Otroshchenko has drawn the same conclusion (2003: 89; 1985: 526): "the population of the Timber-grave cultural unity participated in the formation of the Ivanovka and Belozerka applied-roller decorated cultures", and "the decisive role of the Belozerka sites in the formation of the Cimmerian culture presupposes the Iranian identification of the Belozerka population".

These archaeological data on the genesis of the culture of the Iranians are supported by the anthropological materials.

The anthropological data

The historical outline reconstructed by means of archaeology is in general supported by the anthropological data. The materials from the Ukraine have been studied by S. I. Kruts (1984; *The History of Ukraine* 1985; 1997). She has concluded that since the Neolithic period two main anthropological types of the Europoid race coexisted and interacted in the Ukraine: 1) the Mediterranean type is characteristic of the Linear-Band ceramics and Criş/Körös cultures of the Balkans and Danube region, and of the Neolithic and Bronze Age cultures of Central Europe. In the Ukraine this type is mostly represented between the Dnieper and the Danube and in the Crimea; 2) the more massive broad-faced proto-Europoid type is a trait of post-Mariupol' cultures, Sredniy Stog, as well as the Pit-grave culture of the Dnieper's left bank, the Donets, and Don. The features of this type are somewhat moderated in the western part of the steppe. In the Tripol'e culture both types coexist. The Pit-grave culture population of the north-eastern part of the Pontic steppes had long heads and narrow faces thus showing

a relation to the Mediterranean type. On the Volga and in the Caspian region there is a brachycephalic type of which there are no traces in the Ukraine. All the anthropological types of the Pit-grave culture population have indigenous roots. The anthropological data from the Ukraine do not support the hypothesis of mass migration from outside during the Eneolithic period and the Bronze Age (Kruts 1997: 383).

During the period of the Timber-grave culture the population of the Ukraine was represented by the medium type between the dolichocephalous narrow-faced population of the Multi-roller Ware culture (Babino) and the more massive broad-faced population of the Timber-grave culture of the Volga region (Kruts 1985: 533). The anthropological data confirm the existence of an impetus from the Volga region to the Ukraine in the formation of the Timber-grave culture. During the Belozerka stage the dolichocranial narrow-faced type became the prevalent one. A close affinity among the skulls of the Timber-grave, Belozerka, and Scythian cultures of the Pontic steppes, on the one hand, and of the same cultures of the forest-steppe region, on the other, has been shown (Kruts 1997: 86-88). This proves the genetical continuity between the Iranian-speeking Scythian population and the previous Timber-grave culture population in the Ukraine.

In the Volga-Urals region the latest summarizing work (Khokhlov 2000) has shown that since the Neolithic period variants of the population of Europoid types developed in the open and forest-steppe. The processes were complicated by metisation and numerous migrations in different directions but within Eastern Europe. The heir of the Neolithic Dnieper-Donets and Sredniy Stog cultures was the Pit-grave culture. Its population possessed distinct Europoid features, was tall, with massive skulls. The second component were the descendants of those buried in the Eneolithic cemetery of Khvalynsk. They are less robust.

During the 3rd millennium BC in the period of an ecological crisis the situation in the steppes became very strained. 31% of the Pit-grave and Poltavka skulls bear signs of wounds, often mortal. The tribes of the Abashevo culture appear in the forest-steppe zone, almost simultaneously with the Poltavka culture. The Abashevans are marked by dolichocephaly and narrow faces. This population had its roots in the Balanovo and Fatyanovo cultures on the Middle Volga, and in Central Europe.

According to the data of A. A. Khokhlov (2000: 320-322), the early Timber-grave culture (the Potapovka) population was the result of the mixing of different components. One type was massive, and its predecessor was the Pit-grave-Poltavka type. The second type was a dolichocephalous Europoid type genetically related to the Sintashta population.

It is interesting to note that an admixture of a Uralic component belonging to the local aboriginal population has been recorded. Male skulls of the Potapovkans are of pure Europoid type while the female skulls have more Uralic features. This permits us to regard the appearance of Eastern-European tribes in the Urals and in West Kazakhstan as an elite dominance migration.

One more participant of the ethno-cultural processes in the steppes was that of the tribes of the Pokrovskiy type. They were dolichocephalous narrow-faced Europoids akin to the Abashevans and different from the Potapovkans**.** In the Pokrovskiy series an admixture of the aboriginal Uralic race has been discerned.

In the classical cemeteries of the Timber-grave culture the cranial evidence witnesses the processes of metisation of the descendants of different Eastern-European populations. The majority of Timber-grave culture skulls are dolichocranic with middle-broad faces. They evidence the significant role of Pit-grave and Poltavka components in the Timber-grave culture population.

One may assume a genetic connection between the populations of the Timber-grave culture of the Urals region and the Alakul' culture of the Urals and West Kazakhstan belonging to a dolichocephalous narrow-face type (Ginzburg 1962; Alekseev 1967) with the population of the Sintashta culture. When the Timber-grave and the Andronovo cultures flourished it was the time of stability: there are no traces of injuries on the skulls.

Mass migrations took place in the Final Bronze Age period. A part of the Timber-grave culture population left its homeland. Monuments of the Suskan type reflect the migration of the Cherkaskul' culture from the forest zone of the Urals, but they have almost no anthropological materials. The anthropological data on the creators of the applied-roller pottery are rather few. The sole conclusion might be that the population remained Europoid. Migrations which took place in the beginning of the 1st millennium BC changed the anthropological map of Eurasia. "The Sauromatae emerged in the Volga steppes and they had almost nothing in common with the late Timber-grave culture inhabitants and genetically they derived from the nomadic populations of the South Urals and Kazakhstan. What had happened to numerous communities of the Timber-grave culture, is not known so far. It is likely that among all populations of the Iron Age the Scythians of the Pontic steppes demonstrate the closest resemblance to the latter" (Khokhlov 2000: 322).

This conclusion may serve as a proof of the authenticity of the legends about the arrival of the Sauromatae and Scythians from the countries to the east of the Volga.

As it has been discussed in Chapter 11, the western part of the Andronovo culture population belongs to the dolichocranic type akin to that of the Timber-grave culture (Debets 1954; Ginzburg 1956a; Alekseev 1964b; 1967). The overwhelming majority belongs to the special Europoid Andronovo type, sometimes called the Pamirs-Fergana type. The Andronovans were tall, of athletic build, and with massive skulls. This population inhabited the Urals, all of Kazakhstan and west Siberia which they gradually penetrated from Kazakhstan (Debets 1948; Ginzburg 1957; 1962a; Alekseev 1961a, b; 1967; Ismagulov 1963; 1970; Gokhman 1973; 1980; Dremov 1973; Rykushina 1976; 1979). According to the data of V. A. Dremov (1997), the Andronovo Fedorovo skulls of the Ob variant are closely related to the skulls of the Yenisey and east Kazakhstan. This fact demonstrates the genetic affinity between all groups of the Fedorovo population which, it has been remarked, is different from the Alakul' population of the cemetery of Ermak in the Omsk district which is close to the Alakul' population of west Kazakhstan and to the Timber-grave culture population of the Volga region (Dremov 1997: 76-77, 81). This conclusion is of immense significance as it confirms the hypothesis which I am defending that there were two lines of the formation of the Andronovo unity: the Fedorovo and the Alakul' paths.

During the final Bronze period the Karasuk culture population drove the Fedorovan tribes away from the Yenisey to the west and south. On the Ob in the

forest-steppe zone the tribes of the local substratum from the coniferous forests created Andronovoid cemeteries: Elovka, Chernoozer'e, Sopka II. The aboriginal population had a Mongoloid admixture; Europoid skulls which are rather few belonged to the Andronovo Fedorovo type (Dremov 1997: 120-121).

In the 8th and 7th centuries BC the culture of the Saka formed on the Andronovan base in the steppes of Asia. The Saka of Kazakhstan were the descendants of the massive Europoid Andronovo type (Ginzburg 1951; Rychkov 1964; Alekseev 1969; Alekseev, Gokhman 1984: 27, 35, 53; Ismagulov 1963; 1970; Gokhman 1973; 1980). Among the Saka of north, central and especially east Kazakhstan a slight Mongoloid admixture is recorded (Khodzhayov 1980: 156) which might have been caused by the participation of the Dandybay culture population (assimilated by the Andronovans during the final Bronze period) in their ethnical genesis.

L. T. Yablonsky (1996) observed the absence of the ancestors of the Saka in the Aral Sea region at the end of the pre-Saka period and their migration there from other territories. He (2003: 167-170) justly emphasizes the significance of the ecological crisis in the period of the Final Bronze (which has been many times discussed, cf. Kuz'mina 1997b; 2000; 2003) and the role of migrations in the processes of ethnogenesis (Yablonsky 1996; 2003; Itina and Yablonsky 2001: 106-108; cf. Kuz'mina 1977: 78-79; 1987d; 1994: map 9; 1995). In spite of his hypercriticism L. T. Yablonsky had to conclude (2003: 168) that the hypothesis "of the derivation of the populations of the Early Iron Age from the local groups of the Final Bronze period population has been successfully confirmed by the archaeological and palaeoanthropological data when studying them on the high taxonomic level".

Some important data have been delivered by the anthropologists who study the Central-Asian materials. The majority of the Saka skulls in Tian-Shan are of the Andronovan type. Among the skulls from Fergana the brachycranic also prevail. But in both regions there are admixtures of more dolichocranic population (Ginzburg 1962a; Khodzhayov 1980: 155). In the northern part of Central Asia not only nomadic, but also agricultural populations of the 8th–4th centuries BC descended from the Andronovan proto-Europoid variant (Khodzhayov 1977: 13; 1980: 154; 1983: 100-102; Alekseev *et al.* 1986: 125-130). This means that a part of the late-Andronovan population of this region turned to a nomadic way of life and joined the conglomerate of Saka tribes, while another part turned to agriculture.

In the Pamirs there was a special situation. The Saka of the Pamirs belonged to the dolichocranic narrow-faced Indo-Afghan type of the eastern branch of the Mediterranean race. This type was present here already in the Bronze Age (Litvinsky 1972: 182-184; definitions by V. V. Ginzburg and T. P. Kiyatkina).

It could be stated, to summarize, that the Iranian-speaking Scythians and Saka were the descendants of the steppe population of the Bronze Age which was divided between two major cultural unities: the Timber-grave and the Andronovo, the latter being represented by two original types: Fedorovo and Alakul'. From the Eneolithic period to the Early Iron Age there were no invasions of population from the Near East or Iran in the steppes of Eurasia. All migrations, though numerous, occurred within the steppe and forest-steppe zones.

* * *

This long historiographical sketch was indispensable for drawing significant conclusions on the discussed theme. The problem of the genesis and development of the Timber-grave culture remains arguable. But in spite of the discrepancies between the different opinions on partial questions the general patterns of the culture genesis are distinctly depicted.

1. From the period of Mariupol' unity on up to the Scythian epoch, the development in the steppes was not interrupted by any invasions from outside Eastern Europe.

2. The situation was different in the open steppe and the forest-steppe and was determined by the characteristics and fluctuations of the ecosystem. Ecological crises resulted in cultural crises. There were two ways out of them: innovations or migration.

3. Since the times of the Pit-grave and Novotitorovskaya cultures, when wheel transport was invented, the population became mobile. It led a pastoral way of life. Size and composition of the herd depended on individual ecological conditions. In the west in the Pontic steppes a part of the population under propitious circumstances was involved in agriculture.

4. The mobile economy and the change of natural cycles which led to shift of the boundary between steppe and forest made the situation unstable. This led to movements of tribes and often to the mixing of neighboring tribes and to the formation of new cultures. The cultural map was tessellated.

5. According to C^{14} dating, the Andronovo and Timber-grave cultures formed at the shift of the 3rd and 2nd millennium BC on the common base of Eastern-European cultures. The main components were the steppe cultures of Poltavka, late Catacomb (to far lesser degree), and the Abashevo culture of the forest-steppe zone. The latter culture belonged to the Corded Ware group of cultures of Central Europe.

6. The center where the synthesis of these cultures occurred was situated around the ore deposits of the South Urals. It was here and in the steppes of west Kazakhstan that the monuments of the Sintashta type formed. They indicate the beginning of the Andronovo culture.

7. On the base of the same components and with an impetus from the Urals the Potapovka type sites emerged on the Volga. They became the foundation of the Timber-grave culture.

8. The subsequent development of the Timber-grave culture in the Pontic-Caspian steppes was determined by the large-scale participation of the Abashevo culture in the Don region and the post-Catacomb Multi-roller Ware culture in the Ukraine.

9. The internal periodization of the Timber-grave culture worked out by different authors is identical. The stages of the Timber-grave culture are synchronous with those of the Andronovo culture.

10. The close genetic affinity of the Andronovo and the Timber-grave culture tribes became even closer thanks to regular contacts, especially because of the flow of tin from Kazakhstan and of copper (as well as of finished products) from the Urals. The contact zone lay between the Volga and the Urals. The Andronovan influence reached the Dnieper.

11. The ecological optimum which lasted in the middle and in the third quarter of the 2nd millennium BC allowed the inhabitants of the whole region to develop a settled agricultural and stock-breeding economy. Agriculture was more widely practiced in the Pontic steppes. Species of cereals and breeds of livestock were identical throughout the Eurasian region.

12. The types of dwellings were similar as well: a big house of frame and post construction and a light proto-yurt which became widespread during the period of the Final Bronze Age.

13. The Eneolithic traditions were developed in pottery which was hand-made; the potter's wheel was not used. The basic elements of geometric ornament were identical in both cultures. Some peculiarities of technology, special forms of vessels, and composition patterns of ornaments are diagnostic features of each culture.

14. Common traits in burial rites: barrows, grave pits, houses of the dead, often with a frame of logs or a stone cist, corpses placed in a flexed position on the left and very rarely on the right side, presence of double burials – *sati*, several cases of cremation, fire cult, isolated cases of fractional burials, cenotaphs; altars containing horse bones in the elite barrows, and cow and sheep bones in the common barrows; presence of a couple of vessels and sometimes of a knife or very rarely of some other instruments in the graves; disposal of ornaments in the female graves. Orientation was a diagnostic feature: it was eastern, north-eastern, or northern in the Timber-grave culture, and western and south-western in the Andronovo culture. In the forestless area of the Andronovo culture there was a widespread tradition of erecting stone cists and stone enclosures around graves.

15. The Andronovo Fedorovan tribes were distinctly different. They practiced cremation and produced extremely richly ornamented pots.

16. In the (end of the 14th) 13th–11th centuries BC applied-roller pottery spread throughout the steppe zone from the Danube to the Altai Mountains. The size of the Timber-grave culture population rapidly diminished.

17. In the 10th–9th (8th) centuries BC the forest zone cultures advanced to the south along the entire forest-steppe border. These cultures seem to many scholars to have belonged to Finno-Ugrians.

18. Almost all scholars who have studied the problems of ethnic history regard the population of the Timber-grave culture as Iranians.

The formation of the Scythian complex

How could the genesis of the material culture of the Saka be summarized? B. N. Grakov and A. I. Melyukova (1954) introduced the notion of the 'Scythian triad' which characterized the complexes of the 'Scythian world' in the broad meaning of this term. It included horse equipment, weapons and the animal style art. Nowadays specialists have broadened the list of 'Scythian' features (Murzin 1990: 16-24; Alekseev A. Yu. 2003: 40-41).

Horse equipment

There is a great number of studies that deal with classification of cheek-pieces and bits of bone, horn and bronze (which derive from the two former types) produced in the steppes in the period when the early Iron Age was replacing the Final Bronze Age (e.g. Iessen 1953; 1954; Illins'ka 1961; Terenozhkin 1961;

1976; Bokovenko 1986; 2000; Erlikh 1991; Boroffka 1998; Dietz 1998; Pogrebova 2001, 2005; Gorbunova 2001; Sitnikov 2004). But still no general work with an analysis of the development of horse equipment throughout the steppe zone has been written. It is partially remedied by relevant chapters in "*Arkheologiya SSSR*" (Melyukova 1989; Moshkova 1992).

As I. N. Medvedskaya (1983) has shown, during EIA in the Old World there existed two radically different systems of harness. Since the second half of the 2nd millennium BC in the Near East a bridle was used that consisted of an integral complex of bit with lap-joined cheek-pieces (Potratz 1941: abb. 3, 5, 11). In the steppes from Tuva to the Danube the bridle of the Eurasian type emerged, in which bit and cheek-pieces were not fastened together inseparably.

It should be noted that although the steppes were dominated by mounted horsemen during the Final Bronze Age and EIA, chariots were still employed as prestigious ceremonial transport in Europe in Greece and Scythia, in Asia in the Karasuk culture, and probably in the steppes where some petroglyphs with carriage images date from the end of the 2nd millennium BC. As N. Boroffka (1998: 135) has emphasized, "different types of cheek-pieces were not necessarily designed only for riding or only for chariots."

In the Caucasus chariots of Near-Eastern type were widespread (Pogrebova 2003) and "bridles were generally made following the Near-Eastern examples, i.e. with cheek-pieces connected with a lap joint with the curb or forming an integral unit with them." Isolated finds of bone or horn cheek-pieces of the Eurasian type that were fastened to bronze single-ringed bits "look undoubtedly foreign in Transcaucasia" (Pogrebova 2001: 323).

As for Kazakhstan and Central Asia, since the Final Bronze period there is known only the Eurasian type of bridle. It was formed by three-holed horn or bronze cheek-pieces and double-ringed bits, often stirrup-formed, i.e., one of the rings having a stirrup form.

The typology of bits suggested here is based upon the classification elaborated by A. A. Iessen (1953; 1954) according to the form of outer loop, and the typology of cheek-pieces according to the form of rod and aperture. It is based on the evolution-function method developed by M. P. Gryaznov. I used it in the classification of Andronovan cheek-pieces of the 2nd millennium BC and metal artefacts of Central and Steppe Asia of the Eneolithic and Bronze Age. Taking into account the evolution of bits from pre-Scythian period articles, we suggest that five types should be distinguished: I) primitive double-ringed bits; II) double-ringed bits with an additional little ring; III_1) (type III in A. A. Iessen's classification) with a stirrup-formed tip; III_2) the same form, but with a projection on the stirrup; IV) stirrup-formed bits with an additional aperture which makes them resemble type II; V) bits with an external rectangular link.

Cheek-pieces, on the other hand, have a great number of variants. The general classification considering all chronological and local peculiarities is not our purpose. We only intend, first, to reveal an outline of their evolution and, secondly, to establish the area from where horse equipment might have been brought to Iran. So let us distinguish several basic types: I) horn rodlike cheek-pieces with a bent tip with three apertures lying in the same plane; II) bone, horn, or bronze cheek-pieces with three apertures lying in the same plane, but without a bent tip; (bronze cheek-pieces are of Chernogorovka type); III) horn, but usually bronze cheek-

pieces with three thickenings, each of them having an aperture in the middle, and with a bent tip; IVa) bronze cheek-pieces with curved rod, three loops lying in the same plane and a bent tip, sometimes having a form of spade; IVb) the same type, but with a little cap on the upper tip; Va) bronze cheek-pieces with three loops, as in IVa, but without a bent tip; Vb) the same, but with a cap on the upper tip (V. R. Erlikh [1991: fig. 2] labels types IV, V as type I); VIa (type IV according to Erlikh)—straight rod with three apertures with cylindrical muffs and a bent spade-like tip (in the west—Tsimbalka type); VIb) the same, but without a bent spade and with thickenings on either tip (in the west—Kamyshevakha type).

Thus the genetic development of cheek-pieces could be theoretically reconstructed as a way from type I) horn articles with three apertures lying in the same plane and with a bent tip which is caused by the natural form of material (curved horn) to type III) horn cheek-pieces (or bronze imitations of horn) where the fragile parts around the apertures are strengthened with semi-circular (in cross section) bevels, and the tip is bent as in the original horn form; the formation of type IVa with its straight rod and loops (type Ib in Erlikh's classification) and also with bent tip was parallel. On the basis of the original archaic type II (without a bent tip) the formation of type Va (parallel with that of type IVa) took place. This type had bevels around the apertures, but no bent tip.

A cap on the upper tip of a cheek-piece (type IVb and Vb) was an improvement of types IVa and Va. The evolution ended with the two most durable cheek-pieces with muffs of type VI. The emergence of the animal style led to the appearance of bronze cheek-pieces with a zoomorphic head. But they belong to the other period—the Scythian epoch.

The scheme reconstructed by means of the evolution method is of course completely speculative. In reality in the moments of formation of new tactics—chariots in the Sintashta period and horse-riding in EIA—the quest for new types of horse equipment was very intensive. Even in closed complexes of burials new and traditional types are found together. Moreover, innovations occurred in different regions at different tempos and during the whole period in question local differences persisted. Nevertheless, the analysis demonstrates that the primitive horn and bone cheek-pieces with three apertures were the original type. As it has been already noted, a great number of different types of bone and horn cheek-pieces was created and used in the steppes in the Final Bronze Age (see Chapter 8, fig. 39: 4-8; 42: 10). But in the beginning of the 1st millennium BC only three-holed horn cheek-pieces were selected (types I and II) to become prototypes of all Scythian cheek-pieces. Throughout the whole enormous space of the steppes the development of the horse bridle went in the same direction and the line of evolution remained uninterrupted from the applied-roller ceramics cultures of the Final Bronze to the very end of the Scythian period (Melyukova, ed. 1989: 96-97).

The analysis of the evolution of cheek-pieces emphasizes once more the role of the steppe peoples of the Final Bronze in the improvement of the use of horse and their genetic connections with the Iranian peoples of the Saka and Scythians.

In Asia the earliest finds of the original form of double-ringed bit of type I belong to complexes of the applied-roller ceramics cultures of the Final Bronze Age. In Fergana one link of a bronze bit having single-ringed ends lying in the same plane has been found in settlement 9 in Kayrak-Kumy (Fig. 106: 12;

Litvinsky 1962: 228; 230; table 58: 1; Kuz'mina 1966: 60, table XV: 38) in a complex with pottery with applied-roller and with no ornament but herring-bone (Litvinsky 1962: tables 66-69). B. A. Litvinsky (1962: 66, 69) dated the bit to the 8th–7th centuries BC, and thought that the settlement belonged to a late group. According to modern views, the ceramics of settlement 9 are of the Dongal type and this means that the assemblage, including the cheek-piece, could be dated more accurately to the (10th?) 9th–the beginning of the 8th century BC.

A link of a bit with rings lying in perpendicular planes was found in the eponymic settlement of the Chust culture (Sprishevsky 1961: 40; Kuz'mina 1960: 60, table xv: 39; Fig. 106: 13). The date of this culture is debatable but its complex of metal articles is synchronous with the Final Bronze (see below). Taking into account the remote western analogies of this type of bit in Hallstatt B (10th–8th centuries BC), I believe the date suggested by me in 1966 is accurate: the first quarter of the 1st millennium BC, most probably the 9th–8th centuries BC.

The discovery of two pairs of iron (!) bits of this type in the cemetery of Krasnaya Gora in central Kazakhstan is of special interest (Tkachev 2002, part 2: 140-145, fig. 195: 10, 11). This is the earliest iron bit known to me in the steppes of Asia. In a sacrificial place covered by stones four horse hooves and two horse skulls with bits have been discovered beside the commemorative circle N 7. The bit was made from forged iron rods of rectangular cross section. Inside the wall there were found a pot with a rim and fragments of thirteen vessels—flat-bottomed pots and jars tempered with sand (both large- and small-grained) and grog. They are ornamented with notches under the rim, fingertips and pearls. A. A. Tkachev rightfully thought the complex to belong to the late Dongal type. One should note the complete identity of Krasnaya Gora and Kayrak-Kumy ceramics, especially the distinctive pots with a lip.

The earliest find of a matrix for a bronze cheek-piece known to me is from the settlement of Dal'verzin of the Chust culture. This is a stone mold for a three-holed cheek-piece of type III with a bent tip of the rod (which is round in cross section) and three bevels with round apertures lying in the same plane (Fig. 106: 15; Zadneprovsky 1962: 67f, table xx: 3; Kuz'mina 1966: 60, table xv: 40).

One more cheek-piece of type III was found in circle 17 of the cemetery of Izmaylovka in east Kazakhstan (Ermolaeva 1987b: 64-94; fig. 33: 1). A stone trapezoid cist made of stone blocks fixed vertically in the ground was situated inside a stone wall. A robbed burial was discovered there (Fig. 107: 29, 30). The corpse was oriented with head to the west. A silver earring with a socket and bronze badges and horse gear were found in the grave. Near the box the horse equipment was compactly laid—two three-holed cheek-pieces, two two-holed cheek-pieces with spoon-formed tips, and two pairs of stirrup-like bits (one of type III and the other with a stirrup and round perpendicular aperture through which two cheek-pieces were joined).

The cultural-chronological position of the Izmaylovka complex is determined by its ceramics. There are Dandybay culture vessels (originating from the Karasuk tradition) and Dongal type pots (developed from Andronovo pottery), some of them with roller decoration (Ermolaeva 1987; 1987b: 91, fig. 28, 6). The date of Izmaylovka, and thus the date of the horse equipment, is determined by the late roller and Begazy ceramics, by bullet-like arrow tips which have analogies in the settlement of Myrzhik of the Dongal type in central Kazakhstan

(Kadyrbaev and Kurmankulov 1992: fig. 29). They were found with a three-holed bone cheek-piece and pottery of Namazga VI type. Pottery, arrows and horse equipment badges have analogies in the settlement of Kent and in the cemetery of Dongal (Evdokimov and Varfolomeev 2002: 60; fig. 17: 5; 27: 8-10; 28) dating from the 9th century BC. The ceramic complex, bullet-like arrows and horse equipment badges may be compared with the cemetery of North Tagisken whose date is the 9th–8th centuries BC (Itina and Yablonsky 2001: 97; 100; fig. 123: 2-8).

The badges from Izmaylovka have analogies in the cemetery of Zevakino in east Kazakhstan (Arslanova 1974: table iii, 24) where the spreader of the bridle is found together with a vessel of Dongal type, numerous single-blade knives and a sickle typical of the East-Andronovo metallurgical province of the beginning of the 1st millennium BC, as well as with a stone clasp for a bow case with three fillets. The latter article has a prototype (Arslanova 1974: table ii: 6)—a clasp from the settlement of Malokrasnoyarka in east Kazakhstan (Chernikov 1960: table xxxix: 6). In the settlement of Trushnikovo of the Trushnikovo stage ceramics, a bullet-like arrow tip and a single-bladed knife with an aperture in the handle were discovered, all analogous to corresponding finds from Izmaylovka. The sites of the Trushnikovo stage belong to the Dongal type. S. S. Chernikov (1960: table lxxviib) dated this stage to the 9th–8th centuries BC. A. S. Ermolaeva (1987a: 94) cautiously dated the Izmaylovka complex to the 9th–7th centuries BC. It seems that the synchronization with Dongal, Trushnikovo and Tagisken allows us to lower the date safely to the 9th–8th centuries BC.

So the cited facts give good reason for a statement that the initial types of bronze bits—I) single-ringed and III) with stirrup-like tip; the initial types of I) three-holed horn and III) three-holed bronze (imitating the previous type) cheek-pieces, and the set of bronze badges of a horse bridle —they all developed in the steppes of central and east Kazakhstan in sites of the Dongal type which represented the late applied-roller stage of the Andronovo culture. During the migration to the south the late Andronovans brought horse equipment to Central Asia. Its date is the first quarter of the 1st millennium BC. The lower date of the sites—the (10th) 9th century BC—is determined by the whole archaeological context of the Final Bronze Age. The upper date depends on the chronology of the barrow of Arzhan whose horse equipment, though conserving many archaic features, belongs nonetheless to the Saka epoch.

In Arzhan primitive bits of types I, II, and III were discovered in a single assemblage. Among them there are bits with a spiral rod, which has been regarded as an imitation of leather bits and is an archaic feature. Cheek-pieces are of different types, mainly of type II, often with a mushroom-like cap and sometimes with bevels around the apertures. Horn, bone, leather and wooden elements of bridles are also represented (Gryaznov 1980: 47, fig. 30; Marsadolov 1998). There are over 160 old saddle-stallions buried in the barrow. M. P. Gryaznov thinks that all bridle sets were of same type but, actually, there are ethnographical differences.

The chronology of the barrow of Arzhan is a subject of a heated discussion. The main date—the 8th century BC—was obtained by the C^{14} investigations (Marsadolov 1996). The detailed analysis of the modern state of the Arzhan chronology studies has been undertaken by A. Yu. Alekseev (2003: 15-37, table 2). He dates Arzhan to the 8th century BC and believes the first period of the

proper Scythian culture in Europe to begin at the end of the 8th century BC (p. 27). G. Kossack (1987, 1996) declared himself already in 1987 as an adherent of the long chronology; he was of opinion that the pre-Scythian Novocherkassk stage should be dated to the 8th century BC and the early-Scythian Zhabotin stage—to the end of the 8th century BC. M. P. Gryaznov (1980: 52) thought, after A. A. Iessen, that "the Scythian culture formed already in the 8th century BC, i.e., long before the legendary campaigns of the Scythians in the Near East." He declared that the basis of his chronology were the types of cheek-pieces having analogies in the sites of the Pontic steppes and North Caucasus that preceded the early-Scythian period. He qualified the Arzhan stage as the initial period of the Scythian culture and defined its date first as the 8th–7th centuries BC, and later as the 8th century BC.

But the kernel of a problem is not only the chronology of a certain site. M. P. Gryaznov (1980: 61) has raised a question of reconsidering the date of the Scytho-Siberian cultures and moving it back, perhaps to the 9th–8th centuries BC. In the cultures that are represented by the materials of Uygarak, Tagisken, Tasmola, Semirech'e and the Pamirs, he saw the roots of the Scythian cultures that emerged in Europe only in the 7th–6th centuries BC.

Thus the issue that depends on the chronology of Arzhan includes the problem of the regions where the formation of the Scythian complex took place, and not only the famous triad but the common core of the Scythian culture.

In the early-Saka epoch in Kazakhstan and Central Asia there remain bits of type I, while bits of type III (stirrup-like), type IV (stirrup-like with an extra round aperture which is a combination of types II and III) and bits of type V (with a square cramp) became exceptionally widespread. V. R. Erlikh (1991: 36) suggests the simultaneity of bits of types I and III and cheek-pieces of type II (Chernogorovka) and Vb (Novocherkassk) in the Caucasus. These types coexisted in time and are represented in the same closed assemblages of the cemeteries of Tasmola and others (Kadyrbaev 1966a: 383-8, fig. 7: 3,4; 15: 5-7; 24: 8,9; 26: 6,7; 28: 8). M. K. Kadyrbaev (1966; a) distinguished the Tasmola culture and dated its early stage to the 7th – first half of the 6th century BC (Kadyrbaev 1966a: 385).

In the Central-Asian cemeteries of Uygarak and Tagisken cheek-pieces of types I, III, IV, V are represented, and type III (with stirrup-like tip) is predominant (Tolstov and Itina 1966; Vishnevskaya 1973: 100-111, table xxxvi).

One should note that since A. A. Iessen's work was published (1953: 105), scholars are inclined to assume that type III is of eastern origin and bits of type IV are characteristic of Central Asia and the Asian steppes. Type V (with square tips) is represented in Tagisken (Tolstov *et al.* 1966: 161, fig. 8: 3, 4) and Uygarak.

The materials from Central Kazakhstan and Central Asia demonstrate that it was the leading region in the development of the horse bridle; its main elements were elaborated there already in the 9th–8th centuries BC. This leadership was asserted in the early-Saka period.

The aim of this excursus about horse equipment was to establish the origin of iron single-ringed bits of type I and cheek-pieces of type IIIa in grave 15 of the cemetery of Sialk VIB (Fig. 106) and of the similar set in grave 3 in Tepe Giyan I in Iran (Ghirshman 1939 vol. II: pl. LXVI; Contenau, Ghirshman 1935: pl. viii).

The chronology of Sialk has been disputed. R. Ghirshman (1939) initially was of the opinion that it emerged as a result of the migration of the Cimmerians to the Near East. Later it was ascertained that both sites, Sialk and Giyan, belong to EIA. A. I. Terenozhkin dated bits of this type to the second half of the 7th century BC. I. N. Medvedskaya (1983) proved that this date was unacceptable and suggested a date in the middle of the 8th century BC. This point of view met the objections of the Western colleagues who insisted that the date should be the 9th century BC (Curtis 1995). V. R. Erlikh (1991: 40-41), employing Caucasian analogies, was of the opinion that Sialk dated from the end of the 8th–the first half of the 7th century BC, but he also noted that in Europe iron single-ringed bits were discovered in early Hallstatt complexes. The cited data suggest that Sialk dates to the pre-Scythian period and precedes Arzhan. Its cultural and historical assignment to the Yaz I period in Central Asia reflects the migration of late-Andronovo and late-Timber-grave tribes.

That Sialk horse equipment has analogies in Chust and Dal'verzin provides reasons to think that this group of horse-breeding population came to Iran using the Central-Asian route.

Objecting to V. R. Erlikh one should emphasize a remark he himself has made (Erlikh 1991: 38-44): In the northern Caucasus region the cheek-pieces of type IIIa, which are also represented in Sialk (in Erlikh's classification, type IIIb), belong to a rare group III. This group has little in common with local types which "is caused not by chronological reasons but by their belonging to an alien culture." During the military campaigns of the late 8th and the early 7th centuries a rider's component, born in the Asian part of the steppe zone, penetrated the northern Caucasus from the Near East.

In this connection, the opinion of M. N. Pogrebova (2001: 323) is of special interest. She studied the horse burials of Iran in detail and has demonstrated that the variations of three-holed cheek-pieces (type III in our classification) are often accompanied by stirrup-like bits. Furthermore, some of the cheek-pieces have round caps. "Bronze cheek-pieces look undoubtedly foreign in Transcaucasia."

As remarked above, the date of the cheek-pieces of the Sialk variant lies somewhere between the 9th and the 7th centuries BC. M. N. Pogrebova (2001: 324-326) emphasizes that now the date of the Scythian sites is in the process of being reconsidered and believed to be earlier; accordingly, the date of the pre-Scythian period is lowered too. She dated the cheek-pieces of the Sialk variant to the end of the 8th–the beginning of the 7th century BC or even only the 8th century BC. I (Kuz'mina 1966: 60) and M. N. Pogrebova (2001: 325) suggested that they were the original form for the cheek-pieces with zoomorphic heads. Artifacts belonging to this type were found in Hasanlu, Amlash and dated from the end of the 8th–the beginning of the 7th century BC (Erlikh 1994: 65). R. Moorey (1971: 126) assumed that the cheek-pieces of the Sialk type originated in the Eurasian steppes.

In the Hasanlu citadel in layer IVB 42 pairs of bronze bits and 15 cheek-pieces have been discovered (de Shauensee and Dyson 1983). Most of the cheek-pieces are three-holed, and a part of the bits are single-ringed with spiral rod. According to C^{14} dates, the date of the complexes is the 9th century BC. M. N. Pogrebova (2001: 326) follows I. N. Medvedskaya when she thinks that the cheek-pieces of Sialk and Hasanlu are the earliest and assumes that this type

appeared in the Caucasus no later than the 8th century BC. As for the Central-Asian origin of this complex in Iran, M. N. Pogrebova (2001: 328-9) rejects it because of the absence of stirrup bits there. In her opinion, the cheek-pieces of Sialk type must have been produced not by the aborigines but by the representatives of "the Eurasian tradition", most probably the Cimmerians who came from the north-west. This hypothesis cannot be accepted, first, because of the C^{14} date of Hasanlu—the 9th century BC, and, secondly, because of convincing arguments of J. Curtis (1995) who insisted that the early date is more preferable after analyzing the helmets and taking into account that in Hasanlu there were no traces of influence of Urartu which expanded in the 8th century BC. The third reason is given by the data of the steppes of Kazakhstan and Central Asia where the Sialk complex developed on the basis of the sites of the applied-roller ceramics and painted ceramics of Yaz I-Chust that date from before the 8th century BC.

Summarizing the data on horse-breeding in Iran we can state that it could have appeared there with different waves of steppe population who came through Caucasus and Central Asia. Horse equipment was brought to Iran from Central Asia and was developed there further.

Weapons

Arrows

The development of this category was continuous since the Sintashta period. Most arrows are from the sites of the Atasu and Alekseevka types in Central Kazakhstan (Avanesova 1975b; Margulan 1998: fig. 190; Margulan *et al.* 1996: table liv). In the Final Bronze Age the bullet-like arrows are found in closed complexes. Arrows of category I, type I (two-bladed shaft-hole with leaf-like blade and hidden shaft-hole) are found in assemblages with ceramics with applied-roller, e.g., in the settlements of Sargary (Avanesova 1975: 34), Kent (Varfolomeev 1988: 86, fig. 4: 2; Evdokimov and Varfolomeev 2002: fig. 27: 12, 13), Myrzhik (Kadyrbaev and Kurmankulov 1992: 232; fig. 29: 2, 3; 118: 6-9), Shortandy-Bulak, Malokrasnoyarka (Chernikov 1960: table xxxvi: 2-6) and in the cemetery of Sangru III (Margulan 1979: fig. 93: 1; 161: 8-10). They are believed to date from the 12th–9th centuries BC. The continuous development of the category of two-bladed hafted arrows could be traced from the Sintashta period to the Final Bronze Age (Gening *et al*. 1992: fig. 171: 3; 185: 1-5; 186; Avanesova 1975b; Margulan 1998: fig. 190: 3-5, 11).

In the Dandybay culture there appear for the first time a two-bladed shaft-hole arrow with a barb and three-bladed hafted arrow. They have been found in the tomb 2 in Begazy (Margulan 1998: fig. 22: 9, 10). Arrows with a barb were further developed during the Saka epoch; they are found in Arzhan (Gryaznov 1980: fig. 11: 12). This type and three-bladed haft arrows are characteristic of the Tasmola culture; both types were found in the cemetery of Karamurun I; three-bladed also in Tasmola II, Nurmambet I (Kadyrbaev 1966a: 376, fig. 43: 4; 46: 1-4, 7, 8; 58). The Tasmola artifacts are a modification of the initial types of Begazy. Kadyrbaev (p. 378) emphasized that three-bladed arrows were not characteristic of the Urals region and Scythia, but they were widespread in the Pamirs (Aydyn-kul', Pamirskaya), in east Kazakhstan (Ust'-Bukon'), and in the Altai Mountains.

Gorytus (bow-case) fasteners

There is a characteristic detail of early-Scythian weaponry: small oblong articles with two or three fillets (Cherednichenko 1981). They are discovered throughout the steppes; the earliest specimens originate from the complexes attributed to Cimmerians: Vysokaya Mogila, Endzha (Terenozhkin 1976: fig. 5: 6; 25: 1-6), Krasnoe Znamya (Cherednichenko 1981: 41) and as far to the east as Arzhan (Gryaznov 1980: fig. 12: 1-4). An analogous golden article has been found in north Kazakhstan in Chebachye (AMK: table vi: 23).

Their prototypes (made from horn or stone) has been found in the complexes with ceramics with applied-roller—Alekseevka (Krivtsova-Grakova 1948: fig. 22: 3), Kent (Evdokimov and Varfolomeev 2002: fig. 31: 7), Malokrasnoyarka (Chernikov 1960: table xxxix: 6), Dandybay (AMK: table vi: 85), Zevakino (Arslanova 1974: 58, table ii: 6).

Fasteners of another type—round with one fillet—have been discovered in the Saka barrows of Tagisken and Uygarak (Itina and Yablonsky 1997: fig. 12: 4; Vishnevskaya 1973: table xvi: 14); their analogues—in Zhurovka, Starshaya Mogila and other sites (Cherednichenko 1981: 39, fig. 24).

Cherednichenko believes that the earliest specimens belong to the pre-Scythian period and dates them to the 7th century BC and later.

E. V. Chernenko (1981: 42, fig. 26) regards bone artefacts of cylindrical shape with two mutually perpendicular apertures as parts of the bow case. Their analogies are known in the Andronovo sites, particularly in the cemetery of Alakul' (the cited author's excavations).

Akinaks (sword)

A. Yu. Alekseev (2003: 52) states that "it is impossible to find their typological origins in the preceding cultures of the late Bronze and early Iron." But as we have many times shown, there were numerous types of daggers dating from the Final Bronze Age in the East-Andronovo metallurgical province. This is an evidence of an intensive quest for the most efficient type of weapon for hand-to-hand combat. One may cite the Karakol hoard II as a relevant example (Fig. 68: 5, 6). It consists of five daggers. They have elongated leaf-like blades, 24 to 29.5 cm long, with a lengthwise rib in the middle. A cast handle with a figurine of an animal is separated from the blade by a support (Vinnik and Kuz'mina 1981: 48-53: fig. 1-5). Forms of handles are diverse: a rectangular strip (of metal) with projecting ridges along the edges or with a complex profile with three vertical openings; finally, two handles of oval section with ribs and six or nine horizontal rollers. The hilt ends with a terminal representing an animal. The daggers were cast in composite forms; the figurines were cast separately and then added to the hilt. Smiths also employed the cire-perdue technique (Degtyareva 1985: 15, 16). The technology of the Karakol daggers was similar to that of the *akinaks*. Karakol blacksmiths found the forms of blade, hilt and terminal. They only had to change the gorgerin between the blade and the handle into a butterfly-shape crosspiece to make an *akinaks*. This transformation was not technically difficult. It has been admitted that the Karakol daggers were predecessors of *akinaks* (Vinnik and Kuz'mina 1981: 52). The analogous type of dagger with a ram is known in east Kazakhstan (Arslanova 1982; Samashev 1992). The resemblance of the handles of daggers and the *akinaks* also corroborates this thesis. There are

vertical fillets on the *akinaks* from the Issyk hoard (Akishev and Kushaev 1956: fig. 85), on chance finds from Issyk-Kul' (Moshkova 1992: table 27: 3), the Altai mountains (Kubarev 1981: fig. 1: 2: 9; 3: 1, 6), Minusa, Tuva—the cemetery of Aymyrlyg (Moshkova 1992: table 74: 11, 14, 20; 84: 15, 16). Pre-Saka daggers from the Altai are also distinguished by horizontal rollers on the handle (Kubarev 1981: fig. 1: 2). The same is true for the *akinaks* from Issyk-Kul' (Moshkova 1992: table 27: 1).

Interesting for solving the problem of the origin of *akinaks* is the find of a bronze dagger in the settlement of Elizavetinskoe in the Akmola district of the Akmola region (AMK: 89 N 1123; table iii: 52; Orazbaev 1958: 274, table ix: 2). This is a dagger with a narrowing blade with vertical roller; its handle has vertical partitioned fillets. The handle ends with a mushroom-like terminal; a sickle-like bow divides it from the blade. The bow is thickened in the middle; so are its ends. The dagger is close to several specimens from Karasuk, especially in the construction of the handle with fillets (Chlenova 1976). Since the elaborated classification of Karasuk daggers exists, there is no need to compare them in detail. Similar daggers with a bow represent a type widespread in the cultures of northern barbarians beyond the frontier of China, in the Altai, in Central Kazakhstan (Chlenova1972: table 61: 1-8; Margulan 1979: fig. 2: 15, 16). Analogies to this type of dagger have been found in east Kazakhstan (The Collection of the Semipalatinsk Museum); Baty; Dzhenoma barrow 2 (Chernikov 1949: table x: 1, 2; 1960: 84, table lxvi: 5, 10; Chlenova 1972: table 70: 33, who attributes it to the earliest Scythian type, dating to the middle of the 7th century BC). S. S. Chernikov classified them as articles of Karasuk form but proved that they were produced in the local area of Kazakhstan by the analysis of their metal.

The dagger from Elizavetinskoe is distinguished by projecting studs that were joined and formed a thickening. This allows us to compare it with the daggers from Arzhan (Gryaznov 1980: fig. 11: 1-2) and to admit that the specimen with a figurine on the handle was a combination of this type with the daggers of the Karakol hoard.

The settlement of Elizavetinskoe was the place where gold-bearing ore from the Troitsk gold-fields (one of the group of mines near Stepnoe) was processed. The complex of the settlement dates from the 10th–9th (8th) centuries BC, according to the finds of late-Andronovo ceramics, ornamented with zigzags and horizontal herring-bone patterns, typical of the Dongal type pottery.

Metal articles discovered there belong to the same period: a large celt-hammer with two loops and with a roller along the edge of the socket, a tetrahedral socket puncheon, awls, fragments of two sickles, three two-bladed shaft-hole arrows, and two-edged knives with a support (AMK: 89, table iii: 42, 50; Orazbaev 1958: 274, table 5). They suggest a comparison of this complex with a burial from the cemetery of Borovoe, enclosure 1, where a knife, an awl, a square mirror with a loop handle, and a vessel of the Dongal type were found (according to A. M. Orazbaev, the complex belongs to the Zamaraevo culture). A dagger from Dzhuvan-tobe belongs to the same period as it was found together with a celt-spade (Chlenova 1972: table 70: 20; 33). A dagger found in the hoard of Palatzy in east Kazakhstan is synchronous with them. It has thorns and mushroom-like terminal but no fillets on the handle. The hoard includes a hammer, two celts with a socket and a bracelet with conical spirals which has analogies in

the cemeteries of Sangru II, Ayshrak, Aksu-Ayuly, and Bylkyldak III (Margulan 1988: fig. 192). There was found pottery with applied-roller ornament, Andronovo and, more rarely, Dandybay ceramics. In Sangru I there was also discovered a square mirror similar to that from Borovoe. These finds confirm that during the Late Bronze Age metallurgists of Kazakhstan and Semirech'e were searching for an optimal type of dagger, and finally the *akinaks* emerged as the best form.

For some reason Scythologists have not devoted as much attention to the find of the earliest authentic *akinaks* in north Kazakhstan as it deserved, and in spite of the fact that it was already cited by A. I. Terenozhkin (1976: 130, fig. 80: 3), who attributed it to the earliest Scythian type. S. S. Chernikov (1954: 36, fig. 22: 5) published the results of his expedition of 1938 whose aim was to examine the settlements in the Kokchetav region in the area of the Stepnyak mine, the largest gold-mine operating in the Bronze Age. There were several lakeside villages of gold-miners. In one of these settlements near the village of Stalinskiy Rudnik (Fig. 108) there was an archaeological layer up to 0.6m thick with traces of ore-processing. A very interesting complex was found in the dump and ditches: a bronze dagger-*akinaks*, 30cm long with a lengthwise rib on the blade, with flat handle with a beam-shape terminal, round in section, and with a bow tending toward a butterfly-like form, a knife with a handle with fillets with a hole; a celt-hammer with a square socket; part of a pick; a fragment of a sickle; round mirrors with convex borders; copper ingots; two round bone badges of a horse bridle with notches. One badge is ornamented with carved rhombuses, the other—with concentric circles. The complex also includes ceramics (Fig. 108: 1; Chernikov 1954: 39-43, fig. 18: 4-6, 10; 19; 21: 5). S. S. Chernikov's amazing intuition helped him to establish the precise and accurate chronology and historical significance of this complex fifty years ago. The distinctive feature of the pottery from Stalinskiy Rudnik and from all other settlements near Stepnyak is the complete absence of both Alakul' pots with a ledge and Saka pottery. Predominant types are pots with applied-roller on the shoulder or, more often, under the rim. They are ornamented with oblique nicks or horizontal herring-bone pattern. Many vessels have a swollen trunk. Sometimes there remain the simplest Andronovan patterns: triangles and herring-bones; horizontal herring-bone was popular.

S. S. Chernikov compared the ceramics from Stepnyak with late-Andronovan pottery from the settlements of Alekseevskoe, but he also emphasized that "the settlements near Stepnyak were perhaps younger than Alekseevskoe". He stated their simultaneity with Dandybay II and noted that "Andronovan forms were still strong but there were already new features characteristic of nomads" (Chernikov 1954: 46).

Nowadays the Stepnoe complex could be accurately classified as belonging to the Dongal type. It should be noted that in the settlements of Stepnoe there were also found single-edged knives with a roller and an aperture in the handle, an axe of the Andronovo type with a comb, two daggers-spears with a support, one of them having a craftsman's stamp, an adze with a socket, a spear-like chisel; two-bladed arrows with hidden shaft-hole and with projecting shaft-hole, a tetrahedral arrow and tetrahedral awls. All the bronze articles from Stepnyak without exception have analogies in closed complexes from the settlements with ceramics with applied-roller and in the hoards of the Final Bronze Age. Some categories are characteristic of the wide steppe zone, but their combination is

specific for the Andronovo metallurgical province and especially for the hoards of Semirech'e (Kuz'mina 1965a; 1966; 1967; Kozhomberdiev and Kuz'mina 1980). The date of the earliest *akinaks* in the steppes is established according to the ceramic complex of the Dongal type proving its upper date. The Stepnyak complex confirmed the conclusion that "the type of Scythian akinakes developed in the cultures of the Late Bronze Age in the depths of Asia" (Terenozhkin 1976: 132). An *akinaks* from Lermontovskiy Raz''ezd in the North Caucasus and from Samtavro in Georgia, believed to be the oldest of this type (Terenozhkin 1976: 123, fig. 78: 1; 79: 2 – 4), cannot be used for dating the specimen from Stepnyak since they have very long blades and are already made from iron.

Helmets

Helmets of the Kelermes type constitute one more category of articles common for the entire steppe. Their area extends from the North Caucasus (Kelermes, Krymskaya village, Starokorsunskoe hillfort) and the Ukraine (from the river Tyasmin in the Dnieper region) to the Volga region (Starye Pechery), Central Asia (Samarkand) and Semirech'e (Kysmychi) and the Altai Mountains (a helmet from Kirgizstan belongs to another type). Since the 1940 work of B. Z. Rabinovich, who had distinguished this type, large amounts of studies have appeared, so it suffices to cite only the main publications (Chernenko 1968: 76-82, fig. 41-44; Galanina 1985; Alekseev 2003: 47-50; fig. 3).

M. P. Gryaznov thought that helmets were cast in two-part forms. E. V. Chernenko correctly noted that only a three-part matrix could be used. Other scholars suppose that helmets were cast with the help of a wax model. The date of this type has gradually been lowered. B. Z. Rabinovich believed it to date from the 6th century BC, L. K. Galanina (1985: 174) defined the lower date as the middle of the 7th century BC, and E. V. Chernenko (1968; 1981; 1987) placed it in the 7th century BC (but he admitted that it might have also been the 8th century BC). A. Yu. Alekseev dated it to the 7th – 6th centuries BC. But it was A. A. Iessen (1951: 117) who had already suggested the date of the 8th – 7th centuries BC.

The origin of the helmets is a subject of discussion. E. V. Chernenko proposed (following B. Z. Rabinovich) that they originated in the North Caucasus. L. K. Galanina assumed that the Scythian helmets had formed on the basis of Near Eastern prototypes and then were produced in the North Caucasus and in Central Asia. This hypothesis could not be accepted because of the absence of close prototypes in the Near East.

I suggested (Kuz'mina 1958: 124 – 125) that bronze helmets appeared as an imitation of the Saka caps. Herodotus (7.64) wrote: "The Sacae, or Scythians… had on their heads tall stiff felt caps rising to a point." One of the Saka tribes was called "the Saka in pointed caps." Their images are numerous in the art of Iran. W. Ward (1910: 328, fig. 1051, 1052) regarded the caps of the Saka on Achaemenid cylinders as their pointed helmets. The Saka were armed with axes-puncheons and the helmets were designated to protect against their blows.

It has been noted (Kuz'mina 1958: 122) that the closest analogy to the helmets of the Kelermes type is represented in the protective armament of the nomads who inhabited the northern frontier of China (Fig. 111: 1-8; Egami, Mizuno 1935: Vol. 2, fig. 33: 1, 2). In the present times this armor has been

studied by many scholars. A. V. Varenov (1988: 11; 1989a: 46-50, fig. 14, 15) suggested that the prototypes of the proper Chinese helmets of the Shang period were leather or felt head gear. The helmets covered the neck and had a rectangular cut in the front and a tube on the top to fasten a plume. They were cast in composite molds. Shang helmets are very different from those of the Zhou period. The latter have a cut in the front and another one in the backside and a projection in the middle. Usually the lower brim of the helmet has a roller over which there is an aperture for fastening a panel, and on the top there is a loop for a plume. Helmets are cast with a wax model. They are similar to the Scythian helmets not only in general construction but also in details. This means that their genesis may have been monocentric. A. V. Varenov (1988: 11) notes that the date of the earliest Zhou helmets is the 11th–10th centuries BC and hence they are the original form for their Scythian analogies.

The chronology of the Zhou helmets from Meylihe, Chifeng and Baifu (11th–10th centuries BC, according to Varenov, and 10th–9th centuries BC, according to Khudyakov) is based on the chronology of Zhou (11th–8th centuries BC) and supported by C^{14} analysis of a sample from Baifu: 1120±90 BC.

So where and when did the helmets of the Kelermes type appear? Russian sinologists A. V. Varenov and S. A. Komissarov and the supporters of the hypothesis of an Asian homeland for the Scythians among archaeologists are confident that this innovative form of armor was of Chinese origin. But A. V. Varenov himself proved that there was no genetic connection between Shang and Zhou helmets. Highly relevant in this case is the opinion of Yu. S. Khudyakov, the leading specialist in the history of Asian weaponry, that Chinese helmets were invented to protect against "the blow of a puncheon" which was the main weapon of warrior-charioteers. It is therefore not by chance that they emerged and became widespread among 'the northern barbarians' who waged war with the Ancient Chinese." Moreover, "helmets of the early-Scythian and Saka circle of cultures belong to another stage of development of protective metal head-gear that was a part of a rider's military equipment" (Borisenko and Khudyakov 2003: 24). The Xiajiadian complex in the cemetery of Nanshangen (Wagner and Parzinger 1998: 37-72) is of special interest in this case. In grave N 101 there has been found a helmet of the type in question (abb. 15: 1) in a complex with a spear with a loop, a single-edged knife with a ring as a knob, badges with loops and peculiar one-piece bits with cheek-pieces with splints. In grave N 102 there have been discovered horse equipment including ringed bits and three-holed cheek-pieces. The date of these graves is established by the find of a Zhou vessel of the 9th century BC.

The presence of many objects (horse equipment in the first place) that have analogies and prototypes in the sites of Kazakhstan, Central Asia and the Altai Mountains of the applied-roller ware period suggests that the cultural impulse was going not from China to the steppes but from the eastern regions of the steppe to the 'northern nomads' who lived on the periphery of China.

It should be noted that a prominent specialist in the culture of the 'northern nomads', E. Bunker (2002: 80-1, N 46), when she published a helmet from North China of Cimmerian type from the Ariadne galleries collection in New York dated it to the 7th century BC using the analogy with the Kelermes helmets. This helmet differs from the latter by a horse figurine on the top and an isosceles triangle pattern along the outer brim. It was cast with the help of a wax model;

the horse figurine was cast in a separate two-part form and then welded to the helmet. E. Bunker cites analogies to this helmet from the Taibei National museum found in the site of the Late Bronze Age of Xiaoheishigou, Nincheng in south-east Inner Mongolia (judging from the photo, it is not clear whether it had a nose guard projection or not), and in the David Weil collection without the projection over the bridge of the nose. E. Bunker thought that the frontal triangle projection was invented in Russia in the 7th century BC. She emphasized that the Shang-Yin helmets from Anyang were cast in multi-part molds, while the technique of casting with the use of a wax model appeared in China only in the 6th century BC. The question whether this technology was borrowed in China with the intermediation of the pastoralists of its northern frontiers requires special investigation. As for the horse figurines of the Chinese helmets, they are analogous in shape and technology to the figurines of horses of Mongolian breed without a mane on the terminal of a dagger from the hoard of Karakol in Semirech'e (Fig. 68: 5; Vinnik and Kuz'mina 1980: fig. 2; Degtyareva 1985: 16).

Symptomatic is the finding of two helmets in the slab-lined tombs of Mongolia in Emgent Khoshuu and Kholtost Nuga (Erdenbaatar 2004: 194-197, fig. 8.2A; B; C; 8.3). Erdenbaatar cites analogous helmets from Mongolia and Manchuria from the sites of Shilishan and Sinkun and a chance find from the Ontario Museum in Toronto. They belong to the culture of the 'northern barbarians' of the Western Zhou period.

The discovery of helmets in slab-line tombs revives the question of where the center of their origin has to be localized. Chemical and spectral analysis of bronze articles has demonstrated that Mongolia belonged to the production zone of Siberia including the Altai and Baikal (Erdenbaatar 2003: 217). In the Olov river region of Trans-Baikal the most eastern find of a Kelermes type helmet was made (Borisenko and Khudyakov 2003: 23). N. A. Novgorodova (1970) thought that the main center of production of bronze in Mongolia was the Altai.

One could assume that the major center of bronze casting in the Final Bronze period was the place where the helmets of Kelermes type were invented by the metallurgists of the late applied-roller ware culture. The fact of their migration is incontestable; it is supported by numerous finds of ceramics with applied-roller in slab-line tombs of Mongolia and Trans-Baikal (Fig. 109; Tsybiktarov 1998: fig. 80-84). It was the bearers of the Applied-roller ware culture who brought the skills of riding, horse equipment, elite type of armor (which had emerged along with the new tactics), tools (chisels, adzes) and ornaments (mirrors with a loop, earrings) and passed them to the tribes of the northern frontier of China as they spread from the East-Andronovo steppes to Mongolia and Trans-Baikal.

Simultaneously and slightly earlier did the analogous process of the infiltration of late-Andronovan metallurgists from Semirech'e to Xinjiang also take place (see Chapter 20).

Early-Scythian helmets appeared in the culture of the ancestors of the Saka not as a modernization of the Chinese Shang helmets, but as an innovation dependent on the spread of new tactics – riding – and a use, along with arrows, of hand-to-hand weapons such as axes of Andronovo type.

As we have said, the Shang and the Scythian helmets are essentially different. They have different construction and form of the front cut; the former have no back cut, no roller, no apertures, and no comb (some Scythian specimens have a

comb). The Saka caps have all these details; the important thing is that the type of Saka cap derived from the Andronovan cap (see Chapter 7). This gives me the right to think that it was the Saka cap that became the prototype of the helmet. This hypothesis was accepted by Yu. S. Khudyakov, a specialist in the history of weapons: "The Saka helmets are similar in form to the felt and leather head-gear characteristic of the ancient Iranian-speaking nomads of the steppe zone of Eurasia" (Borisenko and Khudyakov 2003: 24).

The early date of the invention of helmets by the Iranian-speaking tribes in Asia is supported by numerous mentions of this armor in the *Avesta* (Yašt 11.7; 10.112; 13.45). Metallurgists of the late Bronze Age of Kazakhstan, Semirech'e and the Altai knew the technology of casting in three-part molds and with the help of a wax model (Degtyareva 1985; Ryndina *et al.* 1980). The use of a wax model was known in the steppes since the Catacomb period and was widespread in the archaic Scythian epoch. Thus it was not difficult to make helmets and cauldrons.

If this hypothesis, though based only on two helmets from the Altai, is right, one can assume that this new armor could spread to the Volga, Dnieper and North Caucasus, since the contacts were very intensive, either by exchange or with a group of ancestors of the Scythians that migrated to the west. If it was so, it may support the hypothesis of their eastern origin. The presence of most elements of the extended Scythian triad in the Final Bronze Age complexes of east Kazakhstan, the Altai and Central Asia permits one to treat these territories as the main catalyst of the early Saka culture and eliminates the assumption that the ancestors of the Scythians had migrated from the borders of China or from Inner Central Asia. As they reached the North Caucasus (from the east), some prototypes of Saka things became widespread there.

But the Scythian culture itself formed only during the Cimmerian and then Scythian campaigns in the Near East, when they adopted the achievements of the genetically related culture of the West Iranians. In my opinion, the mechanism of formation of Scythian art was convincingly revealed by V. G. Lukonin, M. N. Pogrebova and D. S. Raevsky. The Saka culture and its art formed on the same base of the Final Bronze Age, but they experienced the crucial influence of the genetically close East-Iranian tribes of southern Central Asia and Afghanistan.

Implements

Single- and two-edged knives, wedge-shaped chisels and chisels with an opening, celts with two lugs and a front lug, sickles—in the Saka epoch all these categories retain a resemblance to the articles of the Bronze Age (Kuz'mina 1966) which proves once more the genetic affinity of the Scythians and Saka with the creators of the culture of applied-roller ceramics. Only some proportions changed in the Saka period. The unusual richness of the East-Andronovo province in copper and tin deposits caused the long prevalence of bronze production there, although iron was found in some settlements of the 13th–9th centuries BC.

Single-edged knives

The set of early Scythian cult articles includes thin and long single-edged knives found in graves in pairs (Alekseev 2003: 53, fig. 5). They are known as occasional finds in east and central Kazakhstan and in settlement 15 at Karaganda (Margulan

et al. 1979: 224, fig. 166: 8,9), and in Semirech'e near Almaty (AMK: table VIII: 73) on the Great Canal of the Chu river (fragments), in Fergana in Dolona and supposedly in the Tashkent oasis (Kuz'mina 1966: 44-45, table 5; ix: 24, 33, 36, 37). Two knives that differ from them by a ring on the handle have been found in a cast bronze cauldron in the Cherdoyak mine in east Kazakhstan (Arslanova and Charikov 1980: 148, fig. 2). An analogous knife was discovered in the Atkar cemetery of the Timber-grave culture in the Volga region. O. A. Krivtsova-Grakova (1955: 54, fig. 12: 12) compared it with Andro-novan specimens. A knife with specially sharpened tip of the blade was found in the Karasuk burial of the cemetery of Dolgaya Griva in the upper Ob region (Gryaznov 1956: 31, fig. 7: 26).

Specimens from Tuva in sites of the Arzhan and the following Ust'-Khemchik stages and in the burials of the 8th–6th centuries BC in the cemetery of Dzhuvan-tobe in Semirech'e (AMK: table viii: 52, 53; 73—the latter has a rhombic knob) belong to the Scythian period (Moshkova 1992: inset iii: 8).

Knives from the Karasuk grave and from settlemetnt 15 at Karaganda with ceramics with applied-roller establish the lower date of these articles—the beginning of the 1st millennium BC—and define at least some occasional finds as belonging to this time, and not to the Tagar culture in the Minusinsk valley (Kiselev 1949: table xxiii: 24). These knives are also known in the Aral sea region—in Sakar-Chaga along with arrows of the Chernogorovka type (Yablonsky 1996: fig. 17), which suggests a date of the 8th–7th centuries BC, and in Tagisken in barrow 5 (Itina and Yablonsky 1997: 23; 67) along with whole-metal stirrup-like bits and two-holed cheek-pieces, shaft-hole arrows with rhombic heads and details of horse equipment—a cross-shaped bead and a disc ornamented with solar signs (fig. 47). The complex of the barrow permitted archaeologists to date it to the 8th – the first half of the 7th century BC.

A long knife with a ring-like knob from Uygarak may functionally belong to the same category (Vishnevskaya 1973: table xxi.11). Vishnevskaya dated the cemetery to the 7th–5th centuries BC. The Uygarak finds of stirrup-like bits, three-holed cheek-pieces, shaft-hole arrows, stone fasteners, articles with solar signs which have analogies in the burials of Vysokaya Mogila, Endzha, Kubanskiy, Alekseevskiy and Zhabotin in the western part of the steppe zone and of Giyan and Sialk BII in Iran, and, most importantly, that the groups of articles of the same type occur in all these complexes—all these facts suggest that the date of some graves of Uygarak should be lowered by a half a century (Kuz'mina 1975).

Thus the form of ritual knives of the Saka culture derived genetically from the applied-roller ware culture of the early 1st millennium BC.

Solar signs

A characteristic of early Saka sites is an ornament in form of a circle inscribed into a square with concave sides. It has been regarded as a solar symbol. In Central Asia it is represented on the badges from Tagisken (Itina and Yablonsky 1997: fig. 62), in Uygarak (Vishnevskaya 1973: table xi: 4; xvii: 1, 2; xviii: 33), and in the Pamirs (Terenozhkin 1976: fig. 92: 15). Its analogies are known in the west—in Endzha (Bulgaria), in the villages of Kubanskiy, Alekseevskiy and Zhabotin. The traditional chronology of these complexes is the 8th–7th centuries BC. The origin of this ornament is not clear to me. Solar symbols are very popular in Andronovan art. Among them there are a circle in a square and a

square in a circle (Tkachev 2002: 137); but only the ornament on a badge from the cemetery of Bylkyldak I is relatively close to the Scythian symbol (Margulan 1998: fig. 191: 2). Much closer to the latter are numerous images on stelae of the Okunevo culture (Vadetskaya 1967). But the riddle is, how could a symbol of the 3rd millennium BC from the Yenisey become popular after a thousand years in Central Asia and the Pontic steppes.

Cauldrons

Cauldrons belong to the articles that are diagnostically 'Scythian'. They were found in the North Caucasus near Tanais on the lower Don, in the Voronezh region, in the Volga region, and in the Urals (Krivtsova-Grakova 1955: 44-5, 133, 135; Smirnov 1964: 127-136, fig. 70AB). The concentration of their finds is highest in east Kazakhstan and Semirech'e (Bernshtam 1952: 45-50; Kopylov 1955; Spasskaya 1956; Arslanova and Charikov 1980: fig. 1) and in Xinjiang, which was connected with the Semirech'e center (Mei and Shell 1998: fig. 7). Cauldrons also comprise a large group among the finds of the Tagar culture of Siberia (Chlenova 1967: 92-109, table 18, 19); they were spread as far as Lake Baikal, the Angara and Mongolia (Novgorodova 1989: 259, fig., Erdy 1995). Their typology has been elaborated by E. Yu. Spasskaya (1956) and analyzed by N. L. Chlenova (1967).

Two types have been distinguished. Type I comprise open spherical or egg-shaped vessels with a conical hollow stem-tray and vertical handles. Type II are low open vessels with three legs and horizontal handles.

The chronology and origin of cauldrons are difficult to determine because the majority derive from chance finds. But the cauldrons of the barrows of Kelermes have a fixed date—not earlier than the middle of the 7th century BC. Cauldrons of the Beshtau type (with fixed ring-like handles that are raised over the rim so that they are half of a ring higher than the rim) are believed to be older (Alekseev 2003: 45, fig. 1: 7, 8). They have analogies in the products of the east Andronovo metallurgical province and the Minusinsk Basin. N. L. Chlenova (1967: 94-95, 99) dated them to the 8th–beginning of the 7th century BC.

The early date of the first type is supported by the discovery of a cauldron together with two long ritual knives in the mine of Cherdayak. Such knives were also discovered in sites of the Final Bronze Age and in early Saka burials (see below). This complex also supports the hypothesis that cauldrons were used for making sacrificial food for collective meals on the calendar festivals, first of all on spring New Year or Nouruz. This custom and the use of a large cauldron and ritual knives for killing sacrificial animals is preserved in the traditional culture of the Pamiris, Ossetes, and other nations who derived from the Andronovans.

Some Saka cauldrons were made in composite casting forms. Some of them may have been made with the help of a wax model with a loss of the form, like helmets of the Kuban' type.

Both technologies and the additional casting of details (e.g., of animal figurines) were known already in the Final Bronze period in the east Andronovo metallurgical province (Ryndina *et al*. 1980; Degtyareva 1985: 16). Some cauldrons in Eastern Europe are more primitive and their tray is made separately and then riveted (Smirnov 1964: 128).

The center of production of cauldrons of the second type (with three legs) was Semirech'e, where 13 specimens have been found, and neighboring Fergana from

where the cauldron of Tyuyachi derives. This cauldron is distinguished by a cylindrical trunk (Chlenova 1967: table 19: 8, 10, 11, 12). Separate finds of this type have been made outside this territory in the Minusinsk Basin and in Mongolia where they were imported from Semirech'e. K. F. Smirnov (1964: 135) emphasized that some Sauromatian specimens were close to those of Semirech'e. The date of the type in Central Asia is set to the 8th century BC. The reason for this date is that animal figurines are made not in the Scythian animal style, but in an archaic manner so that they are reminiscent of figurines from the Karakol' hoard.

What is the origin of cauldrons? N. L. Chlenova (1967: 102-3) denies their Chinese genesis and thinks that "Iran was one of the most probable territories which could have been the homeland of cauldrons of the Scythian type." This hypothesis does not seem plausible, since the cauldrons of Sialk, cited by Chlenova, have no tray nor legs, and the cauldrons from Urartu have handles in the form of rings fastened in muffs which are absent from Scythian cauldrons. Speaking of the origin of the cauldron from Fergana, one could cite the ritual vessels of Bactria and Margiana: they have a cylindrical trunk with figures along the border, but no conical tray, though vases and goblets have this element (Sarianidi 1998: fig. 10: 1, 2, 10). So they too could not be prototypes of the Saka cauldrons.

According to another hypothesis proposed already at the end of the 19th century by P. Reinecke, the homeland of the Scythian cauldrons was localized in China. Nowadays this opinion has many adherents among the enthousiasts of the conception og the eastern origin of the Scythians. It is true that diverse types of bronze vessels were elaborated in Shang-Yin China (Bagley 1987). They were cast in forms where composite ornaments (interwoven S-form figures and meanders) were carved.

A vessel of the *ding*-type from North-Central China (Arthur Sackler collection) is a probable prototype of the steppe cauldrons of the second type (tripods with three legs; Bagley 1987: N 86; So and Bunker 1995: 92 N 4). Its typically Chinese ornament helped J. So to date it to the 12th–11th centuries BC. The scholars regard it as a product of Chinese craftsmen who worked for northern barbarians. But the fact should not be overlooked that there were no finds of cauldrons with imitation Chinese decoration neither in Siberia, nor in Kirgizia, nor in Kazakhstan. An essential difference between the vessel of the *ding*-type and the steppe cauldrons is that the *ding* has vertical handles fixed to the upper border, while the steppe vessels have horizontal handles fixed below the border.

In the 7th–6th centuries BC *ding* vessels still existed but their ornamentation changed, which "signals an infiltration of non-Chinese motifs into bronze workshops in China's heartland" (J. So, in So and Bunker 1995: 110 N 24).

As for the cauldrons of the first type (with a tray), their origin might have been connected with the vessels of the *fu*-type from north China (So and Bunker 1995: 108 N 22; Bunker 2002: 194-195 N 185). The *fu* is a deep U-shaped bowl sitting on a low trumpet-shaped stem with vertical handles. Handles are designed as a twisted rope. In the upper part of the trunk there is a roller with notches imitating a rope. It separates the belt with a meander pattern from the lower zone with V-shaped figures. So and Bunker regard this cauldron as belonging to the transitional period between the Eastern and Western Zhou and date it to the 8th century BC. They note that it is the earliest specimen of its type in Western

China. Analogous small and more roundish unornamented vessels were found in Xi'an in the burials of Jundushan, Yanging north of Beijing. The graves belong to non-Chinese people and date from the 7th–6th centuries BC (fig. 22: 1).

Bunker and So think that the Chinese could be the first to cast vessels of this type from bronze, which later became a signature of the Scythian culture. It was further developed by the nomads of Eurasia. Later articles have different proportions, their handles are square in section, and their trays have slots. This type was brought to Western Europe by the Huns (Erdy 1995; Bunker 1997: 269 N 236; 2002 N 186, 187).

In the frontier area of China, inhabited by the 'northern barbarians' there have been found several cauldrons of the Saka type. E. Bunker (1997: 178, fig. 93 N 93) dates them to the 7th–6th centuries BC. There exist also later specimens of the 5th–4th centuries BC (1997: 239 N 195, 196). She supposes that Scythian cauldrons have no prototype in China. "The Chinese may have been the first to cast this type of cauldron which, before the 8th century BC, may have existed in hammered metal or carved wood… the origins of the nomadic cauldron must be sought farther west" (Bunker 1997: 178). Thus E. Bunker declares herself as an adherent of the third, the steppe-hypothesis, on the origin of the Scythian cauldron.

A. M. Tall'gren localized the center of their creation in Central Asia; E. Yu. Spasskaya—in the steppes; N. M. Yadrintsev, G. P. Sosnovsky, E. Minns—in Siberia (Chlenova 1967: 92). N. L. Chlenova (1967: 95-99) proved that the Siberian cauldrons of the Tagar culture were not the earliest of their type, but had developed under the influence of the cauldrons of Kazakhstan, Semirech'e and Central Asia, the earliest of which date from the 8th–7th centuries BC.

As for the origin of the cauldrons of the first type, they have a formal resemblance to clay goblets that were widespread in the Final Bronze Age, specifically in Dandybay and Tagisken (Kuz'mina 1974). This analogy, however, is merely formal, since the vessels have a different purpose and are made of different materials. The comparison of these cauldrons with the riveted cauldrons of the Bronze Age, e.g., from the Samara region and the Ukraine (Krivtsova-Grakova 1955: 44, fig. 10: 9; Berezanskaya and Otroshchenko 1997: 468, fig. 175) shows close resemblance to the vessels with a tray and permits one to accept the suggestion of O. A. Krivtsova-Grakova (1955: 44-45, 133, 135, fig. 10: 9; 31) that Scythian cast bronze cauldrons developed on the basis of riveted metal cauldrons of the Late Bronze Age.

Not only have the latter a trunk analogous to that of large clay vessels of the late Timber-grave and Andronovo cultures, but also the technology of their riveting from horizontal stripes reproduces the coiling technique of fashioning ceramics. The find of a cauldron in the archaeological layer of the settlement of Diky Sad in Nikolaevka in an assemblage with ceramics of the Final Bronze Age suggests that the metal riveted cauldrons of Eastern Europe are of pre-Scythian times and to treat them as predecessors of the Scythian cast cauldron. Of essential importance is an observation by O. A. Krivtsova-Grakova that the shoulders of cauldrons are ornamented with a convex metal roller that imitates the applied-roller of the ceramics of the Final Bronze Age. (One might recall that the Chinese *fu* cauldron of the 8th century BC is also ornamented with a roller with oblique notches. It imitates the applied-roller of the steppe ceramics of the 12th–9th (8th) centuries BC and its reproduction on pre-Scythian riveted cauldrons. This

contradicts the statement that China was the homeland of the Scythian cauldrons.) The ornament of the cauldron from the Samara (formerly Kuybyshev) museum—horizontal zigzag under the roller, pearls, and oval indentations on the rim—copies the typical decoration of the pottery with applied-roller of the Pontic steppes and the Volga region. O. A. Krivtsova-Grakova (1955: 45) supposed that clay vessels with trays, that spread over the entire steppe in the complexes of applied-roller ceramics, are an imitation of metal cauldrons. (Today it seems to me no less probable than the search for prototypes of goblets in the ceramics of the farmers of Iran and Central Asia; Kuz'mina 1974.)

K. F. Smirnov (1964: 128) accepted the conclusions of O. A. Krivtsova-Grakova that the Scythian cast cauldrons derived from the hammered cauldrons of the Final Bronze Age. He cited a cauldron from the village of Mazurki (1964: fig. 70A: 5) as an example of ornamentation with a roller with a 'mustache'. He also emphasized that there were no riveted cauldrons east of the Volga (1964: 130).

What could be the explanation of this phenomenon? It seems that in the Final Bronze Age the center of metallurgical production was localized in Kazakhstan and Semirech'e. This region was rich in ore and the metal-working was highly developed there. This was the reason that the technology of casting cauldrons emerged already in the Final Bronze Age when in the western steppes hammered cauldrons were still produced.

Ornaments of the Saka cauldrons are typical of the applied-roller ceramics cultures: a roller, a zigzag, a lowered triangle (Arslanova and Charikov 1980: fig. 1:3). Animal figurines represent the fauna of Semirech'e and the Altai. The tradition of similar ornamentation on knives and daggers derives from Seyma and Turbino.

As for Xinjiang, the blossoming of culture there in the Final Bronze Age was caused by the migration of the Andronovo population from Semirech'e (there are Andronovan graves in Xinjiang). The similarity of the types of metal articles with those of the Shamshi hoard (Linduff, ed. 2004) permits one to assume that metallurgists and smiths from Central Asia were working in Xinjiang. Petroglyphs discovered there belong to the Eurasian steppe province.

Thus it becomes obvious that there is no need to search for a prototype of the Scythian cauldron either in China or in Iran; one may regard it as an innovation introduced into the culture of metallurgists of the east Andronovo metallurgical province in the period of the applied-roller ceramics. It was the period when wide ethno-cultural relations were established in the steppes, which facilitated the influence of the Central-Asian and Chinese cultures and stimulated the search for new types, adapted to the conditions of the pastoral life. This conclusion supports the opinion of V. A. Gorodtsov (1910: 197).

Mirrors

Mirrors are not only ornaments, but also cult accessories. They are characteristic of the entire Scythian world (Alekseev 2003: fig. 2, map). The classification of Tagar mirrors has been elaborated by S. V. Kiselev (1949: 127, table 3) and is the base for the scheme of classification by N. L. Chlenova (1967: 81-92); the mirrors of Scythia have been classified by T. M. Kuznetsova (2002).

In the sites of the Bronze Age of the steppes mirrors are known in the Andronovo culture. They are of six types: I) round and slightly concave; II)

round with a projecting handle; III) round with a loop handle; IV) square and flat; V) square with a loop handle; VI) round with a loop handle and a border.

Mirrors of type I are known in the steppe sites of Central Asia in the cemetery of Zaman-Baba (late 3rd and early 2nd millennia BC) and in the cemetery of Gurdush of the 15th–13th centuries BC (Kuz'mina 1966: 67-68). That they were borrowed from the agricultural population of south Central Asia is supported by the finds in the same sites of stone beads typical of the Anau culture. The farming culture of south Central Asia belonged to the area of the Iranian and Near-Eastern sites where the type of disk-shape mirrors emerged in the Eneolithic. In Turkmenia mirrors are known since the period of Namazga III, in Iran—in Susa 1A, Hissar III and other sites. Mirrors are characteristic of BMAC and are represented in south Uzbekistan since the Sapalli stage (Askarov 1977: 73, table xxxvii: 2; 4; 7; 9-12): Dzharkutan (Askarov and Shirinov 1993: fig. 63: 6) and the cemetery of Bustan (Avanesova 1997: abb. 14: 4, 5). They are also known in Tadzhikistan in the cemeteries of the Bishkent culture: Tulkhar (Mandel'shtam 1968: table v-vii), Kangurt-Tut, (Vinogradova 2004: fig. 39; 1; 26, 40: 26, 27) Tigrovaya Balka (P'yankova 1986: abb. 72: 11) and of the Andronovo culture—Dashti-Kozi (Bostongukhar 1998: 69, 71, 83; fig. 45: 4, 5).

Mirrors of type II (with a projecting handle) were found in Semirech'e in the hoards of Sukuluk (one intact and one broken) and Sadovoe (three specimens, one with pins for a handle); casting forms were discovered in Fergana in the settlements of the Chust culture: two in Dal'verzin and fragments of two forms in Chust (Kuz'mina 1966: 68, 69, table xiii: 1, 4-6, 8, 9).

In the southern part of Central Asia mirrors of type II were discovered in the Bishkent culture in the cemeteries of Tulkhar, Kangurt-Tut, Kara-Pichok, Tigrovaya Balka (Mandel'shtam 1968: 64, 81; table viii: 1; Vinogradova 2004: fig. 39: 40; 40: 3; 48: 31); and in the Dzham hoard near Samarkand (Avanesova 2001). This type of mirror was known in Iran at the time when the Iranian tribes were settling there. Mirrors have been found in the cemeteries of Sialk B (Ghirshman 1939: pl. xxix 8 etc.) and Khurvin (Vanden Berghe 1959: fig. 157b; 1964: 45).

Mirrors with a projecting handle are numerous in the BMAC in the Sapalli and Dzharkutan stages where they have two variants: with a plain handle and with a handle in the form of a female body. The latter variant has been also found in Turkmenia near Takhta-Bazar (Askarov 1973: table 25: 14; 32: 14; Askarov 1977: 73, table xxxvii: 1, 3, 5, 6, 8; Sarianidi 1988: fig. 14; Sarianidi 2001: table 26: 13-15; Amiet 1998: fig. 10; pl. 88).

Both variants have a very long series of analogies in the cultures of the Near East and Iran. In India there is a mirror of the first type from the cemetery of Harappa R37, of the second type – from Amri (Wheeler 1947: pl. lii: c).

There is no doubt that mirrors of type II with a handle were borrowed by the pastoral tribes from their southern neighbors. In Iran at the time of the settlement of Iranian tribes this type could develop parallel on the base of ancient local forms.

Type II (mirrors with a loop handle) are the most numerous. Mirrors of this type were found in the cemetery of Muminabad in Uzbekistan (Kuz'mina 1966: 68, table xiii: 7), in the settlement of Bayram-Kazgan 2 of the Tazabagyab culture (Itina 1977: 133, fig. 67: 18) and in the Andronovan cemeteries of Fergana (Yapagi) and Semirech'e (Kara-Kuduk, Kul'say, Kyzylbulak), in the Shamshi

hoard (Fig. 33; Gorbunova 1995; Mar'yashev and Goryachev 1999: fig. 5: 5; 9: 15; Kuz'mina 2004: 73, fig. 2.8: 15-16, 31). All these complexes date from the Bronze Age, mainly late Bronze: the 13th–9th centuries BC, and Central Asian specimens are both older and more numerous. Evidently, the third type of mirrors was borrowed from the farming cultures. Mirrors with a loop are known in occasional finds of the BMAC. The type spread from Central Asia to the Urals (Sukhomesovo), to Central Kazakhstan (Atasu), to East Kazakhstan-Zevakino (Kuz'mina 1966: 68; Arslanova 1974: 57, table III: 5) and farther to Siberia – Blizhnie Elbany XIV (Gryaznov 1956: table III: 3). Mirrors from Kazakhstan were found together with ceramics and knives of the Final Bronze, which supports the date. In Siberia this type of artifact became widespread in the Karasuk culture (Chlenova 1967: 88), and among the tribes of the forest steppe: the Tomsk cemetery on Maly Mys (Komarova 1952: 18, fig. 8: 4).

From Semirech'e mirrors with a loop came to Xinjiang where they have been found in the cemetery of Yanbulaq (Mei and Shell 1998: fig. 4: 1; Kuz'mina 1998; 2004: 73, fig. 2.8: 17; Komissarov and Larichev 1998). They reached even Manchuria (Chlenova 1967: 88). From Xinjiang or Siberia the mirrors of type III appeared in China with the help of the 'northern barbarians'. Four mirrors of type III were placed into the grave of Fu Hao (she was a consort of King Wu Ding who ruled in the 13th century BC) in the royal cemetery of the Shang dynasty in Anyang (Linduff 1997a).

A small mirror was also found in Houjia Zuang in grave 1005, whose date is 1300-1028 BC (Juliano 1985: 38-43; fig. 1-4). It was ornamented with Andronovan geometric pattern (Kuz'mina 1998). There are also finds of mirrors belonging to the beginning of the Western Zhou period (Komissarov 1985: 93, fig. 1) and especially to the culture of the northern barbarians of the 8th–7th centuries BC (Komissarov 1988: 90, fig. 75: 18; 76: 7—the cemetery of Nonchangen).

Type IV—square mirror with projecting round corners—is represented by a specimen from the Sukuluk hoard in Semirech'e; its date, according to the date of the hoard complex, is the 13th–9th centuries BC. It reflects the intensive search for new optimal forms that was characteristic of the metallurgical centers of the pre-Scythian period.

Type V—square mirror with a loop on the back side—was found in the Sadovoe hoard (Kuz'mina 1966: 68, table xiii: 2). A fragment of such a mirror was discovered in Fergana in settlement 15 of Kayrak-Kum (Litvinsky 1962: 224, table 49: 1) in an assemblage with ceramics with applied-roller. Analogous mirrors were found in north Kazakhstan in the cemetery of Borovoe, circle 1, together with a characteristic inventory of the Final Bronze Age: a vessel, a bullet-like arrow, a knife with a support, tetrahedral awls and amber and carnelian beads (Orazbaev 1958: 271, table viii). There is a mirror of this type among the grave goods of circle 2 of the cemetery of Sangru in central Kazakhstan (Margulan 1979: 118-120, fig. 90: 2). The burial is in an enclosure of the Karasuk type, but the grave is oriented as in Andronovo with the head to the west and there is a tetrahedral awl and a vessel made of a monolithic lump of clay but ornamented with an applied-roller with oblique notches—the pattern typical of the Dongal type pottery.

A mirror of type V with a loop, but also with projections, as in the case of type IV, was found in Siberia in Elovka in a complex of the Elovka-Irmen'

culture that represented the synthesis of the Andronovo and Karasuk traditions (Matyushchenko 1974: fig. 56: 1).

The discovery of mirrors of type V together with ceramics of the Final Bronze Age dates the mirrors and the complexes in which they are found to the 10th–9th centuries BC and suggests that this period was the time of intensive search for optimal forms of ornaments and weapons in the east Andronovo metallurgical province. Several types of mirrors coexisted, and type III was chosen and modernized by adding borders to the mirror. This new type VI, created by east Andronovo metallurgists, became widespread throughout the steppe, probably because of the movement of one of the East Iranian tribes to the west.

The type of mirrors with a loop developed among the Andronovan tribes in Central Asia and spread to Kazakhstan. It was the Andronovan metallurgists who made the next step in the development of this category: they created type VI mirrors with a loop and a border along the edge. This type became widespread in the Scythian culture where it was further developed. The earliest mirror of this type known to me was found in the settlement of Stepnyak of the Final Bronze Age (Chernikov 1954: 39-43).

But there is a possibility that this type was borrowed from the southern cultures too: a mirror with a border has been found, for example, in Afghan Seistan in the settlement of Gardan-Regi, which dates from the 2nd millennium BC (Fairservis 1961: 72, fig. 34-36).

Mirrors with a loop and border have been discovered in Central Asia in the cemeteries of south Tagisken and Uygarak (Itina and Yablonsky 1997: fig. 69; Vishnevskaya 1973: table xvi), in central Kazakhstan in the cemetery of Tasmola (Kadyrbaev 1966: fig. 5), in the barrows of the Altai Mountains (Kiryushin and Tishkin 1997: fig. 66) and farther to the east in the Minusinsk Basin (Chlenova 1967: table 21), in Tuva (Grach 1980: table 1) and in the slab-lined tombs of Mongolia (Novgorodova 1989: 242, fig. 23).

The dates of these mirrors depend on the chronological systems of the authors and vary from the 9th to the 7th century BC. They appeared in the west later than in the east. T. M. Kuznetsova (1991) dated them to the 7th century BC. Scholars regard mirrors as ritual accessories which had complex semantics and probably were connected with a female cult. The appearance of the border was caused by the fact that mirrors (which were initially concave) were filled with water to help seeing a reflection.

Deer stones

The origin of deer stones that are spread from Bulgaria to Mongolia is still an unsolved problem. In central Kazakhstan there are many menhirs, some of them zoomorphic, but no deer stones. Possibly the solution is that in a part of the steppes idols were mainly wooden? According to Diodorus (Bibl. II, 34, 5) the Saka erected a golden statue on the barrow of queen Zarina. More important is the ethnographical data about different Indo-Iranian peoples, especially the Ossetes, the descendants of the Sarmatians, and the Nuristani (Fussman 1999). They have a custom of erecting a commemorative wooden post with a sketched head and carved dagger, whip, gun and horse. Ya. V. Vasil'kov (1999: 19-21) regards this as a survival of a common Aryan cult of the ancestors. In the 1980s during ethnographical expeditions to Northern Ossetia I have seen tombstones

where beside a dagger, a gun and a horse, there were also carved deer. Might this have been a survival of a very old tradition?

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What conclusion could be drawn from the above excursus?

Seemingly, the hypothesis of the Chinese origin for the complex of the barrow of Arzhan and other early-Scythian sites cannot be corroborated. The categories of early-Scythian material culture formed as a result of a long evolution in the steppes. They descend from the metal-working of Sintashta and the Seyma-Turbino horizon.

In the Final Bronze Age of the 13th–9th and especially 10th–9th centuries BC on a local basis the main categories of early-Saka culture developed in the steppes in the sites of the applied-roller that represent the final stage of the Andronovo culture. These categories are: 1) horse equipment: two-part bits and different types of three- and (more rarely) two-holed cheek-pieces imitating the forms of horn and bone cheek-pieces, different types of badges and other elements of harness; 2) arrows: two-bladed hafted and two-bladed shaft hole with hidden or projecting shaft-hole; two-bladed with a tang, bullet-like, three-bladed; 3) horn and stone fasteners of an arrow-case set with fillets; 4) daggers with tangs and different handles (their use continued into the Scythian times) and genuine *akinaks*; 5) spears; 6) the whole set of tools: single- and two-edged knives of different types, celts, adzes, chisels, awls, needles etc.; 8) cult cast cauldrons of two types – with a conical trunk and with three legs; 8) cultic long single-edged knives; 9) mirrors with a loop; 10) badges with a loop for sewing them on.

The technology of metal-working reached a very high level during the Bronze Age (Degtyareva 1985: 13-15). The predominant technology was casting in a two-part stone mold. Smiths also used univalve molds with a lid and two- and three-part casting molds. Articles were cast in stone, clay and rarely in bronze casting matrixes. A composite casting with additional casting of zoomorphic knobs and the use of cire-perdue were also known. The complex of these technologies, the types of products and similar recipes of alloys depending on the functional designation of articles, were characteristic of the metallurgical centers of north, central and east Kazakhstan, the Altai, Semirech'e and pastoral regions of Central Asia. In this east Andronovo metallurgical province technical skills reached their apogee in the Final Bronze Age when the main categories of the Saka material culture were elaborated.

No traces of adopting technologies from outside, from China in particular, have been recorded. The level of metal-working of the Shang and Zhou periods was very high. But their technologies were very different as well as the composition of alloys (Barnard 1961; Linduff, ed. 2004).

Of special importance here is the note of A. D. Degtyareva (1985) that the metal of the cemeteries of the Dandybay culture is not distinguished from the common mass of bronze and copper articles of Kazakhstan by its spectral characteristics.

Why did the center of the Iranian-speaking world in the 2nd millennium BC move to the Andronovo steppes? There might have been several reasons.

First of all, the major center of tin mining in the Bronze Age was situated in east Kazakhstan and the Altai. Its output, according to the data of geologists, was enormous.

Secondly, metallurgy and metal-working had been intensively developing in this region from the Turbino and Seyma period onwards, and towards the end of the Bronze Age these skills reached an exceptionally high level and became specialized crafts. This led to the emergence of settlements of proto-town type where very large numbers of people were concentrated. These settlements continued to function when in the other parts of the steppe there occurred a crisis of the complex agricultural-stockbreeding economy.

Thirdly, an ecological crisis that arose in the greater part of the steppe and led, as many Ukrainian scholars suggest, to mass migration in the western part of the steppe zone, for some obscure reasons was much less severe in Kazakhstan and south Siberia. This caused the direction of the migrations to the east and mainly to Central Asia and Iran.

The transfer to remote pasturing when it became rather easy to steal livestock, led to robberies and looting, which in its turn stimulated the intensification of weapon production. Smiths experimented and at first elaborated many new and diverse types of offensive weapons, primarily of arrows and daggers, and then improved the models of defensive armour.

The appearance of riding led to the progressive development of horse equipment. Since the success of a mounted warrior depended on the speed of his stallion and his control over him, leather bits and horn cheek-pieces needed to be replaced by bronze articles which had to be permanently improved.

The change of economic and cultural type provoked a social-psychological shock in the late-Andronovo society and accelerated the process of social differentiation, which is evidenced by the grave circles of Dandybay, Begazy and Tagisken.

An important, though not absolutely clear factor in these events was the migration of the Dandybay population from the east to the west of the steppes as far as the Volga. The migrants accelerated the process of stratification of the Andronovans but soon were assimilated by them. The appearance of eastern trilobed hafted arrows and some types of daggers in the steppes might have been connected with their migration. Celt-spades may have appeared as a result of contacts with Xinjiang.

The increase of mobility of the population led to the discovery of new lands and to the establishment of wide intercultural connections. This was the time when constant cultural contacts along the routes of the future Great Silk Road were established. Metal was the main object of exchange.

The routes going out from the steppes are demonstrated by the finds of ceramics with applied-roller and bronzes with high tin content of Andronovo types in the east as far as the slab-lined tombs of Mongolia and the northern borders of China (where the culture of hunters and stock-breeders was much more primitive than the Andronovo), and in the south as far as the oases of Central Asia and Afghanistan including Seistan (where the centuries-old culture of farmers was higher than the Andronovo). From there wheel-made pottery, which has been discovered as far as the Altai, was exported to the steppe. Other achievements of civilization may also have come to the steppe from the south (the technique of casting with the help of a wax model, some types of mirrors, beads etc.). The intensification of exchange, familiarization with new technologies which occurred in the late 2nd and early 1st millennium BC, became the

most important factors of the rapid transformation of culture in the pre-Scythian period when the exchange of objects, ideas and people took place.

But only the territories that had large reserves of raw materials and a developed infrastructure of production, and, secondly, the regions that experienced the influence of the old civilizations and that lay on the routes of major communications could become the very center of these events. In the beginning of the 1st millennium BC central Kazakhstan, the Altai and Central Asia were the area that met these requirements.

To what extent could the political events in China and in the states of southern Asia affect the inhabitants of the steppe? In the 12th century BC the Western Zhou dynasty was established in China, and in the 8th century (around 770 BC) a new change occurred: the capital was moved east and the rule of the Eastern Zhou began. The borders of the state also changed, and this caused the migration of northern tribes. D. G. Savinov (1993) thinks that these events were echoed in the history of the Scythians. In the south of Central Asia the key events were the Bactrian campaign of Semiramis-Shamuramat (mentioned in the account of the end of the 9th century BC events) and the emergence of the Achaemenids. Both the Saka and Scythians were involved in political struggles with them, which could also cause the regrouping of the Saka confederations.

The genesis of the Eastern Iranians of South Central Asia, Afghanistan and Baluchistan

In the beginning of the 20th century E. Schmidt who was directing the University of Pennsylvania excavations in Anau (south Turkmenistan), distinguished the culture of Anau IV on the top of the southern hill (Pumpelly 1908: 49, 106-108). Its beginning was radically different from the preceding culture and abruptly broke the progressive development, established for the previous stages of the site. Its main peculiarity was ceramics, characterized by utter coarseness, made without a potter's wheel. Unlike the splendid wheel-made ceramics of the Anau III (Namazga V-VI) stage, it is painted. The reduction of the area of the settlement and the decline of handcrafts were explained by E. Schmidt as a result of the ecological crisis and a conquest of south Turkmenia by primitive nomadic tribes. Since then there emerged a century-long discussion on the character of this culture, its genesis and ethnic identity.

A. A. Marushchenko (1939) distinguished the Yashilli and Anau IV stages, and after the excavations of El'ken-tepe renamed them correspondingly the El'ken II and III stages (Marushchenko 1959). He introduced the definition of the period of El'ken II and Yaz I as "the Epoch of Barbarian Occupation" (EBO). A. F. Ganyalin (1956b: 83, 84) and E. E. Kuz'mina (1971c: 175; 1976a: table 1) supported him.

V. M. Masson suggested the division of the Anau period into Anau IV and IVA (1959: 102); after the settlement of Yaz-depe had been studied, he suggested for the sites of the barbarian occupation the name of the culture (or epoch) of Yaz I, with a note that there was no early part of El'ken II layer in Yaz-depe.

The term "the Epoch of Barbarian Occupation" became a subject of criticism, and there were attempts to replace it with the terms "the culture of east Khorasan" (Sarianidi 1977: 107-116), "the Chust cultural union" (Zadneprovsky 1978: 44-5), "the culture (or cultures) of painted ceramics of the late Bronze" (Askarov

and Al'baum 1979: 68-74; P'yankova 1998: 204-211) and finally "the culture of Oxus of the Iron Age" (Francfort 2001). Regional schemes of periodization were also suggested (Pilipko 1986).

It should be recalled that in Parthia and Margiana in some settlements in the Namazga VI layer there have been found fragments of Andronovo hand-made ceramics (Fig. 52). They are made of clay with large-grained sand admixture, and ornamented with geometric pattern on the rim and shoulder (isosceles triangles, vertical herring-bone, more rarely meander). According to their stratigraphical position in the upper part of the Anau III layer (late Namazga VI), their date is defined as the 15th–13th centuries BC, so it precedes the Anau IV layer.

It is essential to emphasize that two layers of fire both followed by the remains of steppe-folk's huts were discovered in Tekkem-depe. This allows us to suppose that the newcomers aggravated the crisis that the late-Namazga people were faced with, and settled among them (Ganyalin 1956). Fragments of steppe ceramics are found over the fire in Tekkem-depe. They can be classified to the period of the Final Bronze of the type of Alekseevka: fragments with a roller with crosses; with a horizontal herring-bone under the rim; with oblique notches along the border of the rim (Figs. 52: 23; 71: 1-8, 12, 14; Ganyalin 1956: 85, fig. 9). Such ceramics (often decorated with applied-rollers with notches and crosses) are usually found in the sites of the desert near the mountains (Figs. 49: 29; 50: 8, 12, 23, 24, 34, 42; Ganyalin 1956: 86; Kuz'mina 1956; 1988c; 1966a). They date to the 13th–11th centuries BC. A. F. Ganyalin (1956: 86) believes "the downfall of the whole local ancient farming culture" dates from the last quarter of the 2nd millennium BC.

Nowadays the sites and layers of "the Epoch of the Barbarian Occupation" (EBO) are distinguished on the territory of ancient Parthia (their concentration there is rather high), Margiana, north and south Bactria. Settlements are concentrated in separate oases. In Parthia not only Anau IVA, but also Yashilli-depe, Yassy-depe, Ulug-depe, Chaacha, El'ken-depe belong to this period (Figs. 52; 71: 9; Gutlyev 1974; 1980; 1984; Masson 1966: 184; Sarianidi 1972b; Sarianidi and Koshelenko 1985). The latter is the most significant, for the stratigraphy was first firmly established there: the lower layer of El'ken I belongs to the end of the Anau III (G, F) culture, which is stratigraphically synchronous with Namazga VI. This layer contains a small number of Andronovo sherds. It is followed by the El'ken II stratum which belongs to the epoch of the barbarian occupation; the upper layer is that of El'ken III, which belongs already to the pre-Achaemenid period and is characterized by the revival of wheel-made ceramics (Marushchenko 1959).

El'ken is a large settlement with a citadel (130m in diameter) almost 20m high over a ditch. The lower layer of the settlement of El'ken I, lying on the subsoil, contains ceramics of two types. The overwhelming majority of vessels were made on a potter's wheel. Their forms are diverse, including cylindro-conical. There are also large pots-ewers with truncated cone bases. The outer surface is covered with light-colored or red slip and sometimes burnished (Marushchenko 1959: 60, table IV). This group has precise analogies in Anau III f-g (Schmidt 1904: pl. 10: 1, 2; 12: 1; 14: 1, 2; 19: 1, 7), in the upper layer of Tekkem-depe (Ganyalin 1956) and in Namazga layer VI.

The second group is the rough hand-made ware represented by fragments of pots that are decorated with geometric herring-bone pattern and sometimes have

a protruding rim with oblique notches. The diagnostic feature of this group are the vessels with an applied-roller with oblique notches under the rim (Marushchenko 1959: 60-62, table 5). The quantity of this group of ceramics dramatically increases in the upper part of the layer of El'ken I. A. A. Marushchenko (as well as A. F. Ganyalin) has correctly assigned these ceramics to the Bronze Age of the steppes, but compared it with the Andronovo and Tazabagyab ceramics, and this made him date the El'ken I layer to the middle of the 2nd millennium BC. At the present time the state of Andronovo studies can provide us with more accurate data. The date of the Andronovo and the Tazabagyab cultures became earlier and, most importantly, the classification of late-Andronovo sites has been elaborated. The pottery with applied-roller decoration from the sites of Turkmenia belongs to the Alekseevka type and dates from the 13th–11th centuries BC. The ceramics of the Andronovan types that precede those with applied-roller ornament were found in the lower part of the Namazga VI layer (they were discovered in the layer IIIb of Anau and in several other sites in South Central Asia).

The El'ken II layer is situated over layer I and is essentially different from it. This was the time when a clay platform served as a basis for a citadel, and small country houses or farmsteads were built near the proto-town. This reflects a major social and economic change in the life of the community.

Ceramics also demonstrates significant differences. There are three groups. The first group contains wheel-made pottery. Its number decreased drastically. It is covered (sometimes only the upper part of vessels) with a red, in rare cases burnished, slip. The types of pots, cups and vessels with truncated-cone bottom were conserved (Marushchenko 1959: 63). The second group consists of hand-made ceramics with an admixture of grog and sometimes with textile prints on the inner surface (table xx-xxii). Some of the pots of this group are ornamented with applied-rollers, including those with two mustaches branching off the roller without notches (table xviii). Vessels with handles and a spout appeared (table xiii, xix). According to modern views, this group of applied-roller ceramics belongs to the Dongal type and it dates to the 10th–9th (8th) centuries BC. The third group, regarded as the diagnostic one, consists of hand-made painted ceramics. Pots, cups, deep bowls with handles are covered with light-colored, yellowish or brown-greyish slip. The upper part of the vessels is decorated with geometric patterns—shaded triangles, triangles and rhombs filled with hatching, and triangles filled with paint (Marushchenko 1959: 63, table xv-xvii). These were the ceramics that were assigned by H. Schmidt (in Pumpelly 1908: 49) to the culture of barbarian occupation. Analogous complexes have been discovered in Yashilli, Uch-depe (Masimov 1979) and Yaz-depe. Marushchenko dated these complexes to the 12th–7th centuries BC.

The surface layer of the hill-fort is El'ken III. This is a new and important stage which is evidenced by the area of the town encircled by a wall made of standard unburned bricks, 50-60 x 25-30 x 10cm, erected over a rampart which was faced with bricks. Handicrafts were blooming in the town: there are slags of copper and iron, which appeared here for the first time.

Almost all ceramics are wheel-made. These consist of large pots of cylindro-conical form – *khums*, pots, bowls and vessels of cylindro-conical form with characteristic beak-like (in section) rims, the latter type being absolutely predominant (Marushchenko 1959: 67; table xxvi-xxxii). The vessels are covered

with light-colored or red slip, sometimes only in the upper part. This entire ceramic complex is genetically connected with the preceding traditions of El'ken I and II that had never disappeared. Wheel-made vessels, ornamented (in the upper part) with modelled roller (which indicates the persistence of the traditions of applied-roller pottery) are of special interest (table xxvii: 1).

The El'ken III pottery has analogies in the ceramic complex of Anau IV and Yaz III. Separate types of vessels, e.g., pots with two handles, are reminiscent of the Achaemenid Susa and Persepolis pottery.

The finds of shaft-hole two- and three-bladed arrows (Marushchenko 1959: 67, 69, table xxxii: 3-5) suggest a date for the El'ken III layer as the 7th–4th centuries BC.

Summarizing, Marushchenko (1959: 56, 70) emphasized that "there existed firm ties that bound the settlement of El'ken with the local farming culture." In the Epoch of Barbarian Occupation it became "a centre of a primitive barbarian state, headquarters of a chief of one of the Iranian-speaking pastoral tribes that had conquered the town and settled there."

The same stratigraphy has been traced in Ulug-depe (Sarianidi *AO* 1968; *AO* 1970; Masson and Sarianidi 1972). This is a large capital tepe, with a surface area of 10 ha, and a height of 30.5m. Its archaeological layers date from the Namazga IV period to the Achaemenids. In the middle of the 2nd millennium BC the site, as many others, suffered a crisis, its area dramatically reduced, but the first half of the 1st millennium BC was a period of spectacular growth and it became one of the two capitals of the region, the other one being El'ken-depe. The stratigraphy of Ulug is of interest. The two lowest strata (VII and VI) belong to the Namazga VI stage, with wheel-made pottery but isolated fragments of painted pottery appear already in this culture; and the higher the layer, the larger their number. In stratum IV the architecture of houses with many rooms, built of unfired bricks 55-60x25x10cm, is preserved, but the ceramic complex abruptly changes: now rough hand-made pottery with chamotte admixture prevails. Most of it is ornamented with a frieze outlined with black or red (rarely greenish) paint on the light-colored slip. Motifs of decoration are diverse: isosceles triangles, angles, rhombs, pyramids, either shaded of filled with paint or cross-hatched, or designed in a chess-board fashion (Masson and Sarianidi 1972b: fig. 27; Koshelenko *et al*. 1985: table lxvii; lxviii).

The second group of hand-made pottery consists of kitchen ware and kettles / cauldrons, ornamented with applied-roller or oblique applied details**,** and kettles with applied handles and lids with handles. In the upper stratum hand-made pottery decreased in number drastically, but did not fully disappear. Wheel-made pottery is predominant here—cans, bowls, *khums* of cylindro-conical form, characteristic of the epoch of El'ken III-Yaz II. Thus the stratigraphy of Ulug establishes that painted pottery originated inside the culture of the Namazga VI stage and persisted as a survival in the pre-Achaemenid time when the tradition of making high-quality pottery (of cylindro-conical shape) on a wheel that had never totally disappeared, was revived and became triumphant. Its genesis could be placed in the period of Namazga IV. V. I. Sarianidi (1970: 434) emphasized that wheel-made ceramics of the 1st stratum descended from the local ceramics of the Namazga VI type. He dated the appearance of the complex of Yaz I in the piedmont region to the end of the 2nd millennium BC and assumed that "the

appearance of the complex of painted pottery should not be connected with the steppe area of Central Asia, but with regions farther south", meaning the materials of Tillya-tepe in Afghanistan. V. I. Sarianidi (1972: 54, 55) recorded the considerable thickness of the layers of Yaz I in Afghanistan and supposed that the culture of EBO formed under the influence of Khorasan and its spread was the result of the migration of Indo-Iranian tribes from there.

The survey of several sites in south Turkmenia was undertaken by G. Gutlyev (1974; 1980; 1984). He assigned them to the Early Iron Age. At Yassy-depe a platform of clay and unfired bricks was uncovered, and its stratigraphy has been established. The upper layer was synchronous with Yaz III, i.e., it belonged to the Achaemenid epoch. All ceramics of cylindro-conical form were made on a potter's wheel. Beneath it was a layer of Yaz II where only 34 sherds of 516 were hand-made. In the lowest layer, synchronous to Yaz I, cylindro-conical wheel-made vessels were still found, but their number was substantially lower. Coarse hand-made ceramics with quartz admixture prevailed. The upper part of the vessel was decorated with a frieze, which consisted of triangles filled with rhombuses, oblique strokes and figures filled with paint.

The same stratigraphy has been established for Garaoy-tepe (Gutlyev 1984): in the first level there was 95% wheel-made pottery. In the second and the third levels the share was 90%. The rest of ceramics is ornamented with brown painted angles, herring-bone and cross-hatched triangles on a light-colored background. Judging from the illustrations, there is also pottery with applied-roller and with vertical handles. The situation was different in the lower levels: only 42 of 325 sherds were wheel-turned. There is chamotte temper in the hand-made pottery. Decorative motifs were the same, but there were many stripes filled with paint, triangles and rhombs (Gutlyev 1984: fig. 4). Basing himself on the analogies with other sites, Gutlyev suggests a date at the end of the 2nd millennium BC for the lower level of Yaz I. It is notable that the production of painted pottery persisted up till the Achaemenid epoch.

In the piedmont zone of the Kopet-Dag in the region of Etek in the oasis of Dashly there has been discovered a series of sites of the Epoch of Barbarian Occupation (Pilipko 1986). Three stages have been distinguished in the small settlement of Dashly 17. I) belongs to the period of El'ken II and is characterized by ceramics of three types which have also been found in a test pit in the settlement of Dashly 30. One third of the pottery was made on a potter's wheel and is represented by vessels of biconical form and large pots-ewers with truncated conical base which is a heritage of the Namazga VI traditions. The new—and diagnostically significant—form is the large wheel-turned vessel with beak-like rim and a roller placed under it (Pilipko 1986: tab. 2, esp. 1, 2, 7, 9 with a roller). The latter form undoubtedly emerged under the influence of the steppe ceramics with applied-roller. Hand-made pottery (tab. 1) with a chamotte admixture was covered with a red slip, but more often it had a light-greenish-yellow surface. There were small painted pots with isosceles cross-hatched triangles pattern. Most hand-made ware consisted of large vessels with vertical handles, bowls and a vessel with a spout.

A wall of bricks and clay was constructed around the settlement of Dashly 17 in the second stage.

The ceramic complex of this settlement and of Dashly 16 maintains continuity with the preceding one. But hand-made ceramics are represented only by cups with slip. The essential difference in the complex is the total absence of painted ceramics and the substantial increase of wheel-made pottery. The predominant form among the latter becomes the cylindrical vessel (Pilipko 1986: 9, tab. 3). The finds of shaft-hole laurel-leaf bronze arrows belong to this time.

Thus the sites of the piedmont zone, though having some local differences, are characterized by almost similar stratigraphy and the common pattern of the development of ceramics.

In Margiana traces of connections between the farmers of the Namazga VI epoch and the pastoralists of the Andronovo cultural zone have been discovered in the settlement of Gonur (Fig. 82) and in an adjacent camp, which was found by F. Hiebert, in the settlement of Togolok I, and in the collections from other sites. Pottery is decorated with geometric patterns made with the help of an indented or smooth stamp (Sarianidi 1990: table xii: 14, 15; liv; Hiebert 1994: fig. 4: 38-39; Hiebert, Moore 2004). It lacks the features characteristic of the Tazabagyab culture and the rollers characteristic of the Final Bronze, and belongs, according to curtrent views, to the 15th–14th centuries BC.

In the settlement of Auchin there is both wheel- and hand-made pottery. Vessels with truncated-conical bases copy the local wheel-made pottery, as also does a small vessel with a spout covered with white slip. Some of the hand-made sherds are decorated with encized triangles and angles. They are in many ways close to the Andronovo ceramics (Masson 1959: 20, 21).

In the settlement of Takhirbay 3 (Masson 1959: 20, 21, 27, table xi) similar pottery has been discovered with wheel-turned pottery (Figs. 81, 82; one fragment has a rib characteristic of the Alakul' type, but there are also painted vessels and vessels with a roller under the rim (Sarianidi 1990: table lxii: 10, 11) of the Yaz I type. V. M. Masson (1959: 19) thinks that Auchin is the earlier, and Takhirbay the later site of the Murgab variant of the Namazga VI culture. A vessel with a roller and a spout is from the settlement of Togolok 28 (Sarianidi 1990: table l: 11). It is typical of the EBO.

The key complex in the Murgab delta is the settlement of Yaz-depe. Three archaeological layers have been distinguished there. In the Yaz I layer three groups of ceramics have been uncovered (Masson 1959: 35, tab. 1). The first one consists of wheel-thrown pottery: large pots—khums, semi-spherical cups, goblets, and bowls. They are of red-fired clay and covered (sometimes only their upper part) with a white or yellowish slip. In the lower part of the layer this ware comprises 5.5-8% of this ceramics, and in the upper part its increases to 14.5%. The second type consists of hand-made pottery covered with red or brown painting on a white background. It is difficult to calculate its percentage for only the upper part of vessels was painted. Its average amount is 12% in the lower part of the layer and 6% in the upper part. The motif of decoration is a frieze under the rim; it consists of angles, with their vertex turned upwards, triangles and rhombuses cross-hatched or shaded with straight lines (Masson 1959: table xvii-xx; xxv; xxxi).

The third group—hand-made unpainted pottery—prevailed; its amount decreased by 10% in the upper part of the layer. All hand-made pottery contains a lot of ground ceramics—grog.

Two types of firing were known: grey-black, lightly burnished and brown-red vessels that are coarser. They have similar forms: cups and large pots *khums*, sometimes with vertical handles. These pots have a characteristic feature—they are ornamented with applied-rollers with tucks and sometimes only with oblique segments of a roller (Masson 1959: table xxii: 3, 4; xxiii: 8, 9; xxiv; xxv: 11; xxvi: 1, 2, 7; xvii: 6).

In the same layer there are also sling stones, a mace and three hafted and three shaft-hole two-bladed bronze arrows, a single-edged knife and a badge with a loop (Masson 1959: 38, table xxxiii).

Chronologically, the next layer is Yaz II. Unlike other sites, in Yaz there are no traces of gradual change; the development of production underwent a sudden leap: now all ceramics are wheel-made and there is no admixture of grog. But the genetic continuity of wheel-made vessels could be easily traced in the forms of goblets, pots with truncated-conical base, in white slip and in the fact that it covered only the upper third of the vessel. The persistence of hand-made pottery traditions is reflected in the conservation of a roller and the appearance of beak-shaped rims. Pots of cylindro-conical form are absolutely predominant (Masson 1959: 39, 40, table xxxvii-ix). In the layer II a bronze two-bladed shaft-hole arrow (table xxxix: 18) and fragments of an iron axe (table xxxv: 4) have been found.

The ceramics of Yaz III conserved the traditions of the wheel-made pottery of Yaz II. Its diagnostic feature is the replacement of beak-shaped rim by a rim in the form of a flattened roller (Masson 1959: 41, table xli, xlii). A bronze three-bladed arrow with hidden shaft-hole (table xxxiv: 14) and iron axes and adzes (table xxxv: 1-3) have been discovered.

According to V. M. Masson (1959: 68, 70, 128, 129, fig. 20), the period of Yaz II was the time of cardinal cultural innovations: the system of irrigational canals was expanded, iron was introduced, and a rectangular citadel on a high platform made of clay and mud-bricks was erected. Its modern height is 12m and the surface area is 1ha. The dimensions of bricks, 53 x 28 x 12cm, as well as ceramics, reflect the conservation of architectural traditions of the Namazga VI epoch.

The lower layer of Yaz I corresponds to the upper part of the El'ken II layer, and Yaz II and III layers belong to pre-Achaemenid and Achaemenid periods. V. M. Masson (1985: 61) suggests that Yaz I should be dated 900-650 BC and Yaz II – since the middle of the 7th century BC.

The same process of historical development has been traced in North Bactria. In the oasis of Sherabad in Uzbekistan the Yaz I complex has been discovered in the surface layer of the settlement of Dzharkutan (Figs. 88; 98a: 2,3, 5-18; Askarov 1976: 17-19; 1977: table lxviii; Shaydullaev 2000: 35, fig. 17-18), which consists of a fortress and an adjacent village. The surface area of the citadel of Dzharkutan is 3 ha; it is encircled with a wall with buttresses.

In late pits in the palace area and in a house inside the fortress there have been found sherds of hand- and wheel-made vessels. One third of the hand-made pottery is covered with red paint on a light-colored background. The space under the rim is ornamented. The pattern consists of angles, triangles and rhombuses shaded with oblique lines or filled with paint. The triangles are standing on the top. There are also kitchen pots, sometimes modeled with the use of a stencil with a roller under the rim. It is interesting to note that some wheel-thrown ritual

vessels from the temple are decorated with a roller with notches and crosses under the rim (Askarov and Shirinov 1993: fig. 46: i, iii). The authors (p. 127) rightfully suggest that these facts reflect the syncretism of the aboriginal Bactrian and the foreign Andronovo cultures.

The complex of Yaz II covers layers of BMAC of the Mollali-Bustan stages (Shaydullaev 1990; 2000; Askarov and Shirinov 1993: 55, 57, 58, 85; fig. 19: iii; 20: I; 21; also 74: ii, 1, 2). Wheel-made ceramics from pits represent the continued traditions of BMAC, but the great number of vessels of biconical and cylindro-conical forms prevalent in the Yaz II period, must not be overlooked.

In south Uzbekistan, precisely as in Turkmenia, there are large settlements and fortified farmsteads in separate oases. The dynamics of the development is reflected in the stratigraphy of the settlement of Kyzyltepe in the oasis of Mirshadi (Sagdullaev 1978a; b; 1987; 1989; Sagdullaev and Khakimov 1976; Shaydullaev 1990; 2000). This site has an area of 30 ha. It is a fortress with a citadel 10m high; its area is 2 ha. It stands on a platform made of mud-bricks and clay. The walls have oval towers and there is a ditch around them. Outside it there is an unfortified part of the settlement. There are seven small fortified square farmsteads of Kyzylcha 1-7 in the vicinity, which is the agricultural neighborhood. In the lower layer of Kyzyl I there is 97% hand-made pottery. It has grog or sand temper and is made with the use of textile stencil or of strips, which is typical of the steppe technology of the Bronze Age pottery-making. Large pots and *khums* lack the slip and the burnishing. The rest of the vessels are covered (their outer surface) with whitish or rarely red slip, which reflects the traditions of handicrafts of the farmers. There are only a few wheel-thrown vessels. The main forms are semi-spherical bowls, pots, *khumcha* vessels, sometimes with truncated-conical bases. There are also pots with applied-rollers and vessels with vertical handles and with a spout (Sagdullaev 1978: 7; 1987: fig. 20). This ceramic complex is typical of the Yaz I stage. But its significant peculiarity is that painted pottery is not numerous here. In another site of the Mirshadi oasis—in the single-layer settlement of Bezymyanny—there is not only the described pottery but also a small percent of sherds with strokes of red or black paint or with triangles (Pugachenkova 1972: 47-48).

Kyzyl II was a time of important change. A citadel was built in the settlement. A part of hand-made pottery has traces of the use of a textile stencil. Pots with vertical handles and short spouts have been found.

The percentage of wheel-thrown pottery gradually increased in the transition layers to make up 70% in layer II. Clay has almost no admixtures, firing is good, and the fabric is red. The outer surface of vessels is covered with a light-colored yellow-white slip. The absolute majority of vessels (from cups and bowls to large *khums* and *khumcha*) have a cylindro-conical form and a beak-shaped rim (Sagdullaev *et al*. 1976: fig. 2; Sagdullaev 1987: 10, 11, fig. 22, 23). The distinguishing peculiarity of this site is the custom of decorating wheel-made vessels with strokes and geometrical figures (fig. 24). This ceramic complex has analogies in El'ken III and Yaz II.

Kyzyl III shows the further development of traditions. Almost all the pottery is wheel-thrown and covered up to the rim with white or sometimes pink slip. Painting and beak-shaped rims disappear. The rim becomes triangular in section or roller-shaped. Vessels conserve the cylindro-conical form, but the base

becomes very low, the rib is sharply distinguished and the cylindrical sides are lightly concave (Sagdullaev 1987: 11, 12, fig. 25-26). The Yaz III complex is analogous to this pottery.

The same dynamics has been revealed in the neighboring fully excavated small fortified farmstead of Kyzylcha 6. It was designed for a single family. The large aula/atrium is surrounded with dwellings and is fortified with a wall (Sagdullaev 1987: fig. 7, 8). The population was occupied in agriculture, which is evidenced by the finds of stone pestles, querns, a bronze sickle, and in Kyzylcha 6—of an iron sickle. The finds of stone sickles and knives distinguish the settlement from those of Margiana and Parthia (Sagdullaev 1987: 31, fig. 34: 2, 3). They have analogies in other cultures in Chust and Xinjiang. Weapons are represented by the finds in Kyzylcha of four shaft-hole two-bladed arrows characteristic of the complexes of Yaz-depe (Sagdullaev 1987: 33. fig. 32: 4, 5).

Analogous sites with same stratigraphy and development of ceramics have been discovered in neighboring oases of south Uzbekistan. The settlement of Bandykhan-tepe I with a citadel 90 x 70m and 5-6m high should be mentioned. There is both wheel- and hand-made pottery, sometimes covered with careless strokes of red paint on cream-colored slip under the rim, and rough pots with applied-roller with pits (Rtveladze 1976: 95-96, fig. 2). This permits us to assign this site to the Yaz I period.

The cultural development in the beginning of the 1st millennium BC is demonstrated by the site of Kuchuk-tepa in the Sherabad oasis (Askarov and Al'baum 1979). This is an 8m high hill with a surface area of 0.5 ha. It conserves the remains of a fortified farmstead where one family dwelt. Three stages of life in the farm have been distinguished. The lower layer belonging to the Yaz I period and is characterized by the prevalence of hand-made ceramics; there are but 20% wheel-thrown pottery. It consists of semi-spherical bowls, pots with a roller-shaped rim and large *khumcha*. Textile stencils were used for hand-made pottery production. It consists of bowls and pots with a thin neck. Ceramics from Kuchuk I are distinguished by the lack of applied-roller ornamentation (Fig. 97). Seemingly, two parallel lines under the rim of wheel-made vessels are their imitation (table 3: 12-15). A part of the hand-made ceramics was covered with a cream-colored or pink slip, which is a background for careless red or dark-red painted patterns under the rim: zigzags, triangles standing on the top and shaded with horizontal or oblique lines or filled with paint, or rarely rhombuses and circles (Askarov and Al'baum 1979: 32, 33, fig. 13, 14, table 2; 5). There are figures of hoofed animals.

Of the Kuchuk II complex large pots with beak-shaped rims and truncated-conical bases are characteristic (table 5: 4; 8; 11: 14, 18, 19). Pots with horizontal handles-supports and vessels with spouts are typical (fig. 13; table 5: 2; 8: 5-7, 9; 13: 16). Ornament disappears, yet sometimes strokes or outlines of triangles cover the space under the rim (table 7: 4, 5; 8: 1, 4, 8; 12: 1, 4-6; 13: 1, 4, 11). Large wheel-thrown pots have modelled roller ornament that imitates applied-roller (table 11: 14, 18, 19). There are also pots with a segment of an applied-roller placed under the neck (table 14: 1, 4, 6, 8).

Further gradual development is traced in the complex of Kuchuk III. Hand-made pottery disappears here. Cylindro-conical vessels of fair proportions with a marked rib, concave sides and beak-shaped or thinned-down rim are absolutely

prevalent (table 15-18). This complex is analogous to that of Yaz III and Kobadian I in Bactria.

The inventory of the site includes stone querns, mortars and pestles. Stone sickles (table 22), five bronze knives of two types: sickle-shaped with an aperture in the handle and single-edged with a long handle and with round tip of the blade (fig. 23) are found in the upper layer of the settlement.

The discovery of two horn cheek-pieces with apertures is of interest. Unfortunately, their type can not be defined for they are much fragmented.

Weapons are represented by a bronze dagger with a lengthwise rib and with a semi-spherical knob on the hilt. Twenty-six arrows have been discovered on the site. Two-bladed arrow-heads with a projecting shaft-hole belong to the Kuchuk II period. They are characteristic of the wide zone of Eurasia at that time; they descend from the Andronovan prototypes. Most of the arrows are from the upper layer; among them three-bladed hafted arrows are predominant (Askarov and Al'baum 1979: 44-47, fig. 19; table 24, 25).

On the territory of Tadzhikistan there are but few traces of the Culture of the Epoch of Barbarian Occupation (EBO) revealed. This complex is present in the settlement of Kangurt-Tut, which N. M. Vinogradova (2004: 41, fig. 24: 35-38) believes to date from the very end of the 2nd and the beginning of the 1st millennium BC. It covers the layer of the Bronze Age of the period of Bustan and contains wheel-thrown ceramics (90%). Prevalent forms are pots with conical base and bowls and vases with a stem (fig. 24: 1-25). These ceramics are accompanied by a small amount of hand-made Bishkent and Andronovo ceramics with rich stamped ornaments (Vinogradova 2004: 35, fig. 24: 26-34; 25).

A mold for a dagger with a support and single-edged knives with a bent tip give reason to date the early complex, using a wide scope of analogies, to the 13th–11th centuries BC (Fig. 53: 25; Kuz'mina and Vinogradova 1996) and to assign it to the East-Andronovo metallurgical province. The available radiocarbon dates give a range between 1976/1756 and 1594/1219 BC (Vinogradova 2004: 41), which contradicts the archaeological chronology completely.

It should be noted that horse bones and figurines of the horse have been found in the settlement. This indicates the spread of the animal and of its cult.

In the upper level of the settlement of Teguzak there are vessels of the Yaz I type. The main ceramic complex consists of wheel-thrown white-slipped pottery analogous to the ceramics of Kangurt-Tut. It belongs to the Bustan stage of the Sapalli variant of BMAC. It is accompanied by late-Andronovo ceramics decorated with the help of indented stamp. In the upper part of the layer coarse hand-made unornamented vessels and a pot with a spout and an applied-roller have been found. They belong to the Yaz I complex.

The single purely Yaz I site in Tadzhikistan so far is the settlement of Karimberdy (Vinogradova and Kuz'mina 1986; P'yankova 1996). It is important to emphasize that this was a village of settled farmers and was surrounded with stone walls. There are 62% wheel-made ceramics. Hand-made pottery is represented by vessels with applied-roller or with a spout, bowls and lids. Painted pottery is scarce. The decoration involves herring-bone patterns in dark-red paint on a light back-ground. Its closest analogy is the lower layer of the settlement of Kuchuk-tepe in south Uzbekistan (Askarov and Al'baum 1979; Shaydullaev 2000). L. A. P'yankova dated the settlement to the 9th–8th centuries

BC. The date is established thanks to the discovery of a celt with a shaft-hole (Fig. 53: 26), analogies to which are known in the period of the Final Bronze Age in the East-Andronovo metallurgical province in east Kazakhstan, in Cherdoyak, in the hoard of Palatzy that also includes a bracelet with little horns and a dagger with a mushroom-like hilt-knob and a bow. All these articles are typical of the period of late applied-roller ceramics and the Karasuk culture (Chernikov 1960: 84, table x: 4; lxiv: 8). According to the data of I. G. Ravich, the celt contains 10% tin, which is characteristic of late-Andronovo metallurgy.

In south Tadzhikistan there have been revealed no sites of the transition period from EBO to Yaz II. The pre-Achaemenid period is represented by settlements of the Kobadian I stage as defined by M. M. D'yakonov.

In north-eastern Afghanistan at Shortughai in the surface layer only ceramics of the Alekseevka type are represented. These have simple geometric ornament and an applied-roller (Francfort 1989: pl. 58: 6-8; 11-15; xxvi: 5).

In east Afghanistan the French and Soviet-Afghani expeditions have established that the settlements discovered were not erected by the Achaemenids for the purpose of defending their territories from the northern barbarians, but belonged to the older times.

The French archaeological mission lead by J.-C. Gardin (1998; 2001) has discovered the irrigational system in the oases of Kunduz and Archi. It is evidence of centralization in that region in the Early Iron Age. The mission also examined small fortified villas and the large settlement of Bala-Hissar of Kunduz of the pre-Achaemenid period. The Kunduz River must have been the eastern frontier, beyond which there is evidently no painted pottery (Francfort 2001: 226).

West of it in the oasis of Naibabad the settlement of Naibabad 1 has been examined. Its size is 450 x 300m, and its height is 3m. A ceramic complex of Yaz I type has been discovered there (Sarianidi 1989: 25, 26, table xli-xlvi). Several settlements have been found in the oasis of Farukabad, a small village of Kumli I among them; its size is 30 x 30m and its height is 4m. The hill is a platform of bricks, 43 x 24 x 10cm; there could have been a building on the top. The stratigraphy has shown that under the Achaemenid layer there is a stratum with both wheel-thrown and painted pottery.

The most studied site of north Afghanistan is the settlement of Tillya-tepe in the Shibergan oasis (Sarianidi 1972; 1977; 1989). Tillya-tepe, 'the golden tepe', is a small hill which consists of a platform 100m in diameter made of mud-bricks; the platform was 4m in height and partially sunk into the ground. The citadel was flanked with round towers. Stratigraphically two layers have been distinguished, and the existence of a third, the surface layer blown away by the wind, has been supposed. In the lower layer of Tillya I there was a great hall that was later reconstructed. There is almost no differences between the material of the ceramic complexes of Tillya I and II; they include four types of pottery of two groups (Fig. 99).

The first group consists of wheel-made cups, bowls, pots and large *khums*. Clay is without admixtures, the firing is red. The upper part of the vessels is covered with white slip. According to the observation of V. I. Sarianidi (1972: 21-23), in the upper part of the layer II and in the supposed surface layer III the amount of wheel-thrown ceramics increases; especially that of cylindro-conical

pots; many vessels have a beak-shaped rim, some have modelled roller, which imitates the applied-roller of hand-made pottery (Sarianidi 1972: fig. 15; 17: 3).

The second group consists of hand-made pottery which comprises two-thirds of the total of the ceramic assemblage. It is made of clay with an admixture of grog.

The first type is painted pottery—semi-spherical cups, pots and vessels with a spout. Their inner and outer surface is covered with white or cream-colored slip. Geometrical patterns are outlined with red or brown paint in the upper part of a vessel. The frieze consists of triangles (their top is turned either up or down), rhombuses, zigzags, squares cross-hatched or shaded with oblique lines and sometimes filled with paint. One should note that painting could sometimes be found on wheel-made pottery. Sarianidi (1972: 20) emphasizes that there is no major distinction that can be traced either with respect to form or decoration from the different layers.

These ceramics have a wide scope of analogies in the pottery of the EBO of south Central Asia, and especially in the piedmont zone where the same rich and complicated decorative patterns were used. Sarianidi (1989: 4, 5, 29, 39, 40, table 1) admits that Tillya-tepe was inhabited for a very long time. He places the Tillya I and II layers before the El'ken II layer; he tries to support this hypothesis by the assumption that the thickness of the archaeological layer of the site (he estimated it once 6 and once 9 or 10m deep), while in Parthia the archaeological layer of El'ken II is no more than 3m thick and in Margiana—2m. This opinion has been opposed by L. I. and I. N. Khlopin (1976). Rightfully, as it seems, did they reject the supposition on the thickness of the archaeological layer of Tillya. In the sites of Turkmenia dramatical changes of ceramics from layer to layer are recorded (Gutlyev 1974; 1980; 1984) yet the constancy of the ceramic assemblage of Tillya established by Sarianidi is evidence against its long existence and accumulation. Apparently, this allows us to synchronize Tillya I, II with the sites of the piedmont zone. And Sarianidi (1982: fig. 7) has himself successfully demonstrated it.

The second type of hand-made pottery consists of black and grey ceramics: cups, small pots that widen downwards, bowls (sometimes with a vertical handle). The forms of black ceramics copy those of painted pottery. There is a grog admixture in the clay. Pottery is black for it was fired with insufficient access to oxygen. The outer surface of the vessels is carefully burnished. Many pots are ornamented under the rim with modelled relief bands; sometimes there are several rows of them; or with stirrup-like applied details (Sarianidi 1972: 20, fig. 8: 6-8; 9: 4; 14: 10; 1989: 31-33; table xlix-liv). Specimens with geometric pattern made with the help of smooth stamp are rare (Sarianidi 1972: fig. 10: 4).

Such ceramics though very few in number, are known in the complexes of El'ken II in the piedmont zone. It has been usually regarded as an import from Dahistan or Iran. But the analysis carried out by V. I. Sarianidi (1989: 32, 33) demonstrated that the forms of black polished pottery are far from being identical with their Iranian analogies. The reduced oxygen-free firing was also practiced by the Andronovans. One could have regarded the relief bands as an imitation of the typical Fedorovan flutes, and compared the rollers with the steppe applied-rollers. But this comparison is unfruitful: first the forms of vessels are absolutely different; secondly, when applied-rollers appeared on the steppe pottery the high-quality black-burnished ceramics came out of use. So the origin of this type of

pottery remains unclarified. Yet there are facts that attract attention: the presence of several close forms and the similar technology of firing in the settlements of Mundigak in Afghanistan, Pirak in Baluchistan and Dzhangar in India. J.-F. Jarrige (Jarrige and Santoni 1979: 394, 395) explained this by the process of diffusion from the west connected with the spread of iron in these sites.

The third and the most numerous type of hand-made pottery of Tillya consists of coarse kitchen ware with a considerable grog admixture—large pots and kettles with round sides. Some vessels have vertical handles or stirrup-shaped applied details and projections (Sarianidi 1972: 21; fig. 8: 8; 1989: 35; table xl: 1, 2, 4). Short spouts and applied-rollers, some of them with oblique notches, finger prints, descending 'moustache' or short oblique applied-rollers are the diagnostic features of this pottery (Sarianidi 1972: 21, fig. 7; 9: 1; 10: 3; 12: 1, 7; 22: 4; 1989: table xi).

It was this pottery that is prevalent in the camps and settlements of the south Central Asia. It appeared there even by the end of the Namazga VI period and existed up to the Achaemenid times.

The metal inventory of Tillya-tepe includes two bronze single-edged knives (Sarianidi 1989: table iii: 13, 14). Four bronze two-bladed haft arrows have been found, one of them with rhombic tip (Sarianidi 1972: 24, fig. 7; 14: 7; 21: 4; 1989: table iii: 1-4). Their analogies are known in Yaz-depe (Masson 1959: fig. 34, table xxxiii: 3-4, 8) and in the settlement of Pirak in the layer IIIb but they are of iron there (C. Jarrige 1979: fig. 108: 842; 845). Bronze tubes with apertures have also analogies there (Sarianidi 1989: fig. 6: 2, 5). Ornaments are represented by a bronze badge with a loop (Sarianidi 1989: table iii: 12).

The analysis of architecture, ceramics and metal articles leaves no doubt that V. I. Sarianidi's conclusion is right: Tillya-tepe belongs to the group of the sites of south Central Asia of EBO. The similarity of the sites is not a subject of discussion among specialists, but their genesis and chronology are.

Both relative and absolute chronologies are controversial. The analogy with the sites of Iran of the 13th–8th centuries BC which belong to the Early Iron Age prompted some scholars to classify the sites in question also to the Iron Age (Koshelenko and Sarianidi 1985; P'yankova 1998a; Francfort 2001; Vinogradova 2004: 107).

The appearance of iron in Central Asia is evidenced by the find of several beads in Namazga-depe in a grave that belongs to the end of the Namazga VI period (Kuz'mina 1966: 91, 99, table xv: 10). Fragments of an iron sickle from the Anau IVa layer in Anau belong to the Yaz I epoch (Pumpelly 1903, I: 157-158, N 40). A. S. Sagdullaev (1982: 233) dated the sickle to the 9th–7th centuries BC. According to the opinion of V. M. Masson (1959: 108), this find "might have witnessed the beginning of the Iron Age in Central Asia", which could be dated to the first third of the 1st millennium BC, while "in the 6th–4th centuries BC it was already the period of the High Iron Age." In El'ken-depe, seemingly in layer III, bronze and iron slag has been discovered (Marushchenko 1959: 57). In the citadel of Dzharkutan a fragment of a knife-hilt with iron rivets has been found. According to its ceramic complex, it belongs to the Dzharkutan period of the Sapalli variant of BMAC—13th century BC (Shaydullaev 1998: 39-41).

V. M. Masson (1959: 106) and A. S. Sagdullaev (1982: 233) made a data bank of the finds of iron articles in south Central Asia. There is only one find of

the 8th century BC; it was made in Fergana in the settlement of Dal'verzin of the Chust culture; there is an iron axe in Yaz II, slag in El'ken III and Churrnok. In Sogdiana there is iron in the settlement of Daratepe of the 7th–6th centuries BC. Iron in Khorezm in Kyuzeligyr where a workshop and sickles have been found, in Kuyusay and in Uygarak belongs to the same time. The mass spread of iron in Central Asia is an event of the 6th–4th centuries BC. Hence it is reasonable to begin the Iron Age in Central Asia only from the second quarter of the 1st millennium BC and to classify the sites of EBO of the end of the 2nd and the first quarter of the 1st millennium BC to the Final Bronze Age, as we do with the synchronous complexes of the applied-roller ceramics culture in the steppes.

And what is more, in Iran where the sites of the 13th–8th centuries BC have been classified to the Early Iron Age, there is also no iron in the early complexes. This does not permit us to accept an 'Oxus culture of the Early Iron Age' as suggested by H.-P. Francfort (2001).

In the system of relative chronology the sites of EBO–El'ken II are situated between the Namazga VI–El'ken I and the El'ken III layers, the latter belonging to the pre-Achaemenid time. Several hypotheses have been suggested to explain the chronology of the period and the origin of the culture of EBO.

I. The hypothesis on the migration from the steppe: A. A. Marushchenko (1959: 65) was the first to synchronize the EBO sites with Nad-i-Ali, Sialk V, VI and Giyan I in Iran; he dated them to the 12th–7th centuries BC and emphasized the crucial role in the formation of the culture of EBO of the migration of Andronovan and Tazabagyab tribes who had brought the Iranian language with them. This concept was accepted by A. F. Ganyalin (1956b: 84) who was the first to conclude that "the formation of the new archaeological culture was the result of a synthesis of the aboriginal farming culture and the culture of newcomers who were nomads."

I have also supported their hypothesis on migration (Kuz'mina 1971b; 1972a; 1976). Studying the genesis of the culture of EBO I have directed my attention, as the other scholars did, towards the painted pottery, and noted its difference from both the wheel-made ceramics of Namazga VI and the Timber-grave and Andronovo pottery (Kuz'mina 1972: 137; 1976: 119). But as the problem of the steppe Applied-Roller Ware culture was far from being solved at that time this did not permit me to establish the obvious connection of the pottery of EBO that had rollers with the steppe pottery. It was also wrong to follow V. M. Masson in seeking connections of EBO with Xinjiang which was supported only by the stone reaping knives also known in India.

At the same time, the paper did rightfully demonstrate that the ceramic complex of Achaemenid Iran was different from the so called 'Achaemenid' assemblage of Central Asia, and that the latter formed independently on the basis of the traditions of pottery-making that had been conserved in Bactria since the Namazga VI period. This allowed to employ the new materials to corroborate the hypothesis of M. M. D'yakonov (1961) that there existed a Greater Bactria. Nowadays this hypothesis is supported by the evidence from all south Central Asia and has gained general acceptance.

Later I demonstrated the similarity of the sites of applied-roller ceramics of the steppes and the component of applied-roller ceramics in south Central Asia and their Eastern-Iranian attribution.

II. The autochthonous development hypothesis: V. M. Masson (1959: table 4, 5; 1966: 182) dated Yaz I to 900-650 BC, having emphasized that Yaz-depe lacked the lower part of the El'ken II layer; Yaz II to 650-450 BC; and Yaz III to the time before the conquest of Alexander the Great. Masson demonstrated the progress of the culture of EBO, the development of irrigation, construction of fortresses, and the preservation of ancient traditions of architecture and wheel-made pottery. At the same time he did not deny the probable participation of immigrant Andronovo tribes (RZhVSAI 1984: 6). He suggested that the Iranization of south Central Asia may have occured not in EBO but much earlier—in the 2nd millennium BC (Masson 1959: 118-121). Later he added that the culture of Turkmenia of the second half of the 2nd millennium BC represented the "linguistic assimilation of the aborigines" by the Indo-Iranian tribes. And the cultural transformation of Yaz I, Mundigak VI and Nad-i-Ali I reflected "the formation on the basis of different cultural components" of Western-Iranian (Dahistan and Iran) and Eastern-Iranian (Yaz I) linguistic groups (RZhVSAI 1984: 7-8).

III. The East Khorasan migration hypothesis: V. I. Sarianidi (1972: 24) dated Tillya I to 1300-1000 BC, Tillya II to 1000-600 BC and Tillya III to 600-500 BC. He assumed that the layers of Tillya were thicker and hence older than those of Parthia. Sarianidi (1972: 29-33) supposed that the center of formation of the culture of EBO was in Iran where J. Deshayes (1969) had localized the homeland of the Indo-Europeans. Sarianidi supported his hypothesis with scarce materials with painted ceramics found near Mount Kuchan in the Atrek valley in Iranian Khorasan. He grouped all EBO sites in the East-Khorasan Culture and thought that "one should completely reject the old hypothesis that connects the genesis of the Painted Pottery culture of the Anau IV type with the direct influence of the steppe tribes" (Sarianidi 1972: 33). L. I. and I. N. Khlopin (1976) opposed this hypothesis as they demonstrated that the layers of Tillya I and II were in fact debris alluvia. A. Askarov and L. I. Al'baum (1979: 56) objected to the extra-long chronology of Tillya I-II. Yu. A. Zadneprovsky (1986: 27) noted the absence of authentic data on the sites of Khorasan. The hypothesis of Sarianidi has gained no acceptance.

IV. The cultural synthesis hypothesis: A. Askarov and L. I. Al'baum (1979: 17, 56, 59, 67) thought that EBO belonged to the Bronze Age and synchronized Kuchuk I, Yaz I, El'ken II, Anau IVa and Tillya I and dated them to the end of the 11th and the 10th–the first half of the 8th century BC, Kuchuk II—to the second half of the 8th–7th century BC, Kuchuk III—to the end of the 7th–6th century BC. They rightfully stated that in some regions the formation of the culture of EBO happened on the basis of the ancient farming culture as a revival of the traditions of painted pottery, and in other areas—on the basis of a pastoral culture.

They thought that the migration of 'barbarian' tribes retarded the formation of early urban civilization. But from the middle of the 8th century BC "the ancient cultural and economic tradition of the local tribes… revived with new vigour", and this led to the formation at the time of Kuchuk II of the Bactrian kingdom. They designated this period in the whole region as 'Bactrian'.

V. N. Pilipko (1984: 23-24) assigned the sites of north Parthia to the Early Iron Age and distinguished three periods: EIA-1 (10th–8th centuries BC), EIA-2

(7th–6th centuries BC) and EIA-3 (5th–4th centuries BC). He drew the important conclusion that "the decline of the Namazga VI culture was connected not with the creators of the Painted Pottery culture, but with the nomads of the earlier time. Accordingly, the emergence of the cultures with painted pottery meant not the decline but the regeneration of the ancient farmers' traditions of south Turkmenia… The territory of Yaz correlates with the area of Eastern-Iranian settlement."

A. S. Sagdullaev (1987: 37, 38, 89) suggested the following dates of Kyzyl: I) 1000-700 BC, II) 700-550 BC. He regarded Kyzyl I as the transition period to the Iron Age. He introduced the notion of 'Biko-Bactrian Cultural and Historical Confederation', believing that the formation of a new language and culture as a result of the arrival of the new ethnos occurred with the crucial role of the autochthonous population that conserved the ancient local cultural forms.

L. T. P'yankova (1998: 210-212, 215) classified the sites in question to the Early Iron Age, stated that their chronology was disputable, supported my supposition that the bearers of the Applied-Roller Ceramics culture of the steppes participated in the formation of Yaz I, and acknowledged that the generally accepted view that the cultures of Central Asia at the beginning of the 1st millennium BC were Eastern Iranian was right.

Sh. B. Shaydullaev (2000) assigned the sites of north Bactria to the Early iron Age basing himself on a find from the citadel of Dzharkutan of a hilt of a knife with iron rivets. He dated it to the 13th century BC. His supposition on the partial coexistence of the complexes of Namazga VI and Yaz I is only weakly supported.

N. M. Vinogradova (2004: 106-107) also placed the Yaz I complex of Tadzhikistan in the Early Iron Age. She refused to establish their absolute chronology for there were large discrepancies between the opinions of scholars, and the calibrated C^{14} dates were contradictory. The number of calibrated dates for the sites of EBO is not great and, unfortunately, their distribution is too scattered: Kangurt-Tut—from 1976 to 1098 BC; for Kuchuk and Tillya see the table below—these dates are more reliable.

Tadzhikistan

Tigrovaya Balka		1500±60	
Kangurt-Tut	3 dates	1976/1756 1597/1291 1729/1029	Vinogradova 2004: 290

Uzbekistan

Kuchuk	900±70	1210-1010	RZhVSAI 1984: 4
Dzharkutan temple		1800 1600-1450	Görsdorf, Huff 2001: 85

Afghanistan

Tillya	800±60	1140-940	RZhVSAI 1984: 4

Table 19: Chronology of Central Asian sites

The study of the chronology of the sites from adjacent regions and of earlier sites is therefore needed. Valuable surveys have been made by G. Possehl (1994) and

L. B. Kircho and S. T. Popov (1999); new data are added annually (Ava-nesova 1997; Lyonnet 1996; Götzel 1996; Huff 1997; Görsdorf, Kaninth, Teufer 2001; Vinogradova 2004).

As it has been said, the calibrated dates, unfortunately, do not correspond with the historical Near-Eastern dates that derive from the Egyptian scale, nor with the European that are based on the most reliable dendrochronological method. The improvement of the C^{14} dating system should be left to physicists. Yet now it is reasonable, while still accumulating the base of radiocarbon dates, not to reject the traditional method of analogies (Kuz'mina 1999c; 1998).

The synchronization of the complexes of EBO may be based on ceramics with applied-rollers and metal articles. The use of the steppe parallels allows us to corroborate the legitimacy of classifying the complexes to the Final Bronze Age. As we have emphasized, the ceramics with applied-rollers, oblique notches, crosses and descending moustaches that covers the layer of Namazga VI in Tekkem-tepe, El'ken and Namazga, belong to the Alekseevka type whose type sites are the settlements of Alekseevka and Kent (Figs. 17; 18; 42; 51; 86; 87). Their date is (1350?) 1300-1000 BC. The next stage is represented by the sites of the Dongal type. Their characteristic feature is vessels with rollers applied directly under the rim, applied oblique segments of rollers under the rim and on the shoulder of the pot, and vessels with a swollen trunk, wide neck and rollers under it (Evdokimov and Varfolomeev 2002: fig. 22 – Alekseevka type; fig. 36 – Dongal). Their date is the 10th–9th (8th) centuries BC.

Articles of horse equipment that would indicate that the creators of EBO were mounted horsemen are represented only by fragments of two horn cheek-pieces from Kuchuk-depe (Askarov and Al'baum 1979: table 21: 5, 6). They belong to the category of rod-shaped cheek-pieces with round apertures. This type was invented in the steppes in the Final Bronze Age.

Metal articles of EBO have a wide scope of analogies in the steppes (Figs. 29; 30; 32a; 48; 53; 71: 12, 13, 16; 86; 98a: 10-12; 99: 10, 15; 113). First of all, single-edged knives and sickles (type I of my classification) should be mentioned. The back side is curved; the blade is straight or slightly concave. A specimen of this type has been found in the tower of Namazga; several artefacts are from the settlement of Chust. This type formed in the Timber-grave and Andronovo cultures and became popular in the period of Final Bronze in the East-Andronovo metallurgical province, especially in Semirech'e, Chust and the Tashkent oasis (Kuz'mina 1966: 44, 45, table ix, x) and persisted until the Scythian epoch. Type II consists of reaping knives of the same form with an aperture in the hilt. A knife of this type has been found in Tillya-tepe, and a rare variant with straight back side—in Anau. A knife-sickle has been discovered in the settlement of Kangurt-Tut; it was made according to the Andronovo technology from tin bronze (Vinogradova 2004: 215, fig. 27: 11). A mold has been found in the settlement of Yakke-Parsan; occasional finds have been made in Semirech'e and in the Tashkent oasis in the Burgulyuk camps. Model knives of this type and their stone imitations have been discovered in Kuchuk-tepe, Kyzyl I, II, Dal'verzin and Chust (Kuz'mina 1966: 46, table IX-XI; Askarov and Al'baum 1979: 60, table 23; Duke 1982: 52, 53, fig 14: 2, 3, 5-7; Sarianidi 1989: 36, fig. 89: 13). Genetically, this type descended from the knives of the first type. These articles are close to sickles in function and form; and there are intermediate variants be-

tween them. The lower date of the type in the steppes is the 13th–11th centuries BC, according to their finds in the key complexes—Alekseevka, Petrovka II, Atasu and Kent (Krivtsova-Grakova 1948: 107, fig. 27: 3; Zdanovich 1988, table 10g: 15; Kadyrbaev and Kurmankulov 1992: fig. 20: 2; Evdokimov and Varfolomeev 2002: fig. 27: 15). But they are also known in more recent assemblages.

Another type, IV according to my classification, consists of single-edged knives with a straight blade separated from the long hilt by a support. It is represented in Yaz-depe, Kuchuk-tepe, Tillya-tepe, Dal'verzin, Burgulyuk and in occasional finds in Central Asia (Kuz'mina 1966: 47, table x: 24-27; Askarov and Al'baum 1979: table 23: 3; Sarianidi 1989: table iii: 14; Zadneprovsky 1962: table xxi: 12; Duke 1982: fig. 14: 1). Knives of this type are also found in the settlements of Alekseevka and Atasu (Krivtsova-Grakova 1948: 107, fig. 27: 1; Kadyrbaev and Kurmankulov 1992: fig 20: 4). A knife with a ring on the tip of the hilt has also been found there (fig. 20: 1). An even more elaborate form of knife with a hilt with fillets and a ring is from Kent (Evdokimov and Varfolomeev 2002: fig. 27: 1). The latter type undoubtedly became the prototype of the knives of type III that have a coin-shaped flat round hilt-knob specific only to the Chust culture (Kuz'mina 1966: type III).

V. M. Masson (1959: 45-48, fig. 12) dedicated a special study to the analysis of arrows. He made their classification the basis of the chronology of the stages of Yaz. The finds of arrows in El'ken II, Kuchuk (AO 1966: 1967; Askarov and Al'baum 1979: 57, 61-66, fig. 19; table 24, 25) and in other sites corroborated the legitimacy of the established pattern of evolution. It should be added though that the existing trend of reconsidering the date of the arrow complex of the pre-Scythian epoch as belonging to earlier time permits one to lower the date of the examples from Yaz III and Kobadian I.

The hypothesis that in south Central Asia in EBO two types of arrows coexisted has also been corroborated. These types are 1) two-bladed hafted arrows originating from the south and 2) two-bladed shaft-hole arrows from the steppes where their evolution could be traced from the early-Andronovo period (Kuz'mina 1966: 31-37, table VI; Avanesova 1975b).

Two-bladed arrows of type I with a projecting shaft-hole are found in Yaz-depe in layer I, in Kuchuk-depe, Isat-kuli and in the pastoralist's camp of Bala-Ishem 8 and Kuin-Kuyu in the Kara-Kum desert, and in the Aral Sea region in the settlement of Yakke-Parsan (Kuz'mina 1966: table vi: 2-4; 19-25; Askarov and Al'baum 1979: 25: 2, 4, 6, 7). Arrows of type II with a hidden shaft-hole are from the layer of EBO of Ovadan-depe, Kuchuk-depe, Madau and from sites farther north in Central Asia—the hoard of Brichmulla near Tashkent, the cemetery of Vuadil' in Fergana (Kuz'mina 1966: table VI: 5-11).

The steppe origin of shaft-hole arrows is supported by their discovery in key sites of the Final Bronze Age: Alekseevka, Sadchikovo, Stepnyak, the cemeteries of Borovoe, Dandybay, the settlements of Malokrasnoyarka, Myrzhik, Atasu (Kadyrbaev and Kurmankulov 1992: fig. 29: 2, 3; 118: 6-9; 142: 16, 17), Kent (Evdokimov and Varfolomeev 2002: fig 27: 8-13). These arrows were in use in the 13th–9th (8th) centuries BC.

Ornaments in the sites of EBO are represented by round badges with a cast loop. They are found in the southern hill of Anau, in Yaz-depe, including the layer I, Tillya-tepe, Dal'verzin, Kayrak-Kum and in the hoard of Brichmulla

(Kuz'mina 1966: 69, 70, table xiv: 2, 5, 7, 8, 11-13; Sarianidi 1989: table iii: 12). This type is widespread in the steppes including Siberia and typical of the cemeteries of Semirech'e and Fergana; yet it is known also in Iran in Giyan I and Sialk VI (Contenau and Ghirshman 1935: pl. 8; Ghirshman 1939: pl. ix: lvi). The supposition that the badges came to south Central Asia from the steppes cannot be accepted for the articles of this type were found in Anau III and in Iran in Hissar III (Pumpelly 1908: fig. 259; E. Schmidt 1937: pl. lv, *N* H2631). However a possible steppe origin is indicated for a stone mould for a knife with a ring-shaped support together with badges in the tower of Namazga in the surface layer (Shchetenko 1999: 331, fig. 4: 5), which indicates the steppe technology of their production, and not the casting with the use of a wax model that was common among the craftsmen of Iran. In the steppes such badges decorated not only the costume, but also the horse equipment.

That the badges and the knife with a ring-shaped support—the classical type of instrument in the wide zone of the steppes in the Final Bronze Age—were put in one mold, allows one to establish the date of the founder's assemblage in Namazga to the 13th–11th centuries BC.

The analysis of the hand-made pottery and metal articles permits us to reveal in the cultural complex of EBO a large group of artifacts that are undoubtedly of steppe origin. Their chronology, established on the basis of European parallels, provides an opportunity to make the date of the sites of EBO more accurate.

Almost all metal objects of EBO and pottery with applied-roller of the Alekseevka (13th–11th centuries BC) and Dongal (10th–9th (8th?) centuries BC) are of the steppe origin. It should be noted that in the layer that covers Namazga VI there is represented ceramics of the Alekseevka type and the earliest types of metal articles, which permits us to date the invasion of the steppe tribes to the 13th–12th centuries BC. Most of the ceramics found in the campsites in the desert belongs to the same time.

In the Yaz I sites there remains this pottery but there also appears ceramics characteristic of the complexes of Dongal—pots with a roller under the neck and with segments of oblique applied-rollers. It is interesting to note that there is almost no ceramics of this type in the sites of the desert. Metal articles, in cases when their evolution can be traced, also belong to later types. This indicates that the Yaz I sites belong to the 10th–9th centuries BC. The complexes of the cultures of Chust and Burgulyuk seem to be the youngest; part of their metal articles belongs to the pre-Scythian epoch.

Thus the pastoral tribes that have been migrating from the north in separate groups during the whole 2nd millennium BC must have intensified their movement south in the last quarter of the 2nd millennium BC. This was a result of the ecological crisis and the essential transformation of the culture and the turn to *yajla*-type pasturing and the spread of riding.

In the 13th–12th centuries BC a significant part of the steppe folk settled along the border of the desert. They began making raids against the oases whose population was hit by a crisis provoked by internal causes. The crisis must have deepened because of ecological change—the oases probably became more arid, as suggested by E. Schmidt and B. A. Kuftin. The nomads were gradually settling in the oases and thanks to their military superiority they gained leading positions there. So a long period began when the nomads were gradually turning

to the settled way of life. They were adopting the local material culture; after a period of bilingualism the indigenous population began speaking the language of the newcomers. This is a type of elite dominance migration.

The period of Yaz I represents the next stage: the synthesis of two ethnic groups had already taken place, and the new culture was forming. In this culture autochthonous traits, as well as the Eastern-Iranian language, became prevalent.

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As it has already been said, the sites of Yaz I have analogies in South Asia—in the settlement of Nad-i-Ali in Afghan Seistan in the first place. Its excavation was undertaken by R. Ghirshman (1939) and then by G. Dales (1971; 1977). Unfortunately, there has been no full publication. Two layers were distinguished in the settlement: I) the destroyed stratum where ceramics of the Achaemenid times of the Yaz II type and two-bladed arrow-tips with a projecting shaft-hole were found; II) the lower layer where a platform of a citadel built of bricks of pre-Achaemenid size, 57x28x9cm, was conserved. The fact should be emphasized that the excavation trench was only 12.5m deep, while the tepe of Surkh-Dag (Nad-i-Ali) is 31m high. So the dynamics of the culture of this site has not been established. The ceramics of layer II is represented by vessels of type I made on a potter's wheel. Their fabric is red and their form is cylindro-conical. This type is prevalent in the upper layer. In layer II grey-black pottery, including a vessel with a spout of the Sialk B type, was sometimes found. Painted ceramics is the most common form. It is decorated with geometrical patterns in red or more rarely black paint, and often is multi-colored. The motifs consist of circles, angles, triangles, sometimes cross-hatched (Ghirshman 1939: 20-22, table iii, iv). Some vessels and paintings are undoubtedly analogous to those of the cemetery of Sialk B; the other look more archaic and have been many times compared with ceramics of Yaz I – Tillya I-II (Masson 1959: 60, table 3; Sarianidi 1989: 40 and others). In spite of the archaic traits of the ceramic complex, its date can be defined using the analogy with the ceramics of the Sialk B type and the finds of two-bladed laurel-leaf hafted arrows together with three-bladed shaft-hole arrows of the younger type.

R. Ghirshman (1939: 20, 22) dated Nad-i-Ali II to the 11th–8th centuries BC, while V. M. Masson (1959: 60, table 3) accepted the date of the 7th century BC. G. Dales (1971; 1972; 1977) thought layer II belong to the Median epoch. In any case, the find of pottery analogous to that of Yaz I indicates that this region of Afghanistan was a zone of contact of Afghani–Central-Asian and Sialk sites.

Materials from the settlement of Rana Ghundai in the region of Baluchistan in west Pakistan are of crucial significance to understanding ethno-cultural processes. Here, in a mountain valley adjacent to Quetta, F. Noetling and A. Stein (Stein 1929) undertook reconnaissance, and later W. A. Fairservis (1959) conducted excavations. In the settlement of Rana Ghundai the florescent period was the late 3rd and early 2nd millennia BC. At that time there were active contacts with Harappa and Hissar III, and the influence of the neighboring valley of Quetta was traced. In the epoch synchronous to the time of the crisis of the Harappan civilization, in Rana Ghundai and in adjacent settlements there has also been found evidence of a profound crisis. In Periano Ghundai, the capital of the region, painted ceramics of the Jhukar type has been discovered. In the

settlement of Rana Ghundai traces of destruction of the village and fire have been revealed (Fairservis 1959: 352, 358, 381).

In surface layer A and on the surface of the settlement of Kaudani and Moghul Kala ceramics were found which is completely foreign to the local tradition of painted two-color pottery. These ceramics are hand-made and coarse; they have an applied-roller under the rim (Fig. 105). The roller is ornamented with oblique notches, horizontal herring-bone or crosses, as well as with nail-impressions—'rope ware' (Fairservis 1959: fig. 15: 22, 23; pl. 38: b-m; 47: a, g, i, l-p). This ceramic complex is so specific that it leaves no doubt whatsoever that it belongs to the Alekseevka type of steppe pottery. This establishes the date of the surface layer of these sites of Baluchistan as the 13th–11th centuries BC and suggests that the applied-roller ceramics came there from the north through Turkmenistan.

It is interesting to note that ceramics with applied roller ornament were also found in the southern Indus valley (Baluchistan) at the sites of Tulamba and Durrah-e Bast, Dur-Khan and Patani-Damb (Fig. 105: 1-5, 7-9, 11-13; Franke-Vogt 2001: 263-270; figs. 11-13). According to U. Franke-Vogt the ceramics included 'appliqué' and incised ware which dates to the latter 2nd and 1st millennia BC (the Dark Ages). She compared this assemblage with Pirak and suggests that it preceeded the Londo Ware painted ceramics in Baluchistan.

There are very graphic examples of hand-made pottery in the settlement of Pirak in Pakistan in the Kachi River valley near the Bolan pass. It is a hill whose surface area is 9 ha. The archaeological layer is up to 12m thick; it is divided into three periods. The characteristic feature of the site is that there is a lot of hand-made pottery (70% of the complex). It appeared in period IA and existed until period IIIB (Jarrige and Santoni 1979: 22-23; 76; 77); it remained unchanged through the periods. There is grog admixture in the clay; sometimes tissue stencil was used. The surface of vessels is covered with a white or pink-cream-colored slip. Pots with a wide swollen body sometimes have a small spout or vertical handles. Handles in the form of horizontal applied details are also present (C. Jarrige 1979: fig. 40: 62, 64, 67, 68, 72, 73; 41: 81-84; pl. xxix: b, c). Applied-roller under the rim decorated with finger-prints or pinches is the distinguishing feature of this ceramics (C. Jarrige 1979: fig. 40: 65, 70; 41: 84-86). Such pottery is found in period II (fig. 60-61; Fig 103). Transformed and vestigial forms remain in period III (fig. 73) and on the surface (fig. 83: 482, 484). It is this group of pottery that has full analogies in the ceramic assemblages of south Central Asia and Tillya-tepe.

Wheel-made pottery is not plentiful in the lower period but it becomes widespread in period III. In layer III there are found wheel-made vessels with inclined bases reminiscent in form to Yaz II ceramics. Grey-black ceramics became widespread. In the early period there is 13-15% painted pottery. It is covered with rich geometrical ornaments of red or plum-colored paint. There are scallops of horizontal herring-bone, opposing rows of triangles, rhombuses, cross-hatching and carpet patterns. The wide repertoire of ornaments in period I undoubtedly reflects the traditions of the local painted pottery of the Quetta style. But at the same time, V. I. Sarianidi (1989: 27-30, fig. 7, 8) has convincingly proved that many ornamental schemes of Pirak are close to those of Tillya-tepe. The types of

two-bladed hafted arrows with lowered tips and bronze pipes with apertures (Sarianidi 1989: fig. 6) from the two sites have also much in common (Fig. 100).

Radiocarbon dates of the first period are the 18th–13th centuries BC (Jarrige and Santoni 1979: 17, 19). The upper date of the site is established according to the finds of iron in the surface layer. It is believed to be the 8th century BC, which raises no doubts. But the lower date does not seem to be correct if the Central Asian parallels are to be taken into account. V. I. Sarianidi (1989: 39, table) synchronized Tillya I with Pirak II and placed their beginning into the 13th century BC. Yet the assemblage of hand-made pottery with a roller does not permit Pirak I to date earlier than the 13th century BC. As for the non-calibrated radiocarbon dates of Pirak (period I: 2130±290 BC and 1460±140 BC; period II: 1200±140 BC; period III: 1020±140 BC – Jarrige and Santoni 1979: 337), the dates of the first period differ from the chronology established with the help of the method of analogies.

The connections with Central Asia are evidenced by the finds in Pirak in the periods IB, II and III of figurines of two-hump camels (Fig. 104; Jarrige and Santoni 1979: 79; C. Jarrige 1979: fig. 94, 95; pl. xliib; xliii). The Bactrian camel was domesticated in the Namazga IV period in south Turkmenia and from there was adopted in the beginning of the 2nd millennium BC by the early Andronovo population of the Urals and Kazakhstan (Kuz'mina 1963a; 1980c; 1983a; Kuz'mina and Lyapin 1980). Figurines of camels (Fig. 94) are numerous in koroplastics of Turkmenia and isolated in the Andronovo culture; but on the petroglyphs of Kazakhstan and Central Asia images of the animal are numerous. Its bones are found in the settlements of the entire area. The conclusion of J.-F. Jarrige that the Bactrian camel was earlier unknown in the region and appeared from Central Asia, is well supported. The horse in Pirak is of the same origin. Its figurines were found in periods IB, II and IIIB (Jarrige J.-F. and Santoni 1979: 79; Jarrige C. 1979: fig. 92; pl. xli; and a montage of a figurine of a horseman – pl. xxxiiid).

As it has been many times emphasized, the Eurasian steppes were the area of horse domestication. In the Final Bronze Age riding became widespread there. The skills of horse-riding spread together with the animal itself, which was brought by migrating warrior-horsemen from the steppes. Horse bones have been found in the most part of the sites of the El'ken-Yaz I epoch in south Central Asia. As R. Meadow (p. 334) has established, camel and domestic horse bones were found also in the settlement of Pirak.

Riding appeared in South Asia by the end of the 2nd millennium BC in the period of the settlement of Iranian tribes. In Iran numerous clay and bronze figurines of riders have been found; and the word for 'rider' appears in the *Avesta*.

Obviously, these facts pose the question whether the innovations revealed in the culture of Pirak were also connected with migrations of various tribes who spoke Eastern Iranian dialects. It is interesting that even in the Middle Ages the Pirak region was an area of nomadic tribes having different languages and a different way of life (Jarrige and Santoni 1979: 8). The Kachi valley remained a contact zone. This might explain the combination in Pirak I of the traditions of local Quetta culture and the Applied-roller Ware culture that came from the steppes.

There are also reasons to agree with Jarrige's opinion (1979: 68) that the Harappan period was followed by 'the Age of Invasions' and then by 'the Dark Age' characterized by a semi-nomadic economy. The opinion (p. 77) that the combination of different ceramic traditions in Pirak reflects the ethnic diversity of its population is also legitimate. Finally, incontestable is the conclusion that Pirak had connections with Central Asia (p. 100-101).

Migration from the north has also been recorded in the multi-layer settlement of Mundigak in south Afghanistan in the valley of Kandahar by J.-M. Casal (1961, I, II). The apogee of the site was in period IV when its surface area became several times larger than before, a large building, supposed to have been a temple, was erected, and a monumental edifice with semi-columns was raised on top of the hill. J.-M. Casal regarded it as a palace of a ruler. Wheel-made pottery, including some with Harappan painting, stone and bronze seals, female statuettes and figurines of bulls were found. Active contacts with Hissar, with the sites of Central Asia, Quetta and Zhob were detected, which suggests that the date of layer IV was the end of the 3rd and the beginning of the 2nd millennium BC. The Mundigak V period that belongs to the post-Harappan epoch demonstrates a grave cul-tural crisis. Wheel-thrown ceramics are replaced by hand-made pottery decorated with black and violet paint on a red background (Casal 1961, I: 104, 119; Fig. 102). Casal thought that this was connected with a mass migration of the Chust culture population from Fergana (p. 115). He dated the layer to the first half of the 2nd millennium BC, and the Chust culture to the late 3rd millennium BC (p. 116).

V. M. Masson (1964: 296, fig. 5) emphasized the connections of this complex with Yaz I and, while not disputing the northern origin of the complexes of Mundigak V and VI, declared himself an opponent of the suggested date; he drew attention to the fact that the Chust culture belonged to the late 2nd and the early 1st millennium BC. The forms of vessels are ewers, bowls, pots with vertical handles and short spouts. The ornamental motifs of the pottery of period V are zigzags, triangles, cross-hatched stripes under the rim with descending oblong triangles (Casal 1961: fig. 106-115).

Since scholars directed their main attention to the painting of ceramics, they have overlooked a characteristic element, a roller that is found on some pots (Casal 1961: fig. 112: 560). In layer VI there are no building remains but there are ash-pits left by 'roaming nomads' (Casal 1961, I: 91). Iron is recorded for the first time. In period VI some forms of vessels remain but painting becomes poorer—cross-hatched stripes, rows of triangles and rhombuses shaded with oblique lines, zigzags. The proportion of ornamented pottery was seemingly reduced (Casal 1961: fig. 116-122). Vessels with horizontal applied handles appear and imitation of a not very explicit roller is preserved (Casal 1961, I: 92, fig. 120: 635; 121: 643; Figs. 101, 102)). In some forms and decorative motifs but not in the color of painting this pottery is reminiscent of that of Yaz I.

The Central-Asian parallels suggest the date of the Mundigak V-VI layers as no earlier than the 13th–8th century BC.

The study of material from several sites of South Asia suggests that processes analogous to those in Central Asia also took place there. After the blossoming of culture in the epoch of the mature Bronze Age many settlements were faced with a crisis. On the ruins of agricultural settlements there appear traces of the hearths of pastoralists' camps. Wheel-made ceramics are replaced by hand-made, but in

no site does it fully disappear. Hand-made painted pottery conserves some forms of wheel-made ceramics. Geometric ornaments, though in general having common themes, are individual in each site and conserve the traditions of ancient local painting. This means that the ancient indigenous population remained in the same place. Towards the 8th century BC wheel-thrown pottery replaced painted ceramics.

The diagnostic feature of the Final Bronze Age of Afghanistan and the western periphery of the Indian subcontinent is hand-made pottery. It has a grog temper and is often made with the use of a tissue stencil. Vessels with short spouts, pots with vertical handles and pots or rarely bowls with horizontal applied handles are characteristic of all sites. The common forms are pots or large *khumcha* vessels with swollen sides and an applied-roller under the rim. The roller is covered with oblique notches, crosses, but more often with finger pinches and nail-impressions. In the south rollers with descending moustache are not known to me. This complex has analogies in technology, forms and ornaments with the steppe pottery. From the steppes it spread gradually to the piedmont zone of Central Asia and to Afghanistan. The date of applied-roller pottery is the 13th–8th century BC on the whole territory where it was in use.

Wherever it appears, this ceramics manifests the spread of the Eastern-Iranian language.

The formation of the farming culture of the Iranian-speaking peoples in North Central Asia

The mechanism by which agriculture emerged in the northern regions of Central Asia where in the Bronze Age farming was unknown was substantially different from the processes involving the amalgamation of two ethnoses froms different cultural background. Here the sedentarization of pastoral population took place according to the model of cultural borrowing.

In Usrushan on the upper Syr-Darya the earliest agricultural settlement is Nurtepa in the oasis of Ura-Tyube (Negmatov *et al*. 1982: 89-111). The stratigraphy of this settlement has been established. The lower layer belongs to the end of the Bronze and the beginning of the Iron Age. There is no painted pottery. Hand-made pottery produced with the use of a tissue stencil with grog, quartz and sand admixtures prevails. Its forms comprise pots, cups, and kettles. Cups are covered with brown slip, fine ware with a white slip. Pots, some of them with vertical or horizontal handles and large vessels with applied-rollers, some of them with pinching, are characteristic of this pottery (Negmatov *et al*. 1982: 91, fig. 2: 1, 30-32; 3; 5: 8). This complex has analogies in the hand-made pottery of North Bactria—Kuchuk-depe II, and in the first place in the steppe cultures of Burgulyuk in Chach in the Tashkent oasis, and of Kayrak-Kum in Fergana, especially in settlements 40 and 42 (Duke 1978a: 47-92; 1978b: 51-59; Litvinsky 1962: 131-133; 255-258, table 98, 99, 102, 103, 106). Wheel-made pottery with white slip is not numerous.

This stage was marked by the construction of a clay rampart and of semi-subterranean huts analogous to those of Burgulyuk. The inhabitants led a settled way of life and were occupied in farming and stock-breeding.

Archaeologists have traditionally dated this period to the end of the 7th–6th centuries BC. The new data suggest that it probably should be lowered to the 9th (?)-8th centuries BC.

The next layer of Nurtepa is characterized by the construction of houses and a citadel built of rectangular and square bricks (Negmatov *et al*. 1982: 94, 107). Scholars have suggested that this complex dates from the middle of the 5th century BC (Negmatov *et al*. 1982: 102) but its date is defined by the finds of wheel-thrown pottery of the Kobadian I type and, as it seems, it has to be lowered too. One should note that much hand-made pottery remains in the layer. Part of it is decorated with applied-rollers.

On the surface of the site there have been found sherds of Hellenistic pottery of the Afrasiab II type. Thus Nurtepa belongs to the group of Iranian-speaking pastoral cultures where irrigation farming spread under the influence of Bactrian farmers and much later than in the south.

The Chust culture

The Chust culture is situated in the Fergana valley. It is represented by numerous settlements of three types: large (surface area over 10 ha), average (2-4 ha), small or isolated unfortified farms. The sites are situated in clusters. Dry farming was practiced; it was based on the water supply from small rivers and brooks. There are also villages in the mountains. The settlement of Chust, studied for many years by V. I. Sprishevsky who distinguished this culture, of Dal'verzin and Osh, studied by Yu. A. Zadneprovsky (1962; 1997), are the best known.

Dal'verzin is the capital of the region. It is situated on a natural hill and has surface area of 25 ha. The archaeological layer is 1.6-4m thick and lies on the subsoil. Later the settlement was fortified with a wall 4-6m thick which at the present time is 2.5m high. It was erected on a clay platform overlapped by pebbles and was made of earth, clay and mud-bricks of different size, 50 x 30 x 10cm and 30 x 30 x 10cm. A non-built-up area inside the settlement was separated by a wall; it might have been an enclosure for livestock. In other plots insignificant remains of buildings and a bronze-casting workshop were found.

The settlement of Chust is situated on the bank of the Syr-Darya. This is a natural hill; its surface area is 4 ha. The remains of a wall 3m thick and 3.5m high were found there. It was made of mud-bricks whose size is 55 x 33 x 10cm.

Unique is the terrace settlement on a mountainside near the city of Osh.

The domestic architecture of the Chust settlements is ill preserved. It may have involved small mud-brick houses but there are also the traces of brick houses and small semi-subterranean huts. There are post-pits from proto-yurts at Chust. A great number of pits designated for keeping grain is a characteristic trait of the Chust settlements. Taking into account that in each pit 2 to 10 metric centners of grain could be stored, one should imagine that its reserves were enormous. The other branch of economy was stock-breeding. The cow and horse were mainly bred; sheep, goats, two-humped camels and donkeys followed them. Metallurgy and making of bone and stone implements were highly developed.

Ceramics are the distinguishing feature of the Chust culture. Unlike south Central Asia and Afghanistan it was all hand-made. The clay has admixtures of large-grained sand and grog; many vessels were made by coiling or with the use of a tissue stencil. Firing is poor: the ware is spotted.

Forms of vessels are extremely diverse. Yu. A. Zadneprovsky (1962: 24-28) classified them according to the character of the outer surface. The first type consists of vessels with red slip on the outer surface—73% of the sherds (table xvi). There is only 1.2% pottery specific to Chust with painting (actually, its number was greater since only the upper parts of vessels where there was painting were counted).

Coarse kitchen ware of grey clay constitutes 18%. An insignificant part consists of vessels covered with a white slip and of grey-black-burnished vessels of different texture (fig. 6). Only few fragments made on a potter's wheel have been found. In 1997 Yu. A. Zadneprovsky made his classification more precise (p. 48-54). The main forms are pots with wide or narrow neck, sometimes with a spout or with applied vertical or horizontal handles, bowls, and large *khums* with a narrow neck (Zadneprovsky 1962: table xii-xv, xix). They have a wide scope of analogies in the ceramics of EBO in Bactria, Margiana and Parthia. Round-bottomed pots and bowls, conical cans and ewers with long narrow neck are more specific (table xii: 1, 2, 4, 5, 16-20; xiii).

Some bowls and pots are covered with a frieze in the upper part and rarely down to the base. The frieze consists of triangles, triangles opposed to one another, rhombuses, crossing ribbons either cross-hatched or filled with paint (Zadneprovsky 1972: table xvii; xviii; xxxi; lxxvii; 1997: fig. 48-52). The motif of very oblong wedge-shaped triangles and a range of colors (black painting on red background) are the characteristic features of the Chust ceramics. It has a remote resemblance in color and motifs of painting, but not in forms, to the pottery of Mundigak V and partly VI in Afghanistan (Casal 1961).

Sherds with images of hoofed animals are found only in Osh (Zadneprovsky 1997: fig. 52). They have analogies in the paintings of Kuchuk (Askarov and Al'baum 1979: fig. 14: 22, 23) and Mundigak (Casal 1961: fig. 108: 540). A sherd with a human image is found in Dal'verzin.

Yu. A. Zadneprovsky (1962: 28, fig. 6) rightfully regards black and grey pottery with striped burnishing as an import from the south. He noted that it is characteristic of the lower layer. He emphasized (p. 25) that the ceramic complex is the same in all horizons of Dal'verzin. However, the comparison of the Chust ceramics from different settlements reveals that it has considerable peculiarities (Zadneprovsky 1997: 88-89; Matbabaev 1999). And the settlement of Osh is distinguished by the low number of kitchen and the large quantity of painted pottery. This settlement is situated on the sacred mountain of Suleyman-tau believed to have been the religious centre of Fergana.

In spite of the fact that it was studied for many years, the problem of the origin of the Chust culture still remains unsolved (Ivanov 1996). That it belonged to the group of the Painted Pottery cultures is beyond doubt. Yu. A. Zadneprovsky has even suggested to classify them all to a united Chust super-culture. A. S. Sagdullaev (1983; 1989) has legitimately objected to this suggestion. He emphasized that the peripheral Chust culture differs in many ways from the cultures of Bactria and Parthia that are more highly developed. It is further true that in the south, during the Epoch of Barbarian Occupation, irrigation and architecture (based on century-long traditions) were not only preserved but also transformed as a result of internal development; and pottery-making was preserved as a handcraft, which has been rightfully stated by V. M. Masson (1959). As I have

attempted to prove, the culture of the end of the 2nd millennium BC formed as a result of synthesis of two ethnic groups—farmers who were the bearers of the traditions of wheel-made pottery and stock-breeders who were the bearers of the applied-roller hand-made ceramics.

The situation was profoundly different in Fergana. There was no irrigation agriculture; in Dal'verzin architecture was in an embryonic state: walls of the fortress were built not of bricks but of earth and clay, dwellings were semi-subterranean and yurts; the potter's wheel was not known. The lack of ceramics with applied-roller in Chust is remarkable for it is the diagnostical feature of the second ethnic marker of EBO. All these facts reflect radical differences in the ethnogenetic processes in the north.

Since ceramics are the most important ethnic indicator, Yu. A. Zadneprovsky was searching for exact parallels to Chust. Many forms of the Chust complex undoubtedly have analogies in the south from where black-burnished pottery originated and, which is more important, white-slipped ceramics that indicates connections with north Bactria (Sagdullaev 1983). Contacts with this region are also indicated by the discovery of a specifically Chust type of stone sickles in Kuchuk. But the decoration of the pottery with black painting on a red background has no roots in that region. In searching for them Yu. A. Zadneprovsky (1962; 102, fig. 19-21) drew attention to the sites of Central India of Nevasa and Navdatoli. (When I was working in the Archaeological centre in Pune, I was astonished by the formal resemblance of several elements of decoration; yet not only the forms of vessels but also the entire cultural situation is different). Yu. A. Zadneprovsky (1997: 96-100, fig. 63: 1, 20) also tried to discover the connections with east Turkestan. He focused his attention on the settlement of Xintala. H.-P. Francfort (2001) has rightfully objected to the search of the origins of painted ceramics of EBO in Xinjiang. But this direction of investigation seems to have a promising future for Fergana since the metal-working of Xinjiang undoubtedly formed under the strong influence of the Andronovo centers of metallurgy in Fergana and Semirech'e (Kuz'mina 1998a; 2001f; 2004; Debaine-Francfort 1988-98; 2001; Mei 2000; 2004; Mei and Shell 1998; 1999). Stone sickles specific to the Chust culture may have also originated in Xinjiang. The find of the Chust complex in Sary-Bulun on Lake Issyk-Kul' brings the Chust sites even nearer to Xinjiang. Yet it is necessary to point out that however promising this search might be, it is still far from its completion.

That in Turkmenia and Afghanistan the local variants of painted pottery were the result of the revival of ancient indigenous traditions of painting should be considered indisputable. This was the reason that the sites have local differences.

And what happened in Fergana? There the sedentarization of the local population was taking place. That it was so is proved by the similarity of the Chust pottery with the pottery of adjacent sites of the Kayrak-Kum type. Both complexes are characterized by same technology of pottery production—coiling and the use of a tissue stencil; the same composition of clay that has the admixture of large-grained sand and grog, same forms of unornamented pots with swollen sides, some of them with spouts, with applied vertical and horizontal handles (Litvinsky 1962: table 63: 9; 66: 13; 67: 6; 69: 9, 14; 88: 5; 89: 3; 98; 99; 106: 2, 3). B. A. Litvinsky has correctly assigned most part of the Kayrak-Kum pottery to the very end of the Bronze Age. Its late date is supported

by the total absence of ceramics of the 13th–11th centuries BC with applied-roller (exception: settlement 55, table 103): by the time of Kayrak-Kum this pottery had already gone out of use.

A group of local late-Andronovo population must have turned to rudimentary irrigation agriculture when the climate was becoming more arid (Zadneprovsky 1962: 72-4). The relations with their kinsmen neighbors worsened and this made them build defensive walls around their villages full of grain and metal reserves.

An impulse from the farmers of the south who had earlier established contacts with Fergana in order to get bronze from there conditioned the transformation to the new economy and cultural type. This fact is supported by the types and the analysis of metal articles of EBO.

The use of the materials from the late Kayrak-Kum settlements brings us back to the problem of chronology of this culture. Yu. A. Zadneprovsky (1962) thought it belonged to the Late Bronze Age and dated from the end of the 2nd and the beginning of the 1st millennium BC. Later he placed it in the Early Iron Age with a date of the early 1st millennium BC (RZhVSAI). In the book "The Osh settlement" (1997: 67-80, table vi) he analyzed a series of new radiocarbon dates from the site of Namazga VI and the Chust culture. For an archaeologist it is rather difficult to decide which system of calibration is more correct: the Seattle-Groningen method or the MASCA method used by the American scholars. There are huge discrepancies between the absolute dates acquired according to different methods and the precision according to σ_1 and σ_2. P. Kohl (1984) assigned Chust to the Early Iron Age and placed its beginning about 1500 BC having synchronized it with the sites of EBO of south Central Asia, Mundigak V and Pirak II. Hiebert (1993: 140, fig. 2) accepted the same date—1500 BC—as the lower date of Yaz I. H.-P. Francfort (2001: 221-222) suggests distinguishing three periods of Yaz I: 1500-1000; 1000-700; 700-400 BC. At the present time for the Chust culture there are ten dates from three typical settlements. But they are in the interval of 1680-770 for Dal'verzin and the 21th–7th centuries BC for Chust. Such a dispersion of dates of almost synchronous single-layered settlements leaves the problem of their absolute chronology unresolved. The examination of the new chronology of Namazga-tepe leads to the same pessimistic conclusion (Kircho and Popov 1999).

Under the circumstances one has to return to the traditional archaeological method of analogies.

The Chust culture is exceptionally rich in metal articles. As we have mentioned, the spear-like chisel is significant for dating. It has analogies in the hoards of Sukuluk and Sadovoe in Semirech'e and in Xinjiang (Zadneprovsky 1962: table xxii: 5). Of the same significance are single-edged knives and knife-sickles. They could probably be dated to the beginning of the 1st millennium BC. Of crucial importance are the type of bits from Chust and the type of cheek-pieces from a mold from Dal'verzin (Zadneprovsky 1962: table xx: 3; Kuz'mina 1966: 59-60, table xv: 39, 40) which is close to a cheek-piece from the grave 15 of the cemetery of Sialk B (Ghirshman 1939, II: pl. lxi). Depending on the chronology of Sialk established by different scholars it is either the 9th or the 8th–7th (?) century BC. The discovery in Chust of fragments of ten horn cheek-pieces and a fragment from Dal'verzin is also important for dating. The former belong to the type of three-holed cheek-pieces with three apertures lying in the

same plane (Matbabaev and Batirov 1992: 17). The latter has an oval aperture in the center and two round apertures lying in a different plane (Zadneprovsky 1962: fig. 15). Both types in the steppes belong to the final stage of the Bronze Age, most likely to the beginning of the 1st millennium BC. A. I. Terenozhkin (1965) was also inclined to accept the date of the 8th–7th centuries BC. Thus the traditional chronology suggests that the sites of the Chust culture belong to the end of the 2nd and the beginning of the 1st millennium BC (Sarianidi and Koshelenko 1985: 193). The upper date—the beginning of the 1st millennium BC—is the best supported; and the finds of iron do not contradict it.

Since written sources of the Achaemenid period indicate that the population of Fergana belonged to the area of the Eastern-Iranian language, there is reason to think that the indigenous late-Andronovo population spoke the same language.

It is not known whether the southern component of the Chust culture was the result of the cultural borrowing or whether small groups of farmers from the south penetrated Fergana. The latter supposition might be supported by the insignificant number of ceramics with white slip or grey burnishing and few dolichocranous skulls (Zadneprovsky 1962: 20-24). But this population was soon assimilated. According to the data of T. Khodzhayov (1980: 154-166), Fergana, as well as the Tashkent oasis, belongs to the northern zone where in the Iron Age the descendants of the Andronovo culture were living, though they were already occupied in farming. The population of the southern territories though also speaking Eastern-Iranian languages was genetically connected with the aboriginal population of the Eneolitic and Bronze Ages.

This reflects the substantially different pattern of historical processes of the Final Bronze Age in south and north Central Asia. In the south the elite dominance migration from the steppes took place, and was then followed by assimilation and acculturation of the newcomers, while the aborigines changed their language. In the north, on the contrary, pastoral tribes turned to the new type of economy and culture as a result of cultural borrowing, and preserved their language.

The Burgulyuk culture

The same process of acculturation is obviously traced in the Tashkent oasis in the materials of the Burgulyuk culture distinguished by A. I. Terenozhkin in 1940 (Fig. 113).

A chain of settlements in the region of the reservoir of Tuyabugus on the hills along the Akhangaran River was studied (Duke 1978; 1982; Abdullaev and Duke 1987). Settlement 1 (measuring 250x100m) was surrounded by a ditch 20m wide and 2-2.5m deep and a wall 2m thick made of mud-bricks, 42x24x12cm. This is the earliest fortified construction in the Tashkent oasis. Fourteen dwellings were found in the settlement. One of them is an oval semi-subterranean hut. It is divided by clay walls into four small rooms. Very small oval semi-subterranean huts 3x2 to 6x4m and 0.4 to 1m deep are common. There are also double semi-subterranean huts with a shared entrance. Inside the dwellings there have been discovered niches in the walls and open hearths. Beside the dwellings there were storage pits 0.6x0.4 to 1.6x1m and 0.5 to 4m deep (average).

Ceramics are the main part of the materials. It was all hand-made. The major technologies were coiling and the use of a tissue stencil. Nearly all vessels had a round base. Pots with a spherical trunk, kettles of semi-spherical form and big

khums were distinguished. Some pots and kettles have a short spout and a horizontal handle (support) on the opposite side. Bowls are not numerous (Duke 1982: 44-48, fig. 4, 6-11).

Painted ceramics constitutes only 1% of the sherds (Duke 1982: 49-51, fig. 12). Painting was made with red-brown paint on a red, pink, light-colored or grey background. Semi-spherical kettles and tiny vessels are decorated. Ornamental motifs include angles and triangles with their top turned down. As a rule, they are filled with paint and only in rare cases cross-hatched or filled with dots. The inhabitants were occupied in agriculture of the Kair type (numerous querns are found) and partly in stock-breeding (cow, horse and sheep bones are discovered). The finds of bronze slag witness that metal-working was also practiced. The constitution of alloys is very diverse—tin and lead bronzes, sometimes with antimony and zinc admixtures. The main source of raw materials was in the neighboring Chatkal Mountains (Ruzanov and Lushpenko 2000). Fifty kilometers from the settlements there were the ancient mines of Aktashkan. The Burgulyuk bronze objects belong to the Andronovo metallurgical province, according to their types. There are sickles with concave blade and an aperture in the handle—they are close to those of Chust; single-edged knives with a straight blade distinguished by a support; a razor; awls; two-bladed hafted (and one shaft-hole) arrows (Duke 1982: 51-54, fig. 13, 14).

The chronology of the sites is established as the 10th (?) 9th–8th centuries BC, according to the analogies to the metal artefacts and coarse ceramics on sites of the end of the Bronze Age – Yakke Parsan (Itina 1963; 1977: 160, fig. 78: 14; 79) and Kangagyr (Yusupov 1991: 109-111, fig. 2) of the Amirabad culture and in some settlements in Kayrak-Kum (Litvinsky 1962). In some regions in the pre-Saka epoch vessels acquire a spherical form, which suited the nomadic way of life; ornamentation nearly vanishes, including that with applied-rollers. Total filling of triangles with paint also belongs to late features of painted pottery (Askarov 1976: 19).

The types of dwellings, unpainted pottery and metal leave no doubt that the Burgulyuk culture belonged to the steppe kind of sites. That the population turned to farming was due to internal causes and only stimulated by the cultural influence of the southern farming regions.

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The present chapter seems to be the most important and at the same time the most difficult part of this study. As it has been said, the hypothesis I have maintained on the genesis and migrations of the Indo-Iranians has found many supporters. But even its adherents have emphasized that there is no explanation for the shift of Andronovo and Timber-grave pastoralists to the farming culture of Central Asia of the Achaemenid period.

H.-P. Francfort (1989; rec. Kuz'mina 1992a), the brilliant specialist in the culture of Central and South Asia, bearer of the best traditions of the French Cartesian philosophical school, became the main opponent of this hypothesis. He studied and refuted one after another three hypothetical attributions of the culture of the Iranians, as it is depicted in the *Avesta* and in the evidence of Achaemenid and Greek sources, with the concrete archaeological cultures of Andronovo, Namazga VI, and Yaz I. His objections are as follows (Francfort 1989: 451-453): "This hypothesis, defended by Kuz'mina (1981) and Litvinsky (1981) is an

excellent candidate". It is based upon the relation of the archaeological materials and the data of written sources and is supported by 1) the retrospective analysis; 2) pastoralism; 3) horse-breeding and the use of chariots; 4) social structure which includes charioteers; 5) toponymy; and 6) the contacts of Indo-Iranians (Kuz'mina 1981).

H.-P. Francfort denies the legitimacy of the retrospective method; he thinks that it leads to absurd conclusions, since in the farming culture of the Iranians of Central Asia of the Achaemenid period one could also trace a continuity of the cults of the bull, sheep, camel, fire, of the burial rites, ceramics and defensive architecture, which are all genetically connected with the preceding stages of the culture of farmers. These statements lead one to deduce that it was not the Andronovans, but the settled population of Central Asia who were Indo-Iranians. Hence, Francfort concludes that it is impossible to draw the right conclusion using this method.

This logical judgment of the French scholar is false, for, as it has been said in the chapter on theory, the retrospective method is applicable only to primitive tribal societies where stable traditions of production and beliefs are inherited by younger generations from the elder inside a tribe.

But in agricultural societies with highly developed crafts innovations spread in spite of the ethnic identity of craftsmen. Moreover, we have introduced a notion of ethnic indicators that are specific to a given ethnos and preserved even if it migrates to another ecological zone.

Furthermore, Francfort emphasizes the discrepancy between the general distribution of the cult of the bull and the prevalence of sheep bones in the paleozoological materials. Actually, there is no contradiction. As it has been said, a cow is seven times heavier than a sheep; consequently, the prevalence of sheep in the herd did not mean its prevalence in the diet. According to the data of V. I. Tsalkin (1972b: 80) the meat content of the Andronovans consisted of 60-70% beef, and only 10% of mutton.

Francfort notes that horse-breeding was known not only in the steppes, but also in the Near East since times immemorial, and it was there that chariots were invented. We have had many opportunities to discuss the problem of horses, chariots and riders in this book. The most recent data indicate that the chariots of Sintashta (21st-18th centuries BC, according to C^{14}) are older than those of the Near East, and that it was precisely these chariots that were brought to Central Asia by the Andronovans (Kuz'mina 2001). An important center of horse-breeding in the Near East was the region of upper Mesopotamia – Habur. Written sources suggest that horses from Nuzi were exported to the states of the Near East. An independent Near-Eastern type of cheek-piece might have developed there. It descended from the harness for an ass (Clutton Brock 1992). But the fact should be taken into account that it was Nuzi where the earliest names of Indo-Aryans (who later migrated to Mitanni) were recorded (Gelb *et al.* 1943). This brings us back to the problem of the crucial role of Aryans in the spread of new chariot tactics. Now dozens of new graves of charioteers have been discovered in the steppes (Usachuk, ed. 2004), which eliminates the objections.

Regarding Francfort's general conclusion on the place of charioteers in the society (p. 453): it has become neither clearer nor more corroborated, for the traces of the Andronovans in Central Asia are far too scarce.

Then Francfort procedes to the analysis of the cultures of Namazga VI, Mollali (p. 453). In the opinion of Sarianidi (1981; 1981c), Ghirshman (1977), Jettmar (1978; 1981), Pottier (1981), the Namazga VI culture belongs to the Indo-Aryans. The following features correspond to the data of the written sources – the cults of the bull, camel, fire, *vara*, Yima, trumpets (which might have been necessary for chariot tactics), the similarities with the Jhukar culture, which is regarded as post-Harappan = Aryan; the continuity between the materials of the Bronze Age and the period of the Achaemenids. The culture of the Indo-Iranians is regarded as indigenous, though accepting some borrowings from Andronovo, which renders it impossible to determine whether the bearers of the Namazga VI culture or the Andronovans were Aryans or Iranians; the evidence results in a deadlock.

The Yaz I culture (Francfort 1989: 450) is regarded by Masson, Sarianidi and Jarrige as Indo-Iranian or Iranian (Masson 1959; Masson and Sarianidi 1972; Jarrige and Santoni 1979). It is characterized by 1) irrigation; 2) the use of iron; and 3) a social structure comparable with that depicted in the *Avesta*. Francfort objects that such characteristics are too general: irrigation is known throughout the entire Bronze Age; iron was rarely used and its appearance was not connected with the Iranians; and the social structure depicted in the *Avesta* merely includes the family, clan, tribe and region. According to Masson and Sarianidi (1972), the rulers of regions lived in forts erected on platforms. Francfort rejects this assumption and suggests that this architectural form emerged in earlier times. His general conclusion: "there is nothing that would allow one to affirm that the remains of the Yaz I culture reflected the culture characteristic of the Indo-Iranians" (p. 450). The hypothesis of J. Deshayes (1975) identifying the black-grey ware culture with the Indo-Iranians is also without merit (p. 450). Francfort (p. 454) draws the conclusion that "all examined hypotheses can be discarded as merely plausible, doubtful, giving no possibility to choose incontestable criteria". He suggests his own logical scheme of combining possible solutions (table 115), but these models, artificially constructed with no connection with the concrete materials, are useless for solving the problem.

When studying the cultures of painted pottery of Central Asia, Francfort (2001: 221-232) returned to these questions. He labels them 'the Iron Age Oxus culture'. He examined two main hypotheses that suggest: 1) a synthesis between the Andronovans and the farmers of the oases (the steppe hypothesis); 2) the variants of Turkmenistan emerged from Iran, with the possibility of cross-influence of the painted ceramics cultures of Xinjiang. Francfort unqualifiedly accepts the calibrated C^{14} dates and moves the beginning of the culture to 1500BC and distinguishes three stages: 1500-1000 BC; 1000-700 BC and 700-400 BC.

Francfort (2001: 228) is very convincing when he disputes a connection between the Aketala culture in Xinjiang and the Oxus and Fergana cultures. He underlines that there is no painted pottery in the regions of Aksu, Kashgar, Yarkand, Khotan, adjacent to Central Asia, and that ceramic forms are different there. Only contacts involving ceramics and metal objects of the Andronovo and partially Dandybay culture could be traced, which supports our conclusions (Kuz'mina 1998).

He rightfully accepts the hypothesis, advanced by V. I. Sarianidi (1977), Cattenat and Garden (1977) and myself (Kuz'mina 1971; 1976; 1977c), on the con-

tinuity of the traditions of the development of ceramics, architecture (including the unchanged size of bricks) and irrigation agriculture in Bactria and Margiana.

He appreciates the important changes in the culture of the 14th–4th centuries BC, and the probable role of the Andronovans in these changes; he comes to the conclusion that "the formation of the Eastern-Iranian cultural complex of Central Asia… took place on the basis of a long, slow, and important transformation of the Bronze Age Oxus civilization" (Francfort 2001: 231). But the question of the origin of the Iranians is left unanswered.

How could the position of this French scholar be appraised? First, the term 'the Oxus civilization' is not appropriate, since analogous events occurred in the piedmont zone of the Kopetdag and even in the regions far south. But the main point is that, when speaking of the dynamics of the Bactrian culture, he did not take into account that the most important transformation happened in the steppes.

As it has been demonstrated in the chapters above, in the vast region of Eurasia the complex settled agricultural and pastoral economy was replaced by mobile stock-breeding with the use of mountain pastures in the 13th–9th centuries BC as a result of an ecological crisis. The spread of riding also contributed to this change.

Of crucial importance for solving the problem of the genesis of the Yaz I culture are new studies in steppe ceramics and the distinction between an early stage (13th–11th centuries BC), represented by the Ivanovka type in the Volga region and the Alekseevka type distributed from the Urals to the Altai Mountains, and a late stage (10th–9th/8th centuries BC) of Nur and Dongal. There is an essential detail: imported wheel-made pottery from Namazga VI is widespread in the sites of the Alekseevka type. This permits one to state that by the end of the Namazga VI period the steppe late-Andronovo tribes established active contacts with the farmers of south Central Asia. This cultural exchange was conducted along the future Great Silk Route. Numerous finds of wheel-made ceramics in Alekseevka-type settlements of the Urals and the Altai suggest that the main object of exchange was bronze. This is supported by finds of bronze articles in south Central Asia. Their type and material (bronze with a high tin content) are characteristic of the Alekseevka types. Finds of Alekseevka ceramics are in an absolute majority among the ceramics on the border of the oases and desert zones of south Turkmenia.

The movements of a part of the steppe population to India and of groups of the population of the Ukraine to the east led to an intensification of inter-ethnic contacts and to the formation of a rather homogenous culture, which is known under the provisional and unfortunate name of 'the applied-roller ceramics culture'. Not only hand-made pottery but also many other types of rough and poorly decorated ceramics are common in the steppes, and so are the types of bone cheek-pieces and most categories of metal articles. Certainly specialists distinguish local variants but never before the pre-Scythian period was the culture of the steppes so homogenous. It is this culture that became the basis of formation of the culture of the East Iranians – Scythians, Sarmatians, Saka. This gives us good reason to suppose that different East-Iranian dialects became the common language in the period of final Bronze Age migrations.

Francfort's (as many other scholars' before him) mistake is that he speaks of the spread of an Andronovo (or just steppe) culture lacking individuality, with no

consideration that the majority of the steppe sites, so numerous along the borders of the agricultural oases, had precisely the applied-roller ceramics of the 13th–11th centuries BC, and, which is even more important, in the piedmont zone over the traces of destruction and fire, there is again found this applied-roller pottery.

These facts lead to two essentially important conclusions: first, the chronology of these events – the 15th–4th centuries BC, accepted by H.-P. Francfort – is false, whatever the C^{14} dates say. The epoch of the applied-roller ceramics from Troy, the Danube, Tepe Giyan and China is dated to the 13th–9th centuries BC, according to different chronological systems, including the most reliable dendrochronological material. These data, as we have mentioned, correspond to the Early Iron Age of Iran, the time when West Iranians were settling there. Secondly, the opinion of Pumpelly on the period of barbarian occupation is supported not by the fact that hand-made pottery replaced wheel-made monochrome ceramics in Turkmenia, but by the fact that in this basically new complex there are vessels with applied-roller decoration, and these are diagnostic: they demonstrate from where those who made them had come.

The analysis of ceramic complexes provides a good opportunity to reconstruct ethnogenetic processes in south Central Asia with confidence. A. A. Marushchenko (1939; 1959) and A. N. Ganyalin (1956) were absolutely right when they followed the American scholars in asserting that there was an epoch of barbarian occupation. This thesis is corroborated by the downfall of agricultural settlements, the wide distribution of horse bones, the change in metal production types, and, most importantly, the appearance of new types of steppe two-bladed shaft-hole arrows and knife-daggers with a support. But V. M. Masson (1959) was right too when he directed his attention to the wide scale of essentially significant changes in the culture of the Epoch of Barbarian Occupation (EBO): the improvement of irrigation systems that allowed people to bring new lands under cultivation, the construction of new fortified settlements, including both large cities and small fortified manors.

The scholars who traced and emphasized the line of development of wheel-made pottery production, unbroken throughout the whole period, are also right. It was the local Turkmenistan pottery types, and not those borrowed from Achaemenid Iran, that became the basis of the ceramic complex that formed in Central Asia in the period of urbanization in the pre-Achaemenid period.

The analysis of the totality of materials available at the present time leads to a consistent conclusion that in the Final Bronze Age when the farming culture of south Central Asia and Afghanistan suffered a gradually deepening crisis, perhaps stimulated by ecological conditions, the pastoral horsemen who roamed along the borders of the desert and were the bearers of the applied-roller ceramics culture began penetrating the territory of the oases. It was they who created the culture of the EBO. In some cases they established peaceful relations with the farmers, in other cases the newcomers destroyed the aboriginal settlements that had fallen into decline and built their own temporary houses on the place of fire and devastation. In any case, it was an elite dominance migration. The newcomers retained their way of life for the first time, they continued capturing and stealing livestock, produced hand-made pottery, a part of which they ornamented with rollers, according to the tradition brought from the homeland. But gradually, and especially in the 10th–9th centuries BC, they

turned to a firmly settled way of life, mixed with the indigenous population and adopted its economic type and culture. The most persuasive evidence that the pattern of the historical process depicted here is right is the development of the ceramic complex where the applied-roller pottery was being gradually displaced.

But it is important to underline that it was this pottery that had been brought by the newcomers and became one of the components of the new culture of the bearers of Eastern-Iranian languages.

In the Final Bronze Age the culture of Eastern-Iranian tribes, Scythians and Saka, was forming on the basis of the applied-roller ceramics culture in the steppes. Some of these tribes were turning to the nomadic way of life. At the same time the culture of other Eastern-Iranian peoples (Bactrians, Araeans and others), linguistically closely related to the former group, emerged in the south on the same basis of the applied-roller ceramics culture.

They underwent another gradual transformation from semi-nomadic stock-breeding, looting and raids to settled farming, after having adopted the cultural and economic type of the indigenous inhabitants but after giving their language to them. Earlier the aryanization of north India happened similarly.

The fact should be emphasized that the main population of south Central Asia was still aboriginal. It comprised farmers who conserved their millennium-old traditions of architecture, including the form of bricks, and pottery, including the main cylindro-conical forms of ceramics and light-colored or red slip.

It was this complex that became the basis of Central Asia of the Achaemenid era, a period when the Great Bactrian kingdom might have formed. As we have noted, this complex is essentially different from the pottery of Achaemenid Iran which is very rich in forms.

As for the painted pottery, which is considered as the main distinguishing feature of the EBO, the fashion for it could have been introduced by barbarians who were fascinated by the beautiful scattered sherds that still cover the surface of deserted settlements of Turkmenia. It is interesting to note that even in the layers of late Namazga VI there are known wheel-made vessels decorated either with applied rollers or with painting. (The problem of the revival of the painted pottery tradition in Central Asia, Afghanistan and Iran in the period of migration of the Iranian peoples and the connections of the complexes with ceramics of north India of the Indo-Aryan migration period are still to be studied by the international scientific community).

The gradual replacement of the applied-roller and painted ceramics by wheel-made pottery characterizes the period of stabilization. The barbarians who brought applied-roller crockery and introduced the fashion for painted ceramics, and the indigenous farmers who preserved their native traditions, were mixing. EBO was undoubtedly characterized by bilingualism, and its end reflected the victory of the new language and the consolidation of two ethnic groups.

The anthropological data corroborate this model. They witness that the prevalence of the aboriginal type was conserved in the Early Iron Age. Meanwhile, the written sources evidence that the language of this population was Iranian. The spread of Eastern-Iranian dialects in south Central Asia and Afghanistan, precisely as the spread of Western-Iranian dialects in Iran, took place in the 13th–9th centuries BC. In the 8th–7th centuries BC an essentially new historical epoch began in both regions.

The problem of the date of Zarathuštra

The *Avesta* is the most important source of the history of the early Iranian tribes, and hence the establishment of the chronology of its early part, the Gāthās, and the time when they were composed by the prophet Zarathuštra is of major significance. Debate over the time and space of his sermons has already lasted for three centuries. The problem of the chronology of the *Avesta* has been examined in general works concerning Central Asia and Iran, in works dedicated to the *Avesta* and Zarathuštra himself and in special articles on the chronology of the prophet's life and on the Gāthās of which he was the author. I would like to cite the latest studies by P. O. Skjærvø (1995) and J. Kellens (2001; 2002).

Not aiming to depict the controversy of different points of view in detail, I shall only state the fact of the discrepancy between the leading Iranian specialists (the dates of the works included in the book are shown in brackets).

The opinions of scholars can be ranged according to their estimation of the chronology of Zarathuštra's life.

According to one point of view based on different arguable calculations, the evidence of ancient sources and late Zoroastrian tradition, Zarathuštra lived in the Achaemenid period and was even their kinsman. This opinion for the first time uttered by G. Hertel in 1924 was accepted by E. Herzfeld (1947: 48), W. Henning (1951: 41), I. Geshevitch (1959) and nowadays by G. Gnoli (1989) though their interpretation of the details and methods of argumentation are different. Moreover, E. Herzfeld (1947: 48) thinks that the events in question took place in Media. This point of view has many times been a subject of criticism. It has no supporters in Russia.

But already one of the first specialists, W. Geiger (1862: 132, 136, 169, 170), established that the text is very old and reflects an archaic pastoral economy, and placed the region where Zarathuštra preached in the Eastern-Iranian territories.

Eduard Meyer suggested in 1908 that the date of Zarathuštra should be placed on the border between the 2nd and the 1st millennia BC. This point of view has gained many adherents: Th. Burrow (1973: 123-140), H. Humbach; among Russian scholars it is maintained by the main translator of the *Avesta*, I. M. Steblin-Kamensky (1990: 3; 1993: 3 – the Prefaces to the *Avesta*) and E. A. Grantovsky (Boyce 1987: 290, 291 – Epilogue). In the fifties the adherents of the long chronology of the Gāthās were also the representatives of the linguistic school who studied the *Avesta*, K. Hoffmann, F. B. J. Kuiper, P. Thieme and other (Kellens 2002: 16). This chronology is based on the archaic features of the language of the Gāthās and on the presumption that the texts of the *Avesta* and the *Rigveda* have much in common (Kellens and Pirart 1988). They place Zarathuštra's activity to the time long before the Achaemenid conquest of Central Asia, mainly in the 8th–7th centuries BC. The majority of Russian scholars – M. M. D'yakonov 1954: 139-140; 1961: 59, 63), I. Aliev (1960: 18-21), I. M. D'yakonov (1956: 48, 53, 390; 1971: 141), I. M. Oransky (1960: 92), V. A. Livshits (1963: 308; 1998: 216), M. A. Dandamaev and V. G. Lukonin (1980: 308) – they all, except Aliev, localize the sermons of the prophet in Central Asia in Eastern-Iranian territory.

G. Windgren (1977) assigns Zarathuštra to 10th–7th centuries BC.

One of the leading specialists in Zoroastrianism, Mary Boyce, in the first volume of her "History of Zoroastrianism", published in 1975, placed the home-

land of the Iranians in the Asian steppes and believed that Zarathuštra's activities took place in the Bronze Age; she even noted the survivals of the Stone Age reflected in the *Avesta*. She estimated the date as lying somewhere between 1700 and 1000 BC, most likely 1400-1000 BC. In the book "The Zoroastrians" (Boyce 1987: 27) she made the date more precise: 1500-1200 BC.

Gerardo Gnoli (1980: 199f), the Italian specialist in the *Avesta*, initially thought that the prophet's sermons occurred in the late 2nd or early 1st millennium BC. In his later works (Gnoli 1989) and in his book of 2000 "Zoroaster in History" Gnoli changed his opinion. Now he thinks it is more likely that Zarathuštra's activity took place in the Achaemenid epoch.

M. M. D'yakonov's research (1954; 1961: 59, 361) contributed enormously to Avestan studies. He followed W. Geiger (1882) when he reconstructed the material culture reflected in the *Avesta*, and first of all, in the Gāthās. Having confronted these data with the archaeological evidence of North Bactria that he had obtained, he showed that this culture was much more archaic not only than Achaemenid Iran, but also the Bactrian Kingdom whose existence he supposed. "The comparison with the archaeological materials from Central Asia and Iran demonstrates that the earliest parts of the *Avesta* were formed in the earlier period" (M. D'yakonov 1961: 59-63).

The material culture of the *Avesta* is very archaic; there are no mentions of temples and large irrigation systems and specialized crafts; iron is defined by the same word as bronze; and the main unit of the society is the *vis* - clan, which consists of individual families-households – *nmāna* (the corresponding term in the Gāthās is *dəmāna*).

V. I. Abaev (1956: 23) adopted an original position. He thought that Zarathuštra began his preaching among the pastoral Scythian (Saka) tribes and called them to settle and lead the peaceful way of life; but having gained no support among them, he appealed to the Bactrian king Vištāspa who lived, as Abaev thinks, in the Achaemenid period. V. I. Abaev drew attention to the fact that the image of the society of the Gāthās reflected the traveling way of life of pastoralists who were permanently at war, and raided for livestock that was their main treasure. Zarathuštra called them to settle and work in farming.

To what archaeological reality does the society depicted in the Gāthās correspond?

The prophet's sermons are addressed to the stock-breeders who live by raiding; "the soul of the cow calls for help against having been drawn away" (Yasna 29). The prophet's appeal is to reject raids, cease devastating peaceful villages and turn to a settled way of life and grain-growing while keeping to treaties of peace. When could such an appeal be urgent?

No doubt, it is the Epoch of Barbarian Occupation but, presumably, not the time of the crisis of the 13th–11th centuries BC when the newcomers had not yet been assimilated with the remains of the indigenous population. It must have been the time of Yaz I (1000-800 BC) when in the agricultural areas the sedentarization of the newcomers and the synthesis of two cultures was taking place.

V. I. Abaev was right calling the nomads 'Scythians' – 'Saka': this is the group of Eastern-Iranian tribes, the bearers of the applied-roller ceramics who came from the north. They are closely related to the ancestors of the Saka-Scythians who remained in the steppes and this affinity was still fully realized in

the *Avesta*. Yasht 13.143 says: "the territory of Arya… Turya, Sairima, Daha" (Bailey 1959). These are Aryan Iranian tribes of the Sauromates and Dahas known also from the ancient sources, and Tura who were their closest relations and permanent antagonists living north of Bactria.

The upper date of the archaeologically possible epoch of the Gāthās remains obscure. It depends on the time of formation of the Scythian culture which defines the date of the formation of the pre-Achaemenid urban culture of south Central Asia and Afghanistan.

The use of archaeological materials provides an opportunity to define the territory of the prophet's activity in certain ways more precise: it was not North-Western Iran where in the 10th–8th centuries BC there obtained an utterly different situation.

Finally, the analysis of the materials of the pre-Achaemenid period of Central Asia allows one to refute the hypothesis of a pre-Achaemenid Great Khoresm created by E. Benveniste (1934) and A. Christensen (1943) and taken up by S. P. Tolstov (1948: 108-109), if only the localization of Khorezm in the Tedzhan and Murgab valley by W. Henning (1951: 43) is not to be accepted.

The matter is that in south Central Asia and Afghanistan in the pre-Achaemenid period there emerged fortified town-type settlements, irrigation was developed, including water transportation along the big rivers; and crafts advanced, especially pottery in which strict and subtle forms of cylindro-conical earthenware were elaborated. This provides serious reasons to support the hypothesis of the existence of a Great Bactrian Kingdom that included also Margiana (M. D'yakonov 1954; I. D'yakonov 1956: 380; Kuz'mina 1972a; 1976a; see also Shirinov 2001; P'yankov 2001). According to another point of view, the major center of the region was the Helmend basin, while references to Khorezm and Bactria were only a recollection of the route of migration or a reflection of the relations (Skjærvø 1995: 160).

CONCLUSION

The majority of Russian archaeologists and linguists accept that the sites of the Sintashta type reflect the formation of the Indo-Iranian group of cultures whose origins lie in the earlier Pit-grave culture. Proto-Indo-Iranian became an independent language during the period of the end of the 3rd and the beginning of the 2nd millennia BC. The population knew agriculture, stock-raising, including horse-breeding. They built fortified settlements comparable with the *vara*, manufactured gold and copper, and at the end of the period, also bronze artifacts. The main achievement of the epoch is the introduction of horse-drawn chariots and the privileged position of charioteers who were buried in large barrows with horses, chariots and rich grave goods including all types of weapon that had common-Iranian names. This set of weapons is recorded in the culture of the Aryans of Mitanni and represented in the *Rigveda* and the *Avesta* in the late hymn to Mithra where the ancient Indo-Iranian tradition could have been preserved. This situation corresponds well with the reconstruction of the culture of the Proto-Indo-Iranians and is reliably supported by J. Mallory's hypothesis on the genesis of the Indo-European peoples and O. Skjærvø and G. Fussman's conclusion that the Indo-Iranian linguistic community split between 1700 and 1500 BC.

Unfortunately, there are no reliable data that could help answer the question when the Indo-Iranian continuity split into three (or more) groups: Iranians, Indo-Aryans, Dards and Nuristani. (In a quite recent work by A. I. Kogan "The Dardic languages. Genetic characteristics" (Moscow 2005) it is suggested that the Nuristani languages emerged earlier, and the Dardic languages – later). One could suggest though it is impossible to prove that the appearance of the sites of the Potapovka type on the Volga and then on the Don and the Dnieper under the influence of Sintashta signified the beginning of the disintegration of the unity of proto-Iranians (the Timber-grave population) and proto-Indo-Aryans and Dards and Nuristani (the Andronovans). The existence of early borrowings from Indo-Aryan and Iranian into the Finno-Ugrian languages speaks in favor of this proposal.

Judging from the fact that the language of the Aryans who came to Mitanni around the middle of the 2nd millennium BC or slightly earlier is believed to be Indo-Aryan with some Iranian traits, it is possible to state that the disintegration of Indo-Iranian unity began earlier than the middle of the 2nd millennium BC in the homeland. I. M. D'yakonov however finds Nuristani traits in the language of the Aryans of Mitanni; but this does not exclude the statement of the disintegration of the unity.

At that time three large cultural bodies formed in the Eurasian steppes: the Timber-grave culture in the Ukraine and as far east as the Urals. V. V. Otroshchenko's hypothesis on the existence of two Timber-grave cultures is not widely accepted and concerns only the different role of two groups in the

formation of this culture. The majority of scholars regards the creators of the Timber-grave sites as the ancient Iranians. That the area of the Timber-grave culture coincides with the area of Iranian hydronyms revealed by V. N. Toporov and O. N. Trubachev (1962), the fact shown by S. S. Berezanskaya (1972), provides serious support for this hypothesis.

Sites of the Fedorovo type extend from Central Kazakhstan to the Yenisey. In the Urals sites of the Alakul' type are found while mixed types prevail in north and central Kazakhstan; these formed as a result of the interaction between the Alakul' and the Fedorovo tribes. Differences are evident only between the extreme sites of the typological scale. In linguistic terms, this continuous chain of interrelated complexes can be described as the area of settlement of the bearers of related dialects of the Indo-Iranian community.

The sites of the Fedorovo type demonstrate the closest resemblance to the reconstructed culture of the Vedic Aryans: the existence of inhumation alongside the prevailing rite of cremation, the rite of *sati*, specific types of ritual ceramics. This provides good reason to suggest that the Fedorovan tribes were Indo-Aryans.

Three chronological stages are distinguished in the history of migration of the steppe tribes to Central Asia and farther south.

Stage I: the 20th - 17th centuries BC: the appearance of cheek-pieces of the Sintashta type on the Zeravshan in the grave of Zardcha-Halifa and a cult of the horse from the Urals and later ceramics of the Petrovka type in the camp of Tugai near the agricultural settlement of Sarazm. There is no evidence that they reached India. According to the materials of Dzharkutan, the newcomers were not numerous but they employed horses and chariots and established elite dominance and adopted the culture of the BMAC. It is not known whether some part of this population moved south and was among those who established the BMAC contacts with Baluchistan. And there is, of course, no data to support the theory that it was the early Andronovans who destroyed the Harappan civilization and were guilty of the massacre in Mohenjo-daro, as M. Wheeler (1968) assumed. His opponents pointed out, first, that in other Harappan cities there were no signs of violence and destruction. Secondly, according to the stratigraphy of Harappa, there is a chronological hiatus between the downfall of this city and Cemetery H. This leads to the conclusion that the collapse of the centers of civilization was caused by ecological, social and political reasons (Bongard-Levin and Il'in 1985).

The hypothesis of B. and R. Allchin (1973) is very probable: they thought that pastoral tribes settled on the frontiers of the Harappan centers that were experiencing a crisis because of ecological disasters and internal social and economic catastrophies. The downfall of the cities cleared the way for the newcomers, and they began to settle along the borders of oases. Yet we are not speaking of hordes but isolated groups. Meanwhile a part of the indigenous Harappan population moved east to Haryana and south to Gujarat where the Harappan sites, as some scholars think, are younger than in the west.

Of extreme importance is the continuity in the culture of the Harappan and Post-Harappan period on the periphery of Harappan territory (Joshi 1978). This proves that the movement of the Aryan groups was slow and gradual. Initially the newcomers and the aborigines settled near each other but not together. The

Vedic sources clearly reflect the relations with the indigenous population. Already in the 19th century the existence of borrowings from the local languages was discovered. Now there is a large literature concerning this problem (Witzel 1999 and others).

There are very few loan-words in the *Rigveda*, but some names of tribes included in the Aryan community and the names of several rulers and especially priests are definitively non-Indo-Aryan. This means that the newcomers established contacts with the elite of several adjacent tribes and a part of the priests turned to their side and joined the new nobility (as we have seen, this process began already in North Bactria).

In the Brāhmaṇas the number of loan-words from the Dravidian and Munda languages increases, and there are new borrowed lexical fields: not only the names of flora and fauna unknown to the Aryans, but also the words of economy and everyday life.

This reflects the fact that the Aryans came into closer contact with ordinary people of the land—craftsmen and farmers. This is the time when it becomes legitimate to speak of the formation of a new culture—the culture of the people of India, that formed as a result of an organic synthesis of the strange culture of the Aryans mostly revealed in the language, and the aboriginal culture that preserved the ancient Harappan traditions.

As G. Possehl (2002) has shown, the way of life essentially changed in India in this period: small villages, the centers of agriculture and handcrafts that became much degraded, replaced populous cities. Harappan writing, costly jewels and seals disappeared, international trade stopped, but the old methods of economy, tools, domestic animals, the traditions of house-building, the types of means of transportation and, most importantly, the tradition of ceramic production on a potter's wheel were preserved. So the opinion of the Indian scholars who emphasize the conservation of the Harappan traditions in the culture of the subsequent periods is quite correct.

The Aryan contribution was the spread of horse and chariot, which is recorded in the petroglyphs of India and the burial rite: the prevalence of cremation with the existence of inhumation, the rite of *sati*, sacrifices of horses and essentially new mythological beliefs and a social structure close to that of other Indo-European peoples.

The second stage of the migration of pastoral tribes south was in the 16th–14th centuries BC. People from the mixed Timber-grave-Alakul' zone occupied new territories and formed the original farming culture of Tazabagyab. The sites of the Andronovan tribes are recorded across Central Asia. In the Tashkent and Samarkand oases the Timber-grave population appears and comes into contact with the Andronovans.

The Fedorovan tribes reached the Amu-Darya, took part in the formation of the Tulkhar culture and actively interacted with the bearers of the farming Bactria-Margiana culture.

Cultural contacts among the groups of the steppe population can be defined as the integration of the bearers of related languages or dialects.

Interaction between farmers and stock-breeders was very diverse and followed very different patterns (see part II). South Tadzhikistan and Uzbekistan illustrate different patterns of contact: cultural influence: the conservation of

culture with the change of burial rite (the Tadzhik variant of the Andronovo Fedorovo culture); integration: the formation of the new culture of Bishkent as a result of the synthesis of the Andronovo Fedorovo culture and BMAC; elite dominance migration and then integration: the penetration of the Andronovo population in the BMAC and the probable subjugation of the indigenous population, primarily in the ideological sphere. This pattern is of great interest; it is displayed in the materials of the cemetery and especially the temple of Dzharkutan. These facts could be interpreted as a gradual aryanization of the population of south Central Asia and the peaceful spread of the Indo-Aryan and the Dardic-Nuristani languages in this region. If this model is correct, it agrees well with the hypothesis of Th. Burrow (1973) that the Indo-Aryans first settled in Central Asia and then migrated to India from there; the Iranians followed them, which explains why the Iranian languages lack loan-words so numerous in Sanskrit. The movement south to Afghanistan and India of the cultures that were combinations (in different proportions) of Andronovan Fedorovan and BMAC traits demonstrated the Kulturkugel model of Aryan migration suggested by J. Mallory (1998).

The 13th–9th(8th) centuries BC was the period of the third stage of migration. It was caused by the cultural transformation of the Eurasian steppes as a result of internal development and ecological crises.

At that time the new cultural and economic type was becoming firmly established: the mobile (*yayla*-type) stock breeding which implied the emergence of riding. Migrations became more active: a part of the Timber-grave tribes moved to the North Caucasus because of the crisis; they had already begun appearing and settling in the Caucasus at an earlier time and adopted some features of the material culture of the highlanders. M. N. Pogrebova (1977) connects the migration of the descendants of the Timber-grave population from the Caucasus to Iran with the appearance of West Iranians in Iran. Another way might have lain through Central Asia. This was an elite dominance migration with the subsequent adoption of the aboriginal culture by the newcomers and of the Iranian language by the indigenous population. Having come to Iran, the West Iranians borrowed local grey-black ceramics and contributed to its wide dissemination, as well as of the Western-Iranian language, for they roamed a lot in the region. The Fedorovans moved to Central Asia and their territory in south Siberia was occupied by the bearers of the Karasuk culture.

The other part of the Timber-grave population came to the Urals region and moved to Central Asia along the Caspian Sea. The activation of cultural connections, the mobility of population led to a considerable unification of culture, which is graphically demonstrated by the emergence of a common type of ceramics with applied roller. The departure of the Fedorovans and the interaction of Timber-grave and Alakul' tribes who were closely related not only in their culture but also in their anthropology, especially in the contact zone of the Urals, led to the replacement of the diversity of many individual variants that existed in the High Bronze Age by the cultural uniformity of vast steppe territories in the Final Bronze Age. This may have been connected with the formation and the spread over the whole steppe zone of the proto-Eastern-Iranian language.

Numerous cultural innovations of the Final Bronze Age (the rise of metallurgical production which led to the introduction of iron, the invention of new types of weapons and cheek-pieces for riding horses) contributed to the formation in the steppes of the culture of different Eastern-Iranian tribes of Saka, Sauromatians, Scythians and others.

In the meantime in the 13th–11th centuries BC a part of steppe tribes, the bearers of the applied-roller ceramics, kept to established routes and approached the borders of the agricultural oases. In their camps on the edge of the desert they left numerous fragments of Ivanovka-Alekseevka ceramics with a roller and isolated bronze artifacts of late-Andronovo type. They exchanged metal and products of stock-breeding for grain and wheel-made pottery of the Namazga VI type which spread from north Kazakhstan to the Altai Mountains and Semirech'e; in the upper layer of the agricultural settlements there appeared the steppe hand-made ceramics of the Alekseevka type. The contacts with farmers were alternately peaceful and hostile. In order to protect themselves from nomadic raids the inhabitants of El'ken-depe constructed fortification walls. But the progressive decline resulted in the downfall of the Namazga VI culture. On the ruins of settlements (Tekkem, Namazga) there appeared the huts of the newcomers.

The crisis began. The barbarians settled in the half-deserted towns. During the Epoch of Barbarian Occupation a part of the pastoralists continued to lead a nomadic way of life, made raids against the settlements, captured livestock and took grains. But another part lived together with the aborigines. They produced their traditional applied-roller ceramics; their attention was attracted by painted pottery that they found on the surface of the deserted tepe. The aborigines revived the lost technique of painting on their order but continued to produce high-quality wheel-thrown ceramics for themselves. Thanks to their military superiority, the barbarians gained leading positions in the society. This is an example of elite dominance migration. Having subjugated the local population, the newcomers who were the bearers of the applied-roller ceramics, after a period of bilingualism, imposed their Eastern-Iranian language on the farmers.

The consolidation of the aborigines and the newcomers that had turned to the settled way of life slowly advanced. The latter gradually became hostile with their Eastern-Iranian relations who had remained nomads. In order to protect themselves, both from their aboriginal subjects and the nomadic tribes, they began to construct forts, build new settlements and dig canals using the experience of the indigenous inhabitants. A substantially new stage of the history of south Central Asia and Afghanistan began.

The period of gradual rise of culture which belongs already to the Eastern-Iranian peoples dates to the 10th–9th (8th) centuries BC. It was these historical circumstances that could have reflected the background of the sermon of the prophet Zarathuštra whose appeal was to reject the devastation of Mazdayasnean settlements, to turn to agriculture and the protection of livestock. It is not by chance that Zarathuštra demanded that blood sacrifices cease and accused the progenitor Yima himself of committing them! The prophet first addressed himself to his tribesmen who continued to roam; but having gained no support, he came to a prince Vištāspa who could have lived in a citadel like those mentioned above. (It is of course a risky step for an archaeologist to use such a

complicated text as the Gāthās whose interpretation is not easy even for the specialists in religion; but the coincidence of cultural and historical situation depicted in the Gāthās with the archaeological evidence is fascinating!)

Speaking of the *Avesta* one should note that the assumption of V. I. Sarianidi (1998) that some of the rituals of the *Avesta* formed in the sites of BMAC already in the Bronze Age, deserves close attention in spite of the severe criticism by G. Fussman, H.-P. Francfort and many Russian scholars. The manifest cult of fire revealed, e.g. in Dzharkutan where there are traces of assimilation of BMAC with the Andronovans (Avanesova and Tashbulatov 1999; Shirinov 1990; 2000; Burney 1999: 11, 12), suggests that the bearers of this cult, the Andronovans, adopted some traits from fire-worshippers of the BMAC. These traits were preserved in Central Asia for many centuries.

In late Bronze Age sites of south Central Asia there has also been recorded a pre-Zoroastrian rite of dividing the corpse and burying a part of the bones and skulls in vessels. (However, as it has been said, this rite was also known to the Vedic Aryans and some of the Saka tribes.) These facts support the notion that the process of formation of the *Avesta* was long and took place on the basis of rituals and mythology of different Eastern-Iranian tribes, especially in the Epoch of Barbarian Occupation.

Further development was directed the same way in the large territories of Central Asia and Afghanistan. In the Mihr Yast the land named *Airyanəm vaējō*, 'the land of the Aryans', is mentioned. It includes Area, Margiana, Sogdiana, Khorezm and highland territories of the Hindukush. In this area settlements, agriculture and handcrafts developed; the use of the potter's wheel became the only method of pottery production; a new urban civilization emerged; the zone of farming economy expanded. Inhabitants of territories where there had been no traditions of irrigation agriculture turned to this type of economy. These processes did not occur simultaneously in different regions of Central Asia. Northern territories fell behind the southern. The early agricultural complex was not revealed e.g. in Khorezm and, which is very strange, in the settlement of Afrasiab, the scene of the deeds of the heroes many times depicted in the late parts of the *Avesta* and in *Shah-name*.

It should be emphasized that, as A. Christensen (1934; 1943) demonstrated, the memory of the genetic kinship of all Iranian peoples is very stable in the *Avesta*: Sairima, Tura and Iraj are called brothers. The first two of them are said to be the progenitors of the Sauromates and the Turas (a collective name for the peoples of north Central Asia and Kazakhstan); and the youngest brother is the progenitor of the Iranians of Iran.

Pastoral tribes were very mobile and it is therefore impossible to outline the borders of their territory. But the ethnic consciousness of ancient kinship is reflected not only in the self-definition common for all Indo-Iranians – *Arya*, but also in the general term *Saka* which was used by Strabo to describe the region of Sakasena in West Iran.

When did the Iranian unity split? Indirect evidence suggests that it happened in the homeland in the Bronze Age. In the 9th century BC when Iranian names appeared in the Assyrian sources, they can be interpreted as Median (D'yakonov 1956; Grantovsky 1960; 1998). As for the East Iranians, the emergence of several languages may have occurred at the beginning of the first millennium

BC. Important evidence is the etymology of the name of the Syr-Darya River mentioned by the Ancient authors – *Yaksart*, established by V. A. Livshits (2003: 10). It means 'flowing', 'streaming'. The word belongs to the Sogdian dialect that had emerged from the Saka language group.

The burden of the subsequent history of Central Asia was cultural exchange and military struggle between settled farmers and pastoralists.

Similar processes must have taken place in Iran. There also arrived Iranian tribes divided into nomads and those who settled. It should be emphasized that the sedentarized Iranians were only warriors and administrators. As M. A. Dandamaev (Dandamaev and Lukonin 1980) has shown, in Achaemenid Iran the indigenous inhabitants were farmers, they also were craftsmen but there was also a lot of foreign specialists brought from every part of the empire from the Greeks to the Indians.

For many years it was believed that the urban civilization of Central Asia was created after the Achaemenid conquest by Cyrus the Great who became king in 558 BC. The study of the settlement of Kala-i-Mir in the Kobadian oasis in south Tadzhikistan allowed M. M. D'yakonov (1954) to distinguish the ceramic complex of Kobadian I and to assume that it formed before the period of the Achaemenids. Further studies revealed a series of sites of the pre-Achaemenid time (the 9th – the early 7th centuries BC) and showed their genetic connections with the complexes of the Bronze Age and the substantial differences from the synchronous complexes of Iran (the works of Gardin, Sarianidi, Kuz'mina).

This provides archaeological support for the hypothesis uttered by W. Geiger (1906: 50-54), revived by M. M. D'yakonov (1954: 138; 1961: 64, 75) and defended by G. Gnoli (1980: 95), R. Frye (1962: 64-65), V. A. Livshits (ITN 1963), I. V. P'yankov (ITN 1998) and many others. There are data on the Bactrian kingdom in the *Avesta* and in the texts of the Greek authors, first of all Ktesios of Knidos who lived at the court of Artaxerxes. The legend is also reflected in the work of Diodorus (II: 2-7). There is an account of the Assyrian king Nin's campaign against Bactria and his wedding with Semiramis. She is an historical figure – Shamuramat; her reign was after 810 BC. Under her son Adadnerari III in 802-788 BC there were several eastern campaigns (D'yakonov 1956: 167-169). Xenophon (Cyr. 1.5.2) believed that the war with Bactria occurred under the Median king Cyaxares. Describing the conquests of Cyrus, Herodotus (1.153) mentioned Bactrians as the main enemies of the king along with Babylon, Egypt and the Saka. So he emphasized the greatness of Bactria.

V. A. Livshits (ITN 1963: 156) analyzed the Bactrian legend and came to the conclusion that from the late 9th and 8th centuries BC "the power of Bactria, the existence of numerous fortified settlements on its territory and the capital – Bactrae, are the authentic kernel of the legend."

Thus the base of the actual civilization in Central Asia, Afghanistan, Iran and India was established in remote antiquity not as a result of wars and conquests that brought chaos and destruction but as a result of peaceful work and interaction of different peoples that created the new culture as a result of the interaction and achievements of old and young ethnic groups that formed the nation of their country.

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As we have seen, in the light of the existing evidence the identification of the ancient Indo-Iranians with the creators of the pastoral cultures of Andronovo and Timber-grave (as well as with Bishkent and Tazabagyab) who then migrated from the steppes to India and Iran, appear to be most firmly corroborated.

Numerous problems, however, remain unsolved. Joint efforts of linguists and archaeologists, anthropologists and geneticists, paleogeographers and zoologists from different countries offer the only possibility to clarify these problems. I would like therefore to conclude this book with the words of an ancient appeal of the "Unity hymn" (*Rigveda* 10.191):

Get together! Make arrangements together,
Settle your intentions together.
May your thought be united
So that you live in perfect harmony.

Post Scriptum

Now that I am about to finish my fifty-years-long work, what are the most arguable points that I see in it myself?

First, there is the absolute chronology. The dates of the cultures of the Eurasian steppes are based on the synchronization with the chronological scale of Europe and agree well with the chronology of China that has been established independently. But they differ from the calibrated dates of Central and South Asia.

Second, the insufficiency of data for the reconstruction of the paleogeography of certain regions of Eurasia in the III–I millennia BC.

Third, the problem of the comparison of archaeological materials with the information of the Indo-Iranian texts. The use of the *Rigveda* and other Indo-Aryan texts is now possible thanks to the studies of the material culture by W. Rau and T. Ya. Elizarenkova. But as for the *Avesta*, an extremely complicated monument that consists of elements from different times, comparable work has not been carried out by Iranian specialists. So the use of the *Avesta* without proper textual analysis is fraught with errors.

And to conclude, I should like to apologize to the readers for the repetitions however inevitable they may be in the book that I have been writing for many years and that was translated over the past five years. It would have never been published without the titanic efforts of its editor J. P. Mallory whose ideas became very fruitful for my research and found additional support in the materials shown in this book.

APPENDIX ONE

THE CHRONOLOGY OF THE ANDRONOVO CULTURE

Chronology is the eyes of history
Hesiod

The methods of determining chronology

There are three principal methods in use for determining the absolute chronology of the ancient cultures of the Old World: 1) historical, based on the Egyptian and Mesopotamian kings' lists, the Greek Olympiads and bamboo annals and inscriptions on oracle-bones and vessels in China; 2) dendrochronology; and 3) radiocarbon dating.

The relative chronology of the Eurasian steppes is determined with the help of stratigraphical data from settlements and cemeteries. Determining the absolute chronology of the steppe is hindered by the following: 1) the steppe population had neither writing nor its own chronological system; 2) the dendrochronological scale for Bronze Age sites has not been completed yet; 3) the old radiocarbon dates are scattered over too broad a range and, evidently, lack any critical precision. For instance, the age of the graves of the Sintashta cemetery of the same type covers the range between the years 2250 and 1390 BC (without calibration), although, according to Gavrilov's dendrochronological data, this cemetery functioned for no longer than 130 years. The dispersion of the stratigraphically later sites of the Alakul' type runs from the 21st to the 14th centuries BC, and the still later Amangel'dy type is placed between the 18th and 14th centuries BC; the Yeniseyan Fedorovo monuments of the same type span the 27th to 5th centuries BC, which is historically unacceptable (Kuz'mina 1994). That is why a sceptical attitude toward the radiocarbon dates, particularly the calibrated dates, has prevailed in Russian archaeology until recently, and the principal method of determining absolute chronology was that built on analogies with the more reliably dated cultures of western Europe, southern Asia and China.

The absolute chronology of the steppe cultures is based on the creation of chains of sites with overlapping (common) types. S. V. Kiselev (1960) synchronized the Eurasian steppe bronzes with China and, on this basis, shifted them back by two centuries. A. I. Terenozhkin (1965) undertook a synchron-ization with the European scale and established a long chronology for the sites of the Ukraine. The long dispute over a key complex—the Borodino hoard—ended in victory for the advocates of the long chronology (Bochkarev 1968; 1986: 78-111; Berezanskaya 1982: 26, 39-41; Chernykh and Kuz'minykh 1989: 256-263).

The discovery of cheek-pieces and articles with Mycenaean ornament made it possible to relate them directly with Mycenae (Leskov 1964; Smirnov and Kuz'mina 1977: 40-50; Kuz'mina 1980a). The subsequent investigations in the

Ukraine and the Volga Region (*Arkheolohiya Ukrainskoy SSR*: 355, 356, 457, 482, 498; Vasil'ev *et al.* 1985: 60-82) enabled one to create a quite reliable series of sites, synchronized on the basis of imports and overlapping (common) types, above all, of metal articles and cheek-pieces, with the western European scale developed by H. Müller-Karpe (1959; 1960; 1980) and A. von Brunn (1959; 1968). Thus, in the development of the Eurasian steppe cultures of the Bronze Age several successive stages have been identified, which are well synchronized with one another and rest on the chronology of Mycenae and other European cultures in the West, and Anyang China in the East.

The new radiocarbon dates of the steppe cultures

In Western archaeology, especially in Near Eastern archaeology, calibrated radiocarbon dating was established after the publication of the article by C. Renfrew "Wessex without Mycenae" in 1968 and his book in 1973.

But the calibrated dates were accepted neither in Germany nor in Russia because they differed greatly from the historical chronologies of Egypt and the ancient Near East; this created an even larger time gap (Chernykh 1997). However, in recent years in the laboratories of Europe and the United States new series of the C^{14} dates have been obtained, which requires a review of the issue (Kuz'mina 1998).

For vehicle burials from the Ukrainian Pit-grave and Catacomb cultures the Radiocarbon Laboratory at Queen's University Belfast gave a date range of 2264±25 to 2083±19 BC without calibration (Mallory and Telegin 1994: 30-31*)*. For the burial mounds of the Volga the laboratories of Arizona and Oxford have produced the following uncalibrated dates: for the Pit-grave culture—four dates between 4520±75 and 4370±75 BP; for the successive Poltavka culture—4320±80 and 4070±70 BP; for the subsequent Timber-grave culture—four dates between 3490±70 and 3400±70 years ago. And what is fundamentally important is that this newly determined chronology is confirmed by the stratigraphy of the burial mounds (Kuznetsov 1996).

For the Pokrovskiy type graves of Kruten' Kurgan in the Volga Basin there are two dates: 1680-1606 BC and 1848-1770 BC (Mikhaylova and Kuz'mina O. 1999).

For the Novy Kumak horizon cemeteries of Potapovka and Utëvka VI in the Volga Region the Oxford laboratory has provided six uncalibrated dates between 3710±70 and 3479±70 BP, and for the Urals, for the cemetery of Krivoe Osero, the Arizona laboratory has yielded four dates from 3740±50 to 3510±80 BP (the gap between the last two dates is quite astonishing, for they were determined on the basis of the skulls of two horses of the same team from the same complex). To determine the monuments' genuine age, the results are subjected to calibration, which gives for the Novy Kumak horizon, at 1σ, the age of 23rd–17th centuries BC, with 2σ, - 24th–20th centuries BC (Vinogradov 1995b; Anthony and Vinogradov 1995; Kuznetsov 1996; Trifonov 1996; Bochkarev 1998), although P. F. Kuznetsov (1998: 58*)* arbitrarily chooses the average values, assigning the Potapovka stage to the 19th–17th centuries BC, which is methodologically doubtful.

There exist ten radiocarbon dates for the Arkaim settlement (two of them are produced by the University of Arizona). "The main zone of reliable date ranges from the 18th to 17th centuries BC " (Zdanovich 1997: 60). Chariot fragments from the Satan grave of the Petrovka type date in the range 1557-1255 BC (Novozhenov 1994: 160).

Very ancient calibrated dates were obtained for the Alakul'-type cemetery in Siberia (Matveev 1998), the Elunino culture 1710±75 and 1610±30 BC, the Fedorovo type on the Altai—1750 ±25 and 1620±20 BC for the cemetery of Turina Gora; for the sites with applied-roller-decorated border pottery of the Final Bronze Age the dates are 1200-900 BC (Kiryushin 1991; 1993). A long radiocarbon chronology has been established for the cultures of eastern Siberia and the Far East (Orlova 1995).

Thus, a problem emerges regarding the correlation between the recently fixed dates and the dates obtained with the help of other methods as a result of the synchronization with the monuments of the neighboring regions, such as western Europe, southern Asia and China, with which the steppe tribes were in contact. Each of these regions has its own independent chronological system, and the Eurasian steppes provide a unique opportunity to compare and inter-check three chronological systems of the Old World.

The European line of synchronization

The synchronization of the sites of the Novy Kumak horizon is established with the Central European cultures of the Bronze A1, 2 periods according to Paul Reineke, and the cultures of the Danube Region of the Monteoru I C4-II A stages on the basis of: 1) bone buckles (Sava 1992; Litvinenko 1996; Matveev 1996); 2) the segmented faience, dating from the 17th–16th centuries BC (Bratchenko 1976), found in the burial grounds of Sintashta, Alabuga, Grafskie Razvaliny, Tanabergen (Fig. 64); 3) cheek-pieces with tenons which were distributed from the Urals and Kazakhstan to the Danube and Shaft grave IV in Mycenae (Leskov 1964; Oancea 1976; Smirnov and Kuz'mina 1977; Kuz'mina 1980; 1994; Goncharova 1996; Bochkarev 1998; Pryakhin and Besedin 1998; Penner 1998); 4) the Mycenaean ornaments (Smirnov and Kuz'mina 1977; Vasil'ev *et al*. 1994; Vasil'ev (ed.) 1995; Obydennov and Korepanov 1997; fig. 59; Penner 1998) and the Post-Mycenaean decoration of the later articles.

During the final stage of the Multi-Roller Ware culture, contacts with the Danube region increased and spread westward along the Danube (Sava 1992; Chernyakov 1996; Litvinenko 1996). Cultural links with Greece could have been maintained through the Danube region as well as by sea. The Kamenka settlement and port exhibiting lighthouses and population that included fishermen were discovered in the Crimea, which may be interpreted as evidence for coastal navigation (Kisly 1996). Sintashta's cultural influence spread over to the Danube and from there it reached Mycenae (Lichardus *et al*. 1996).

The traditional date of the Central European monuments of the Bronze A1, A2 period is now assigned to two centuries based upon a thoroughly elaborated dendrochronology scale (Krause, Becker and Kromer 1989; Kromer and Becker 1993; Randsborg 1992; Bochkarev 1992; Kuniholm 1993; Sherratt *et al*. 1991;

1994). However, the dates obtained by the dendrochronological method disagree with those determined by the radiocarbon method, remaining some two centuries later than the latter.

Decisive in determining the age of the Novy Kumak horizon is the similarity of Type I cheek-pieces and ornaments with those from Mycenae. Since the cheek-pieces represented in the steppes are the most archaic and quite diverse (which reflects the search for the most effective variants) and can be viewed as a prototype of the Mycenaean ones, it was assumed that the traditional date of the Mycenaean shaft graves —1570-1550 BC (Mylonas 1957: 181; Marinatos 1960: 177)—was indeed the *terminus post quem* of the steppe cheek-pieces and served only as the upper limit of the Novy Kumak horizon (Smirnov and Kuz'mina 1977; Kuz'mina 1980).

The Mycenaean chronology was based on: 1) the typological schemes elaborated by G. Karo and A. Furumark; 2) the synchronization with the monuments of Egypt and the Near East. In recent years there has been a tendency to revise G. Karo and A. Furumark's schemes (Killian-Dilmeir 1988) and also to assign the shaft graves to an earlier time. The date was shifted back by a century according to both the method of analogies which required a reinterpretation of Mycenae's relations with the monuments of Egypt and Western Asia, dated by the historical method (Kemp and Merrileese 1980; Warren and Hankey 1989; Dietz 1991; Coleman and Walz 1997) and also by the radiocarbon method on the basis of the date of the volcanic eruption of Santorini (Åström 1987; Betancourt 1987; Dickinson 1994; Manning 1995). If a date of the 17th century BC is accepted, this will allow, accordingly, to the lower the age of the Novy Kumak horizon, a lower date of the 18th–17th centuries as well (Kuz'mina 1994; 2000; Otroshchenko 1994). However, even in this case the new calibrated dates of the steppes complexes will remain older than those obtained by the method of the analogies with Mycenae and Central Europe.

The South-Asian line of synchronization

The steppe pastoral tribes in the south bordered on the farmers of Central Asia, Afghanistan and India, whose cultures belonged to the circle of the ancient Eastern civilizations. These two groups of population traditionally had contacts. Their most ancient evidence is the Zardcha-Halifa burial near Samarkand (Bobomulloev 1993; 1998; Fig. 65) where Sintashta type disc-shaped cheek-pieces and solid bronze bits were found along with the articles of the Bactria-Margiana types: pottery of the Namazga VI type – the Mollali stage gold ornaments, metal vessels, similar to those from Tepe-Hissar III, a mirror, a pin with a representation of a horse on its head, whose image, however, is comparable with the those of the steppes.

No less important is the discovery of Petrovka type ceramics at the metallurgists' settlement of Tugai near Samarkand together with vessels of Sarazm, the neighboring settlement of farmers. B. Lyonnet (1996: 60, 68, 120) assigns this complex to the Sarazm III period and dates it to the 3rd millennium BC, but N. A. Avanesova assigns it to Sarazm IV (Avanesova in Lyonnet 1996*)* and dates the complex, according to the traditional chronology of Petrovka, to

the 17th–16th centuries BC. A. Isakov (1991: 113, 115) dates Sarazm IV, according to calibrated dates, to the 23rd–19th centuries BC.

The relations with the Bactria-Margiana archaeological complex (BMAC) are demonstrated by the discovery of lapis lazuli beads in Sintashta (Kuz'mina 1997), a BMAC type vessel at the settlement of Ustye (Vinogradov 1995b), and a mirror with a BMAC type handle at the Krasnoye Znamya burial mound (Sungatov and Safin 1995 but it may derive from a Scythian grave).

The next stage of the relations is represented by the findings of imported BMAC pottery of the Namazga VI period at an Andronovo settlement of the Fedorovo type (Malyutina 1991); numerous mixed complexes of Tadjikistan and Uzbekistan combining the wheel-made ware of Namazga VI, the hand-made pottery of Fedorovo and Andronovo metal types (P'yankova 1994, 1998; Vinogradova 1994; Kuz'mina and Vinogradova 1996; Kuz'mina 1997).

The chronology of these complexes is debatable. Russian archaeologists base their dates on the traditional European scale and are as follows: Sintashta-Petrovka is assigned to the 17th–16th centuries BC, the Fedorovo complexes – to the 15th–14th centuries BC and even later.

The chronology of the Turkmenian sites was established by V. Masson (1959; 1964) on the basis of the stratigraphy of multi-layer settlements and the chronology of Hissar III and Andronovo. His chronology has been universally accepted.

V. I. Sarianidi (1977: 158) assigns the completion of the BMAC in Afghanistan to the middle of the 2nd millennium BC. He divides the evidence from Margiana (1990: 5) into the following periods: 1) Kelleli—the 19th to 18th centuries BC; 2) Gonur—the 17th to 15th centuries BC; and 3) Togolok—the 15th to 9th centuries BC. A. Askarov (1997: fig. 31) proposes for the north a Bactrian sequence: 1) Sapali stage—1700-1500 BC; 2) Dzharkutan—1500-1350 BC; 3) Mollali—1350-1000 BC; then the Dzharkutan period was dated to the third quarter of the 2nd millennium BC, Kazali to the 13th–12th centuries BC, and Mollali to the 11th–10th centuries BC (Askarov *et al.* 1983: 33, 39, 42, 44). L. B. Kircho and S. G. Popov (1998) insist on the traditional dates.

This traditional chronology is severely criticized by Western scholars, who insist upon assigning the sites according to the C^{14} dates, which are approximately 300-500 years earlier, and set the BMAC to 2300-1500 BC. G. Legabue (1989) and P. Kohl (1992: 158, 195) place the date of the BMAC to the 21st–18th centuries BC. Other European and American scholars also accept the calibrated dates: BMAC 2100-1700 BC (Hiebert 1993; 1994), 4000-1800 BC (Götzelt 1996); Sarazm IV—2300-1700 BC (Lyonett 1996: 16, 67), Shortughai stage A—2200-2000 BC (Francfort 1989: 241, 242). The long chronology is consistent with a series of radiocarbon dates from the Harappan culture in India (Possehl 1994). V. M. Masson (1999) and V. I. Sarianidi (2002) accept the new calibrated chronology.

The Zardcha-Halifa grave is assigned by S. Bobomuloev (1993: 63) to the early stage of Namazga VI, to the Dzharkutan stage of the Sapalli culture, and is dated by him, following A. Askarov, to 1700-1500 BC on the basis of the C^{14} date of 1650±60 BC (uncalibrated). Later he (1997: 132) compared the complex with Shah-Tepe IIa and Hissar III, accepting the calibrated date of the

Dzharkutan temple, i.e., 2034-1684 Cal BC, and assigned Zardcha-Halifa to 2100-1700 Cal BC.

Defining the age of the Tugai settlement, B. Lyonett (1996: 60, 68, 120) disagrees with N. A. Avanesova and accepts the early date for the ceramics of the Sarazm type as the 3rd millennium BC. A. I. Isakov (1991: 113, 115) assigns the fourth Sarazm layer to 2300-1900 BC according to calibrated dates.

Thus, our date for the Novy Kumak horizon coincides with the European and Central Asian chronology which in the traditional system assigns it to the 17th and 16th centuries BC, i.e., contemporary with Mycenae; in the new dendrochronologically adjusted Myceaean and European dating of Bronze Age A2—to the 18th–17th centuries BC. The acceptance of calibrated radiocarbon dates, however, would advance their age both in Europe and Central Asia to the 21st-18th centuries BC. The last date is supported by a new radiocarbon date of a cheek-piece from Monteoru (Zaharia 1990: 43).

The discovery of the Zardcha-Halifa grave and the Tugai settlement makes it possible to synchronize for the first time the farming sites of the BMAC and Sarazm IV of the Dzharkutan period with early Andronovo.

Of great importance for establishing the chronology of the Fedorovo type is the discovery of Andronovo pottery on the settlement of Shortughai in northern Afghanistan (Francfort 1989). Shortughai is an outpost of Harappan civilization. Stage A–periods I and II of Shortughai are assigned to the Harappan culture. From the upper Harappan layer comes one fragment of Fedorovo pottery. Stage B–period III belongs to the BMAC. Fedorovo type ceramics are assigned to this period. Period IV is represented by the Bishkent culture, which came from northern Bactria, and in whose burial complexes have been found steppe pottery of the final Bronze Age with applied-roller ornament and a socketed double-blade arrow. H.-P. Francfort dates stage A to 2200-2000 BC, synchronizing it with Harappa, Namazga V-VI, Mundigak IV, Shahr-i-Sokhta III-IV, Tepe Yahya IVB, Bamur V-VI, and Shahdad-Hissar IIIc. Presuming that the site remained inhabited uninterruptedly after the departure of the Harappan population, Francfort dates stage B to 2000-1700 BC. The 16 radiocarbon dates that have been obtained are not too convincing, for they overlap with each other: period I–2816-1680 BC; II–3340-2060 BC; III–2850-1640 BC; IV–2160-1680 BC. The chronology of stage I seems to me undisputable but the date of stage II has provoked some discussion (Kuz'mina 1992).

All these dates radically differ from the traditional chronology of the steppe sites but correlate well with the new calibrated dates of the Novy Kumak horizon.

The Chinese line of synchronization

The numerous common types of metalwork demonstrate the active cultural relations between Xinjiang and Fergana and Semirech'e in the 13th–9th centuries BC (Kuz'mina 1998). Also established are the contacts with China of the Shang-Yin epoch, which were realized through the north-western Chinese tribes. This is shown by the common types of knives with a zoomorphic handle, spears, socketed arrows, mirrors and the Fedorovo gold trumpet-shaped earrings.

Finally, and what is particularly important, is that horse-drawn chariots are likely to have spread to China under the influence of the Andronovo culture. The traditional date of the Chinese complexes—14th–13th centuries BC—correlates with the traditional Andronovo chronology of the sites of the late Fedorovo type in eastern Kazakhstan and Siberia and the Karasuk culture in the Minusinsk Basin. The system of synchronization of the earlier monuments is not sufficiently advanced, but the first traces of metal, cattle, sheep and horse are set in northwest China to the end of the 3rd–beginning of the 2nd millennium BC, when they had already been well-known in eastern Kazakhstan and southern Siberia.

Conclusion

The above analysis has shown that the date of the first stage of the Andronovo culture of the Novy Kumak horizon sites of Sintashta and the following Petrovka types, according to the traditional chronology which is based on the Mycenaean sequence, is the (18th) 17th–16th centuries BC. The date of the Alakul' type monuments in the west and the Fedorovo type monuments in the east, just as of the mixed types, is the 15th–13th centuries BC.

The date of the final Bronze Age sites – the Applied-Roller Ware culture – is established as the (13th)12th–9th centuries BC on the basis of a most comprehensive set of appropriate correlations with the types of metal articles, cheek-pieces and applied-roller ware from the Noua culture on the Danube and Troy VIIB in Asia Minor to Xinjiang in western China and Tepe Giyan in Iran. This chronology corresponds well with the radiocarbon dates (but without calibration), obtained for the late Fedorovo monuments of the Urals—1300-1070 BC; eastern Kazakhstan—1230-810 BC; the Ob—1220-1110 BC, the settlement of the Alekseevka type (Sargary—1230-750 BC) and the synchronous complexes of the adjacent steppe areas.

These dates, determined by the method of analogies and synchronization with the European complexes, conform with the traditional chronology of the Central Asian farming cultures and are also confirmed by the synchronization of the Andronovo complexes of the Fedorovo type both with Central Asia and China. The three independent lines of synchronization may be correlated with one another.

However, the traditional chronology stands in sharp opposition to the results of calibrated radiocarbon dates: the calibrated dates appear to be several centuries older than the traditional ones. But an important point here is that the new calibrated dates of the steppe sites coincide with the radiocarbon dates of the Southern Asian sites. Hence, there is a systematic divergence between the results of the two methods of determining chronology. A more precise definition of the actual age of the Eurasian steppe sites depends on: 1) advancing the radiocarbon method and adjusting its results to the historical chronology of Egypt and Mesopotamia; 2) combining and correlating the radiocarbon and dendrochronological scales in Europe and the Near East; 3) defining more precisely the chronology of Mycenae; and 4) elaborating the synchronization of the steppe cultures with China. At the present time it is methodologically correct to use

either the traditional method of synchronization or the radiocarbon one, taking into account the difference between these two systems.

APPENDIX TWO

RADIOCARBON DATES

Andronovo radiocarbon dates

bm. - burial mound; gr. - grave

Site	*Type*	*Date (BC)*	*Laboratory number*	*c - coal w - wood*
Sintashta I, bm. V, gr. 2	Sintashta	3440±60 (1490±60)	LE-1141	w
Sintashta, gr. 5	Sintashta	3360±70 (1390)	KI-862	w
Sintashta, gr. 7	Sintashta	3420±70 (1450)	KI-863	w
Sintashta, gr. 19	Sintashta	3560±180 (1510)	KI-864	w
Sintashta, gr. 28	Sintashta	3760±120 (1810)	KI-657	w
Sintashta, gr. 7	Sintashta	3870±215 (1920)	KI-652	w
Sintashta, gr. 22	Sintashta	4090±480 (2140)	KI-706	w
Sintashta, gr.39	Sintashta	4100±170 (2150)	KI-658	w
Sintashta, gr. 2	Sintashta	4160±105 (2210)	KI-650	w
Sintashta, gr. 11	Sintashta	4200±100 (2250)	KI-653	w
Sintashta, settlement	Sintashta	3410±90 (1460±90)		c
Tsarev Kurgan, bm., central gr.	Petrovka	3520±65 (1570±65)	RUL-276	w
Tsarev Kurgan, bm., central gr.	Petrovka	3720±120 (1770±120)		
Tsarev Kurgan, bm., central gr.	Petrovka	3570±60 (1620±60)	RUL-275	w
Raskatikha trench IV, plot E2, gr. 1	Petrovka	3910±60 (1960±60)	LE-127	c
Raskatikha trench I, plot M10-11, central gr.	Petrovka	3300±50 (1350±50)	LE-11195	c
Sintashta-Petrovka type	2 dates 5 dates	1960-1350 1770-1460		
Alakul', bm. 15, gr. 1	Alakul'	3360±50 (1410±50)	LE-924	w

Alakul', bm. 15, gr. 6	Alakul'	1430±80	LE-923	w
Subbotino, bm. 17, gr. 3	Alakul'	3460±50 (1460+50)	LE-1126	w
Subbotino, bm. 2, gr. 1	Alakul'	3900±70 (2050±70)	LE-1128	w
Subbotino, bm. 3, gr. 1	Alakul'	3910±70 (1960±70)	LE-1127	w
Subbotino, bm. 18, central gr.	Alakul'	3300±50 (1350±50)	LE-1196	w
Kamyshnoe II, gr. 6	Alakul'	3810±70 (1660±70)	LE-1198	w
Kamyshnoe II, gr. 1	Alakul'	3420±70 (1470±70)	LE-1199	w
Alakul' type	2 dates 5 dates	not correct 2050-1350		
Tasty-Butak, settlement, pit 14	Kozhumberdy	3550±65 (1550±65)	RUL-614	w
Tasty-Butak, settlement, pit 11	Kozhumberdy	3190±80 (1240±80)	LE-213	w
Tursumbay, bm. 6, gr. 1	Kozhumberdy	3190±90 (1340±90)	LE-660	w
Tursumbay, bm. 7, gr. 1	Kozhumberdy	3080±50 (1130±50)	LE-662	w
Kozhumberdy type		1550-1130		
Amangeldy, bm. 8, gr. 1	Amangeldy	3730±100 (1780±100)	LE-990	w
Amangeldy, bm. 6, gr. 1	Amangeldy	3050±60 (1400±60)	LE-988	w
Amangeldy, bm. 2, gr. 6	Amangeldy	3310±50 (1360±50)	LE-991	w
Amangeldy type	Amangeldy	1780-1360		
Baborykino II, settlement	mixed	3420±65 (1470±65)	RUL-275	w
Novonikol'skoe, settlement, trench IV, h=0,9 m	mixed	3160±120 (1200±120)	LE-989	c
Novo-Burino, cemetery	Fedorovo	3250±60 (1300±60)	LE-921	w
Novo-Burino, cemetery	Fedorovo	3020±50 (1070±50)	RUL-611	w
Novo-Burino, cemetery	Fedorovo	3190±70 (1240±70)	RUL-610	w
Bolshaya Karabolka, cemetery	Fedorovo	3150±55 (1210±55)	RUL-216	w
Tuktubaevo, bm. 26, gr. 2	Fedorovo	3060±65 (1110±65)	LE-940	w
Tuktubaevo, bm. 26, gr. 1	Fedorovo	3020±60 (1070±60)	LE-921	w
Fedorovo type (the Urals)		1300-1070		
Lebyazh'e, gr. 10	Fedorovo	3370±100 (1420±100)	LE-1315	w

Predgornoe, bm. 2	Fedorovo	2760±60 (810±60)	RUL-632	w
Predgornoe, bm. 2, gr. 1	Fedorovo	3030±50 (1080±50)	RUL-630	w
Predgornoe, bm. I, centre	Fedorovo	2970±60 (1020±60)	RUL-633	w
Predgornoe, bm. 3	Fedorovo	3180±70 (1230±70)	RUL-634	w
Late Fedorovo (East Kazakhstan)		1230-810		
Elovka II, gr. 112	Fedorovo	3150±55 (1200±55)	LE-939	w
Elovka II, gr. 64	Fedorovo	3060±±65 (1110±65)	LE-940	w
Elovka II, gr. 47	Fedorovo	3160±65 (1210±65)	LE-941	w
Late Fedorovo (Ob)		1210-1110		
Lanin Log, bm. 1, gr. 1	Fedorovo	3390±70 (1440±70)	RUL-630	w
Lanin Log, bm. 1, gr. 3	Fedorovo	3660±65 (1710±65)	RUL-617	w
Lanin Log, bm. 2, gr. 1	Fedorovo	3970±70 (2020±70)	RUL-619	w
Kamenka II, fence 24, gr. 1	Fedorovo	3910±75 (1960±75)	RUL-604	w
Kamenka II, fence 25, gr. 2	Fedorovo	2549±65 (590±65)	RUL-595	w
Yarki II, gr. 1	Fedorovo	2370±95 (420±95)	RUL-518	w
Yarki II, gr. 2	Fedorovo	2970±70 (1020±70)	RUL-529	w
Uzhur, bm. 2	Fedorovo	4600±250 (2650±250)	RUL-587	w
Pristan' I, fence 6, gr. 2	Fedorovo	3750±60 (1800±60)	RUL-602	w
Fedorovo type (Yenisey)		2650-420		
Sargary, settlement, dwelling 5	Final Bronze Age	2700±60 (750±60)	LE-1183	w
Sargary, settlement, dwelling 7	Final Bronze Age	3180±40 (1230±40)	LE-1184	w
Final Bronze Age		1230-750		

Radiocarbon dates of Chistolebyazh'e, Khripunovo and Ermak-4 cemetery and Cheremukhovy Kust settlement (Matveev 1998, pl. 15, p. 367, 371)

Bm., grave	*Laboratory number*	*^{14}C date (BC)*	*Cal. date*
Chistolebyazh'e, burial mounds of group 1			
bm. 10, gr. 1	UPI-570	3380±60 (1430±60)	3693-3555
	UPI-571	3490±50 (1540±50)	3832-3689
	SOAN-3236	4090±75 (2140±75)	4845-4370
	SOAN-3237	3870±40 (1920±40)	4416-4239
Chistolebyazh'e, burial mounds of group 2			
bm. 9, gr. 1	UPI-562	2623±35 (673±35)	2776-2742
	UPI-567	3766±43 (1816±43)	4236-4199
	SOAN-3238	3960±40 (2010±40)	4443-4417
	SOAN-3239	3755±85 (1805±85)	4181-4087
bm. 13, gr. 3	UPI-563	3889±39 (1939±39)	4418-4258
	SOAN-3240	3880±45 (1930±45)	4418-4258
	SOAN-3241	4085±40 (2135±40)	4780-4365
bm. 13, gr. 4	UPI-565	3884±39 (1934±39)	4418-4258
	SOAN-3242	3925±270 (1975±270)	4450-4090
Khripunovo cemetery			
bm. 1, gr. 13	SOAN-3243	3805±25 (1855±25)	4258-4152
	SOAN-3244	3730±30 (1780±30)	4148-4104
bm. 1, gr. 21	SOAN-3247	3935±45 (1985±45)	4368-4356
bm. 1, gr. 26	SOAN-3245	3720±30 (1770±30)	4148-4104
bm. 1, gr. 25	SOAN-3246	3725±35 (1775±35)	4148-4104
Ermak-4, cemetery			
	SOAN-2433	1330±30	
	SOAN-2434	1360±30	
	SOAN-2435	1275±25	
Cheremukhovy Kust settlement			
	UPI-568	2300±160	
	UPI-569	1655±53	
	UPI-560	1496±95	
	UPI-564	1330±30	

Radiocarbon dates of Potapovka and Sintashta types (Trifonov 1996a, pl. 1)

Lab number	*site*	*^{14}C date, BP*		*1σ*	*2σ*
AA-9874A	Krivoe Ozero	3580±50	skull of horse1	1973-1789	2036-1752
AA-9874B	Krivoe Ozero	3740±50	skull of horse1	2197-2038	2286-1975
AA-9875A	Krivoe Ozero	3700±60	skull of horse2	2179-1976	2278-1905
AA-9875B	Krivoe Ozero	3525±50	skull of horse2	1906-1749	1972-1690
OxA-4262	Utëvka VI, bm. 6, gr. 4	3510±80	bone	1925-1721	2041-1620
OxA-4263	Utëvka VI, bm. 6, gr. 6	3470±80	bone	1876-1678	1981-1551
OxA-4264	Utëvka VI, bm. 6, gr. 6	3585±80	bone	2032-1800	2142-1709
OxA-4265	Potapovo I, bm. 5, gr. 13	3710±80	bone	2220-1981	2360-1881
OxA-4266	Potapovo I, bm. 5, gr. 3	3510±80	bone	1925-1721	2041-1620

Radiocarbon dates from the neighboring regions (Possehl 1994)

site	*Lab. no.*	*^{14}C date (BC)*	*calibrated date*	*type*
Namazga Depe	LE-665	3030±60 (1170±60)	1Σ cal BC 1387 2Σ cal BC 1416	Namazga VI
Sapalli Depe	LE-916	3640±90 (1800±95)	1Σ cal BC 2135 2Σ cal BC 2277	Namazga V-VI
	LE-1078	3450±50 (1605±50)	1Σ cal BC 1869 2Σ cal BC 1885	Namazga V-VI
Shortughai	MC-1730	3640±95 (1800±100)	1Σ cal BC 2136 2Σ cal BC 2281	Bishkent
	NY-421	3535±165 (1690±70)	1Σ cal BC 2120 2Σ cal BC 2322	Bishkent
Tigrovaya Balka	LE-717	3350±60 (1500±60)	1Σ cal BC 1731 2Σ cal BC 1749	Vakhsh
Togolok 21	Beta 33564	3460±100 (1615±105)	1Σ cal BC 1888 2Σ cal BC 2027	Namazga VI
Ulug Depe	LE-1098	(3910±50) (2075±50)	1Σ cal BC 2464 2Σ cal BC 2554	Namazga V
	LE-1096	3500±50 (1655±50)	1Σ cal BC 1885 2Σ cal BC 1938	Namazga V
	LE-980	3280±95 (1430±100)	1Σ cal BC 1676 2Σ cal BC 1749	Namazga VI (early)
Kuchuk Depe	LE-773	2850±50 (985±50)	1Σ cal BC 1046 2Σ cal BC 1154	EIA (Yaz I)
Dalverzin Depe (lower)	LE-323	3050±120 (1190±125)	1Σ cal BC 1424 2Σ cal BC 1525	EIA (Yaz I)
Pirak	LY-1643	2970±140 (1110±145)	1Σ cal BC 1396 2Σ cal BC 1516	Period III
	LY-1642	3150±150 (1295±155)	1Σ cal BC 1527 2Σ cal BC 1743	Period II
	TF-1201	2650±150 (780±155)	1Σ cal BC 922 2Σ cal BC 1153	Period II

Radiocarbon dates of settlement Kangurttut (Vinogradova 2004, p. 106, app. 15)

Laboratory number		*^{14}C date BP*	*calibrated date*
Gif-8414	coal	3150±60	2σ BC 1594-1291
			1976-1756
			1729-1098

Radiocarbon dates of Uzbekistan and Afghanistan
(RZhVSAI 1984: 4; Görsdorf, Huff 201: 85)

site	*^{14}C date BC*	*calibrated date, BC*
Kuchuk	900±70	1210-1010
Dzharkutan, temple	1600-1450	
Tillya	860±60	1140-940

Radiocarbon dates of Chust culture (Zadneprovsky 1997: 71-78, pl. VI)

CHUST
LE 1208-860 BC
1 900..... 866
862.....818
2 982.....964
LE 2199-1430 BC
1 1506-1482
1454.....1402
2 1516-1388
1340.....1322
LE 2200-920 BC
1 996.....902
2 1020.....836
LE 2201-1500 BC
1 2316.....2194
2158.....2148
2 2450.....2432
2402.....2372
2358.....2136
2064.....2062

OSH
LE 1485-1940 BC
1 1962.....1960
1950.....1876
1838.....1818
1798.....1784
2 2026.....2002
1982.....1864
1848.....1768
LE 1654-750 BC
1 828-796
2 898.....872
854.....780
LE 1655-1240 BC
1 1380.....1346
1318.....1254
1242....1210
2 1394.....1334
1330.....1162
1146.....1128

DALVERZIN
RUL 127-920 BC
1 1115.....1090
1070.....820
2 1370.....1350
1310.....770
RUL 323-1400 BC
1 1530.....1250
1240.....1210
2 1680.....1110
1100.....105

After G. Possehl (1994)

site	Lab no	5568BP	5730 BC	calib-3	Culture
Hissar	Tips-20	3483±63	1635±65	1σ 1883	Hissar III (late layer)
				2σ 1945	

After Kircho and Popov (1999, p. 356-361)

Lab no.	Period	^{14}C age (BP)	calibr. date by Groningen 1.20 (1995); 1σ cal. BC	calibr. date after: Kohl 1984; 1992; CRD 1σ BC	calibr. date after: Hiebert 1994; CRD 2σ BC
Ulug-depe					
LE-980	Namazga VI, 2 mill. BC	3280±95	1672...-1656 1634...-1440		1749-1324
Namazga-depe					
LE-665	Namazga VI late	2980±60	1306-1284, 1268-115, 1090-1076		
R 1297	Namazga VI	2870±50		1125-1015	1199-905
R 1298	Namazga VI	3220±40		1665-1415	1498-1269
R 1299	Namazga VI	3240±50		1675-1430	1621-1408
R 1300	Namazga VI	3050±50		1410-1245	1416-1128
R 1300a	Namazga VI	2880±60		1130-1020	1257-901
R 1301	Namazga VI	2960±50		1345-1100	1372-1003
R 1302	Namazga VI	3220±9		1680-1395	1684-1267
R 1303	Namazga VI	2680±50		905-780	1010-546-
R 1304	Namazga VI	3350±50		2005-1770	2021-1742
Tekkem-depe					
LE-1095	Namazga VI, 2 mill. BC	2460±60	760-678, 658-634, 552-468, 462-412		
LE-1603	Namazga VI	4310±40	3012-3004, 2924-2882		
LE-1604	Namazga VI	4950±50	3784-3692, 3672-3666		
LE-1605	Namazga VI	4520±60	3342-3292, 3284-3266, 3240-3104		
LE-1638	Namazga VI	3620±50	2030-1994, 1988-1892		
LE-1639	Namazga VI	3640±50	2116-2088, 2038-1928		
LE-1640	Namazga VI	4330±50	3028-2980, 2930-2884		
LE-1641	Namazga VI	2450±40	756-688, 538-412		
LE-1642	Namazga VI	4630±50	3502-3420, 3380-3346		
LE-1643	Namazga VI	4280±50	2922-2872, 2802-2778, 2714-2708		
LE-1854	Namazga VI	5030±60	3944-3846, 3820-3768, 3726-3724		

LE-1856	Namazga VI	3110±40	1418-1372, 1354-1314		
LE-1857	Namazga VI	5540±60	4454-4416, 4402-4342		
LE-1858	Namazga VI	3660±40	2124-2084, 2042-1968		
LE-1860	Namazga VI	4280±50	2922-2872, 2802-2778, 2714-2708		
LE-1861	Namazga VI	4130±50	2866-2810, 2760-2724, 2700-2612		
LE-2355	Namazga VI	4310±60	3030-2972, 2932-2876, 2796-2784		
Gonur 1 (north)					
LE-1207	Namazga VI, 2 mill. BC	3560±70	1974-1864, 1848-1770		2009-1744
LE-2407	Namazga V late	2180±40	356-288, 250-226, 210-166		
LE-2408	Namazga V late	3510±40	1880-1862, 1850-1762		
LE-2409	Namazga V late	4290±40	2918-2880		
LE-2411	Namazga V late	4200±40	2880-2864, 2812-2744, 2728-2696		
Beta-35125	Namazga V	3630±90			2138-1888
Beta-33560	Namazga V	3580±60	2032-1883		2032-1883
Beta-33561	Namazga V	3520±60	2030-1694		2030-1694
Hel-2964	Namazga V	3750±80	2278-1979		
Gonur 1 (south)					
Beta-33562	Namazga V	3700±60		2290-1930	2290-1930
Hel-2963		3540±		2009-1694	
Hel-2965		3550±80		2009-1740	
Hel-2966		3410±80		1855-1534	
Hel-2967		3380±110		1770-1509	
Hel-2968		3600±80		2031-1776	
Hel-2969		3480±90		1916-1639	
Hel-2970		3380±		1766-1524	
Togolok 21					
LE-2678	Namazga VI	3270±40	1608-1556, 1534-1506, 1482-1456		

LE-2679	Namazga VI	4620±40	3500-3456, 3434-3432, 3378-3342		
LE-2681	Namazga VI	4610±50	3502-3450, 3444-3424, 3380-3334, 3220-3200, 3154-3136		
LE-2682	Namazga VI	5060±40	3942-3896, 3888-3848, 3820-3796		
LE-2683	Namazga VI	3540±40	1914-1904, 1902-1870, 1844-1776		
LE-2684	Namazga VI	4270±40	2914-2876, 2796-2784		
LE-2685	Namazga VI	3540±40	1914-1904, 1902-1870, 1844-1776		
Beta-33564	Namazga VI	3470±	1920-1680		1920-1680
Sapalli-depe					
LE-916	Namazga V late	3640±90		2190-1880	
LE-1078	Namazga V late	3450±50		1895-1690	
?		1560 BC			
Bustan VI (cemetery)					
LE-4994	2 mill. BC	3580±70	2024-2004, 1980-1872, 1842-1776		
LE-4995	2 mill. BC	3620±40	2028-2000, 1984-1912, 1906-1900		
LE-4991	2 mill. BC	3540±70	1936-1858, 1854-1752		
Dzharkutan					
?		1650 BC			
Beta-33557	2 mill. BC	3540±70		2125-1695	2042-1734
Dashly 3					
LE-978	2 mill. BC	3440±50		1890-1685	1882-1617
LE-1175	2 mill. BC	3066±70		1425-1255	
LE-1252	2 mill. BC	3670±50		2185-1950	2191-1889
LE-1254	2 mill. BC	4230±70		2970-2795	
LE-1253	2 mill. BC	4060±70		2685-2540	
LE-1251	2 mill. BC	3250±40		1680-1435	

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Abbreviations

AAH — *Acta Archaeologica Hungarica*. Budapest.
AEB — *Arkheologiya i ètnografiya Bashkirii*. Ufa.
AIDSK — *Arkheologicheskie issledovaniya drevnego i srednevekovogo Kazakhstana*. Alma-Ata, 1980.
AIK — *Arkheologicheskie issledovaniya v Kazakhstane*. Alma-Ata, 1973.
AJA — *American Journal of Archaeology*. Princeton.
AMI — *Archaeologische Mitteilungen aus Iran*. Berlin.
AMIR — *Arkheologiya i metody istoricheskikh rekonstruktsiy*. Leningrad, 1985.
AMIT — *Archäologische Mitteilungen aus Iran und Turan*. Berlin.
ANASA — *Aryan and Non-Aryan in South Asia: Evidence, Interpretation, and Ideology*. J. Bronkhorst, M. Deshpande (eds.), Cambridge (Mass.), 1999.
AO — *Arkheologicheskie otkrytiya*. Moscow.
AP — *Arkheologichni pam'yatki URSR*. Kiev.
ART — *Arkheologicheskie raboty v Tadzhikistane*. Dushanbe.
ASGE — *Arkheologicheskiy sbornik Gosudarstvennogo Èrmitazha*. Leningrad.
AUS — *Arkheologiya Ukrainskoy SSR*. T. I. Kiev, 1985.
AVEL — *Arkheologiya vostochno-evropeyskoy lesostepi*. Voronezh, 1980.
BAEIAP — *The Bronze Age and Early Iron Age Peoples of Eastern Central Asia*, Victor H. Mair (ed.). Washington D.C., 1998.
BAOC — *Bactria: An Ancient Oasis Civilization from the Sands of Afghanistan*, Giancarlo Ligabue, Sandro Salvatori (eds.). Venezia, 1988.
BIA — *Bulletin of the Institute of Archaeology*. London.
BMFEA — *Bulletin of the Museum of Far Eastern Antiquities*. Stockholm.
BMOIP — *Byulleten' Moskovskogo obshchestva ispytateley prirody*. Moscow.
BSA — *British School at Athens*. London.
BSLP — *Bulletin de la Société de linguistique de Paris*.
BSOAS — *Bulletin of the School of Oriental and African Studies*. London.
BVSP — *Bronzovy vek stepnoy polosy Uralo-Irtyshskogo mezhdurech'ya*. Chelyabinsk, 1983.
BVUIM — *Bronzovy vek Uralo-Irtyshskogo mezhdurech'ya*. Chelyabinsk, 1984.
CISPP — *Congrès international des sciences préhistoriques et protohistoriques*.
CSCE — *Regional Specifics in Light of Global Models BC – Complex Societies of Central Eurasia from the 3rd to the 1st Millennium*. K. Jones-Bley, D. G. Zdanovich (eds.). Washington D.C.
DIuP — *Die Indogermanen und das Pferd*. Hänsel B., Zimmer S. (eds.). Budapest, 1994.
DKPP — *Drevnie kul'tury Povolzh'ya i Priural'ya*. Kuybyshev, 1978.
DSA — *Dostizheniya sovetskoy arkheologii v XI pyatiletke*. Tezisy. Baku, 1985.
DSKP — *Drevnie i srednevekovye kul'tury Povolzh'ya*. Kuybyshev, 1981.
EAF — *Ethnographisch-archäologische Forschung*. Berlin.
EAZ — *Ethnographisch-archäologische Zeitschrift*. Berlin.
EBVU — *Èneolit i bronzovy vek Ukrainy*. Kiev, 1976.
EBVUIM — *Èneolit i bronzovy vek Uralo-Irtyshskogo mezhdurech'ya*. Chelyabinsk, 1985.
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EDRO *Ètnos v doklassovom i ranneklassovom obshchestve*. Moscow, 1982.
EJVS *Electronic Journal of Vedic Studies*
ENB *Ètnogenez narodov Balkan i Severnogo Prichernomor'ya*. Moscow, 1984.
EPITsAD *Ètnicheskie problemy istorii Tsentral'noy Azii v drevnosti*. Moscow, 1981.
ESA *Eurasia Septentrionalis Antiqua*. Helsinki.
EW *East and West*. Roma.
GE *Gosudarstvenny Èrmitazh*.
GIM *Gosudarstvenny istoricheskiy muzey*.
IAASA *The Indo-Aryans of Ancient South Asia: Language, Material Culture and Ethnicity*. G. Erdosy (ed.). Berlin, NY, 1995.
IAI *Iskusstvo i arkheologiya Irana*. Moscow, 1971.
IAK *Izvestiya arkheologicheskoy komissii*. St Petersburg-Petrograd.
IAN KazSSR *Izvestiya Akademii nauk Kazakhskoy SSR*. Alma-Ata.
IAN KirgSSR *Izvestiya Akademii nauk Kirgizskoy SSR*. Frunze.
IAN KirgSSR SON *Izvestiya Akademii nauk Kirgizskoy SSR. Seriya obshchestvennykh nauk*. Frunze.
IAN SSSR *Izvestiya Akademii nauk SSSR*. Moscow.
IAN TurkSSR SON *Izvestiya Akademii nauk Turkmenskoy SSR. Seriya obshchestvennykh nauk*. Ashkhabad.
IDV *Istoriya Drevnego Vostoka. Ot rannikh gosudarstvennykh obrazovaniy do drevnikh imperiy*. Moscow, 2004.
IGAIMK *Izvestiya Gosudarstvennoy akademii istorii material'noy kul'tury*. Leningrad.
IIGK *Istoriya Iranskogo gosudarstva i kul'tury*. Moscow, 1971.
IIJ *Indo-Iranian Journal*. The Hague.
IIMK *Institut istorii material'noy kul'tury AN SSSR*. Moscow-Leningrad.
IIS *Iz istorii Sibiri*. Tomsk.
IISPP *Iz istorii Srednego Povolzh'ya i Priural'ya*. Kuybyshev.
IK SSR *Istoriya Kazakhskoy SSR*. T. I. Alma-Ata, 1977.
IMKU *Istoriya material'noy kul'tury Uzbekistana*. Tashkent.
IRAO *Izvestiya Rossiyskogo Arkheologicheskogo Obshchestva*. St Petersburg.
ITN (1963) *Istoriya tadzhikskogo naroda*. Moscow, 1963.
ITN (1998) *Istoriya tadzhikskogo naroda*. Litvinskiy B. A., Ranov V. A. (eds.). Dushanbe, 1998.
Izv. OON AN TadzhSSR *Izvestiya Otdeleniya obshchestvennykh nauk Akademii nauk Tadzhikskoy SSR*. Stalinabad, Dushanbe.
Izv. SOAN SON *Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR*. Seriya obshchestvennykh nauk. Novosibirsk.
Izv. SOAN SIFF *Izvestiya Sibirskogo otdeleniya Akademii nauk SSSR*. Seriya istorii, filologii i filosofii. Novosibirsk.
Izv. UzFAN SSSR *Izvestiya Uzbekskogo filiala Akademii nauk SSSR*. Tashkent.
JA *Journal asiatique*. Paris.
JAOS *Journal of the American Oriental Society*. New Haven.
JIES *Journal of Indo-European Studies*. Washington, D. C.
JNES *Journal of Near Eastern Studies*. Chicago.
JRAS *Journal of Royal Asiatic Society*. London.
Kaz. FAN SSSR *Kazakhstanskiy filial Akademii nauk SSSR*.
KDSP *Kurgannye drevnosti stepnogo Podneprov'ya*. Dnepropetrovsk.
KSIA *Kratkie soobshcheniya Instituta arkheologii*. Kiev.
KSIA *Kratkie soobshcheniya Instituta arkheologii*. Moscow.
KSIE *Kratkie soobshcheniya Instituta ètnografii*. Moscow.
KSIIMK *Kratkie soobshcheniya Instituta istorii material'noy kul'tury*. Moscow.
MAIKTsA *Mezhdunarodnaya Assotsiatsiya po izucheniyu kul'tur Tsentral'noy Azii. Informatsionny byulleten' UNESCO*. Moscow.
MAK *Materialy po arkheologii Kavkaza*. St Petersburg.
MAR *Materialy po arkheologii Rossii*. St Petersburg.
MASP *Materialy po arkheologii Severnogo Prichernomor'ya*.
MDAFA *Mémoires de la délégation archéologique française en Afghanistan*. Paris.
ME *Materialy po ètnografii*. Petrograd.

MIA *Materialy i issledovaniya po arkheologii SSSR*. Moscow - Leningrad.
MKAEN *Mezhdunarodny Kongress antropologicheskikh i ètnograficheskikh nauk.* Moscow.
MKhE *Materialy Khorezmskoy èkspeditsii*. Moscow.
MNMKP *Materialy nauchno-metodicheskoy konferentsii prepodavateley Kustanayskogo pedagogicheskogo instituta.* Kustanay.
NAA *Narody Azii i Afriki*. Moscow.
NBPP *Neolit i bronzovy vek Povolzh'ya i Priural'ya.* Kuybyshev, 1977.
NTTGU *Nauchnye trudy Tashkentskogo gosudarstvennogo universiteta*. Tashkent.
OAK *Otchety arkheologicheskoy komissii*. Sankt Petersburg.
OEG *Osobennosti estestvenno-geograficheskoy sredy i istoricheskie protsessy Zapadnoy Sibiri.* Tomsk, 1979.
OIKP *Ocherki istorii i kul'tury Povolzh'ya.* Kuybyshev, 1976.
ONU *Obshchestvennye nauki v Uzbekistane.* Tashkent.
PAPP *Problemy arkheologii Povolzh'ya i Priural'ya.* Kuybyshev, 1976.
PAS *Proiskhozhdenie aborigenov Sibiri i ikh yazykov*. Tomsk, 1969.
PAUKS *Problemy arkheologii Uralo-Kazakhstanskikh stepey.* Chelyabinsk, 1988.
PAUS *Problemy arkheologii Urala i Sibiri*. Moscow, 1973.
PDIE *Pamyatniki drevney istorii Evrazii*. Moscow, 1975.
PDKK *Po sledam drevnikh kul'tur Kazakhstana*. Alma-Ata, 1970.
PIDO *Problemy istorii dokapitalisticheskikh obshchestv*. Leningrad.
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PKhKP *Problemy khronologii i kul'turnoy prinadlezhnosti arkheologicheskikh pamyatnikov Zapadnoy Sibiri*. Tomsk, 1970.
PPS *Proceedings of the Prehistoric Society*. London.
PRK *Poiski i raskopki v Kazakhstane.* Alma-Ata, 1972.
PSAH *Prehistoric Steppe Adaptation and the Horse.* M. Levine, C. Renfrew, and K. Boyle (eds.). Exeter, 2003.
PYuVE *Problemy èpokhi bronzy yuga Vostochnoy Evropy.* Donetsk, 1979.
RA *Rossiyskaya arkheologiya*. Moscow.
RiV *Rossiya i Vostok: problemy vzaimodeystviya*. Chelyabinsk, 1995.
RZhVSAI *Ranny zhelezny vek Sredney Azii i Indii.* Ashkhabad, 1984.
SA *Sovetskaya arkheologiya*. Moscow.
SAA *South Asian Archaeology.*
SAGU *Sredneaziatskiy gosudarstvenny universitet*. Tashkent.
SAI *Svod arkheologicheskikh istochnikov*. Moscow.
SAS *Srednyaya Aziya i ee sosedi v drevnosti i srednevekov'e*. Moscow, 1981.
SE *Sovetskaya ètnografiya*. Moscow.
SGAIMK *Soobshcheniya Gosudarstvennoy akademii istorii material'noy kul'tury*. Leningrad.
SGE *Soobshcheniya Gosudarstvennogo Èrmitazha*. Leningrad.
SKIO *Srubnaya kul'turno-istoricheskaya obshchnost'*. Kuybyshev, 1985.
SMAE *Sbornik Muzeya antropologii i ètnografii*. Moscow - Leningrad.
SS *Sovetskoe slavyanovedenie*. Moscow.
SSKIE *Skifo-sibirskoe kul'turno-istoricheskoe edinstvo*. Kemerovo, 1980.
SV *Sovetskoe vostokovedenie*. Moscow.
SVAE *Srednevolzhskaya arkheologicheskaya èkspeditsiya*. Kuybyshev, 1977.
TAS *Trudy arkheologicheskikh s''ezdov.*
TGIM *Trudy Gosudarstvennogo istoricheskogo muzeya*. Moscow.
TIAE *Trudy instituta antropologii i ètnografii*. Leningrad.
TIE *Trudy Instituta ètnografii*. Moscow.
TII AN TadzhSSR *Trudy Instituta istorii, arkheologii i ètnografii Akademii nauk Tadzhikskoy SSR.* Dushanbe.

TIIA AN UzSSR *Trudy Instituta istorii i arkheologii Akademii nauk Uzbekskoy SSR.* Tashkent.
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TIIAE AN TurkSSR *Trudy Instituta istorii, arkheologii i ètnografii Akademii nauk Turkmenskoy SSR.* Ashkhabad.
TIIYaL KirgSSR *Trudy Instituta istorii, yazyka i literatury Akademii nauk Kirgizskoy SSR.* Frunze.
TIIYaL Kirg. FAN SSSR *Trudy Instituta istorii, yazyka i literatury Kirgizskogo filiala Akademii nauk SSSR.* Frunze.
TKhE *Trudy Khorezmskoy èkspeditsii.* Moscow.
TMAE *Trudy Mariyskoy arkheologicheskoy èkspeditsii.* Yoshkar-Ola.
TMOIP *Trudy Moskovskogo obshchestva ispytateley prirody.* Moscow.
TOIPK *Trudy Otdela istorii pervobytnoy kul'tury Gosudarstvennogo Èrmitazha.* Leningrad.
TOSA *Teoreticheskie osnovy sovetskoy arkheologii.* Leningrad, 1969.
TSA RANION *Trudy sektsii arkheologii Rossiyskoy Assotsiatsii nauchno-issledovatel'skikh institutov obshchestvennykh nauk.* Leningrad.
TSGU *Trudy Samarkandskogo Gosudarstvennogo universiteta.* Samarkand.
TTSZh *Tipy traditsionnogo sel'skogo zhilishcha narodov Yugo-Zapadnoy i Yuzhnoy Azii.* Moscow, 1981.
TYuTAKE *Trudy Yuzhno-Turkmenistanskoy arkheologicheskoy kompleksnoy èkspeditsii.* Ashkhabad.
TZS *Trudy po znakovym sistemam.* Tartu.
UIZh *Ukrains'kii istoricheskii zhurnal.* Kiev.
UAS *Ural'skoe arkheologicheskoe soveshchanie.*
USA *Uspekhi sredneaziatskoy arkheologii.* Leningrad.
UZ PermGU *Uchenye zapiski Permskogo Gosudarstvennogo universiteta.* Perm'.
UZ SGU *Uchenye zapiski Saratovskogo gosudarstvennogo universiteta.* Saratov.
UZ TashGU *Uchenye zapiski Tashkentskogo gosudarstvennogo universiteta.* Tashkent.
UZ TGU *Uchenye zapiski Tomskogo gosudarstvennogo universiteta.* Tomsk.
UZAAGPI *Uchenye zapiski Almaatinskogo gosudarstvennogo pedagogicheskogo instituta.* Alma-Ata.
VAE *Voprosy arkheologii i ètnografii Tsentral'nogo Kazakhstana.* Karaganda, 1982.
VAN KazSSR *Vestnik Akademii nauk Kazakhskoy SSR.* Alma-Ata.
VAU *Voprosy arkheologii Urala.* Sverdlovsk.
VDI *Vestnik drevney istorii.* Moscow.
VEEKB *Vostochnaya Evropa v èpokhu kamnya i bronzy.* Moscow, 1976.
VF *Voprosy filosofii.* Moscow.
VI *Voprosy istorii.* Moscow.
VIMK *Vestnik istorii mirovoy kul'tury.* Moscow.
VISIDV *Voprosy istorii Sibiri i Dal'nego Vostoka.* Novosibirsk, 1961.
VKKDTs *Vzaimodeystvie kochevykh kul'tur i drevnikh tsivilizatsiy.* Alma-Ata, 1989 (Materials of a symposium. Abstracts were published in Alma-Ata in 1987).
VPAP *Voprosy periodizatsii arkheologicheskikh pamyatnikov Tsentral'nogo i Severnogo Kazakhstana.* Karaganda, 1987.
VYa *Voprosy yazykoznaniya.* Moscow.
WWC *When Worlds Collide: the Indo-Europeans and the Pre-Indo-Europeans*, T. L. Markey and J. A. C. Greppin (eds.). Ann Arbor.
ZDMG *Zeitschrift der Deutschen Morgenländischen Gesellschaft.* Leipzig, Wiesbaden.
ZRAO *Zapiski Rossiyskogo arkheologicheskogo obshchestva.* St Petersburg.
ZUOLE *Zapiski Ural'skogo obshchestva lyubiteley estestvoznaniya.* Chelyabinsk.

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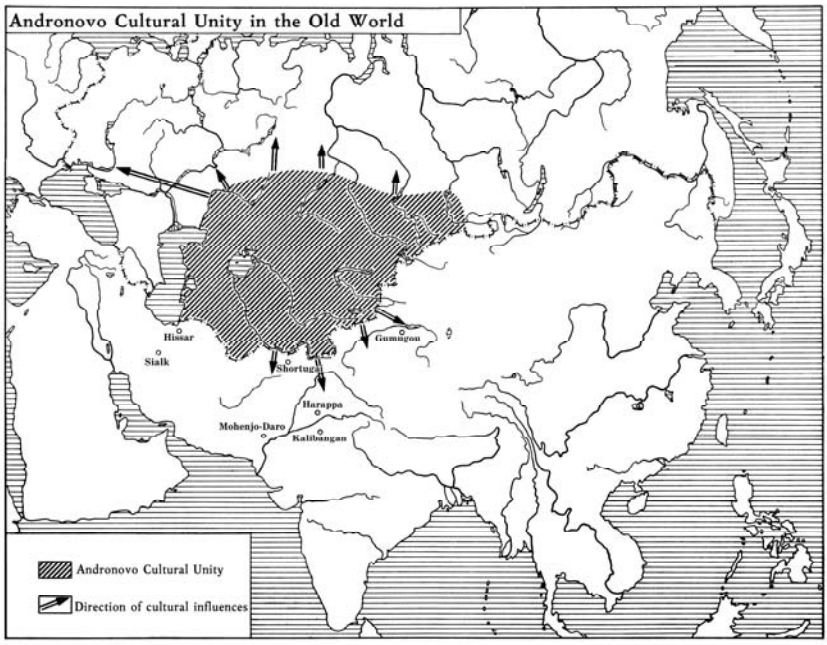
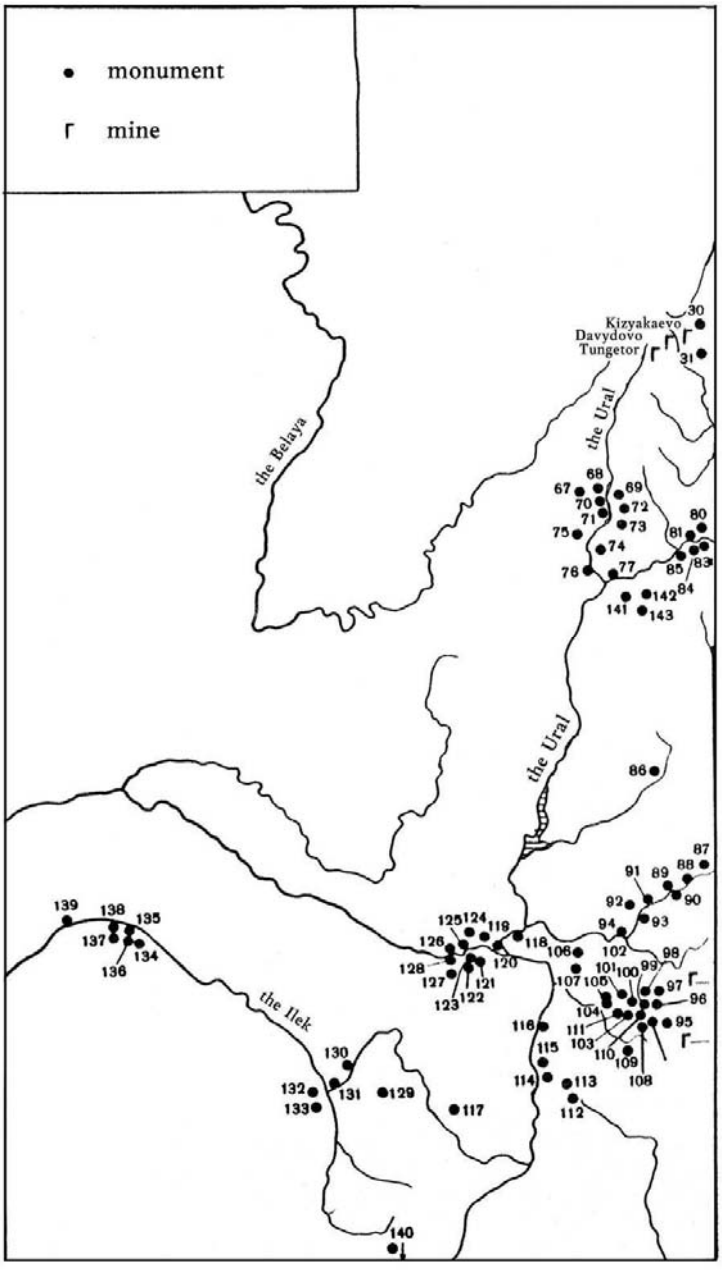
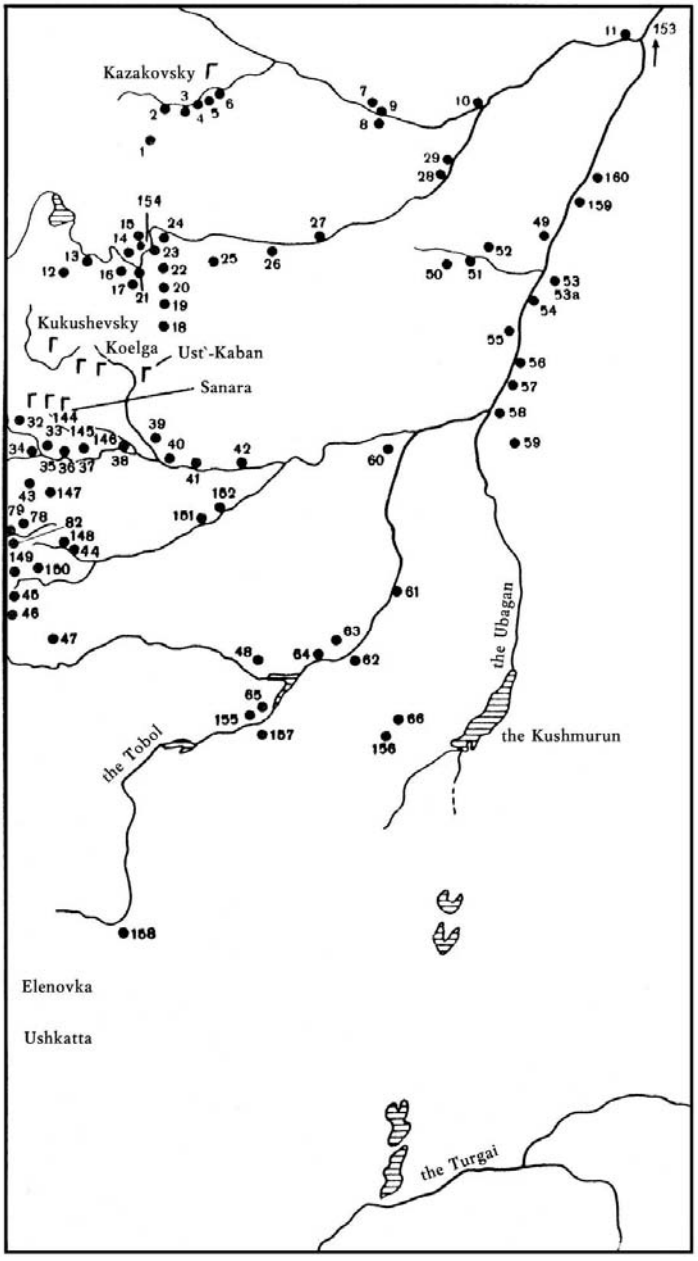
MAPS



Map 1: Distribution of the Andronovo cultural entity.



Map 2a: The main Andronovo sites. Western area.



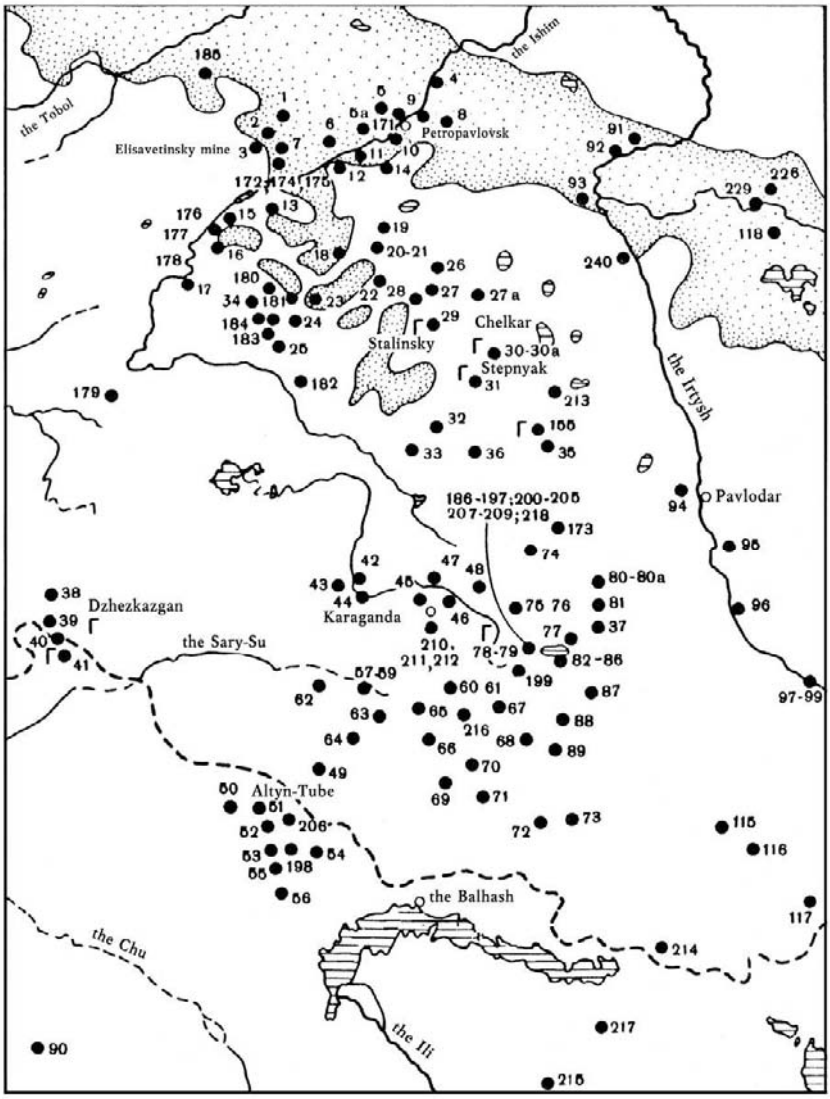
Map 2b: The main Andronovo sites. Western area.

Map 2: Site legend

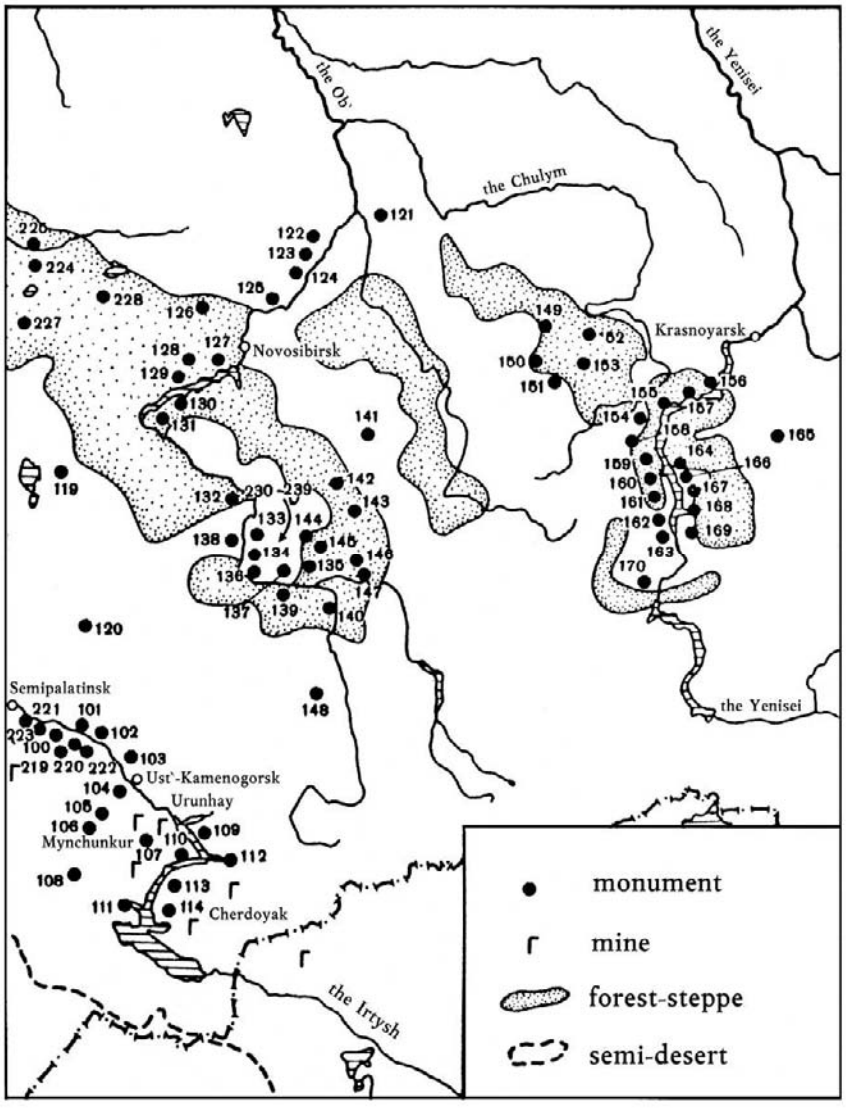
1. Nurbakovo c F
2. Ust'-Karabolka p s
3. Malo-Kazakhbaevo s
4. Novo-Burino c F
5. Barmakovo s
6. Bol'shaya Karabolka c F
7. Zamarevo s
8. Barmino s
9. Baborykino s
10. Kubasovo s
11. Tomilovo c A
12. Tuktubaevo c F
13. Byshkil' c F
14. Chernyaki c A
15. Chernyaki c
16. Chernyaki s
17. Sosnovka I-III c F
18. Korkino s
19. Sineglazovo c F
20. Smolino I, II c F A
21. Isakovo IV c F A
22. Sukhomesovo c F
23. Churilovo II c A
24. Fedorovo c F
25. Starikovo s
26. Alakul' c A
27. Subbotino c A
28. Baklanskoe s
29. Baklanskoe c A
30. Sarafanovo s
31. Kambulat s
32. Berezovskiy c A
33. Chernorech'e c A
34. Biryukovo s
35. Stepnoy I c P
36. Stepnoy II c TG
37. Chernorech'e c TG
38. Chernorech'e s
39. Kinzerskiy c F
40. Urazaevskiy II c F
41. Troitsk c P
42. Bobrovskoe s
43. Bashnya Tamerlana c A
44. Kulevchi III s
44a. Kulevchi VI c P
45. Sintashta I c P
46. Mirnyy III c A
47. Bersuat c TG A
48. Asenkritovskoe s
49. Tsarev Kurgan c P A
50. Talovka s
51. Kipel' I s
52. Kipel' III s
53. Kamyshnoe c A
53a. Kamyshnoe s
54. Raskatika c P
55. Yazevo I s
56. Verknyaya Alabuga c P
57. Yalym s
58. Ubagan II s
59. Evgen'evka c A
60. Zagarino s
61. Konezavod III s
62. Sadchikovo s
63. Alekseevka s
64. Alekseevka c A
65. Pereleski c A
66. Semiozernoe s
67. Nizhnee Spasskoe s
68. Spasskoe I c A
69. U Spasskogo Mosta s
70. Spasskoe II c
71. Spasskoe III c TG
72. Verkhnee Alekseevskoe s
73. Nizhnee Alekseevskoe s
74. Gora Mokhnataya s
75. Maly Kizil I, III s
76. Pervomayskiy c TG
77. Agapovka c TG
78. Chernigovskoe s
79. U Belogo Kamnya s
80. Bakhtinskoe s
81. Obryv s
82. Levoberezhnoe Bakhtinskoe s
83. Tribiyak s
84. Nizhnee Bakhtinskoe s
85. Ust'-Bakhtinskoe s
86. Karabutak s
87. Dzhilandy s
88. Bely Kamen' s
89. Kupa s
90. Kungurlyuk s
91. Kiyma s
92. Krasnaya Krucha c
93. Aydarly s
94. Dzharly s
95. Tursumbay I c K
96. Tursumbay II c K

97. Kiimbay I-VII s
98. Kuduksay s
99. Elenovka I, II, III s
99a. Elenovka m
100. Elenovka II c K
101. Shandasha II s
102. Shandasha I, II c K
103. Kupukhta s
104. Kupukhta c K
105. Baytu s
106. Baytu I c K
107. Baytu II c K
108. Ataken-say c K
109. Ushkatta m
109a. Ushkatta c K
110. Ushkatta II s
111. Ushkatta I, III-VIII s
112. Tasty-Butak s
113. Tasty-Butak c K
114. Buget II c K
115. Buget II s
116. Kozhumberdy c K
117. Sary-Murza s
118. Novy Kumak c K P
119. Orsk c A
120. Nikel' c A
121. Kirgil'da I c K
122. Kirgil'da II c K
123. Tulaykin Aul c K
124. Novy Akkerman c K
125. Khabarnoe II c K
126. Khabarnoe I c K
127. Kunakbay-Say c K
128. Ural-say c K
129. Ul'ke c K
130. Pochtovy post c K
131. Kargala c TG
132. Aktyubinsk, poligon c A
133. Aktyubinsk, ptitsefabrika c A
134. Ter-Butak c TG
135. Pyatimary c A-K
136. Uvak c Sl
137. Mechet-say c Sl
138. Bliznetsy (Kumak) c Sl
139. Vetlyanka c Sl
140. Emba c A
141. Arkaim s
142. Aleksandrovka c
143. Cherkassy s
144. Putilovskaya Zaimka c F
145. Priplodny Log c F
146. Kamenka c
147. Kamyshnoe I s
148. Kara-Oba c
149. Gorodishchenskoe III c
150. Zmeinaya Gorka c
151. Sokolok c
152. Nikolaevka c
153. Duvanskoe XVII s
154. Urefty c F
155. Pereleski II s
156. Naurzum c A
157. Shokubay I, II s
158. Verkhnetobol'skoe s
159. Kamyshnoe s
160. Chistolebyazh'e c

c = cemetery, cf = chance find, cv = cave, h = hoard, m = mine, pt = petroglyph, s = settlement , st = site
A = Alakul', Al = Alekseevka, An = Anau, At = Atasu, B = Beshkent, D = Dandybay, F = Fedorovo, K = Kozhumberdy, LB = Late Bronze Age, P = Petrovka, Sl = Soliletsk, Sm = Semirech'e, T = Tautary, TG = Timber Grave, Tz = Tazabagyab



Map 3a: The main Andronovo sites. Eastern area.



Map 3b: The main Andronovo sites. Eastern area.

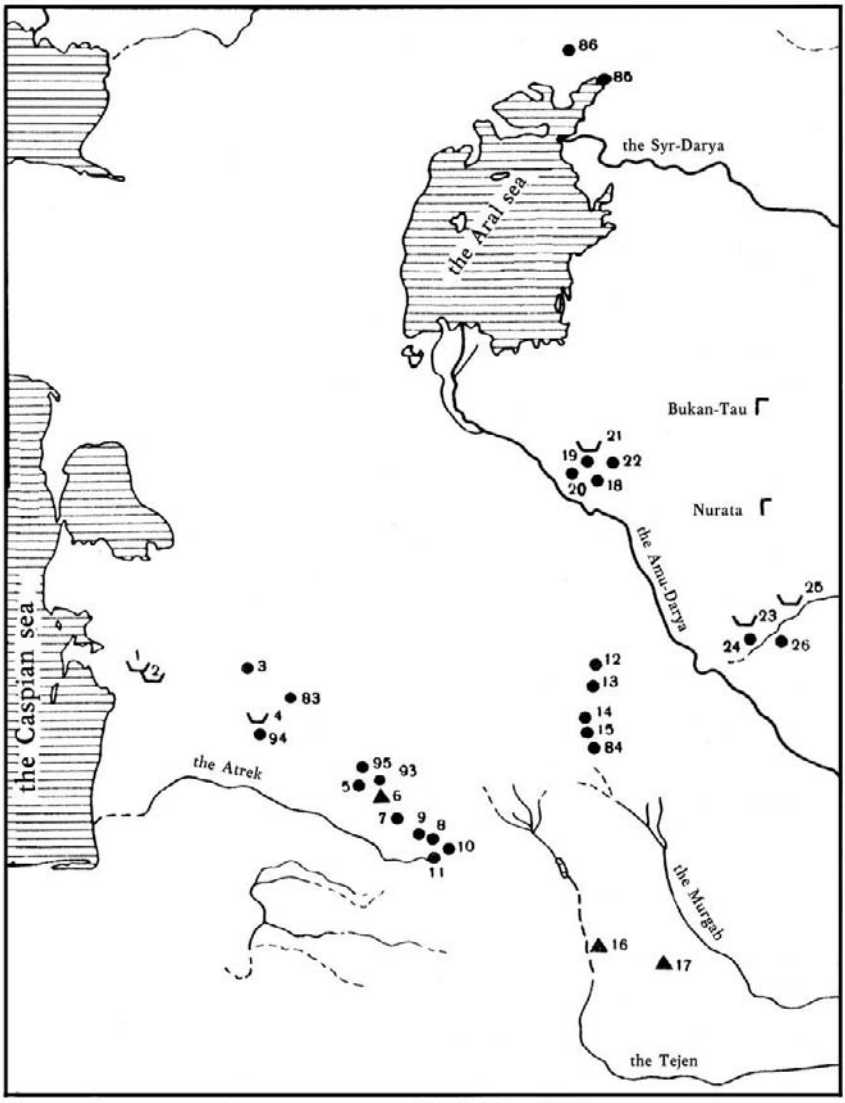
Map 3: Site legend

1. Amangel'dy s
2. Amangel'dy c A M
3. Kenesc P
4. Petropavlosk c A M
5. Pokrovka s
6. Petrovka I s
6a. Petrovka II s
7. Petrovka c P
8. Bogolyubovo s
9. Yavlenka s
10. Novonikol'skoe I s
11. Il'inka s
12. Semipalatnoe c A
13. Burluk I c F
14. Bishkul' IV s
15. Alypkash c F
16. Efimovka c A
17. Kalachevsky c F
18. Kenotkel c F
19. Kokchetav c A
20. Chaglinka c A
21. Chaglinka s
22. Koshkarbay I c F
23. Aydabul' c A M
24. Zhabay s
25. Zhabay-Pokrovka II s
26. Biyrek-Kol' c F
27. Obaly c F
27a. Obaly s
28. Borovoe c F
29. Chelkar, Stepnyak s
30. Stalinskiy s
30a. Aul'naya ploshchad' s
31. Bes-Tyube s
32. Burly s
33. Dzhelambet c
34. Sargary s
35. Nurmambet c A
36. Balykly c A
37. Bozengen s
38. Ulutau s
39. Sorkuduk s
40. Aynakol' s
41. Milykuduk s
42. Alep-Aul s At
43. Zhilandy c F At
44. Dolinskoe s
45. Dandybay c F D
46. Nura Tsentral'ny khutor c At
47. Algabas c A
48. Botakara c F
49. Zhaman-Uzen II c At
50. Kosagal c F
51. Atasu s
52. Sangru II c F
53. Atasu (Ayshrak) c At
54. Zhamantas c A
55. Belasar c D
56. El'shibek c At
57. Bugyly I c F
58. Buguly I, II s
59. Taldy c A
60. Baybala c F
61. Baybala s
62. Basbaldak c At
63. Akbaur (Akkezen) s
64. Aksu-Ayuly c At
65. Sherubay-Nura s
66. Karasay c At
67. Egiz-Koytas c A
68. Zhabay-Karasu c At
69. Akshatau c F
70. Kanattas c F
71. Karabie c At
72. Begazy c D
73. Tautary c T
74. Kokdambek c
75. Bes-Oba c A
76. Dzhamantas c F
77. Nurken c At
78. Bylkyldak II c At
79. Bylkyldak I c At
80. Satan c A
81. Taldy c A
82. Tas-Bulak c A
83. Karkaralinsk s
84. Krasnaya Krucha c A
85. Bat'kin Paek c A
86. Suukbulak s
87. Enbek-Suygush c D
88. Murza-Shoku c At
89. Temir-Astau c At
90. Kotanemel' c At
91. Chernoozer'e c
92. Chernoozer'e s
93. Omskaya s
94. Akmola c F
95. Lebyazh'e c F

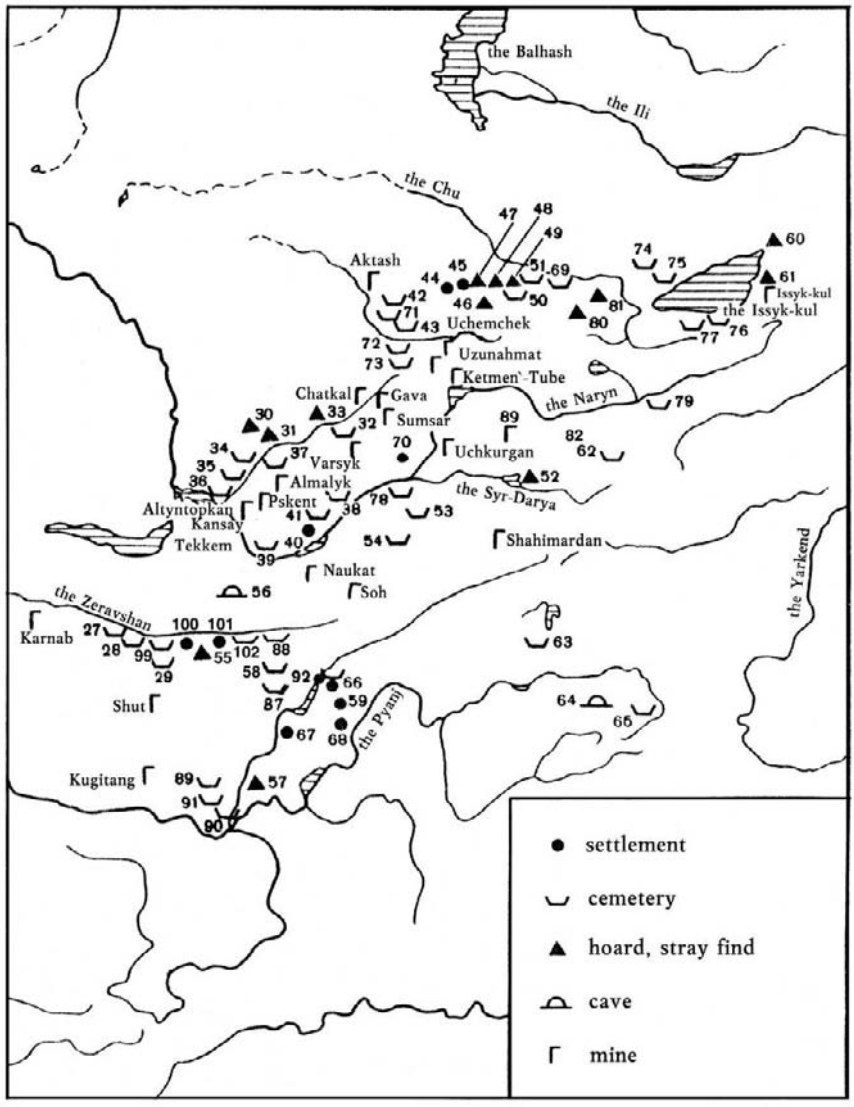
96. Semiyarskoe cf
97. Semilpalatinskie dyuny c
98. Semilpalatinskie dyuny s
99. Semilpalatinskie dyuny u Solo-v'evskoy mel'nitsy s
100. Maly Koytasc F
101. Zevakino c F
102. Barashki s
103. Predgornoe c F
104. Oblaketka c F
105. Karausek c
106. Zhanazhurt c
107. Mynchunkurs P
108. Karadzhal c F
109. Malokrasnoyarka c
110. Trushnikovo s
111. Ust'-Bukon' c
112. Ust'-Narym s
113. Kanay s
114. Cherdoyak s
115. Sarybulak c
116. Sarykol' c F
117. Mesto raskopok akad. V. V. Radlova c F
118. Preobrazhenka III c Mx
119. Nizhnyaya Suetka c F
120. Novo-Aleksandrovka c F
121. Samus' IV s
122. Elovka II c F
123. Yurt Akbalyk c F
124. Chuchka 7 s
125. Krasny Yar I s
126. Vakhrushevo c F
127. Irmen' I s
128. Shlyapova s
129. Ordynskoe c F
130. Milovanovo s
131. Razdum'e s
132. Barnaul (kozhzavod) c F
133. Blizhnie Elbany XII c F
134. Blizhnie Elbany XIV c F
135. Sosnovka s
136. Klepikova s
137. Khomutinka c F
138. Shipunova c F
139. Volchikha c F
140. Zmeevka c F
141. Ur c F
142. Kytmanovo c F
143. Stepnoy Chumysh c
144. Oz. Itkul' s
145. Ikonnikova c F
146. Mokry Yar c
147. Prigorodnoe khozyay-stvo TsRU c F
148. Il'inka s
149. Bol'shepichugina c F
150. Ingol'skiy Klyuch s
151. Ob"yul s
152. Andronovo c F
153. Orak c F
154. Uzhur s F
155. Solenoozernaya c F
156. Pristan' I c F
157. Sukhoe Ozero I c F
158. Klyuchi s
159. Yarki I c F
160. YarkiI c F
161. Karasuk V s
162. Bateni, protoka s
163. Ust'-Erba c F
164. Kamenka III c F
165. Kamenka II c F
166. Beloyarsk s
167. Lanin Log c F
168. Lebyazh'e I c F
169. Tepesey c F
170. Podkuninskiy Ulus c F
171. Vishnevka I s
172. Karluga II s
173. Elizavetskiy priisk s
174. Berlik c P
175. Aksayman c P
176. Grafskie Razvaliny c
177. Bektengiz c
178. Ulyubay c P
179. Aksuat c
180. Yakshi-Yangiz-Tau s
181. Kuropatkino II c F
182. Rodionovka s
183. Pavlovka s M F
184. Vinogradovka s
185. Tokanay c A
186. Kzylkent c Al
187. Upais s Al
188. Ak-Tobe I, II c A
189. Ashchi-Ozek c A
190. Dongal s
191. Tagibay-Bulak s
192. Izhevskiy c Mx
193. Ikpen' I s
194. Kent s
195. Kent I c At
196. Mayrovka s

197. Maytan c A
198. Myrzhik s
199. Nurtay c A
200. Tashik c A
201. Domalaktas s
202. Ust'-Kinetay s
203. Shapat c A
204. Ak-Tobe II c A
205. Entuziast I s
206. Aybas-Darasy c D Al
207. Dermen c LB
208. Bola-Kulboldy c LB
209. Kshtan c LB
210. Sovkhoz Kirova u Karagandy c A
211. Buguly II c
212. Efimovka c A
213. Zvenigorodka c At
214. Alakul' c Sm
215. Bigash c Sm
216. Shortandy-Bulak s
217. Bien 13 c P
218. Kara-Kuduk c Sm
219. Betkuduk c F
220. Dzhartas c F
221. Belokamenka c F
222. Temir-Kanka c P
223. Ermak c A
224. Abramovo 4 c F
225. Abramovo 5 s
226. Vengerovo 1, 7 s
227. Kargat 6 s
228. Martem'yanovo s
229. Sopka 2 c Mx
230. Kalinovka 2, 4 s
231. Krokhalevka 13 c F
232. Bol'shoy Log s
233. Polturino c F
234. Chernaya Kur'ya 3 s
235. Mironov Log 2 s
236. Novoil'inka s
237. Pes'yanov mys s
238. Gilevo I, II s
239. Kureyka 3 s

c = cemetery, cf = chance find, cv = cave, h = hoard, m = mine, pt = petroglyph, s = settlement , st = site
A = Alakul', Al = Alekseevka, An = Anau, At = Atasu, B = Beshkent, D = Dandybay, F = Fedorovo, K = Kozhumberdy, LB = Late Bronze Age, P = Petrovka, Sl = Soliletsk, Sm = Semirech'e, T = Tautary, TG = Timber Grave, Tz = Tazabagyab



Map 4a: The main Andronovo sites. Central Asia.

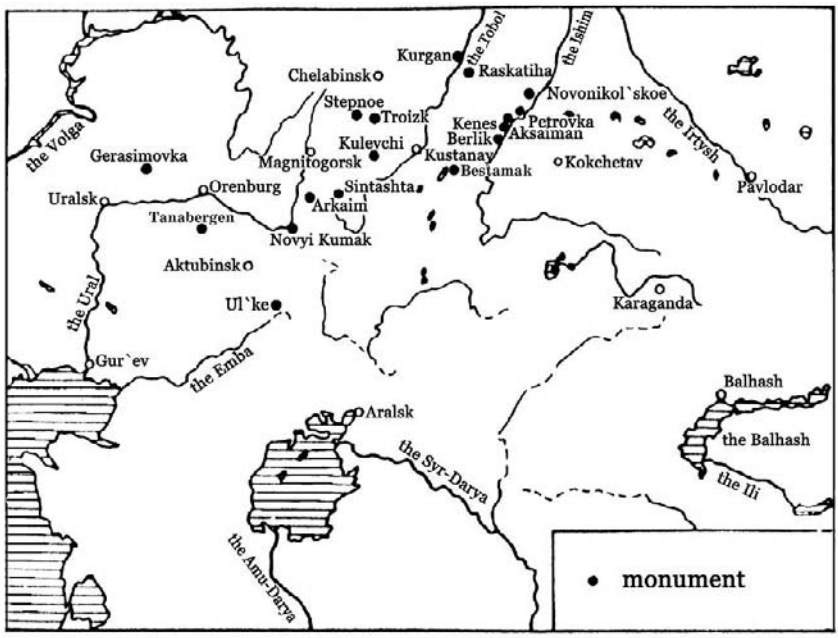


Map 4b: The main Andronovo sites. Central Asia.

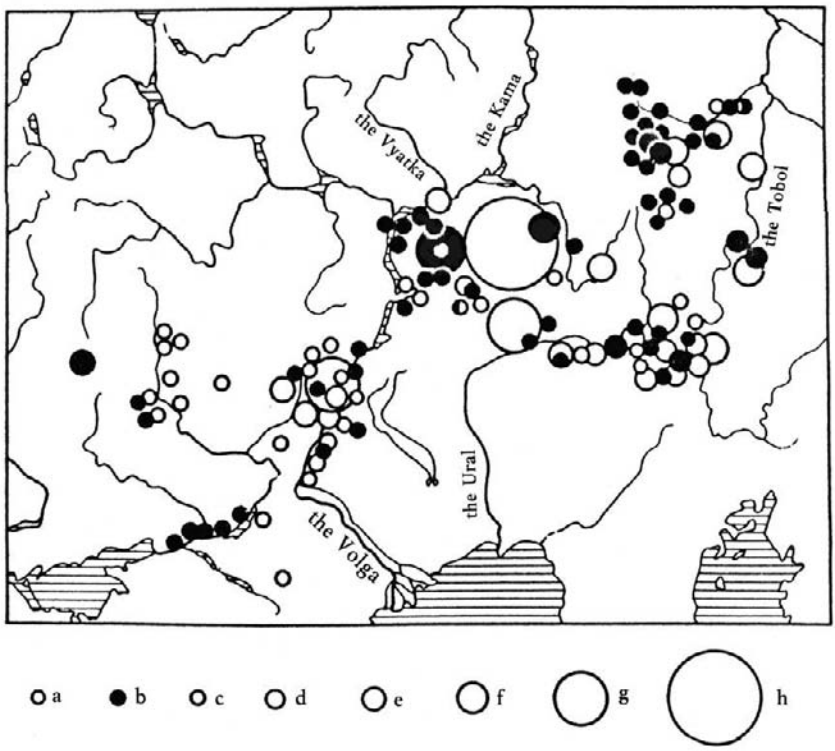
Map 4: Site Legend

1. Karalemata-say c TG
2. Patma-say c TG
3. Bala-Ishem st
4. Parau c TG
5. Ovadan st
6. Ashkhabad st
7. Anau s An
8. Namazga s An
9. El'ken s An
10. Sermancha s An
11. Tekkem s An
12. Taip s An
13. Gonur s An
14. Auchin s An
15. Takhirbay 2, 3 s An
16. Kuin-Kuyu st
17. Imam-Baba st
18. Angka s Tz
19. Kavat 2 s Tz
20. Kavat 3 s Tz
21. Kokcha 3 c Tz
22. Kokcha 1 s Tz
23. Gurdush c
24. Gudzhayli 1-9, Bol'shoy i Maly Tuzkan Tri Kruga st
25. Kyzyl-Kyr c
26. Paykent 1-10 st
27. Muminabad c
28. Chakka c
29. Urgut c
30. Iskander cf
31. Chimbaylyk h
32. Aurakhmat c
33. Brichmulla h
34. Nikiforovkiy c F
35. Yangi-Yul' c TG
36. Vrevskaya c F
37. Orekhovskoe c TG
38. Dashti-Asht c
39. Khodzhi-Yagona c
40. Kayrak-Kumy st
41. Dakhana c
42. Tash-Tyube c Sm
43. Tash-Bashat c Sm
44. Kainda s
45. Dzhail'ma s
46. Sadovoe h
47. Aleksandrovskoe s K
48. Sukuluk I, II h
49. Novopavlovka cf
50. Tegermensay c Sm
51. Prigorodnoe pogr. F
52. Uzgen cf
53. Karamkul' c Sm
54. Vuadil' c Sm
55. Iskanderkul' cf
56. Ak-Tangi cv
57. Dzhilikul' cf
58. Tandyryul c B
59. Kangurt-Tut s B
60. issyk'Kul' (Tyup) h
61. Karakol I-II h
62. Arpa c F
63. Kokuybel'-su c
64. Kurteke s
65. Kzyl-Rabat c
66. Teguzak s B
67. Sovkhoz Kirova s F
68. Karim-Berdy s B
69. Alamedinskoe s
70. Dzhal-Aryk s Sm
71. Kulan-say c Sm
72. Kyzyl-say c Sm
73. Besh-Tash c Sm
74. Novorossiyskiy c
75. Chon-Kemin c Sm
76. Kekelik-say c
77. Ton I c Sm
78. Dzhazy-Kechu c Sm
79. Chyrgail c
80. Tuyuk h
81. Shamshi h
82. Saymaly-Tash pt
83. Kzyl-Arvat st
84. Yaz-depe s An
85. Aral'sk st
86. Saksaul'skaya st
87. Kumsay c Sm
88. Dashti-Kozi c Sm
89. Beshkent II c B
90. Tigrovaya Balka c B
91. Tulkhar B
92. Nurek c B
93. Dzeytun st
94. Parau st
95. Bezmen st
96. Dashly 3 s An
97. Togolok 15 s An
98. Dzharkutan s An

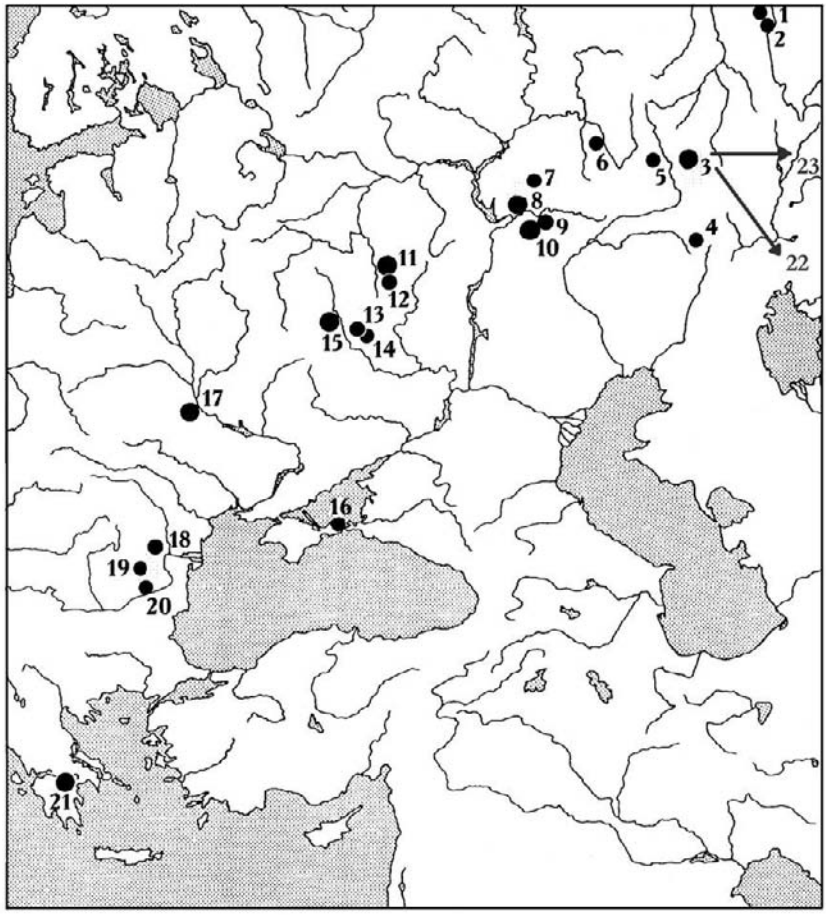
c = cemetery, cf = chance find, cv = cave, h = hoard, m = mine, pt = petroglyph, s = settlement , st = site
A = Alakul', Al = Alekseevka, An = Anau, At = Atasu, B = Beshkent, D = Dandybay, F = Fedorovo, K = Kozhumberdy, LB = Late Bronze Age, P = Petrovka, Sl = Soliletsk, Sm = Semirech'e, T = Tautary, TG = Timber Grave, Tz = Tazabagyab



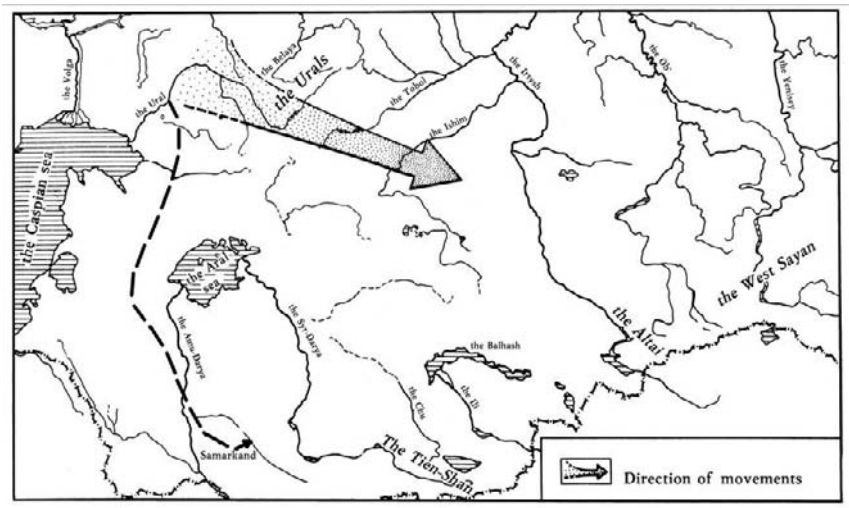
Map 5: Sites of the Petrovka type.



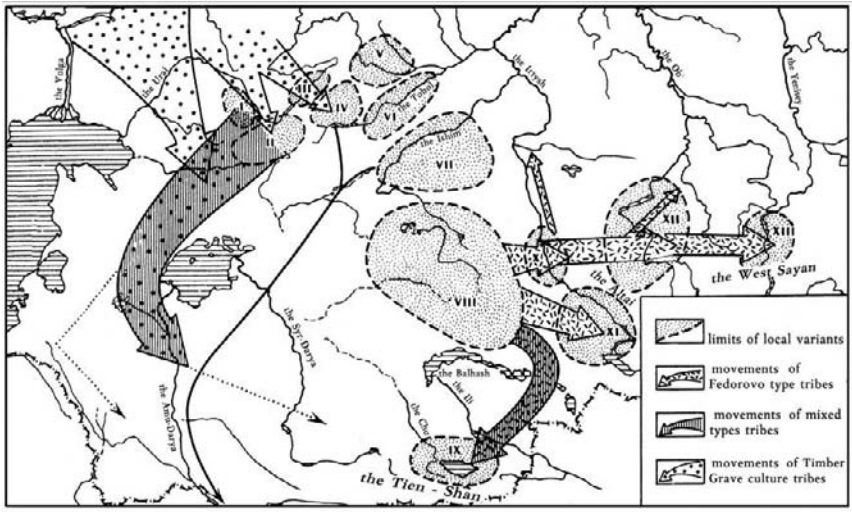
Map 6: Distribution of metallic artifacts from Andronovo mines.
a- Elenovka-Ushkatta group; b – metal of the Volga-Ural group; c – 1 find; d – 2-3 finds; e – 4-6 finds; f – 7-10 finds; g – 11-15 finds; h – 49 finds.



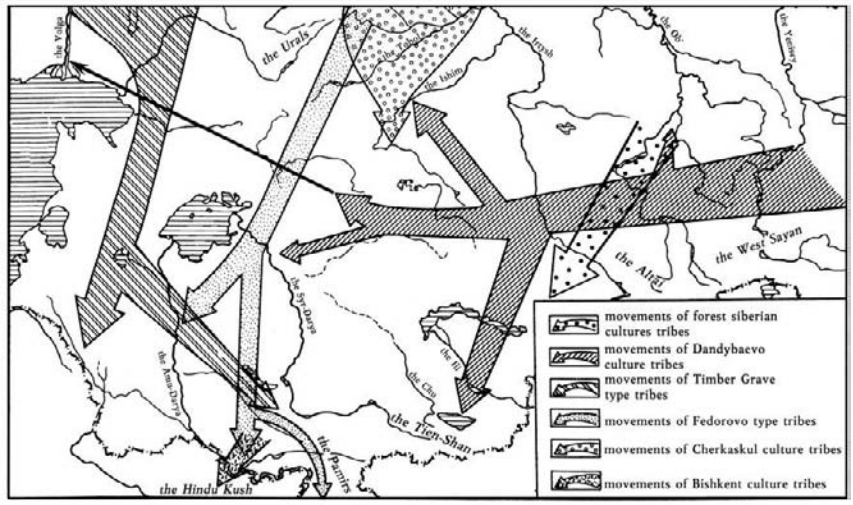
Map 7: Cheek-pieces of types 1 and 2.
1: Novonikol'skoe; 2: Petrovka; 3: Sintashta; 4: Tanabergen; 5: Tavlykaevo; 6: Balanbash; 7: Surush; 8: Potapovo; 9: Krasnoselki; 10: Utevka; 11: Pichaevo; 12: Vlasovo; 13: Kondrashkinskiy; 14: Otrozhka; 15: Kondrashkovka; 16: Kamenka; 17: Takhtemirovo; 18: Chirlomaneshty; 19: Sarata-Monteoru; 20: Ulmeni; 21: Mycenae; 22: Zardcha-Halifa; 23: Bestamak.



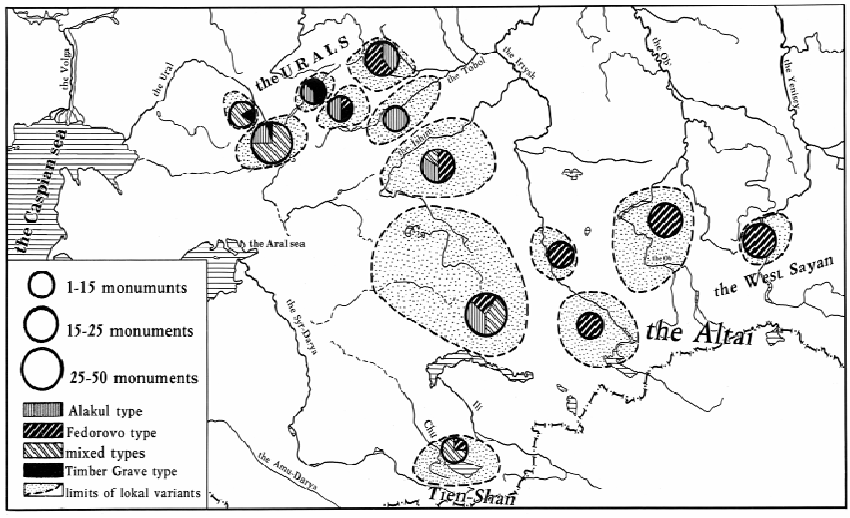
Map 8: The ethnic movements of the early Andronovo tribes.



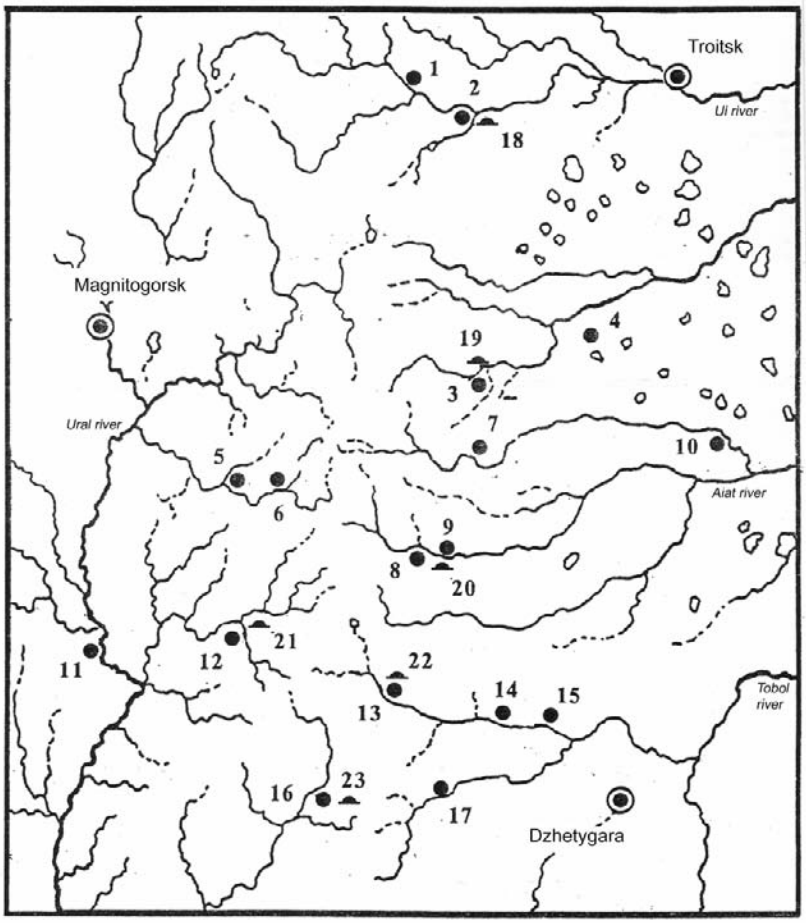
Map 9: The ethnic movements of the Andronovo tribes in the 15th-13th centuries BC.



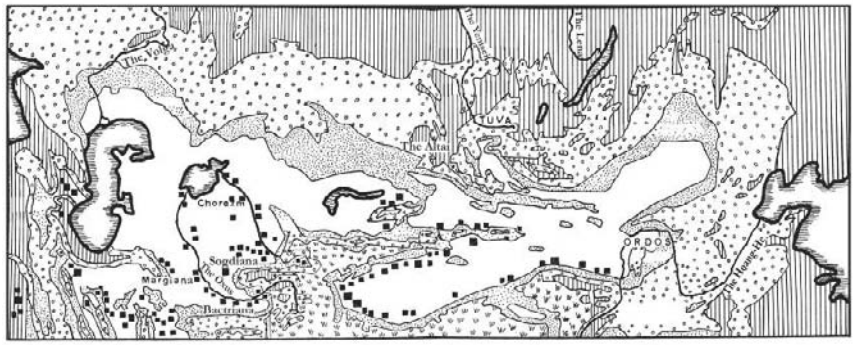
Map 10: The ethnic movements of the Andronovo tribes in the 12th-9th centuries BC.



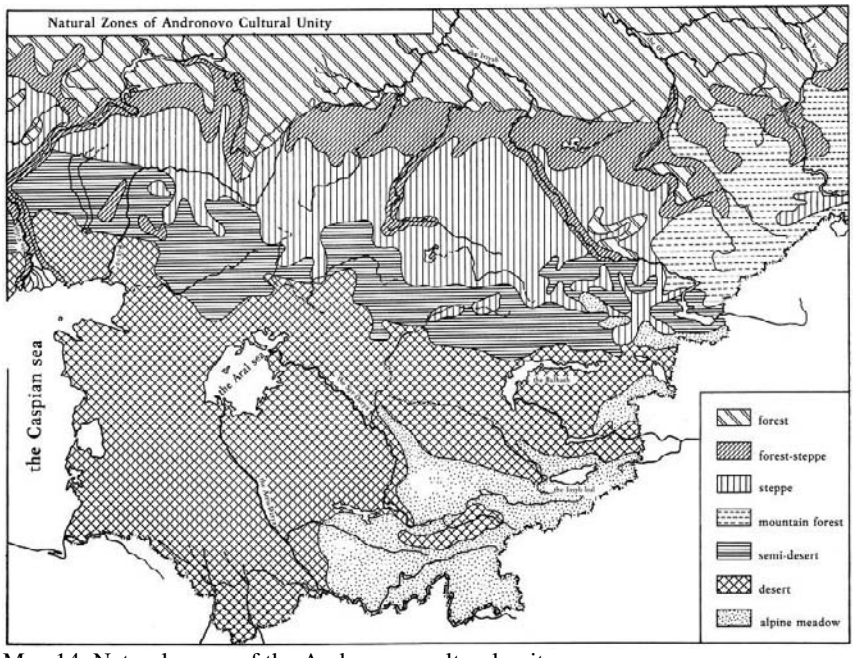
Map 11: The distributional pattern of Andronovo types.



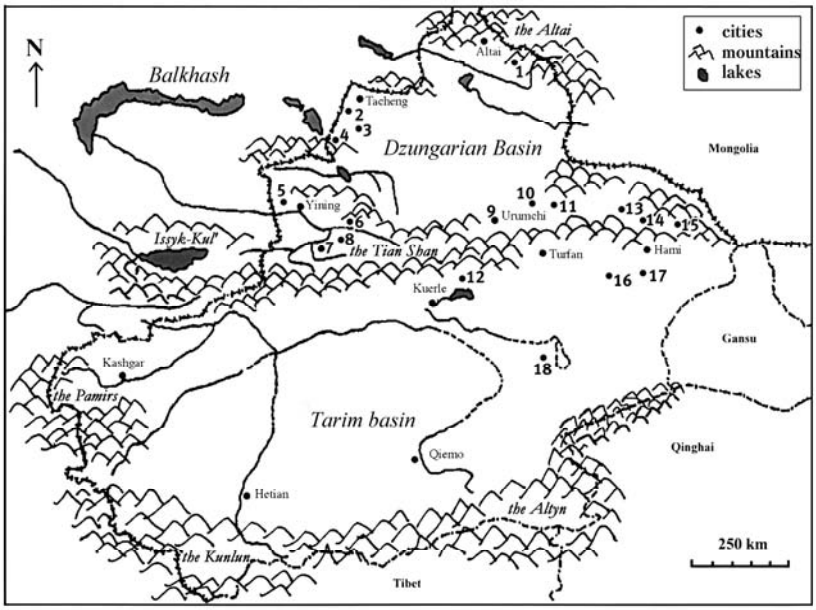
Map 12: Sites of the Sintashta type.
1: Stepnoe; 2: Chernorech'e; 3: Malokizil'skoe; 4: Kuysak; 5: Sakryn-Sakla; 6: Ustie; 7: Rodniki; 8: Chokotay; 9: Iseney; 10: Zhurumbay; 11: Ol'gino; 12: Sukhoy Dol; 13: Kizil'skoe; 14: Arkaim; 15: Sintashta; 16: Selentash; 17: Krivoy Dol; 18: Alandskoe; 19: Yagodny Dol.



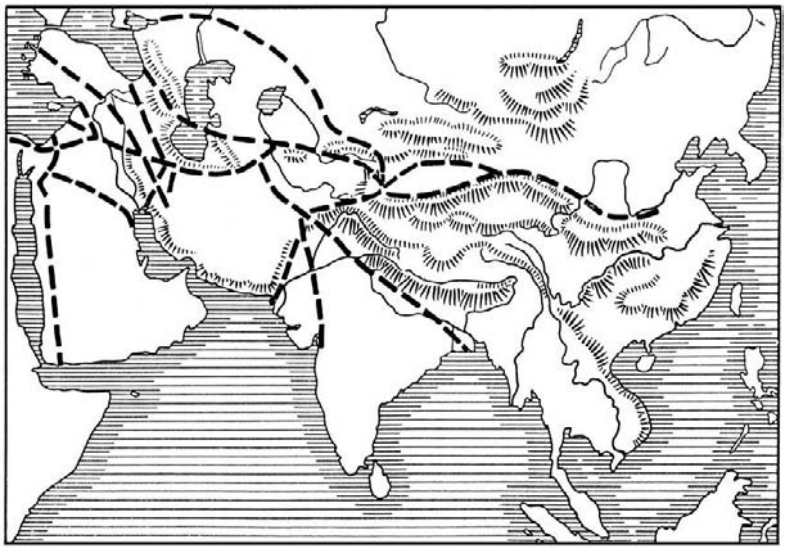
Map 13: Natural zones of Asia



Map 14: Natural zones of the Andronovo cultural unity.

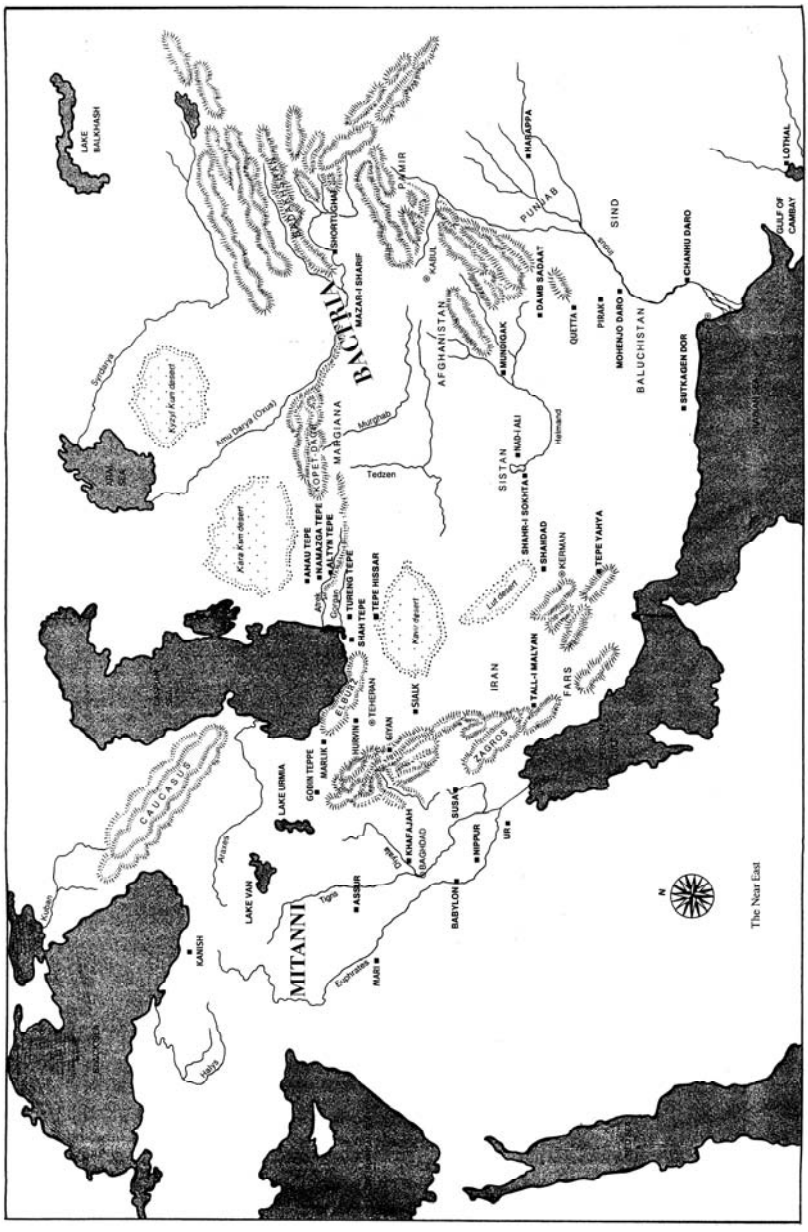


Map 15: Xinjiang.
1: Ke'ermuqi; 2: Tacheng; 3: Tuoli; 4: Sazi; 5: Jining; 6: Nileke; 7: Agharsin; 8: Xinyuan; 9: Urumchi; 10: Jimusa'er; 11: Quitai; 12: Xintala; 13: Lanzhouwanzi; 14: Kuisu; 15: Ka'ersang; 16: Wupu; 17: Hami; 18: Gumugou.



Map 16: The Silk Road.

Map 17: Sites of Northern Bactria (after Vinogradova 1994).



Map 18: The territory of the Indo-Iranians.

FIGURES

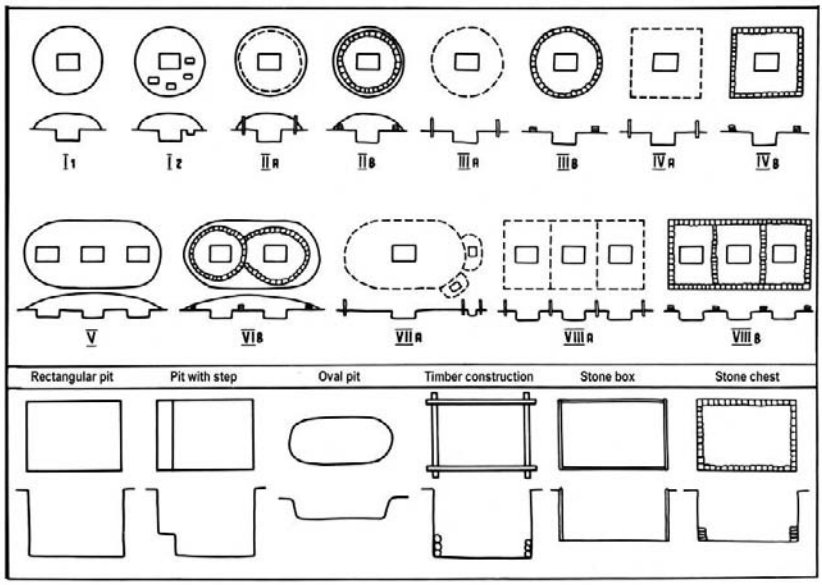


Fig. 1: Evolution of types of mortuary construction.

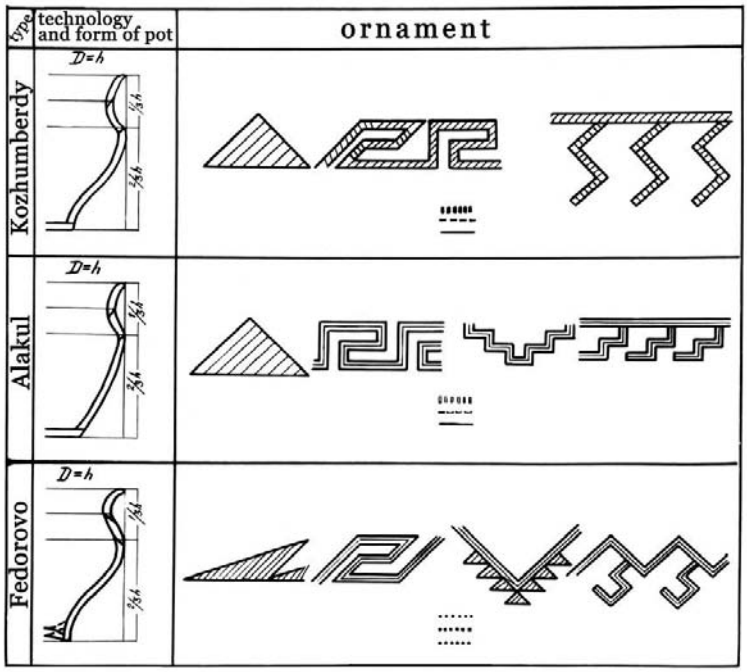
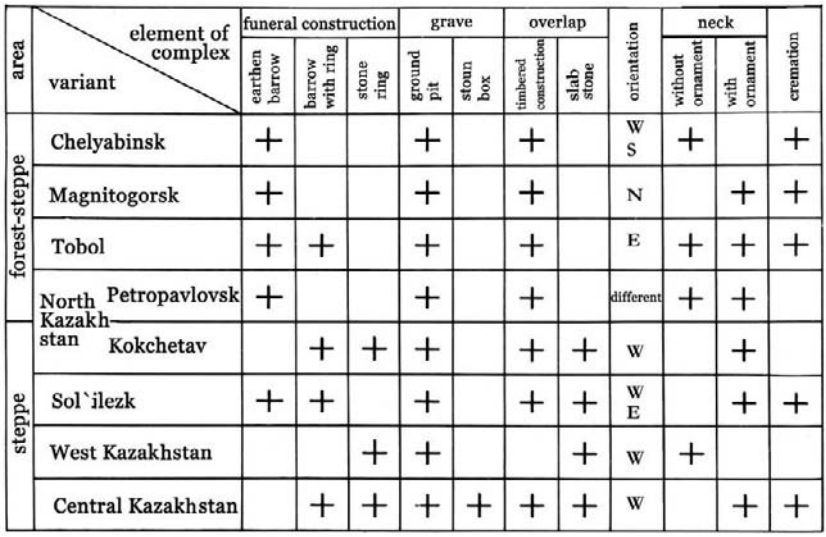


Fig. 2: Technology and typology of Andronovo ceramics.

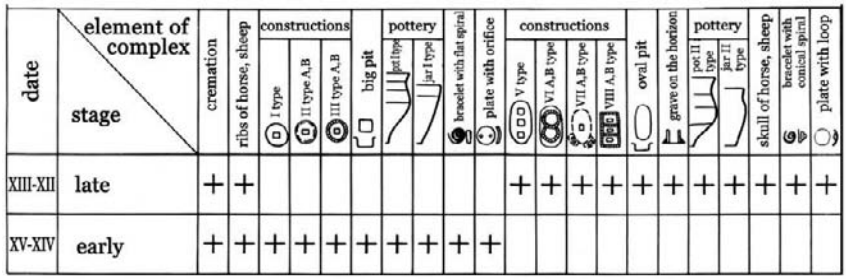
Date	Elements of complex / Type	pot of I type	Barrow with children graves	Pit with step	skeleton of horse	pot of II type	stone implements	barrow	timber	wooden overlap	skull and legs of horse, bull, sheep	pot of III type	barrow with stone ring	kozhumb. type pot	stone box	stone fence	sheep skull	oval fence	oval pit	pot of IV type
XIII	Alakul late	+																	+	+
XIII	Kozhumberdy late	+													+	+	+	+	+	+
XIV-XIII	Atasu	+				+	+				+	+		+	+	+	+	+		
XIV-XIII	Amangeldy	+						+	+	+	+	+	+	+	+	+	+			
XV-XIV	Kozhumberdy early	+							+	+	+	+	+	+	+	+	+			
XV-XIV	Alakul early	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+			
XVII-XVI	Petrovka	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			

Fig. 3: The evolution of mortuary complexes of the Alakul' type.



area	element of complex / variant	funeral construction: earthen barrow	funeral construction: barrow with ring	funeral construction: stone ring	grave: ground pit	grave: stoun box	overlap: timbered construction	overlap: slab stone	orientation	neck: without ornament	neck: with ornament	cremation
forest-steppe	Chelyabinsk	+			+		+		W S	+		+
forest-steppe	Magnitogorsk	+			+		+		N		+	+
forest-steppe	Tobol	+	+		+		+		E	+	+	+
forest-steppe	North Kazakhstan Petropavlovsk	+			+		+		different	+	+	
steppe	North Kazakhstan Kokchetav		+	+	+		+	+	W		+	
steppe	Sol`ilezk	+	+		+		+	+	W E		+	+
steppe	West Kazakhstan			+	+			+	W	+		
steppe	Central Kazakhstan		+	+	+	+	+	+	W		+	+

Fig. 4: Local variants of Alakul' type sites.



date	element of complex / stage	cremation	ribs of horse, sheep	constructions: I type	constructions: II type A,B	constructions: III type A,B	big pit	pottery: pot type	pottery: jar I type	bracelet with flat spiral	plate with orifice	constructions: V type	constructions: VI A,B type	constructions: VII A,B type	constructions: VIII A,B type	oval pit	grave on the horizon	pottery: pot II type	pottery: jar II type	skull of horse, sheep	bracelet with conical spiral	plate with loop
XIII-XII	late	+	+									+	+	+	+	+	+	+	+	+	+	+
XV-XIV	early	+	+	+	+	+	+	+	+	+	+											

Fig. 5: The evolution of mortuary complexes of the Fedorovo type

elements of complex / variant	funeral construction				grave			overlap		orientation	rite		dish	peculiarities	
	barrow I, V	barrow with ring II, VI	stone ring III, VII	stone fence IV, VIII	pit, timber	stone box	stone chest	wooden overlap	stone slab		cremation	ingumation		pottery	ornaments
the Ural	⊕	+			⊕	+		+		*w*	+		+		
North Kazakhstan	+	+	+	+	⊕	+	+	+	+	*s-w*	⊕	+	+	peatched comb	
Central Kazakhstan		+	⊕	+	+	+	⊕		+	*w*	⊕	+		bottom with ring	
East Kazakhstan		+	+	+	+	+	+		+	*E* *N-E*	+	⊕			
the Ob`	+				+			+		*w* *N-E*	+	⊕	+		round temple ring
the Yenisei		+	+	+	+	+	+	+	+	*N-E*	+	⊕		square pots	temple ring with narrow reciever

Fig. 6: Local variants of Fedorovo type sites

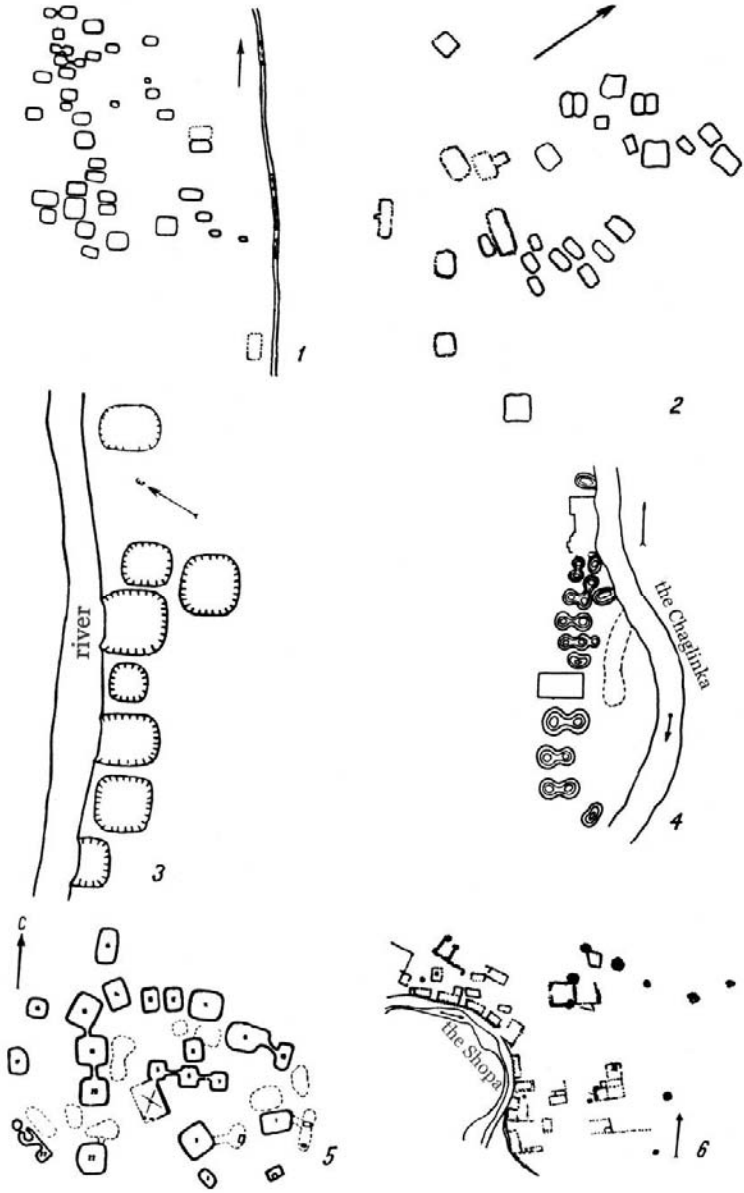


Fig. 7: Types of Andronovo settlements.
1: Shortandy-Bulak; 2: Akbaur II; 3-Karkaralinsk; 4: Chaglinka; 5: Atasu; 6: Buguly II.

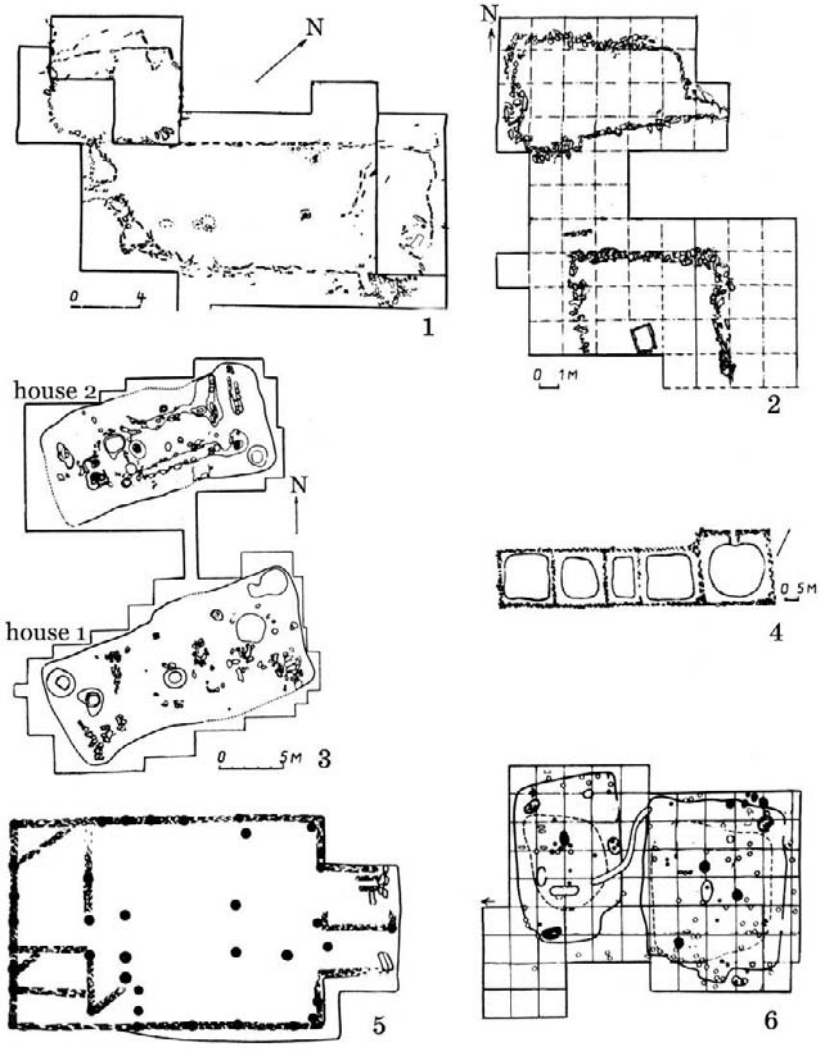


Fig. 8: Types of Andronovo dwellings.
1: Ushkatta II; 2: Shandasha I, II; 3: Tasty-Butak; 4: Buguly I, house 28; 5: Shortandy-Bulak, house 14; 6: Kamyshnoe, houses 1 and 2.

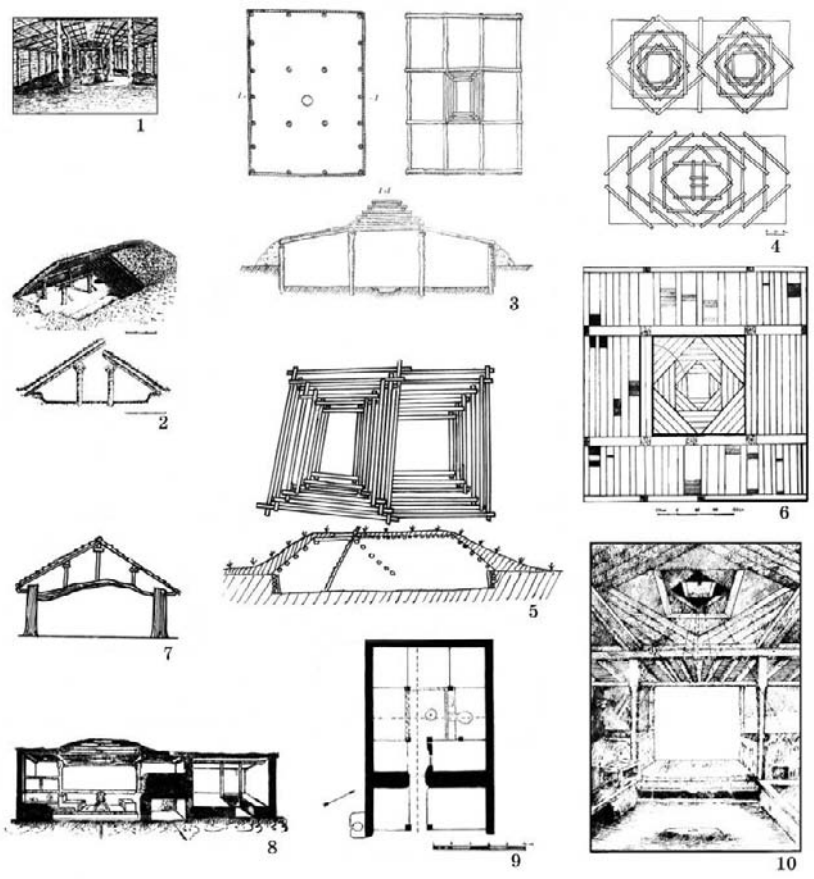
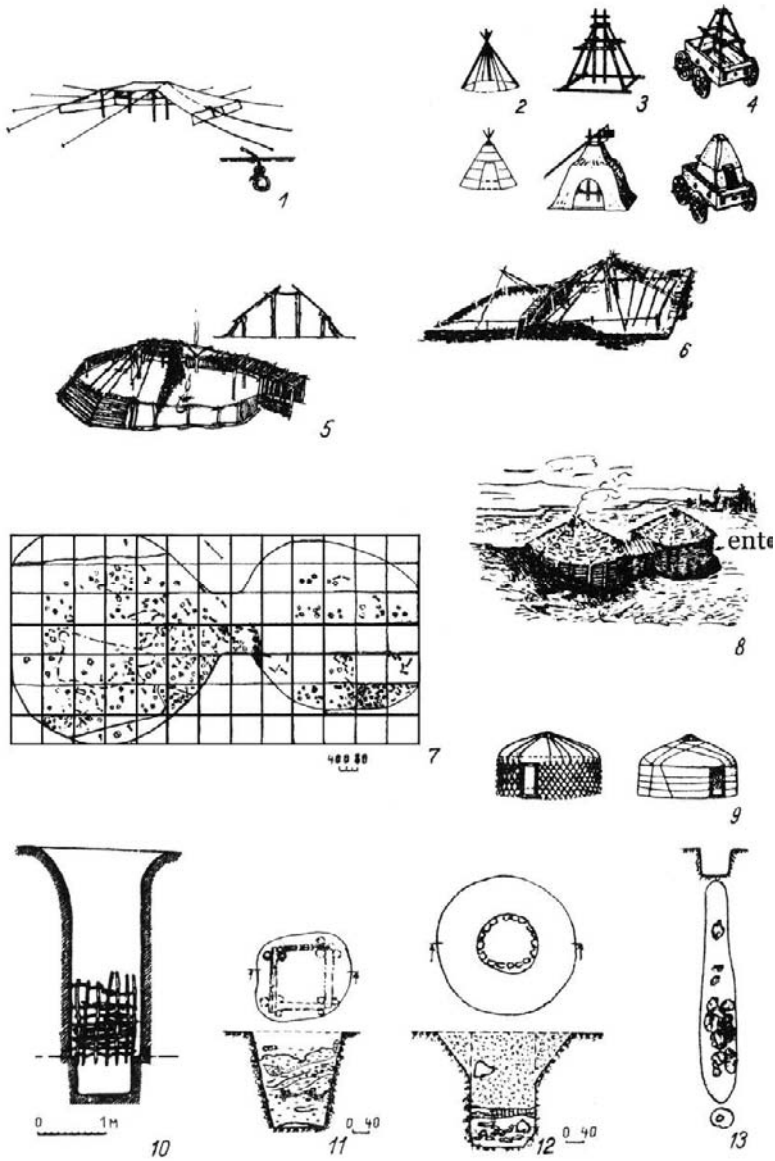


Fig. 9: Types of roofs and reconstructions of Andronovo dwellings.
1, 3: Atasu: A. Margulan; 2: Suskan: N. Merpert; 4: Shandasha: E. Kuz'mina; 5: Lyapichev Khutor: M. Gryaznov; 6: Khuf; 7: Punjab house; 8: Banay; 9: Ba-Rushon; 10: Shar-Jadt.


1
2
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13
0 1M
0 40
0 40

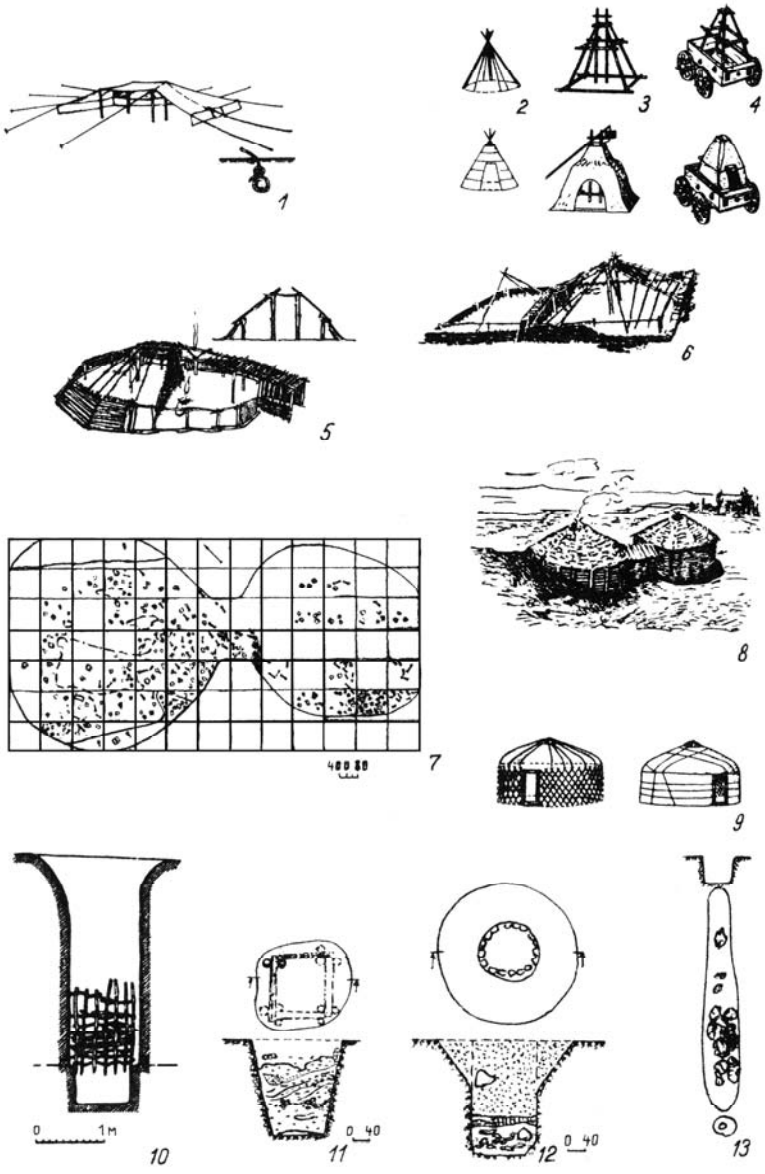

Fig. 10: Types of light dwellings of nomadic peoples and the evolution of the yurt. 1: Arabia; 2: Siberia; 3: Scythian dwelling; 4: Scythian vehicle; 5: Suuk-Bulak; 6: Buguly II; 7, 8: Chaglinka; 9: a yurt;
types of wells: 10: Tasty-Butak; 11, 12: Chaglinka; 13: hearth from Sadchikovo.

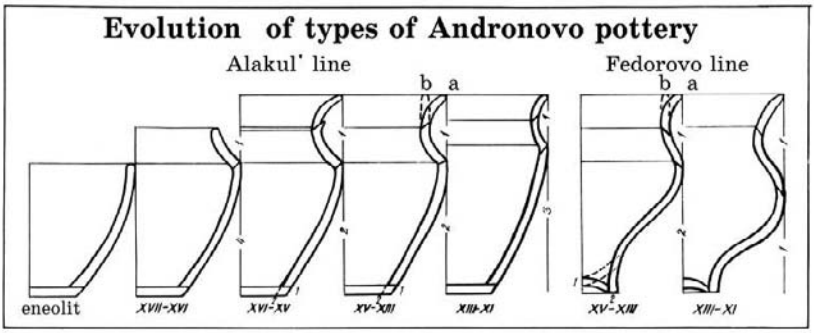

Fig. 11: Evolution of Andronovo pottery types.

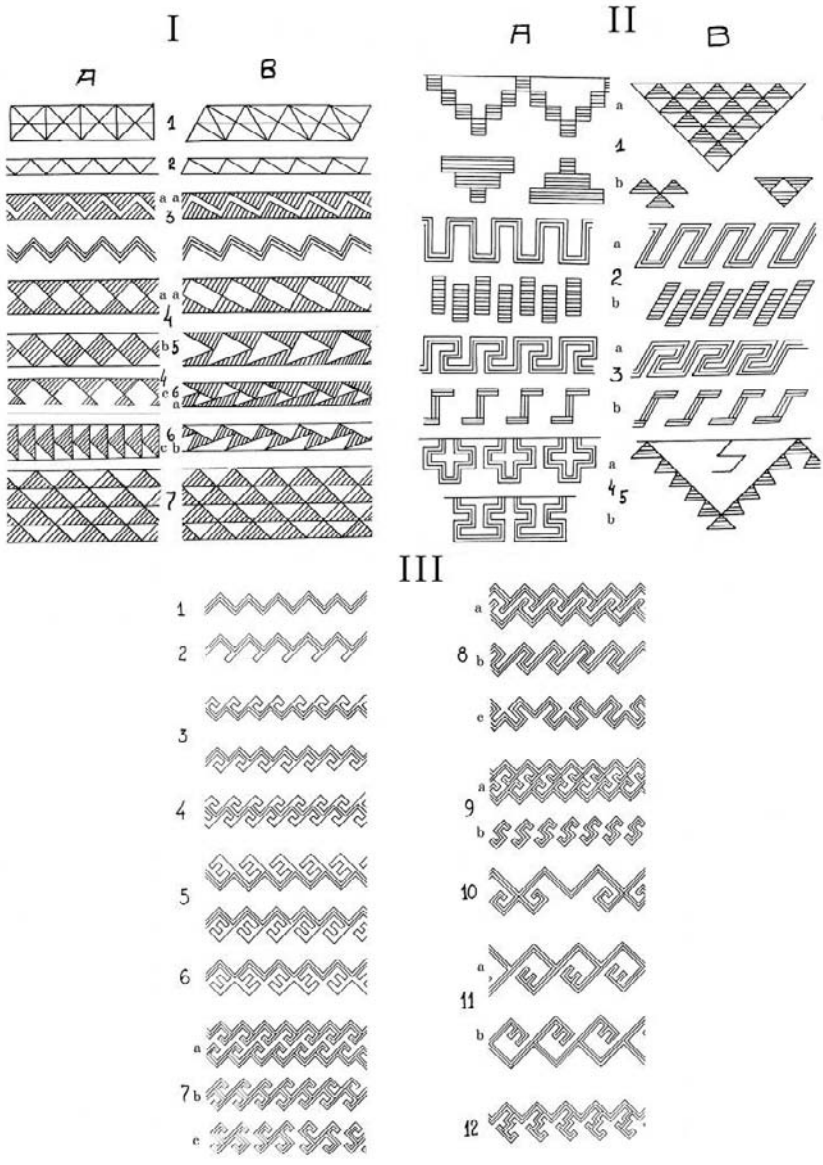

Fig. 12: Ornamentation patterns of Andronovo pottery.
A: direct netting; B: oblique netting; a: positive; b: negative.

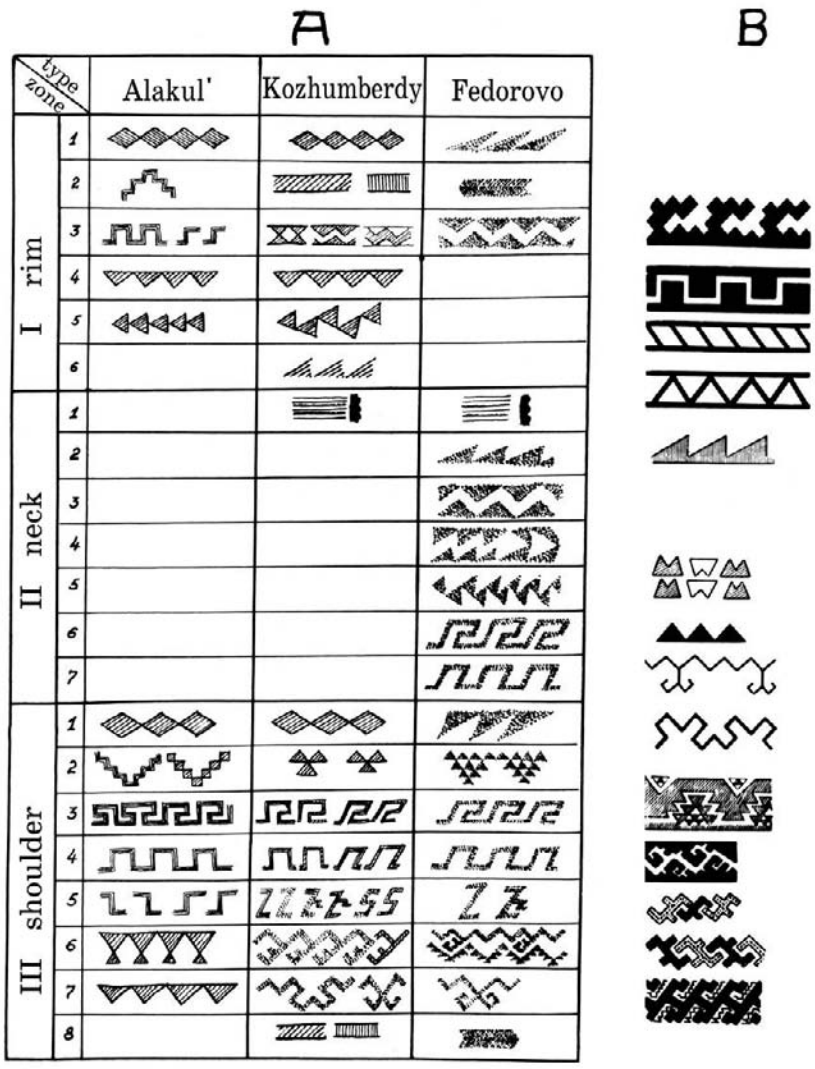

Fig. 13: A: Distribution of ornamental elements in different types of Andronovo pottery; B: Andronovo elements in Ugric pottery (after S. Ivanov).

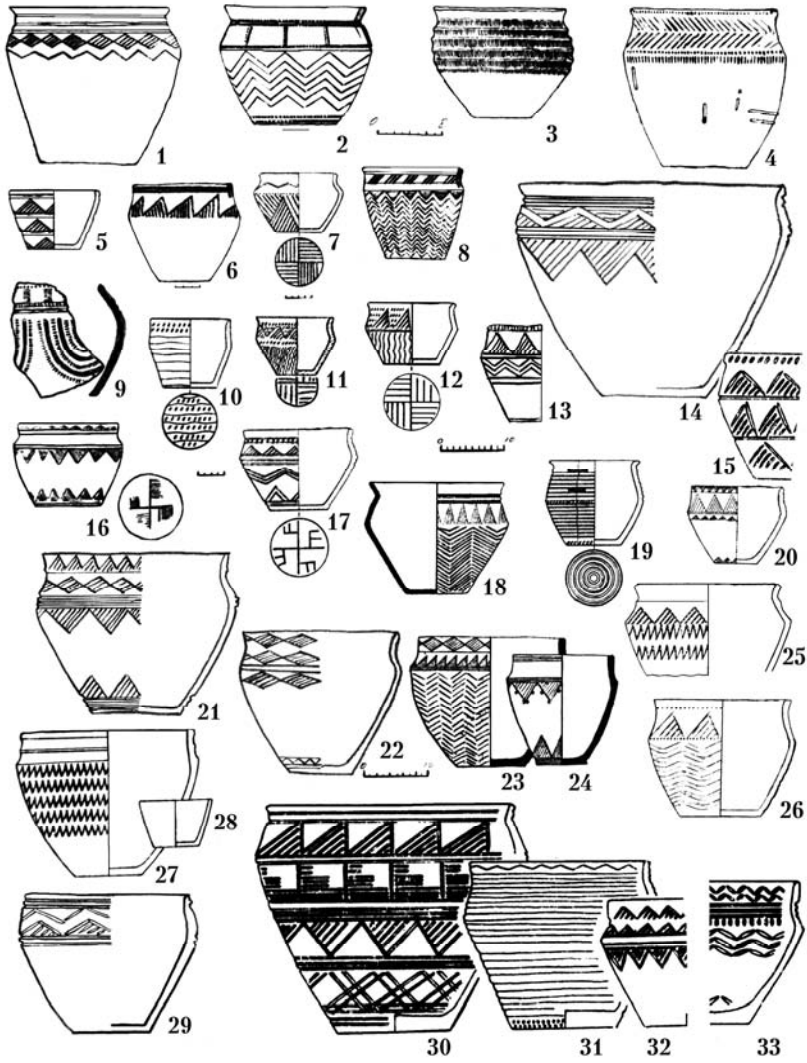

Fig. 14: Ceramics: Petrovka type.
1-4, 6, 8: Novy Kumak; 5, 7, 10-13, 17, 19-20, 25-28: Petrovka; 9, 16, 32: Stepnoe I; 14, 21-22, 29: Berlik; 18: Stepnoe II; 23-24-Berezovskiy; 30: Aksayman; 31: Kenes; 15: Petrovka settlement; 33: Kulevchi III settlement.

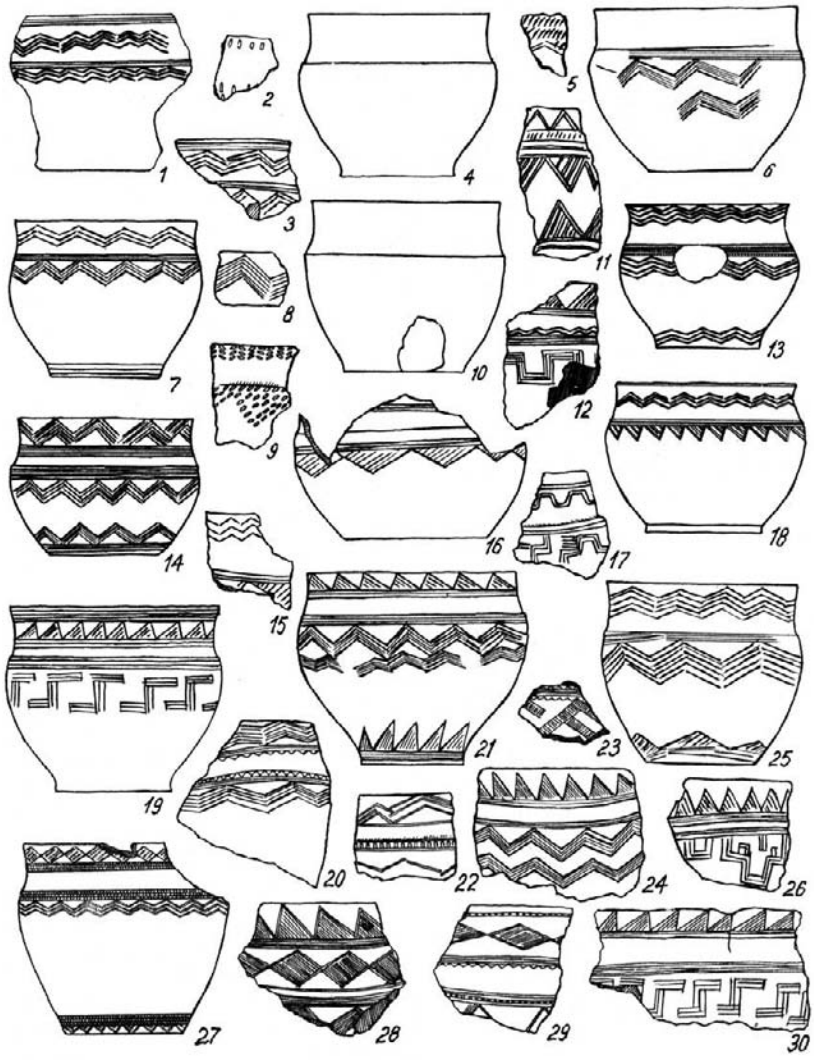

Fig. 15: Ceramics: Alakul' type. Alakul' barrows 15 and 49.

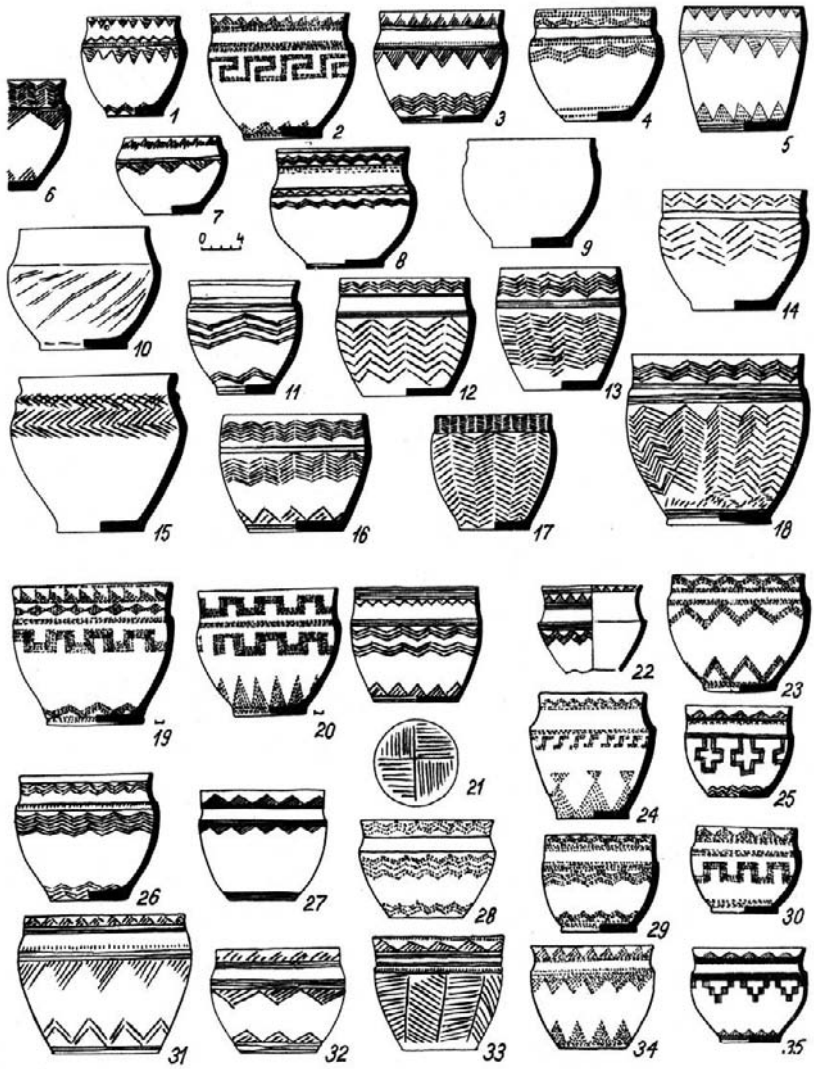

Fig. 16: Evolution of Alakul' type pottery of the Urals.
1-18: Alekseevka; 19-35: Alakul'.

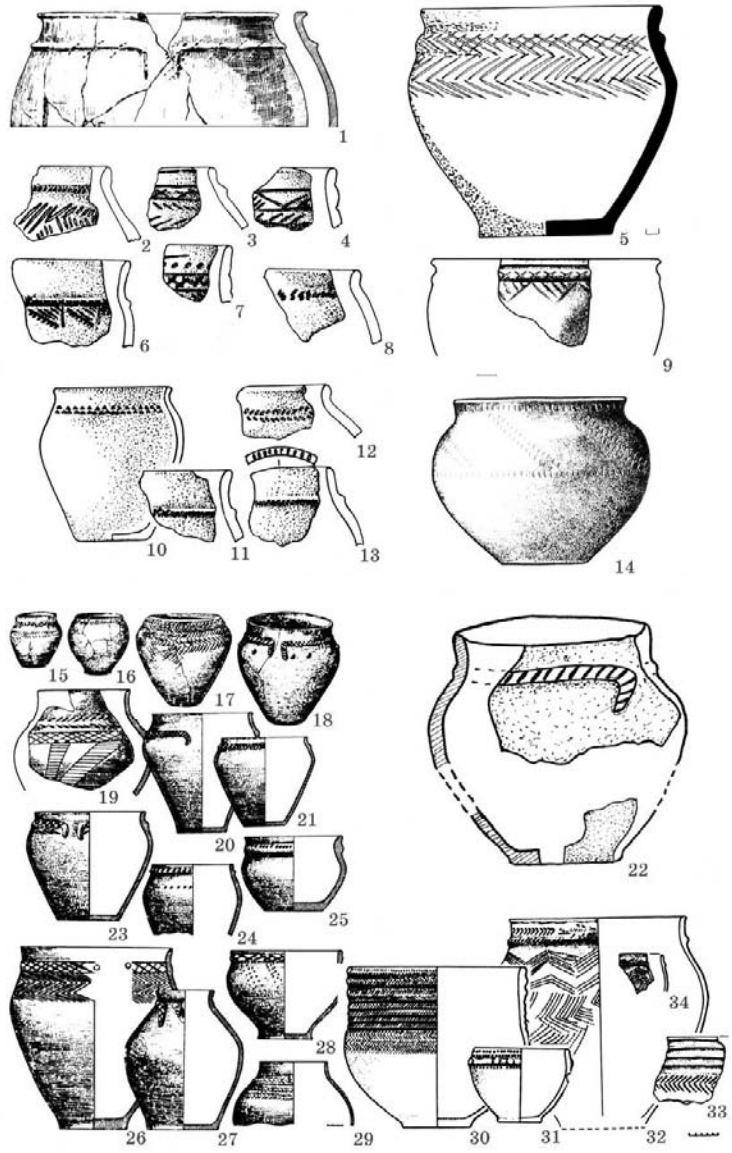

Fig. 17: Ceramics: Alekseevka type.
1: Trushnikovo; 2-4, 6, 8, 11-13: Zagarino; 7, 15-18: Alekseevka; 10: Konezavod; 19, 23, 29: Sargary; 20-21, 25: Novonikolskoe; 24: Yavlenka; 26-27: Petrovka II; 30-34: Duvanskoe XVII; cemeteries: 5: Alekseevka; 9, 14: Begazy; 22: Bola-Kulboldy III; 28: Sargary.

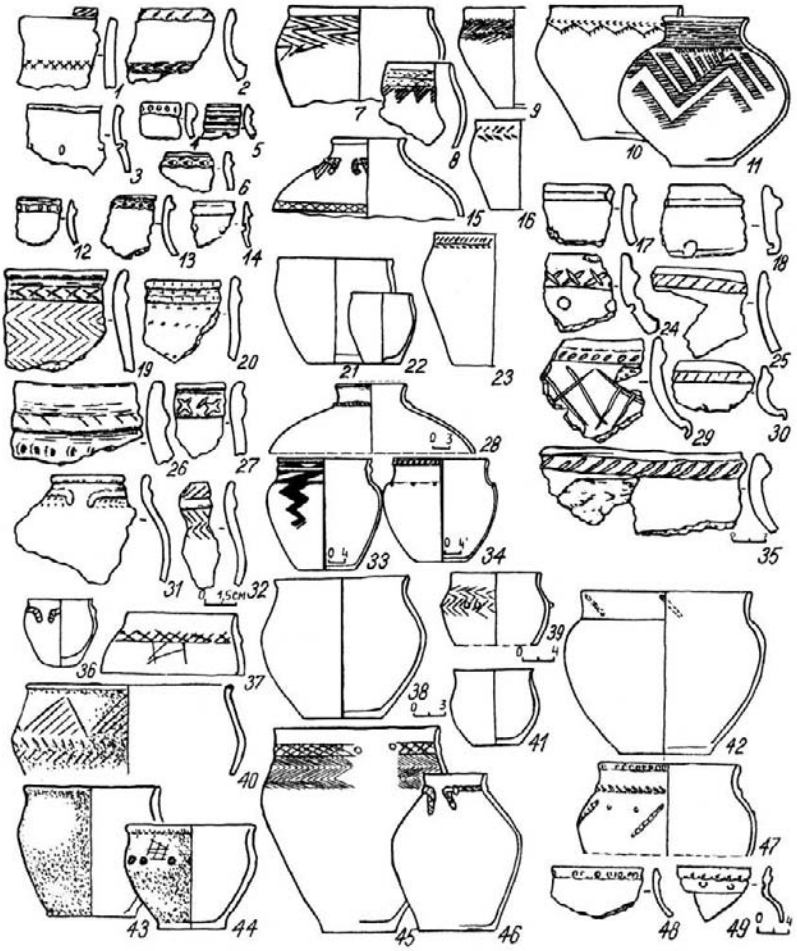

Fig. 18: Pottery of the Late Bronze Age in the Asian steppes.
1-6, 12, 14, 19-20, 26-28, 31-34: Kent; 7-11, 15-16, 21-23, 36-37: Novonikolskoe; 17-18, 24-25, 29-30, 35, 42, 47-49: Dongal; 40, 43-44: Novoil'inka; 45-46: Petrovka II; cemeteries: 38: Kshtan; 39, 41: Dermen.

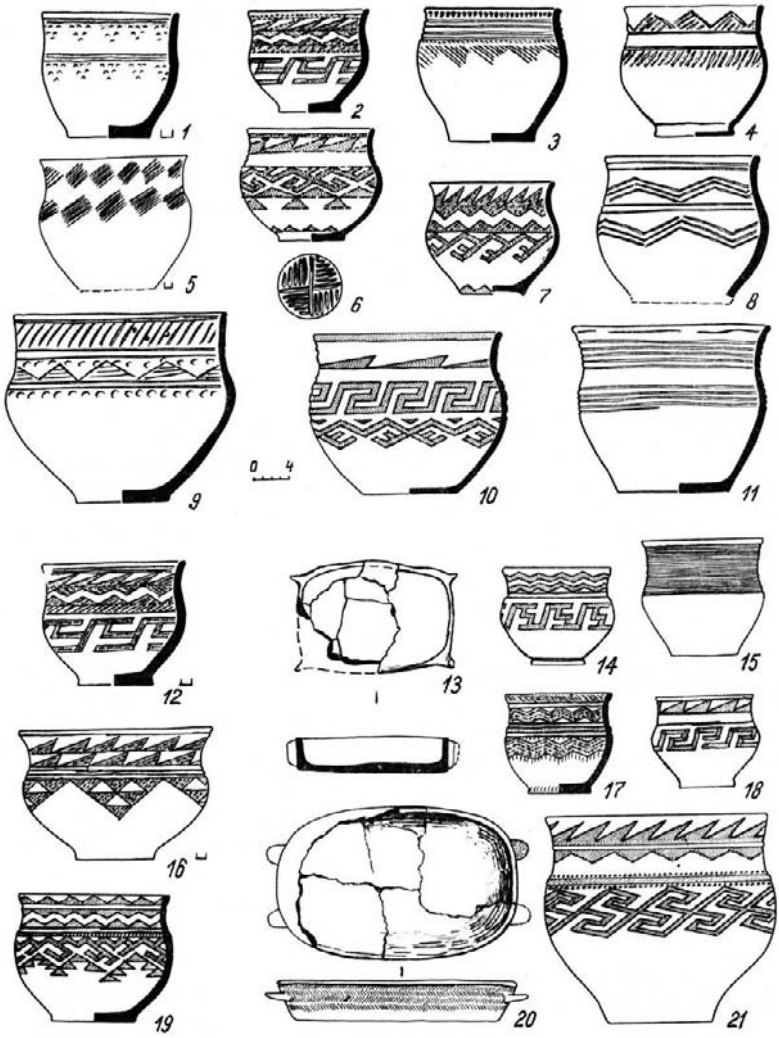

Fig. 19: Ceramics: Fedorovo type (Ural variant).
1, 2, 7-8, 12: Chelyabinsk city region; 3, 6, 11, 13: Sukhomesovo; 4, 5, 10, 16: Smolino; 9: Isakovo; others: Fedorovo.

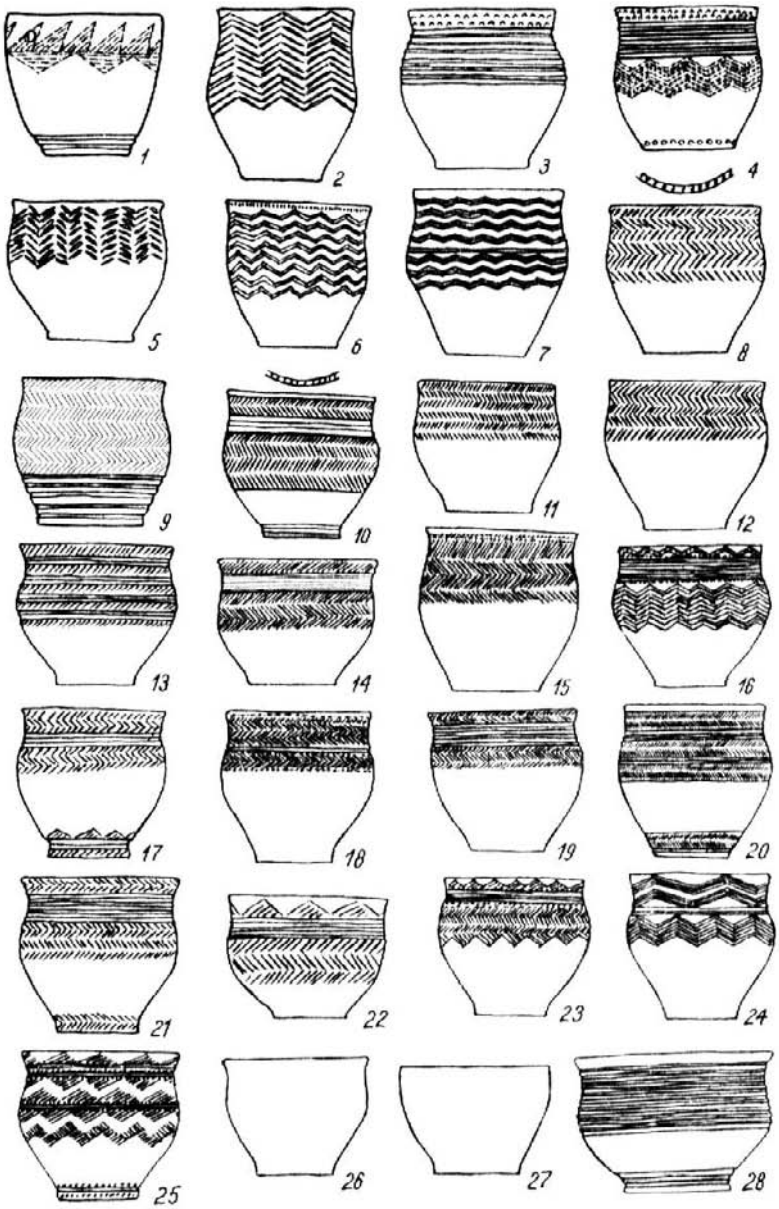

Fig. 20a: Ceramics: Fedorovo type (North Kazakhstan variant).
1-4: Biyrek-Kol'; 5-28: Borovoe.

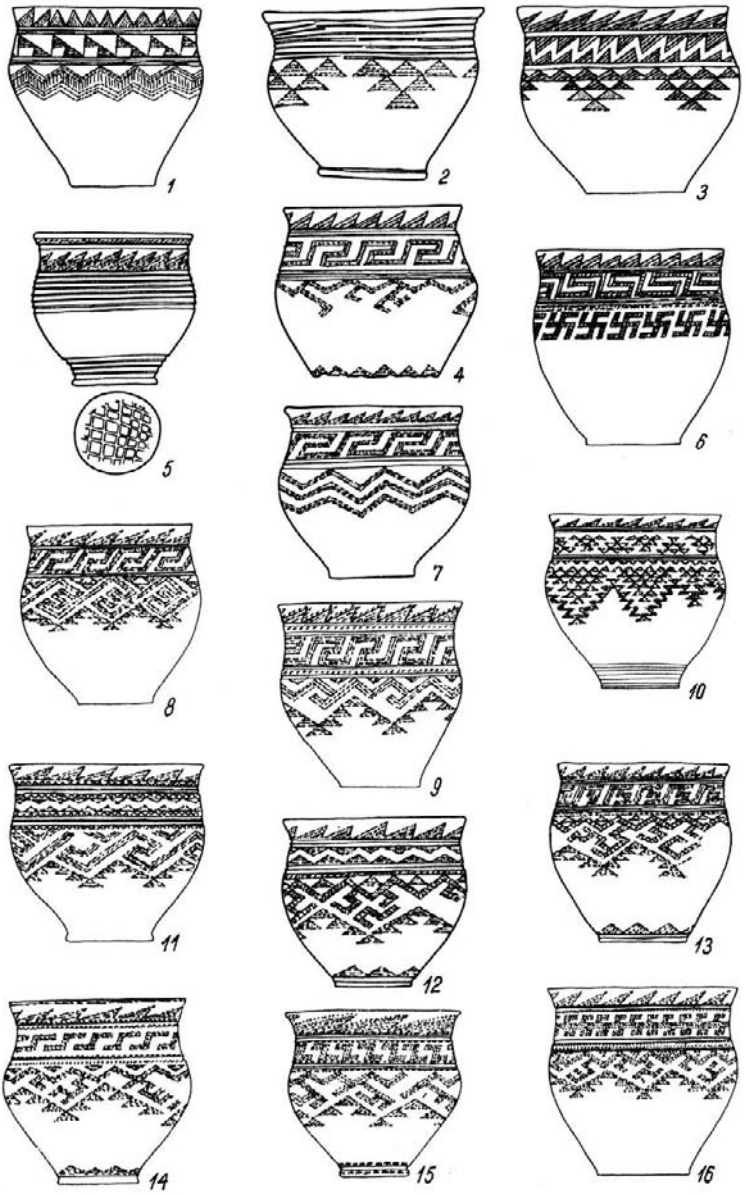

Fig. 20b: Ceramics: Fedorovo type (North Kazakhstan variant).
1, 6, 9, 12: Biyrek-Kol'; others: Borovoe.

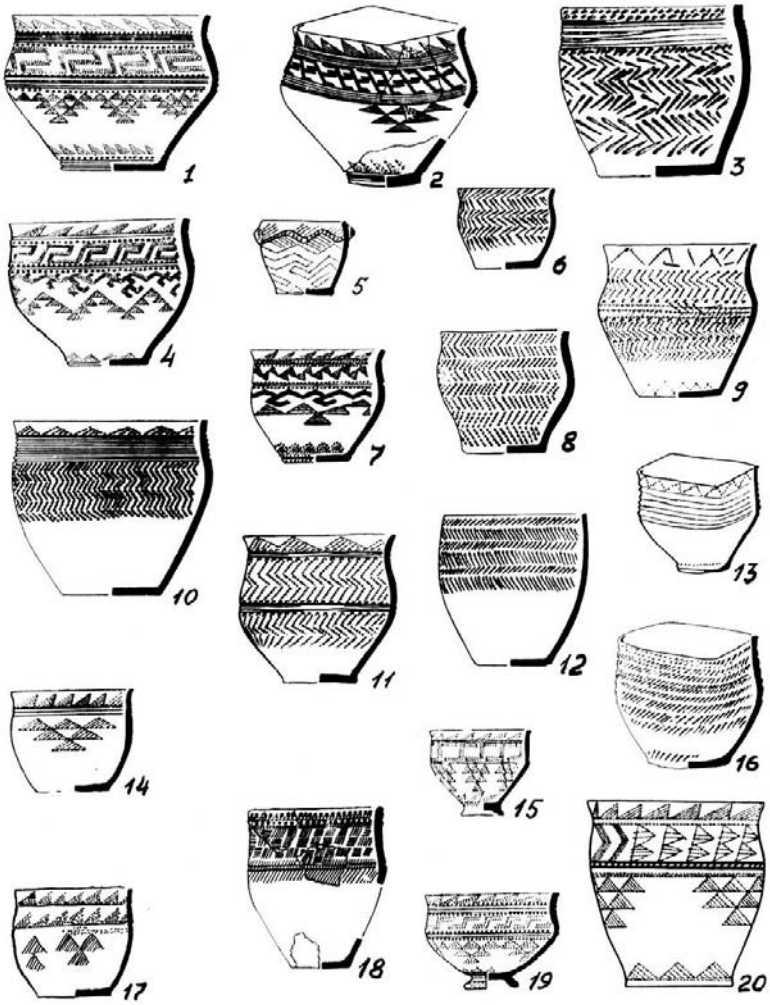

Fig. 21: Ceramics: Fedorovo type (Yenisey variant).
1-4, 7-8, 10, 18, 19: Sukhoe Ozero; 5, 9, 11: Solenoozernoe; 6, 12: Pristan'; 13-15, 16: Novaya Chernaya II; 14, 17: Ust'-Erba; 20: Andronovo.

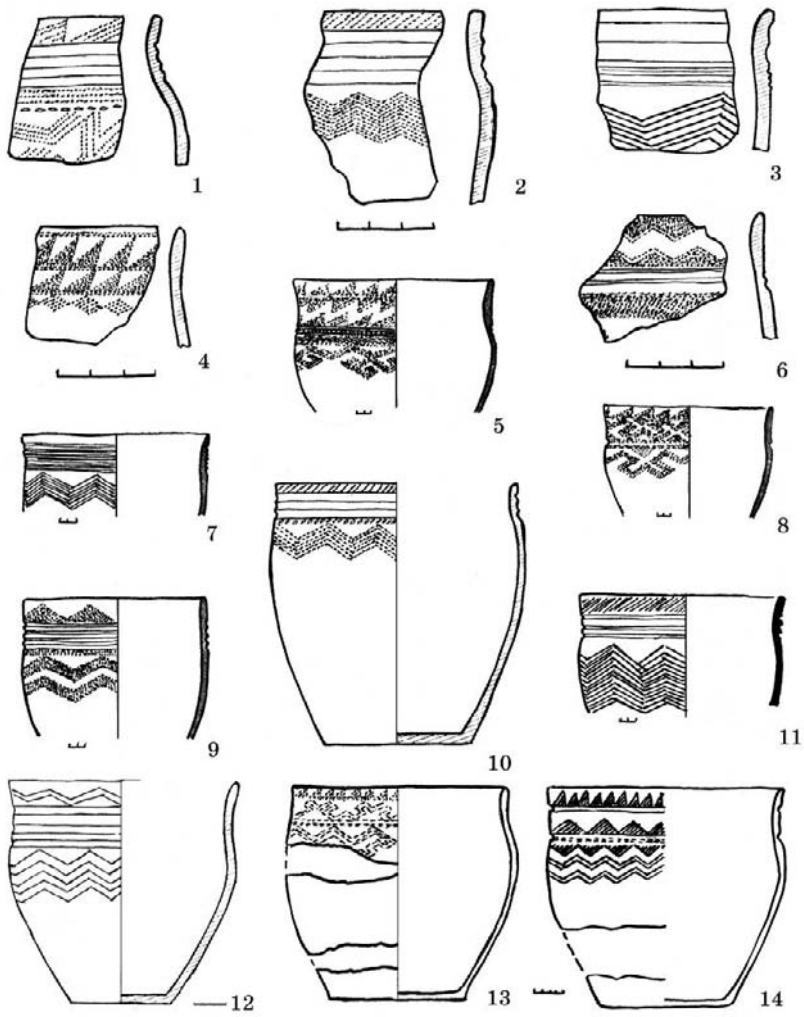

Fig. 22: Fedorovo type pottery from the settlements of Kipel', Cherkaskul' and Bishkul'.

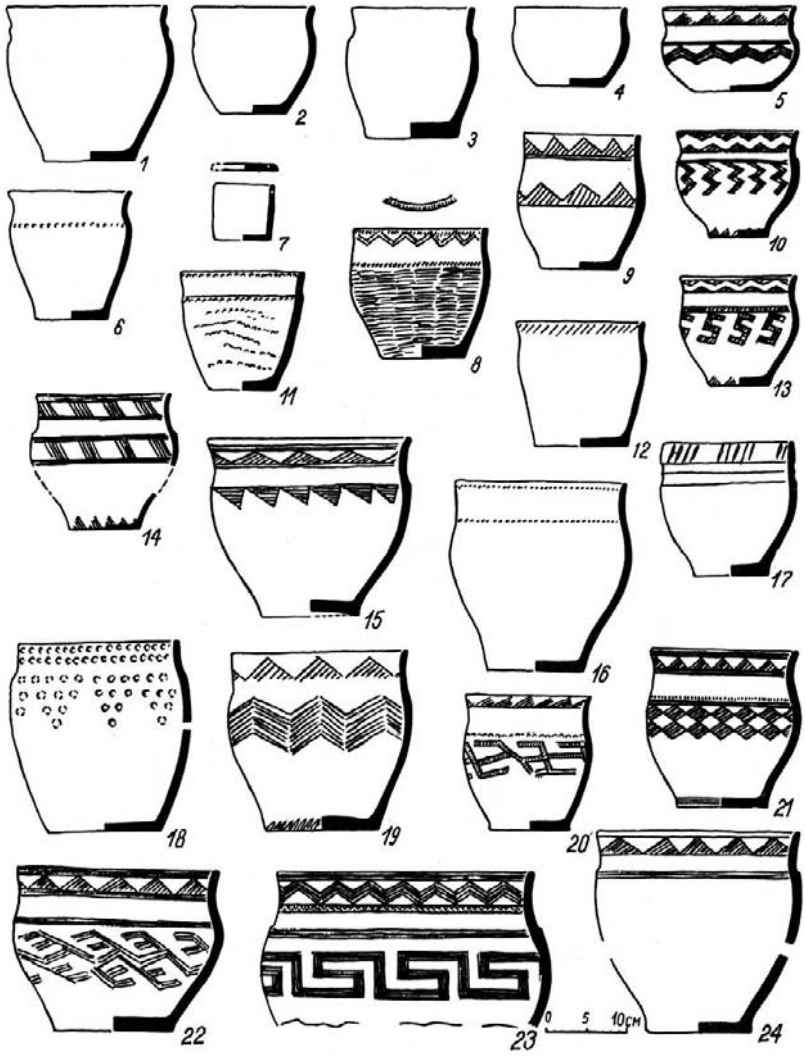

Fig. 23a: Kozhumberdy type pottery. Cemetery of Tasty-Butak.

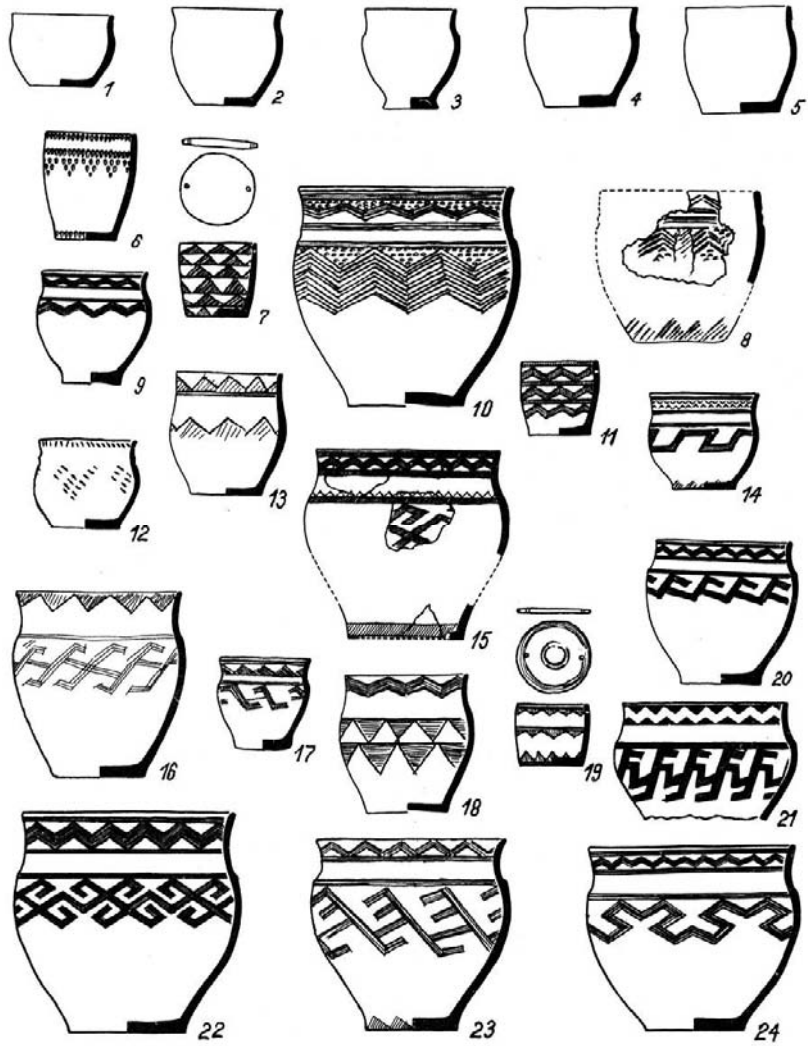

Fig. 23b: Kozhumberdy type pottery. Cemetery of Tasty-Butak.

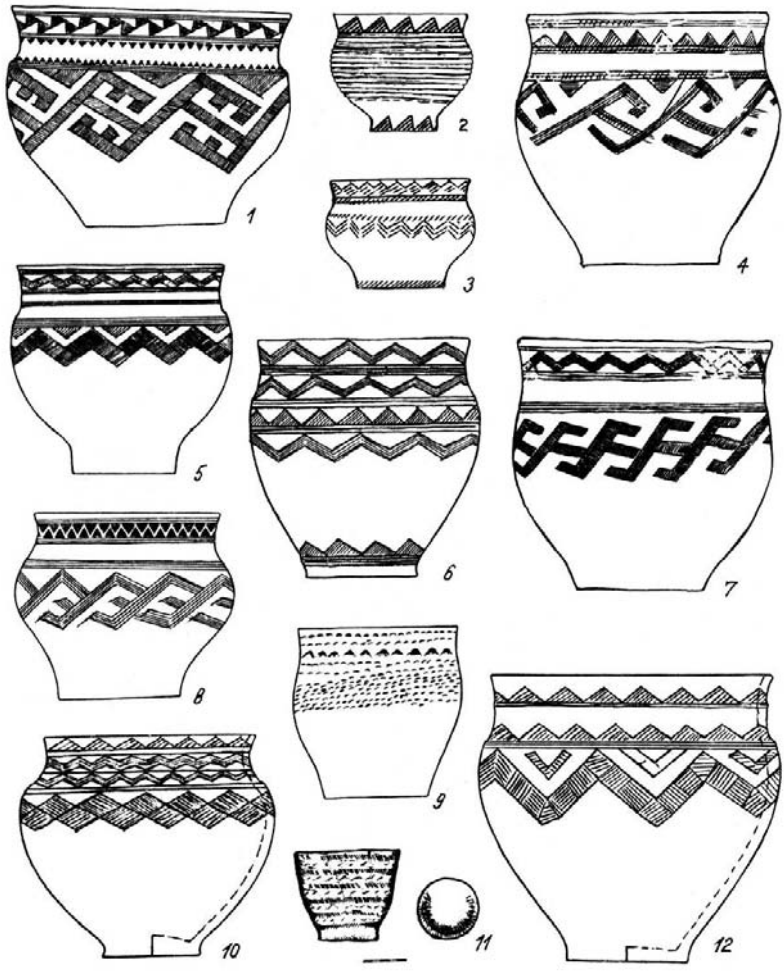

Fig. 24: Kozhumberdy and Sol'-Iletsk type pottery.
1-3, 8-9: Khabarnoe; 4, 7: Novy Kumak; 5: Uvak; 6: Mechet-say; 10-12: Bliznetsy.

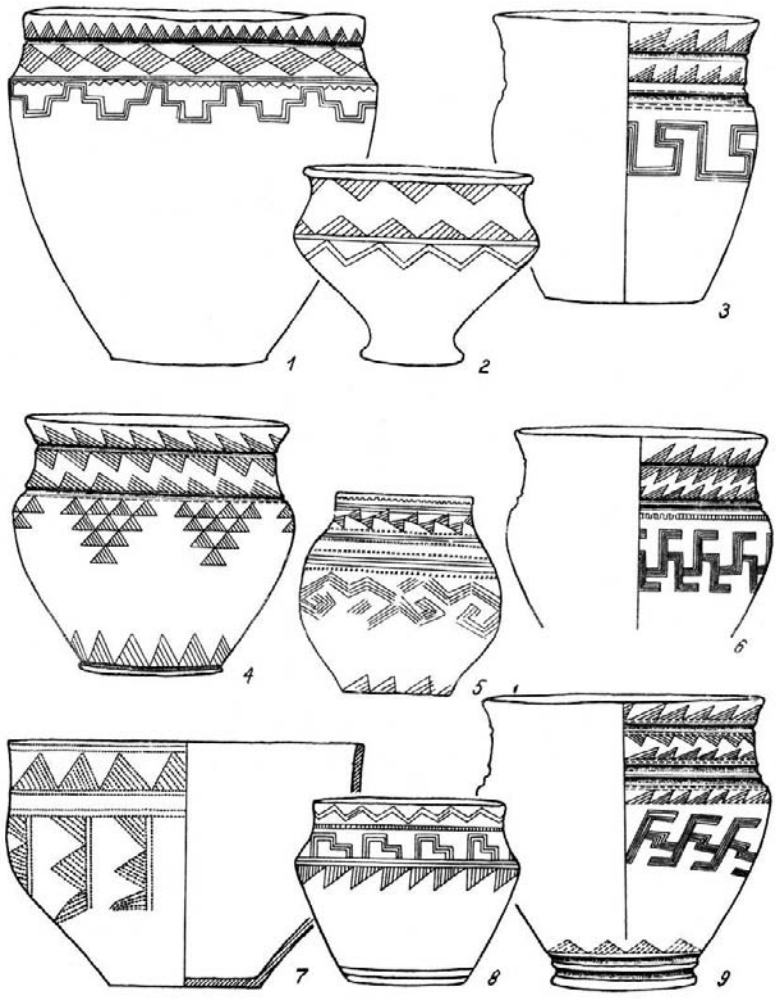

Fig. 25: Atasu type pottery and vessels from south Kazakhstan and the Tashkent oasis.
1: Efimovka; 2-El'shibek; 3, 6, 9: Atasu; 4, 8: central Kazakhstan (Karaganda museum); 5: Zangi-Ata (near Tashkent); 7: Road Chimkent-Tashkent.

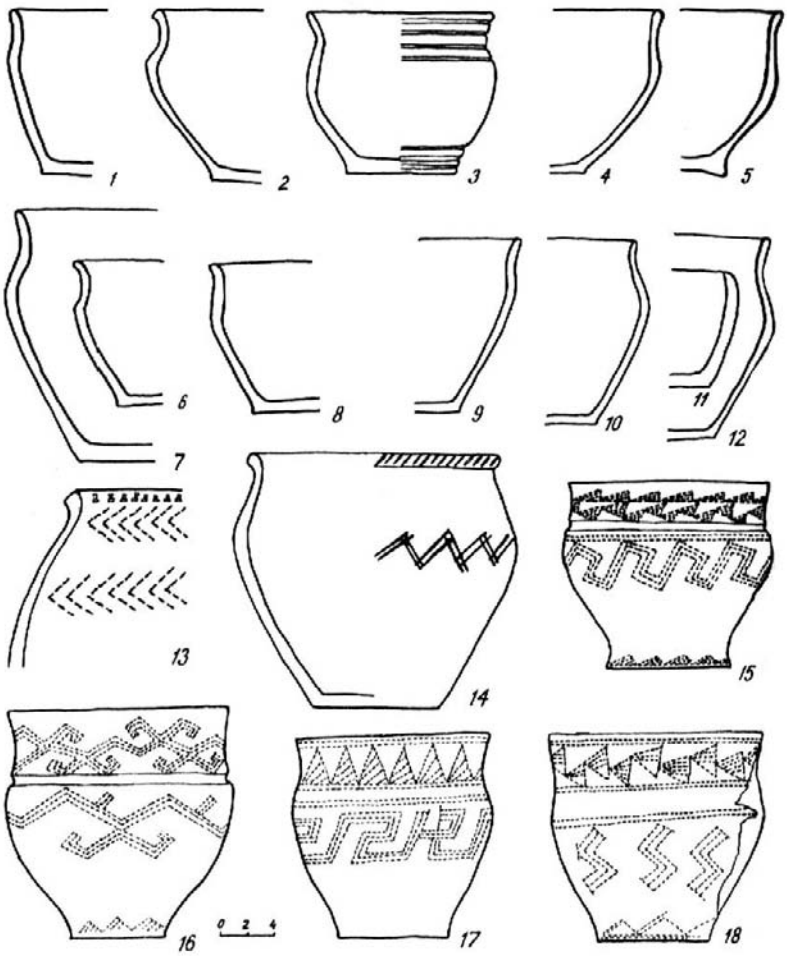

Fig. 26: Semirech'e type pottery.
1, 6: Kyzil-say; 2: Kulan-say; 3, 5, 8: The Big Chu canal; 7, 11-12, 14: Tash-Bashat; 9-10: Tash-Tyube; 13: Dzhal-Aryk settlement; 15: Prigorodnoe; 16: Issyk-Kul'; 17-18: Arpa.

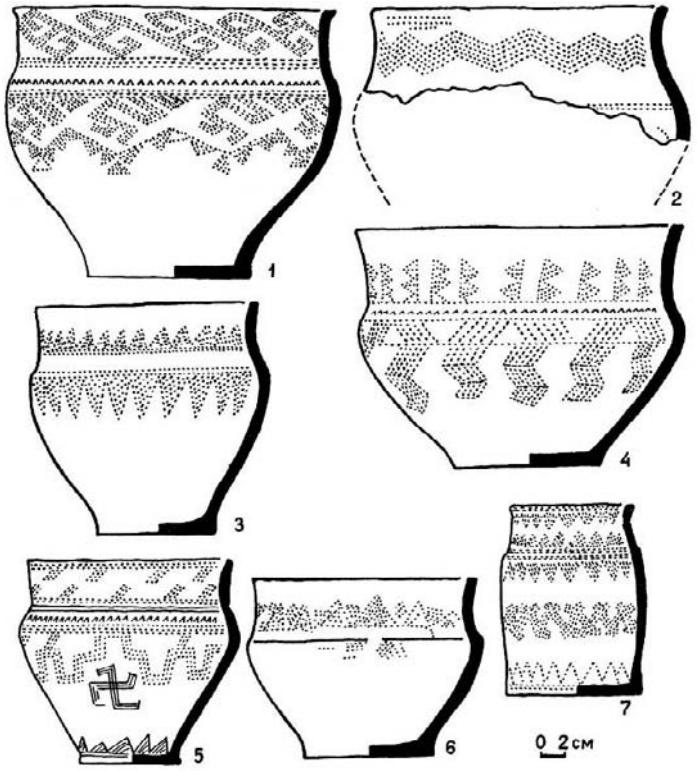

Fig. 27: Tautary type pottery. Tautary cemetery.

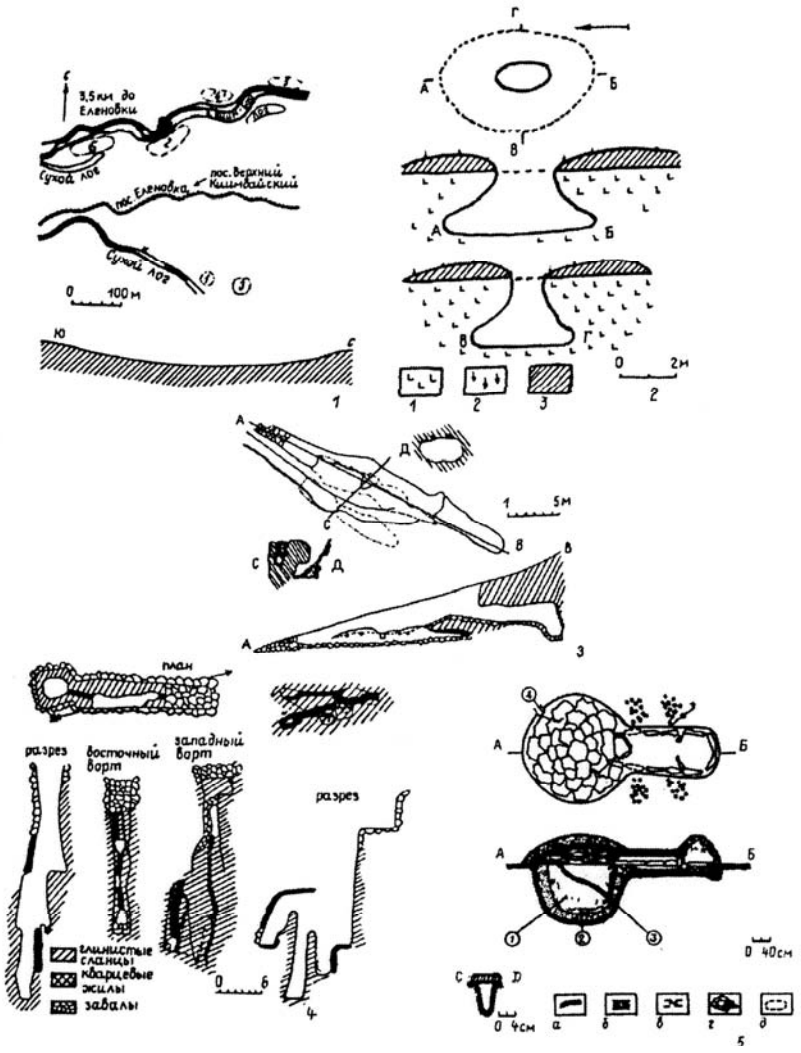

Fig. 28: Types of Andronovo mines and smelting furnaces.
1: Elenovka mine (1 - mine, 2 - ground for crushing ore, 3 - cemetery, 4-6 - settlements, 4 - Lower Kiimbay, 5 - Upper Kiimbay, 6 - Elenovka); 2: Altyn-Tyube (plan and cross section); 3: Karagoin (plan and cross section); 4: Mynchunkur, mine 6 (plan and cross section); 5: settlement Atasu (reconstruction of smelting furnace).

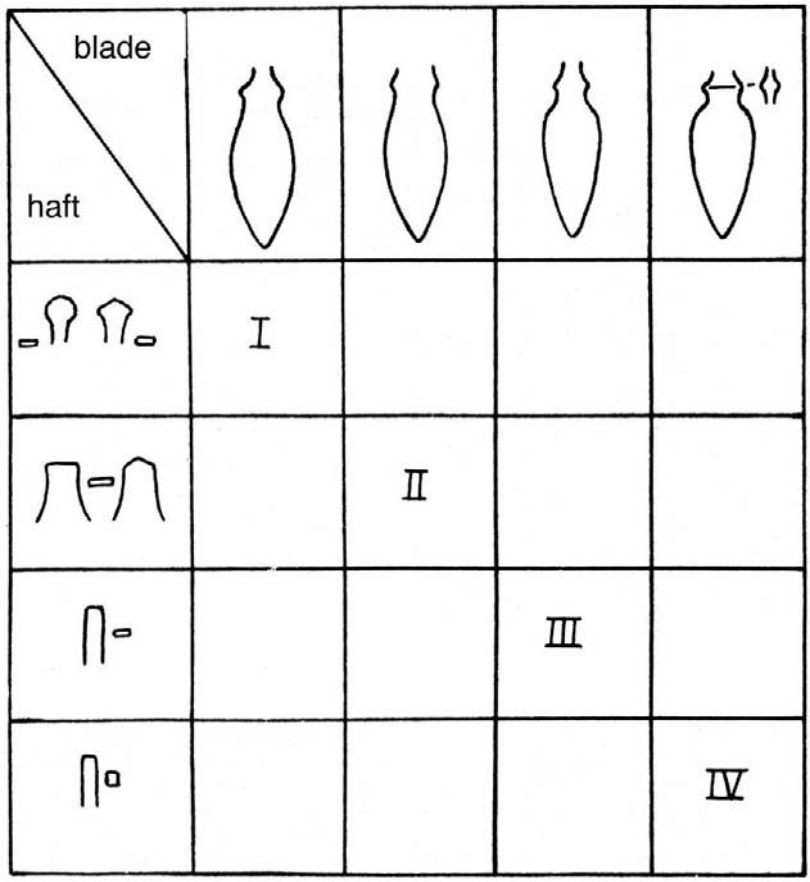

Fig. 29: Evolution of knives.

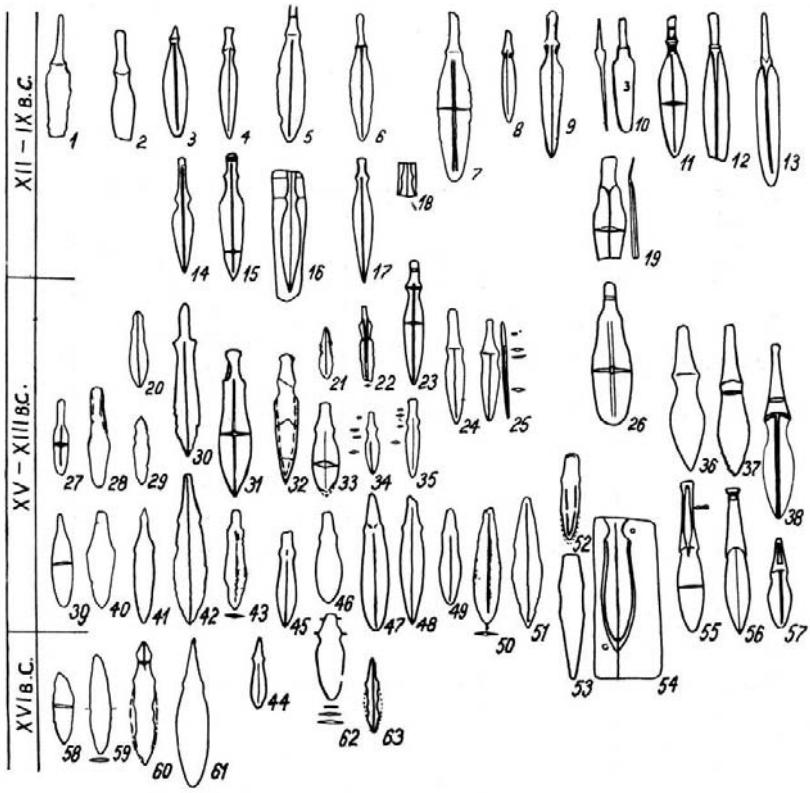

Fig. 30: Principal discoveries of knives in Andronovo complexes.
Cemeteries (1: Borovoe; 5: Chernoozer'e; 14, 17: Elovka II; 15: Zevakino; 20: Maytan; 21: Bozengen; 23: Putilovskaya Zaymka; 24: Zhilandy; 25: Altyn-Tyube; 26: Bylkyldak; 27: Evgenevka; 28: Novy Kumak; 29: Uvak; 30: Borovoe; 31, 37: Chernyaki; 32: Maly Koytas; 33: Kupukhta; 34-35: Urefty; 36: Gerasimovka; 39: Naurzum; 40: Vetlyanka; 41: Orsk (grave); 42: Ul'ke; 43: Subbotino; 44: Kulevchi VI; 45: Tsarev Kurgan; 46: Kozhumberdy; 47: Satan; 48, 56: Tokanay; 49, 57: Nurmambet; 50: Kamyshnoe; 51: Bliznetsy; 52: Nurtai; 53: Krasnaya Krucha (grave); 58: Petrovka; 60: Kenes; 61: Novy Kumak; 63: Berlik). Settlements (2: Atasu; 3: Alekseevka; 6: Chelkar; 7: Elizavetinskiy Priisk; 8: Yavlenka; 13: Kent; 13: Kureika; 18: Kamyshnoe; 54: Mirny; 55: Novonikol'skoe; 59, 62: Kulevchi III). Stray finds (4: Kasargul; 9: Central Asia; 10-11: Semipalatinsk; 16: Mynchunkur; 19: Pervomaiskiy; 22: Bolshaya Rechka; 38: Kustanay (16, 54: stone moulds)).

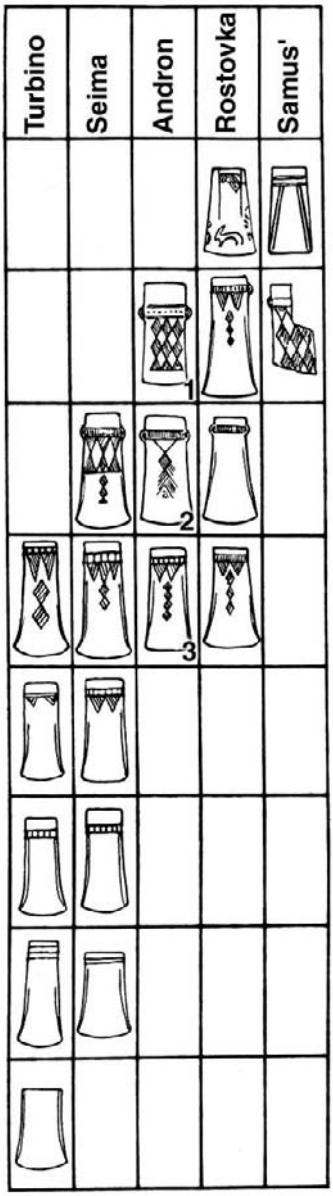

Fig. 31: Evolution of celts.
1: Kosikha; 2: Kalbinsky; 3: Omsk hoard.

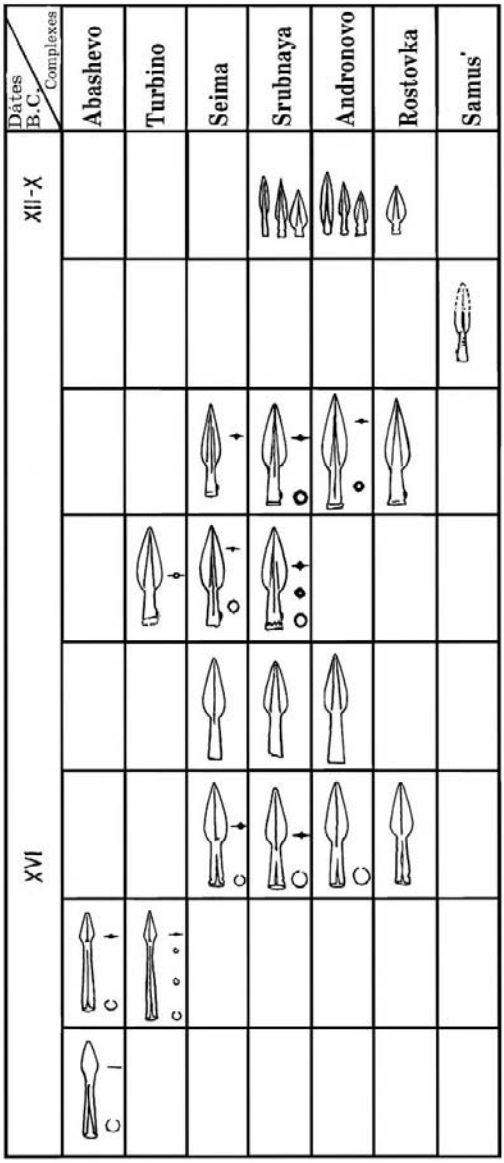

Fig. 32a: Evolution of spears. Abashevo (Tyunino, Dolgaya Gora), Srubna (Masurka, Kobylenka, Karamysh, Pokrovsk, Malye Kopani); Andronovo (Uyfalvi collection, Orsk, Bliznetsy)

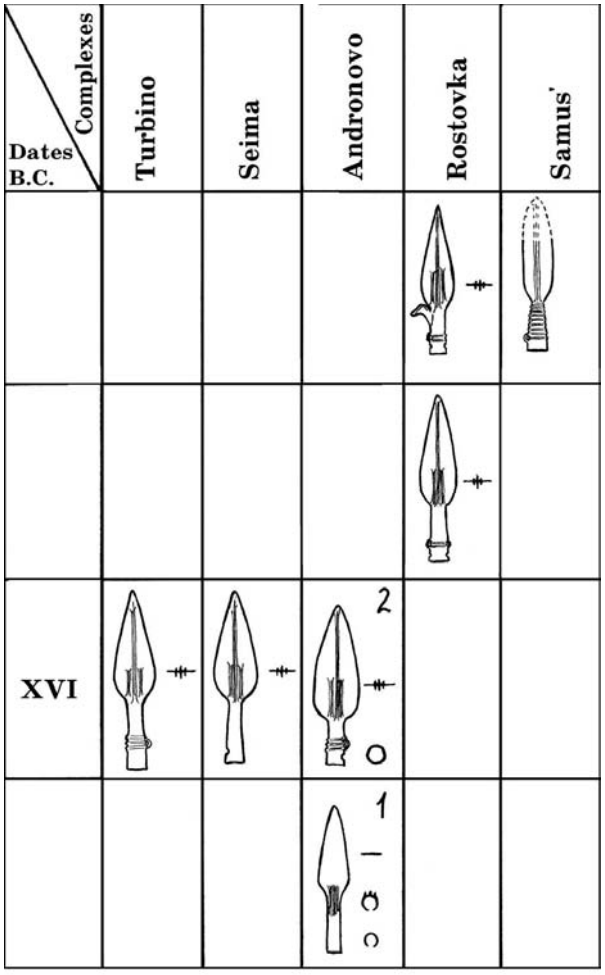

Fig. 32b: Evolution of spears with attachment.
1: Semipalatinsk; 2: Omsk.

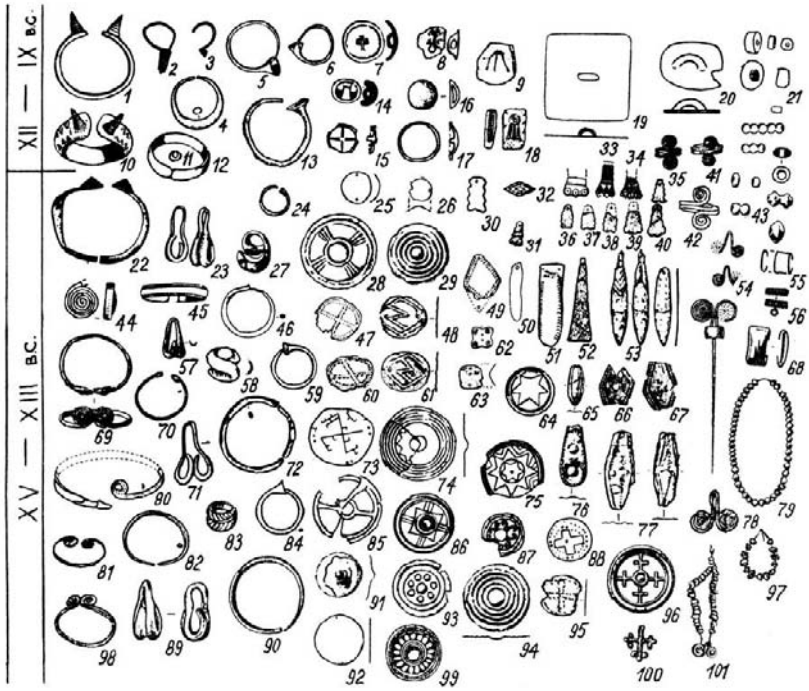

Fig. 33: Principle types of Andronovo ornament and its evolution.
Bracelets (1: Belasar; 10: Iskander; 22: Ayshrak; 44: Ural-say; 69: Tasty-Butak; 80: Kupukhta; 81: Baytu; 98: Alakul'; 12: Tash-Tube; 45: Arpa; 70, 83: Baytu). Temple-ring (11: Barnaul; 23: Gurdush; 57: Uvak; 71: Kupukhta; 89: Novy Kumak). One and a half temple ring (27: Bylkyldak; 46: Sukhoe Ozero; 72: Tasty-Butak; 90: Khabarnoe). Temple ring with trumpet (5: Tash-Tyube; 6: Sangru; 18: Tegermen-say; 59: Kupukhta; 84: Dzhartas). Plates (7: Brichmulla; 8: Sukhoe Ozero; 14: Tash-Tyube; 15, 17: Kent; 16: Urlanovo; 25-26, 47, 60: Borovoe;28-29: Alekseevka; 48, 61, 94: Tasty-Butak; 73, 75, 88: Kuropatkino; 74: Ayshrak; 85: Buguly; 86, 96: Bylkydak; 87: Balakty; 91: Baytu; 92, 99: Alakul'; 93: Buguly; 95: Khabarnoe; 9: Suukbulak; 18: Kamyshnoe; 30: Alypkash; 31: Bylkyldak; 32: Murzashoky; 33: Maly Koytas; 34: Akmola; 35: Borovoe; 36-38: Aksu-Auly; 39-40: Baishtyn). Pendants (50: Borovoe; 51: Tash-Tube; 52: Ural-say; 53: Alekseevka; 65-67, 76-77: Tasty-Butak). Mirrors (19: Borovoe; 20: Kara-Kuduk). Finger-rings (41: Alekseevka; 42: Borovoe; 100: Chernyaki). Spectacle pendants (54, 67: Petropavlosk; 78: Chistolebyazh'e; 101: Alakul'). Beads (21: Borovoe; 43, 68: Bylkyldak; 55: Tautary; 56: Tasty-Butak; 79: Petropavlosk; 97: Kupukhta). Stone moulds (9, 18).

Fig. 34: Chariots on Andronovo and Srubna vessels and petroglyphs from Kazakhstan, the Pamirs, India and Tuva.
Petroglyphs (1, 2, 11: Koybagar III; 3, 5: Koybagar I; 4: Kok-Bulak; 7: Tekke-Tash; 9: Gabaevka; 10: Koybagar II; 12: Chinge; 13: Syyn-Churek; 14: Akdjilga (the Pamirs); 15: Thor (Indus); 16: Arpausen V). Cemeteries (6: Sukhaya Saratovka; 8: Spasskoe I).

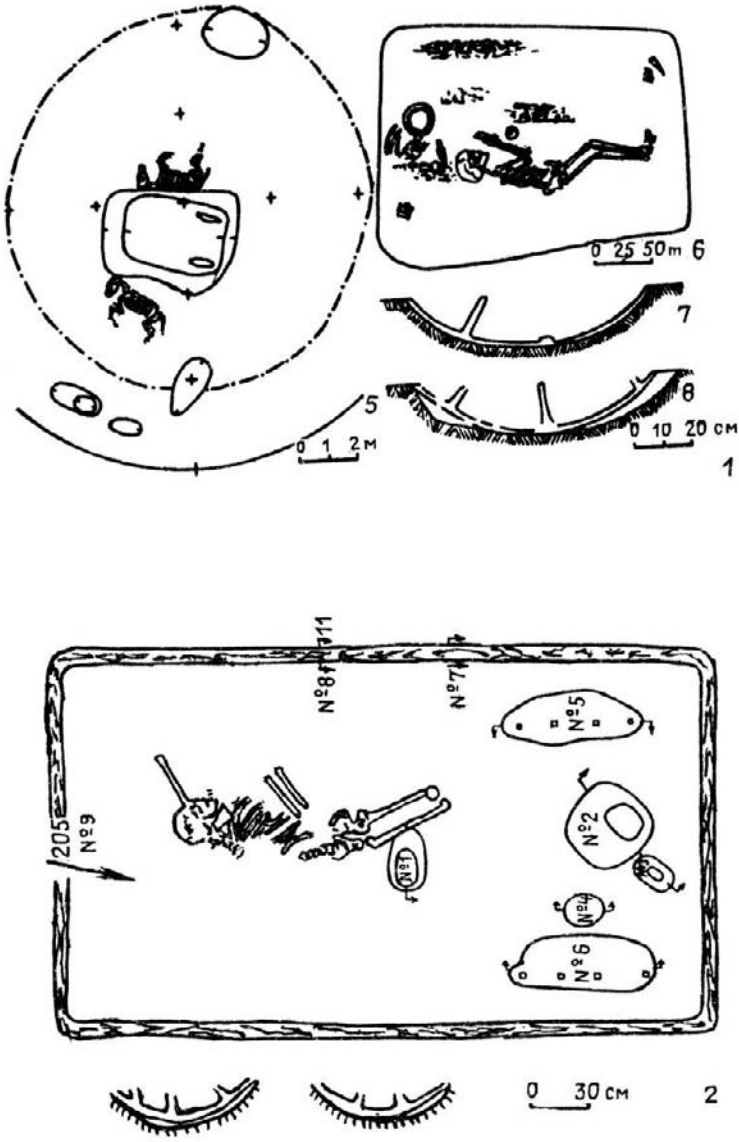

Fig. 35: Graves with the remains of chariots and imprints of spoked wheels.
1: Berlik II; 2: Sintashta, grave 28.

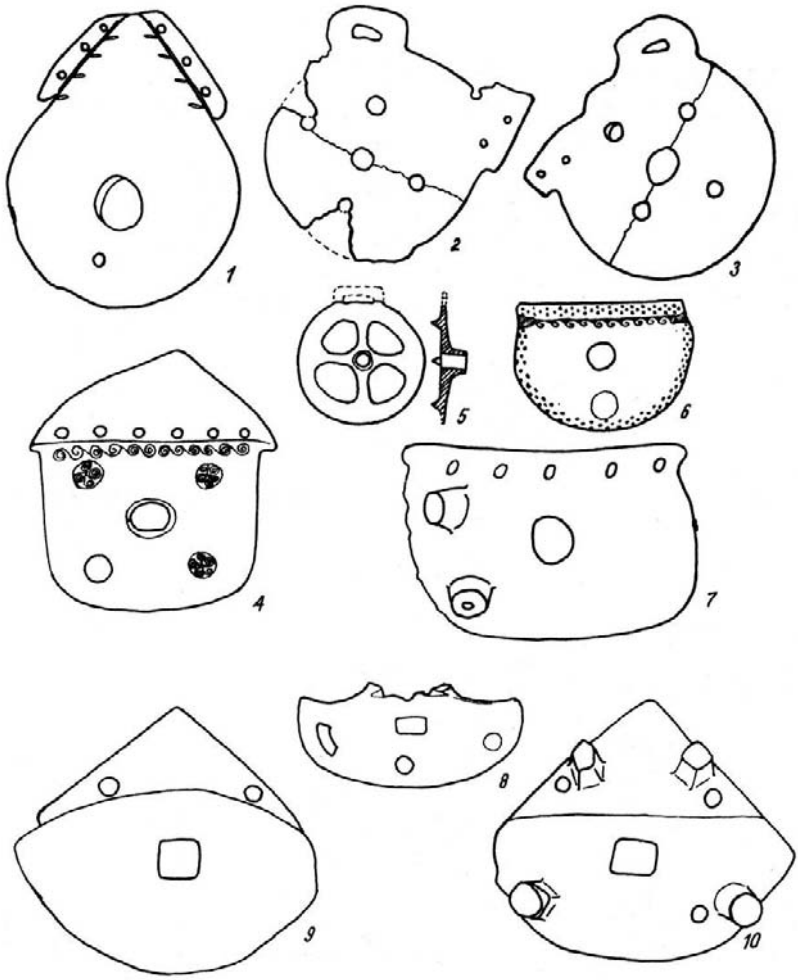

Fig. 36: Cheek-pieces from the Eurasian steppes and Greece.
Settlements (1: Polyany; 7: Otrozhka; 8: Kulevchi III). Cemeteries (2-3: Vesely; 4: Bogoyavlenskoe; 6, 9: Utëvka VI; 5: Athens).

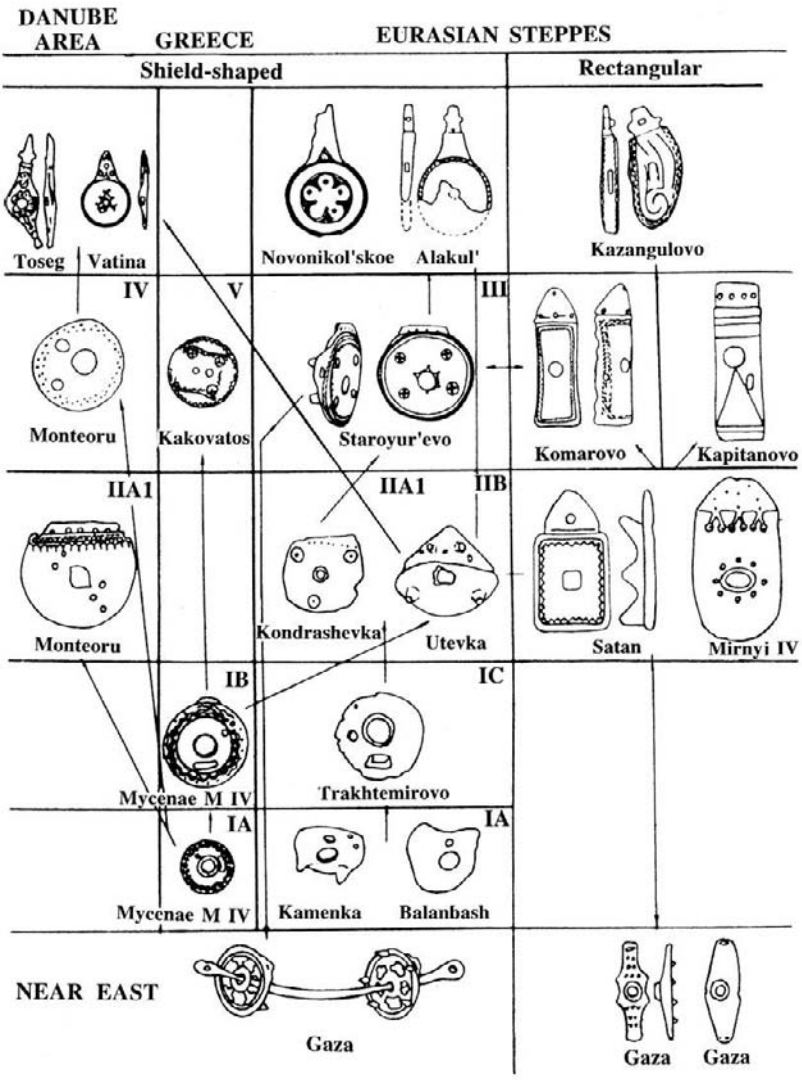

Fig. 37: Evolution of types of cheek-pieces of the Eurasian steppes, the Danube region and Mycenae.

Fig. 38: Mycenaean ornaments (after G. Karo and A. Furumark) in the Eurasian steppes.

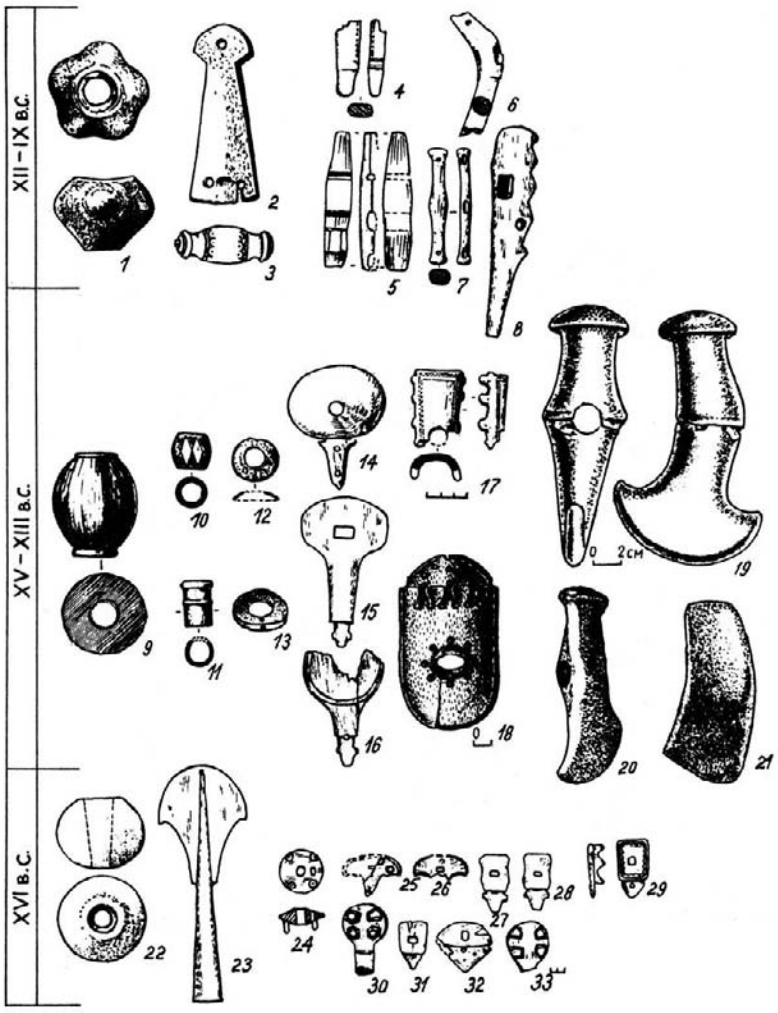

Fig. 39: Evolution of stone and bone artifacts.
Settlements (1: Malokrasnoyarka; 2, 6: Atasu; 3-4: Alekseevka; 5: Shortandy-Bulak; 7: Yazevo; 8: Chelkar; 14, 17: Tasty-Butak; 18: Mirny IV; 19: Korkino; 25: Novonikol'skoe I; 26: Kulevchi III; 30, 33: Petrovka II). Cemeteries (9, 13, 16: Alakul'; 10: Uvak; 11-12: Tasty-Butak; 15: Aydabul; 20: Mirny; 21: Krasnya Krucha (grave); 22: Kenes; 23-24: Sintashta; 27-28, 31: Aksayman; 29: Satan; 32: Berlik). 1, 19, 22: stone; 9: bronze; 12: shell; the rest: bone.

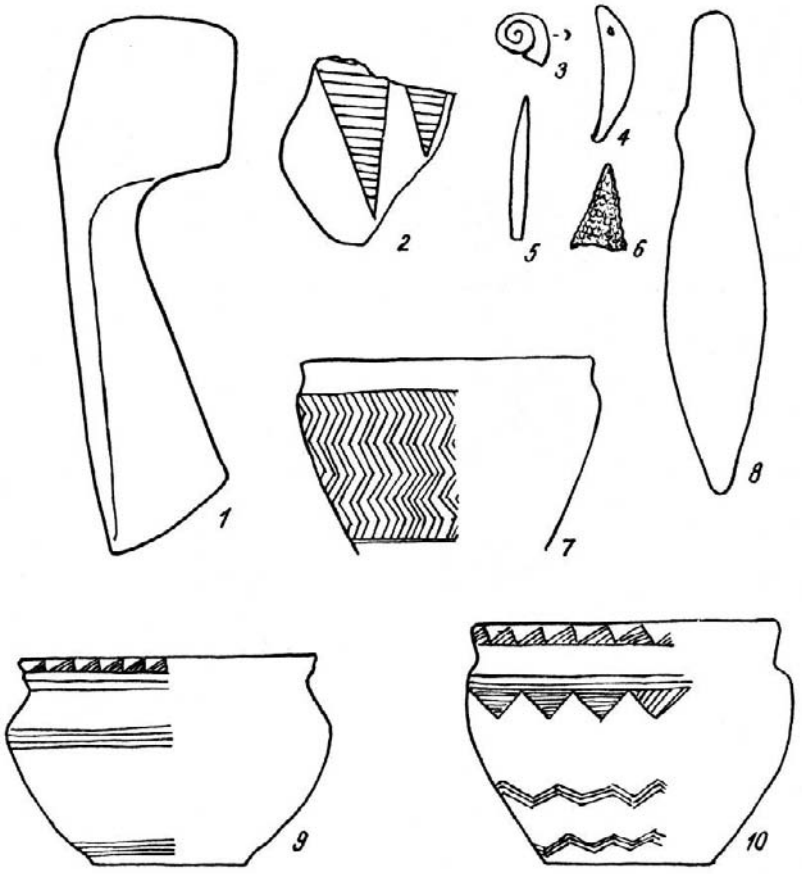

Fig. 40: Assemblage from the grave of Tsarev Kurgan.
1,3, 5-6: bronze; 4: tooth; 7, 9-10: pottery; 8: stone.

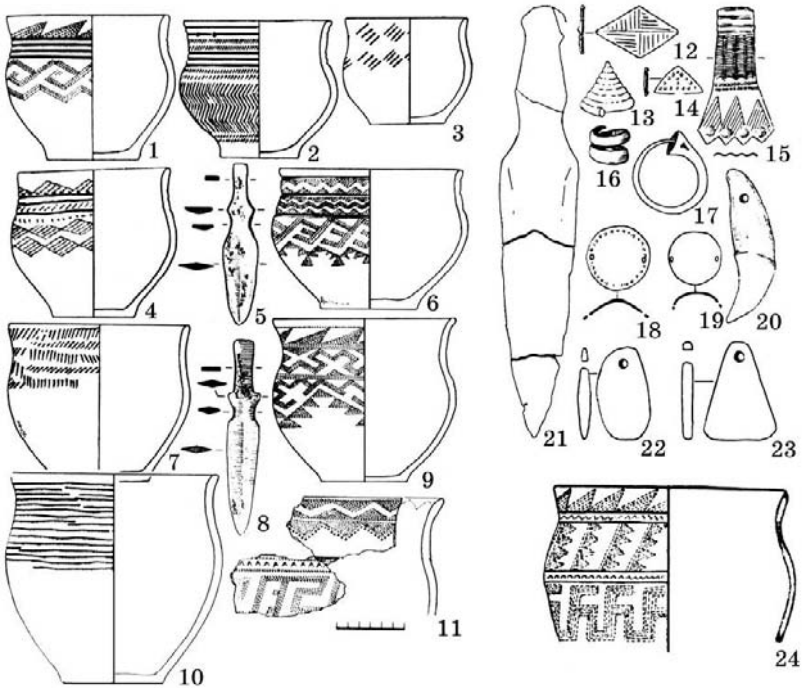

Fig. 41: Assemblages that date Fedorovo-type sites.
1-11: Urefty; 12-23: Maly Koytas; 24: Samus'; 5, 8, 12-19, 21: metal; 20: tooth; 22-23: stone; the rest: pottery.

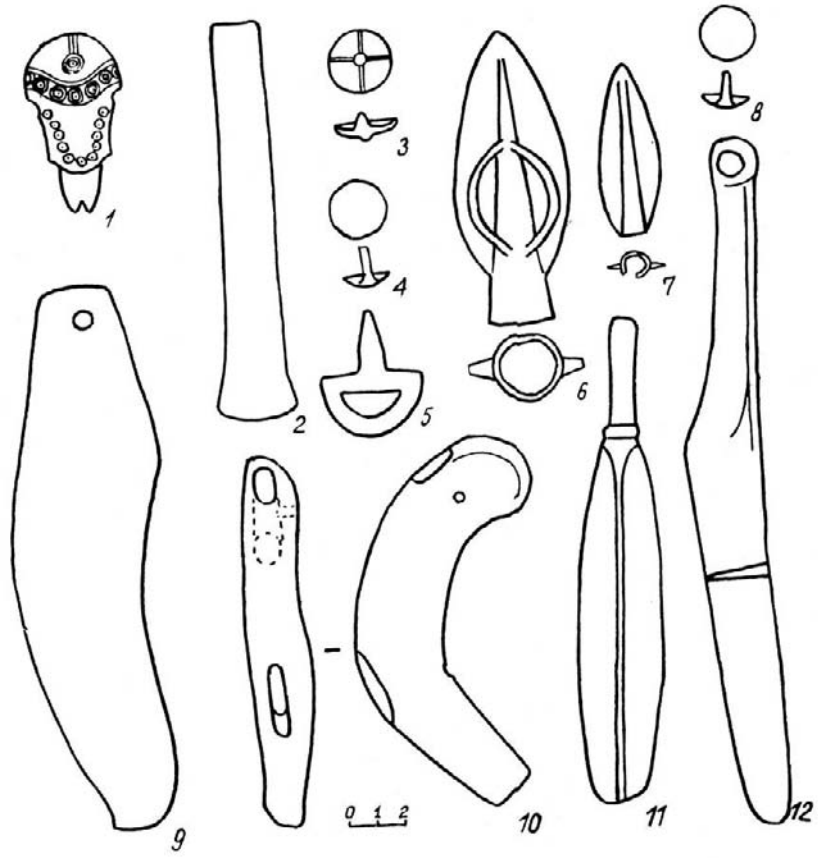

Fig. 42: Assemblage from the settlement at Kent.
1, 10: bone; the rest: bronze.

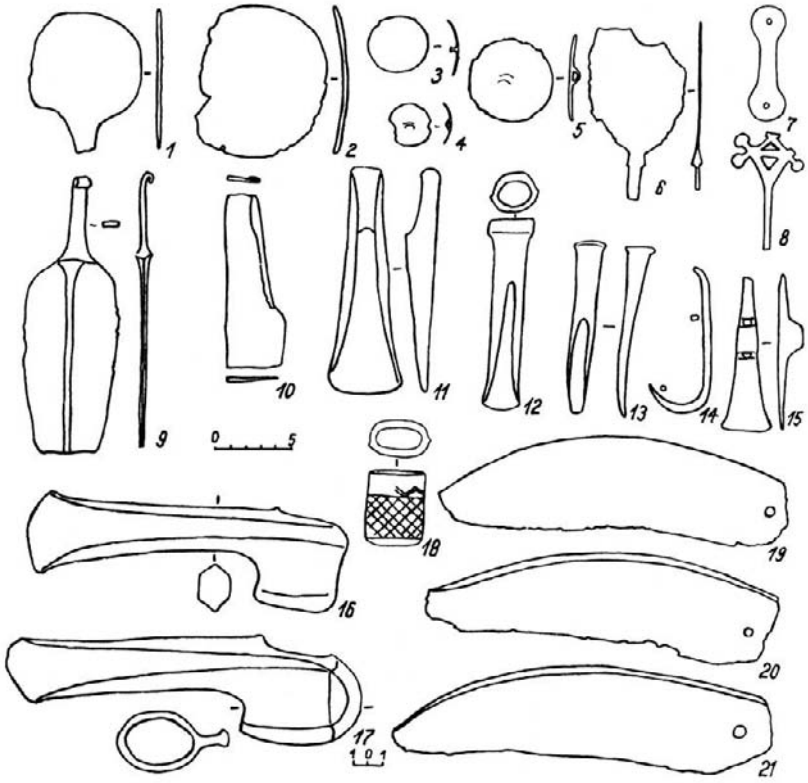

Fig. 43a: The Shamshi hoard.

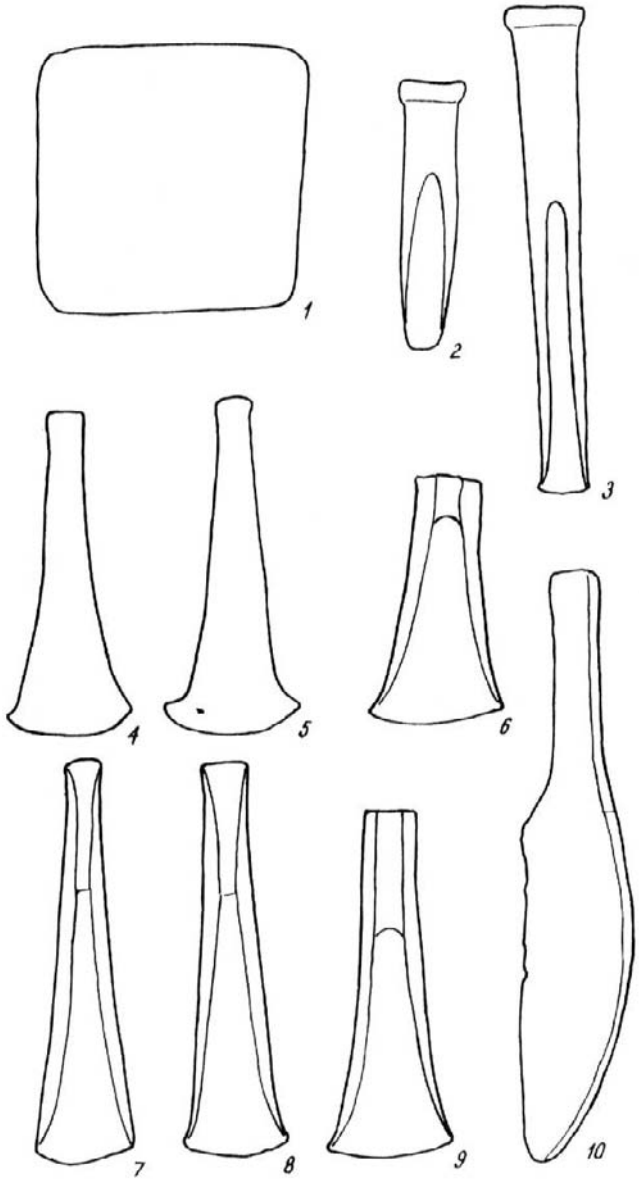

Fig. 43b: The Tuyuk hoard.

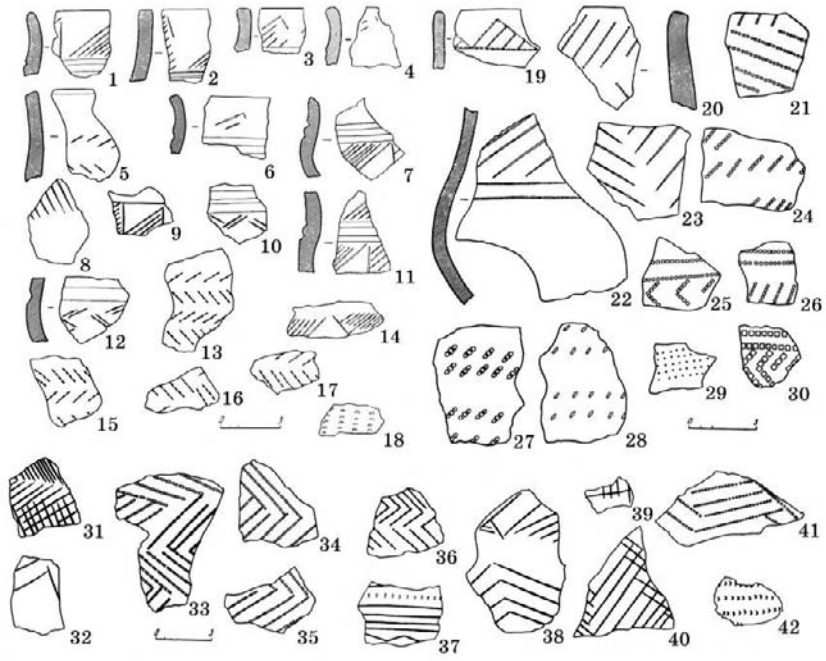

Fig. 44: Pottery from the Aral region.
1-18: Aral'sk; 19-23: Karakul'; 24-30: Kartaly; 31-32, 36-42: Shulkum; 33-35: Sorbulak.

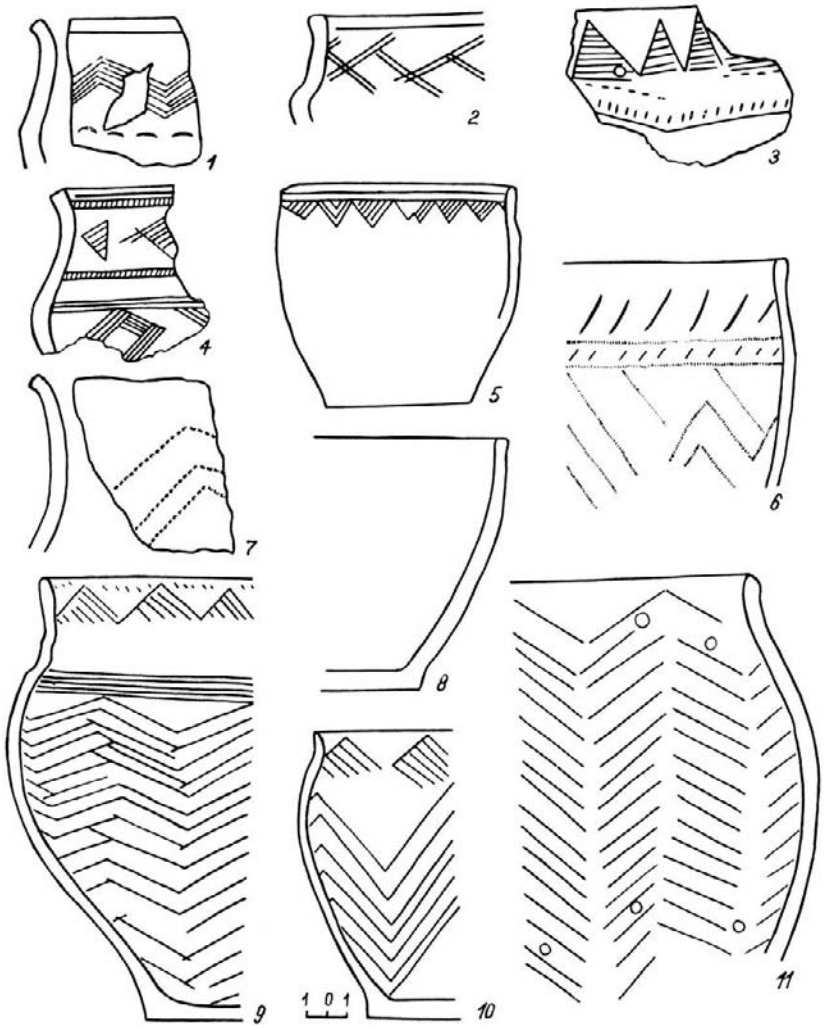

Fig. 45: Central Asian pottery.
Graves (1: Chaga (near Turkestan); 7: Vrevskaya; 9-10: Gurdush cemetery). Sites (2, 4, 11: Bol'shoy Tuskan; 3: Zaman-Baba II; 6: Tri Kruga; 8: Maly Tuzkan). Settlement (5: Ak Tepe II).

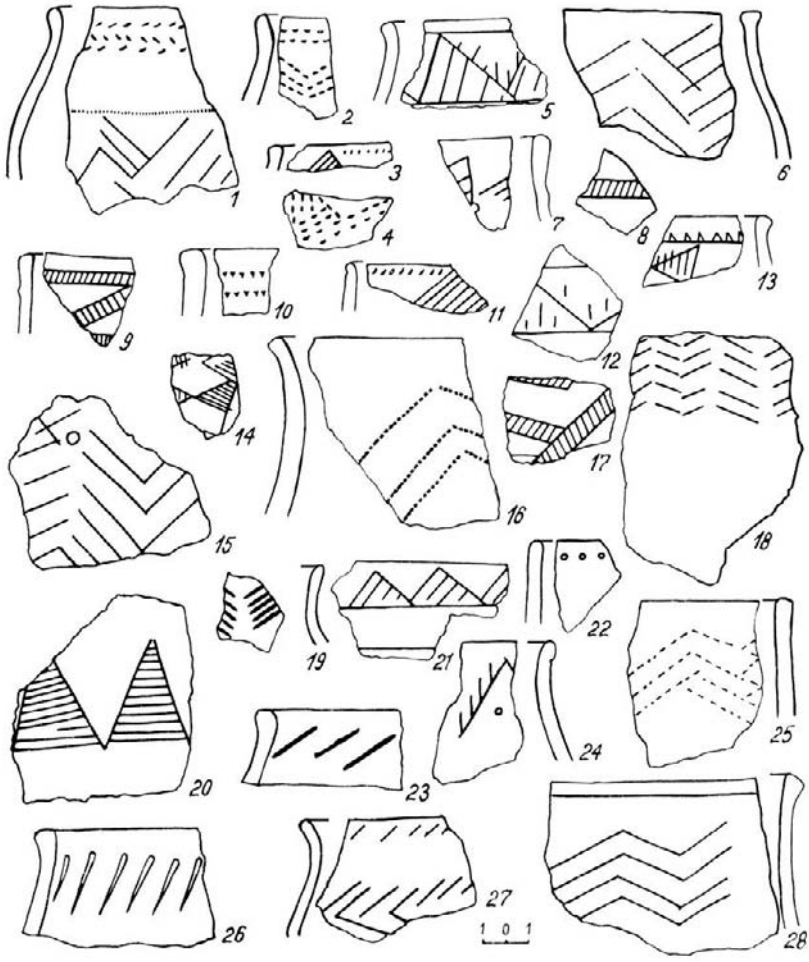

Fig. 46: Pottery from the Makhan-Darya.
3, 9, 17, 27: Gurdush cemetery; 18: Gudzhaili; 9, 20: Bol'shoy Tuzkan III; 26: Paykent; 28: Gudzhaili 4; the rest: Tri Kruga.

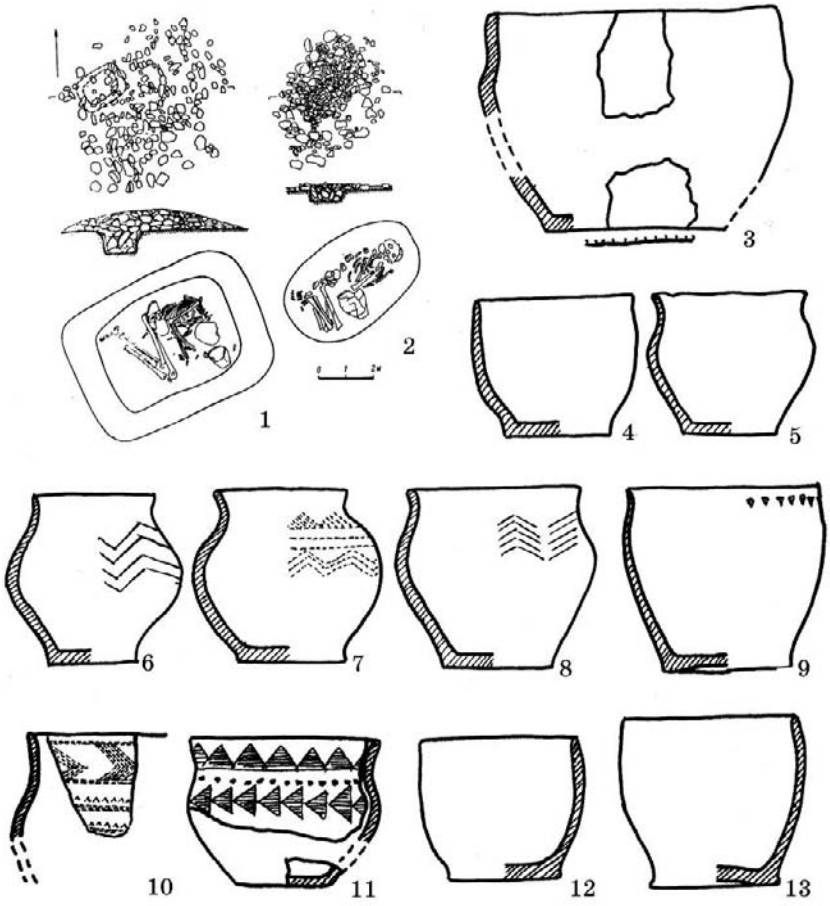

Fig. 47: Sites of Central Asia.
Cemeteries (1,9, 12-13: Patma-say; 2: Parau). Graves (5: Yangi-Yul'; 6, 8: Orehovskoe; 7: Nikiforovskie zemli). Sites (3: Barkhannaya; 4: Angren; 10: Nauka-Tepe; 11: Paykent).

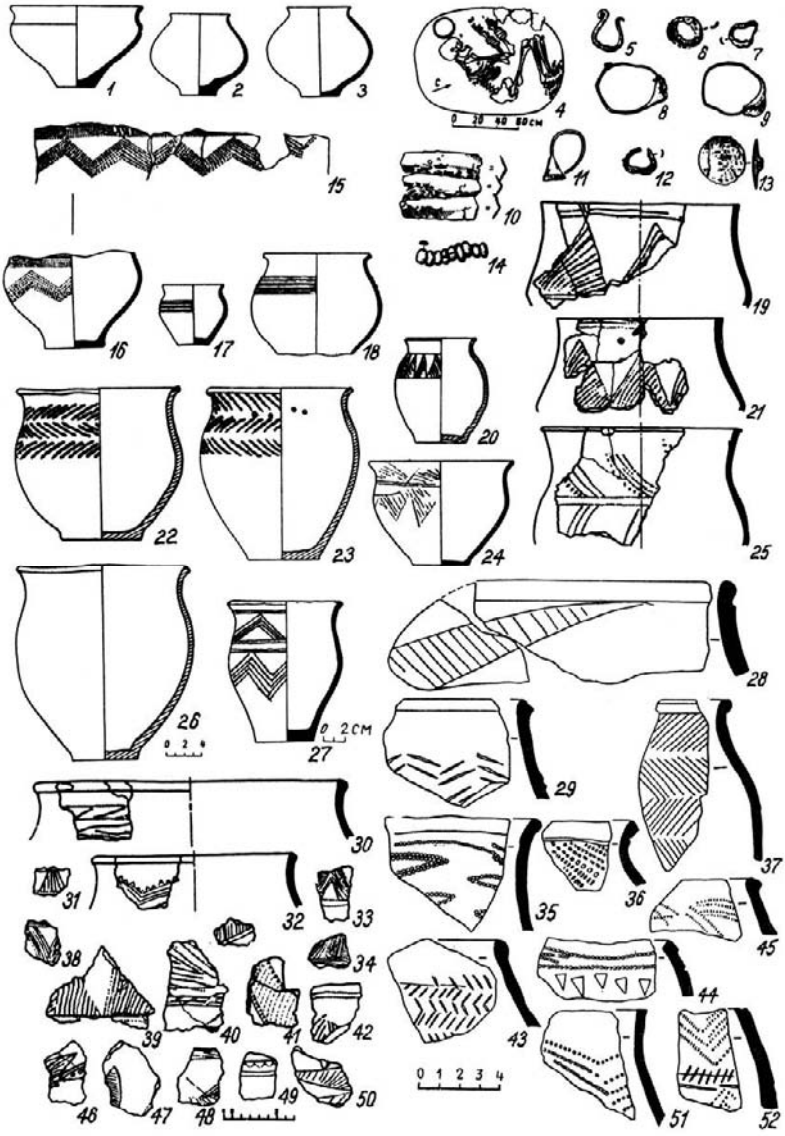

Fig. 48: Assemblages from Tadzhikstan.
Cemeteries (1-3, 15-18, 24, 27: Kumsay; 4-14, 20, 22-23, 26: Dasht-i-Kozi). Settlements (19, 21, 25, 30-34, 38-42, 46-50: Teguzak; 28-29, 35-37, 43-44, 51-52: Kangurt-Tut). 5-14: metal; the rest: pottery (1-3: wheel turned).

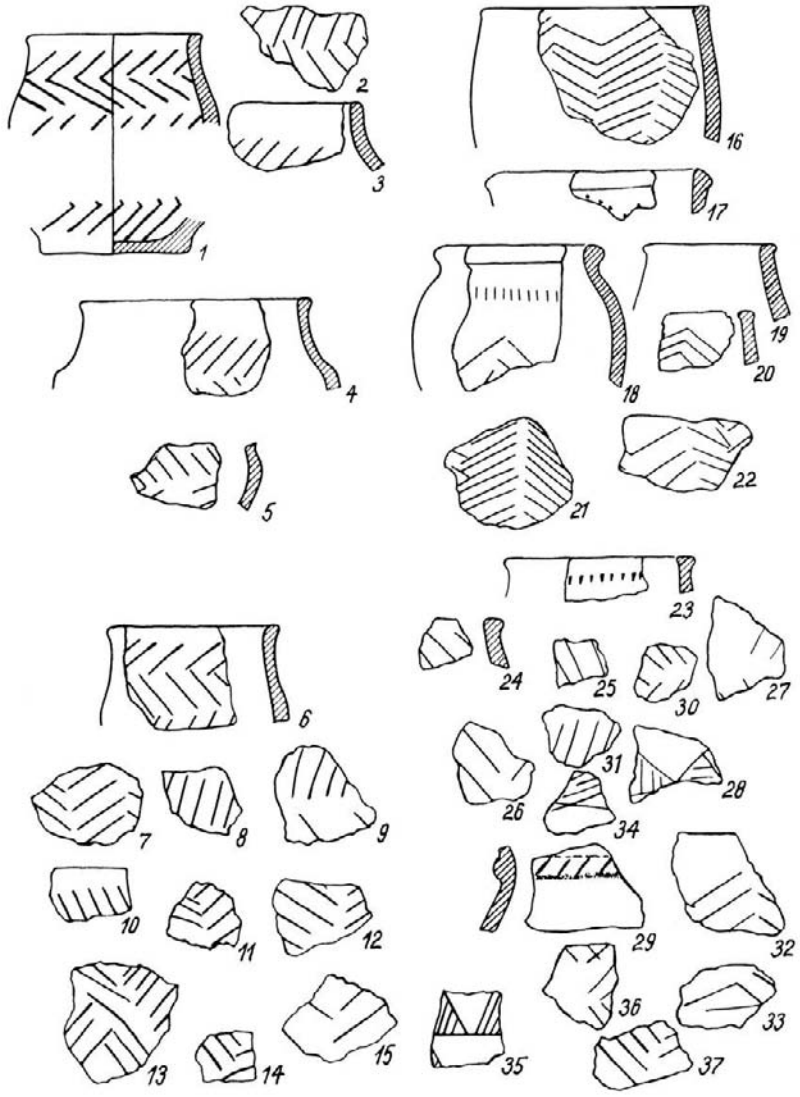

Fig. 49: Pottery from Turkmenistan.
1-9, 11: Kodzh; 10, 12-22: near Jeitun; 23-28: near Geok-Tepe; 29: Chingiz-depe; 30-33: Kenele well near Asgabad; 34-37: near Besmein.

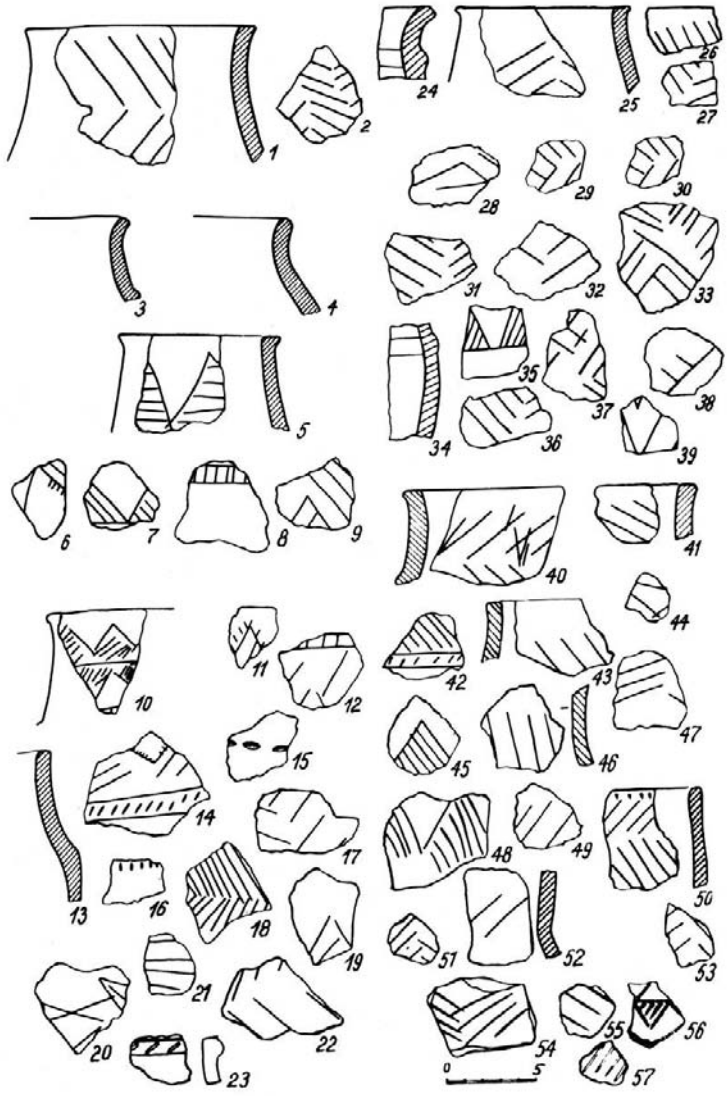

Fig. 50: Pottery of southern Turkmenistan and northern Afghanistan.
1-2: well at Kurru-Geokcha; 3-23: near Ovadan-depe; 24, 26-27, 30-33: near Asgabad; 25, 28-29: well at Kenele near Asgabad; 34-39: near Besmein; 40-42, 44, 47-48, 50: well at Kel-Agy Bayram-Ali, delta of the Murgab; 43: well of Sagat-Yasr, Mary, delta of the Murgab; 51-53: well at Ekiper; 54-57: southern bank of the Amu-Darya, northern Afghanistan.

Fig. 51: Pottery with applied roller ornament from the south Russian steppes and Iran.
Settlements (1-6: Lyapichev Khutor; 7-13, 23-25: Nur and complexes of the Nur type on the Volga; 14-15: Grachev Sad; 16, 42-55: Ivanovka; 17-22, 40-41: Belozerka; 36: Kirovskoe; 37-38: Ushkalka; 39: Chervonnoe Ozero; 63-65: Turgenevo). Cemeteries (56: Bykovo; 57-58: Giyan).

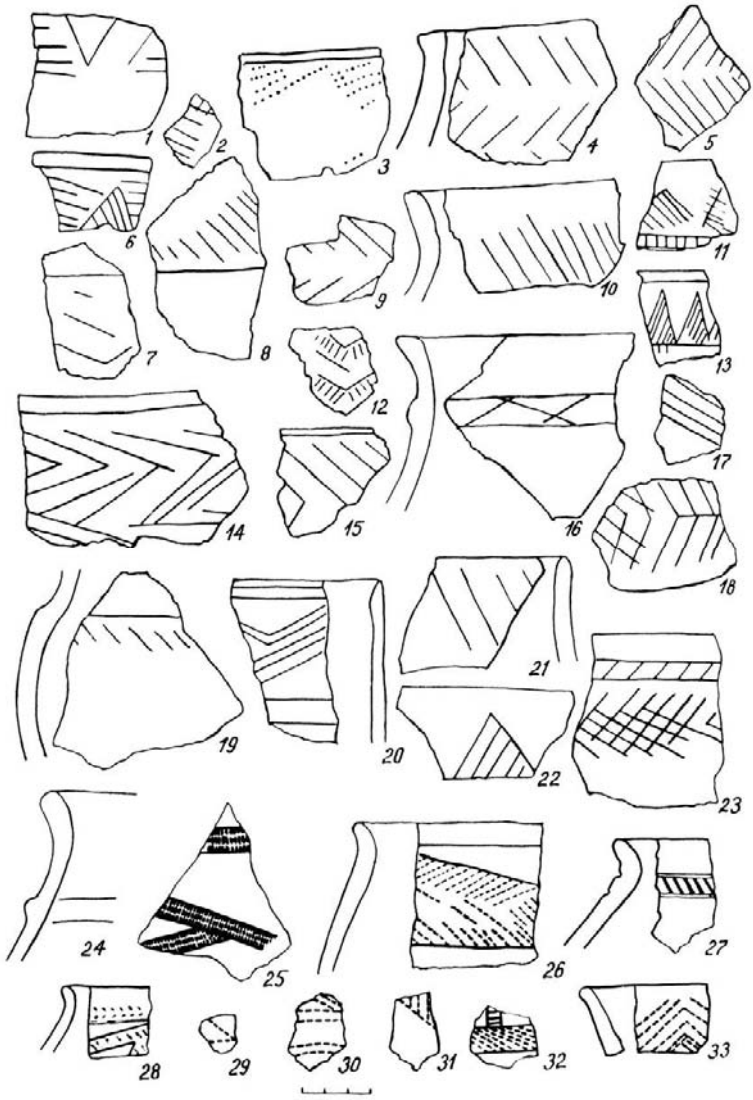

Fig. 52: Andronovo pottery from agricultural settlements in southern Turkmenistan and Afghanistan.
1-3, 6-9: Takhirbay 3: 12, 14-15: Auchin; 13: Baigushly; 4-5, 10, 18, 20, 22: Anau III; 11: Sermancha-depe; 16: El'ken-depe 1; 17: El'ken-depe 2; 19, 21: Namazga-depe; 23: Tekkem-depe; 24-33: Shortugai (after H.-P. Francfort).

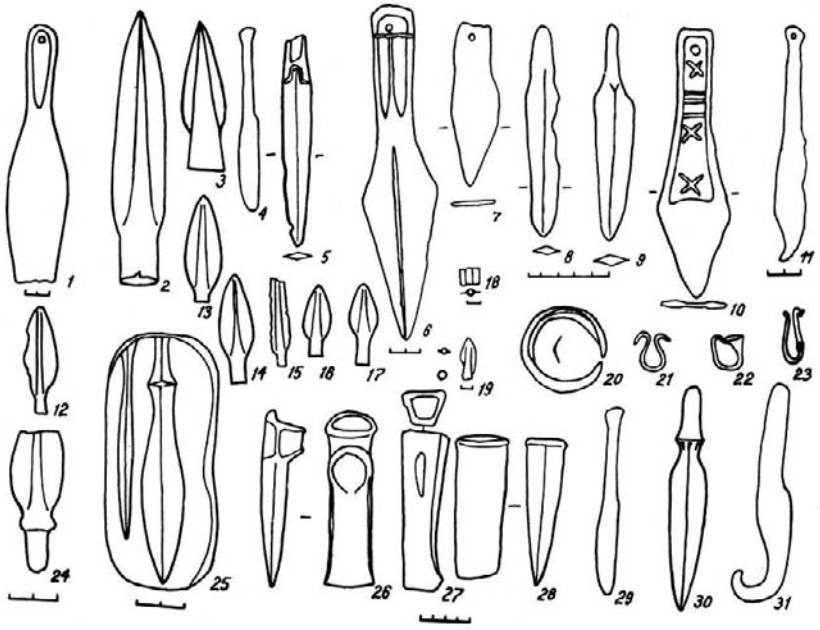

Fig. 53: Andronovo type bronzes from Central Asia and Afghanistan.
1: Vahshuvar; 2: Samarkand; 3: Asgabad; 13: Bala-Ishem; 14: Uzbekistan. Cemeteries (4: Bishkent; 5: Tigrovaya Balka; 7-10, 18: Tulkhar; 11: Nurek; 20-21, 23: Kumsay; 22: Tandyryul). Settlements (6: Dashly 3; 12: Anau; 16: Togolok 15; 17: Takhirbay 2; 19: Shortugai; 24: Namazga-depe; 25, 31: Kangurt-Tut; 26: Karim-Berdy; 27: Kulin-tepe; 28: Varahksha; 29: Arsaf-say; 30: Tashkent oasis). Wells (15: Kuin-Kuyu). 25: stone mould; the rest: bronze.

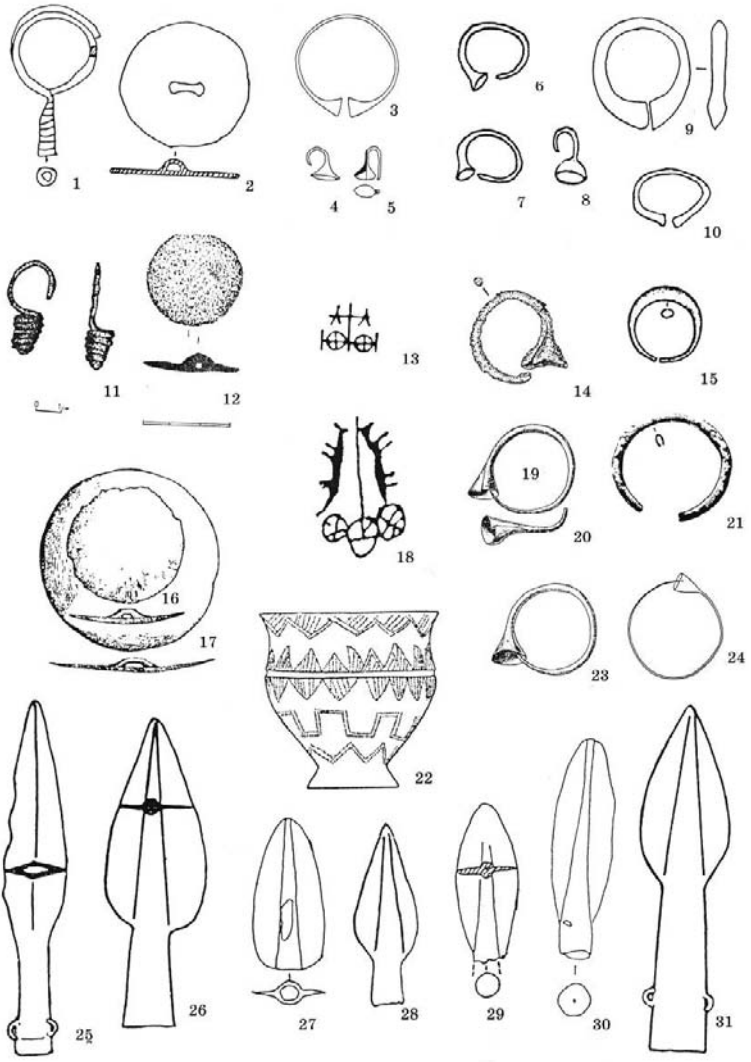

Fig. 54: Xinjiang, Ferghana and Semirech'e.
1, 2, 9, 27: Yanbulaq; 3: Gansu; 4, 8, 10: Liujiahei; 5: Xiajiadian; 6-7: Dun Bei; 11: Tamgaly; 12, 14: Kul'say; 13: Chinese picture-writing for 'chariot'; 15, 21: Begazy; 16-17: Shamshi hoard; 18: petroglyph from Geernuobade heshan, Pamirs; 19-20, 23: Tash-Tube II; 22: Sazi, Tacheng; 24: Vuadil'; 25-26, 31: Shang graves in China; 28: Lou-Lan; 29: Qurauzhma; 30: Huayuanzi.

Fig. 55: Anthropomorphic and zoomorphic works of art.
1, 3: Saymaly-Tash; 2: Babaevka I; 4: Jumba; 5: Ulu-Zhilanshik; 6; Semipalatinsk; 7, 9: Irtysh area; 8: Ushkatta II; 1-3: petroglyphs; 4: bronze; 5-7, 9: stone; 8: clay.

Fig. 56: Petroglyphs with solar-faced character and a plowing scene.
1-3: Saymaly-Tash; 4-5: Tamgala.

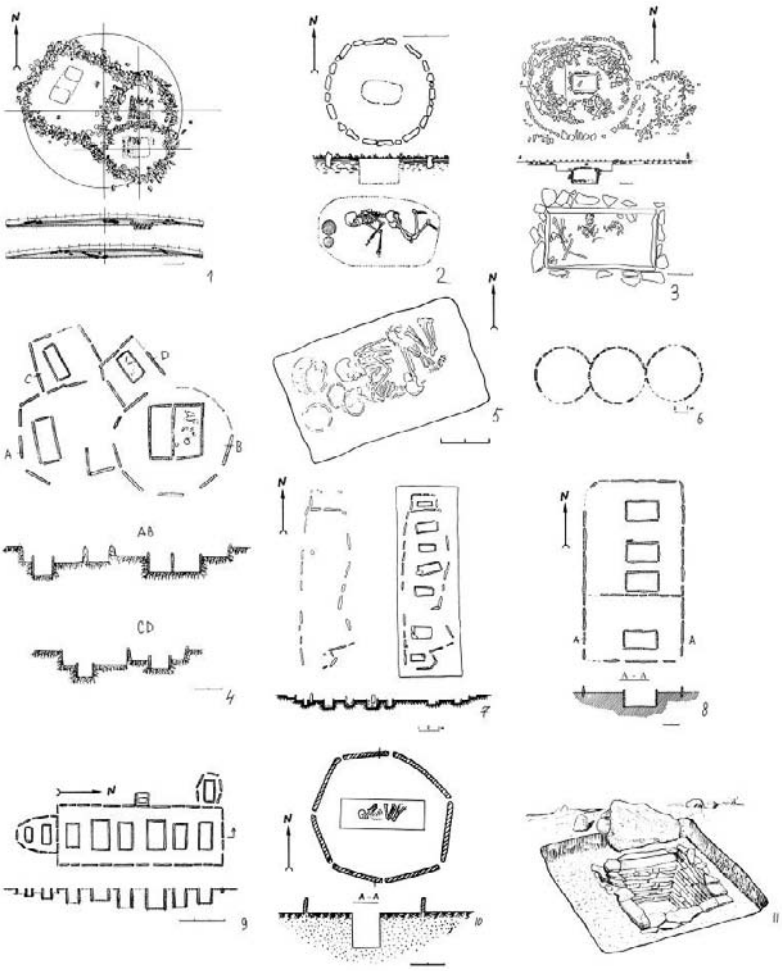

Fig. 57: Andronovo types of stone constructions and graves.
1: Tuktubaevo; 2: Kirgil'da; 3: Zevakino; 4: Begazy; 5: Baytu I; 6, 8, 10: Bylkyldak I; 7: Taldy I; 9: Aishrak; 11: Buguly I.

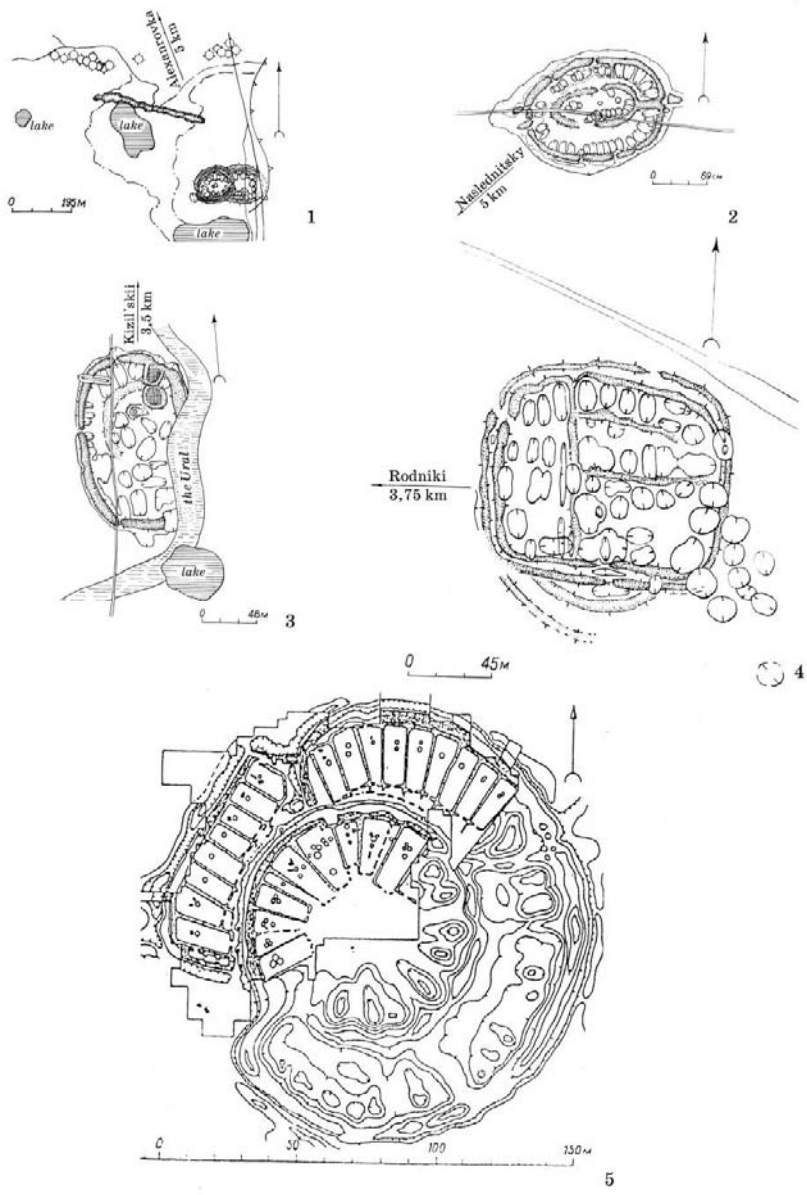

Fig. 58: Plans of Sintashta-type settlements
1: Isiney; 2: Naslednitsky; 3: Kisil'skoe; 4: Rodniki; 5: Arkaim.

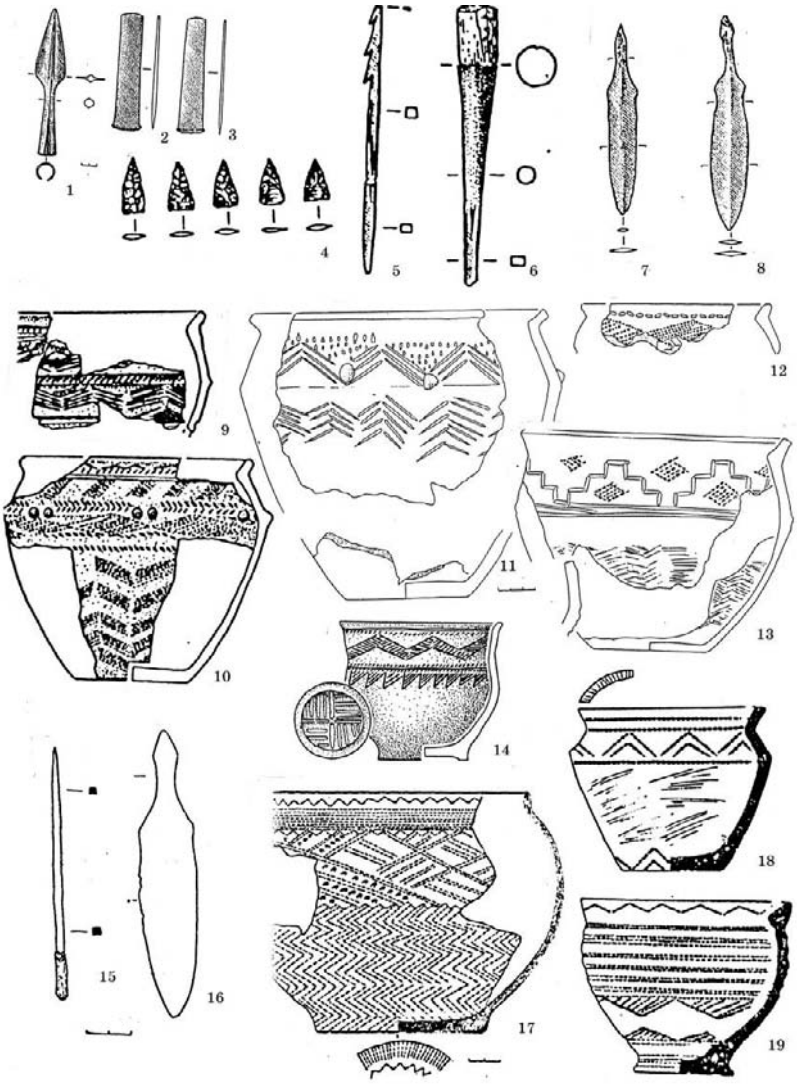

Fig. 59: Cemetery assemblages.
1-14: Bol'she-Karagan; 15-19: Gerasimovka; 1-3, 5-8, 15-16: metal; 4: stone; 9-14, 17-19: pottery.

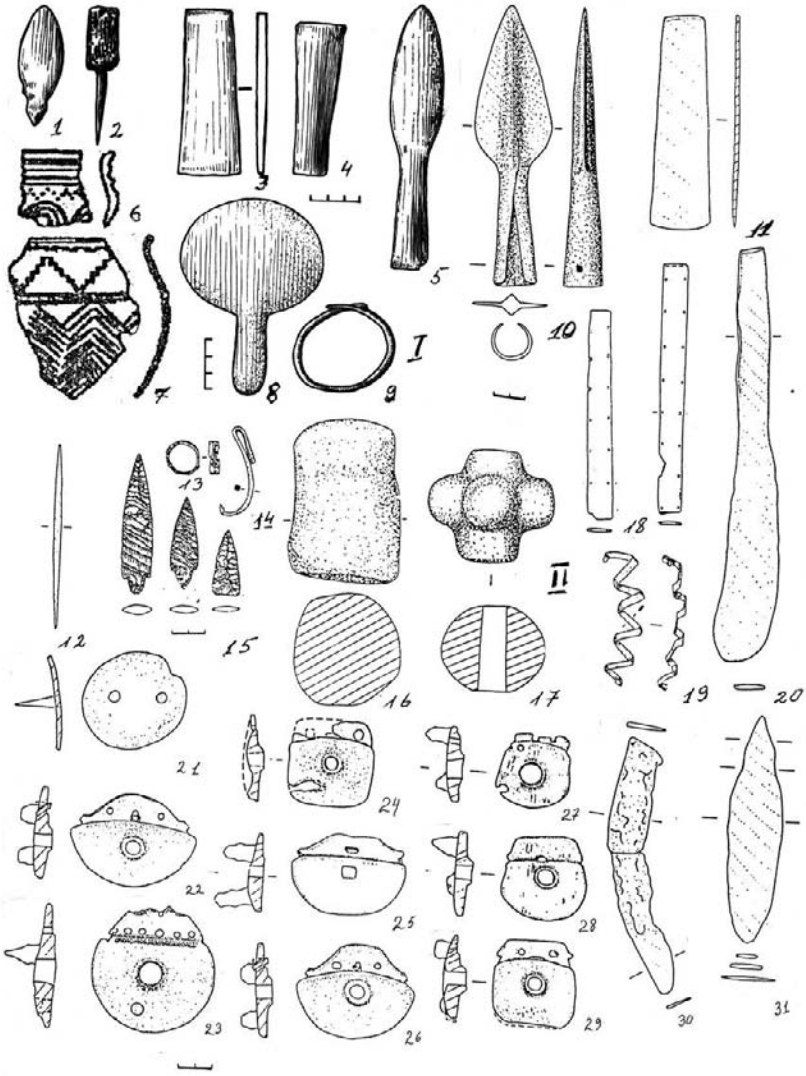

Fig. 60: Assemblage from Krasnoe Znamya (I) kurgan and the cemetery of Kamenny Ambar (II).
1-5, 8-14, 18-20, 30-31: metal; 15-17: stone; 21-29: bone.

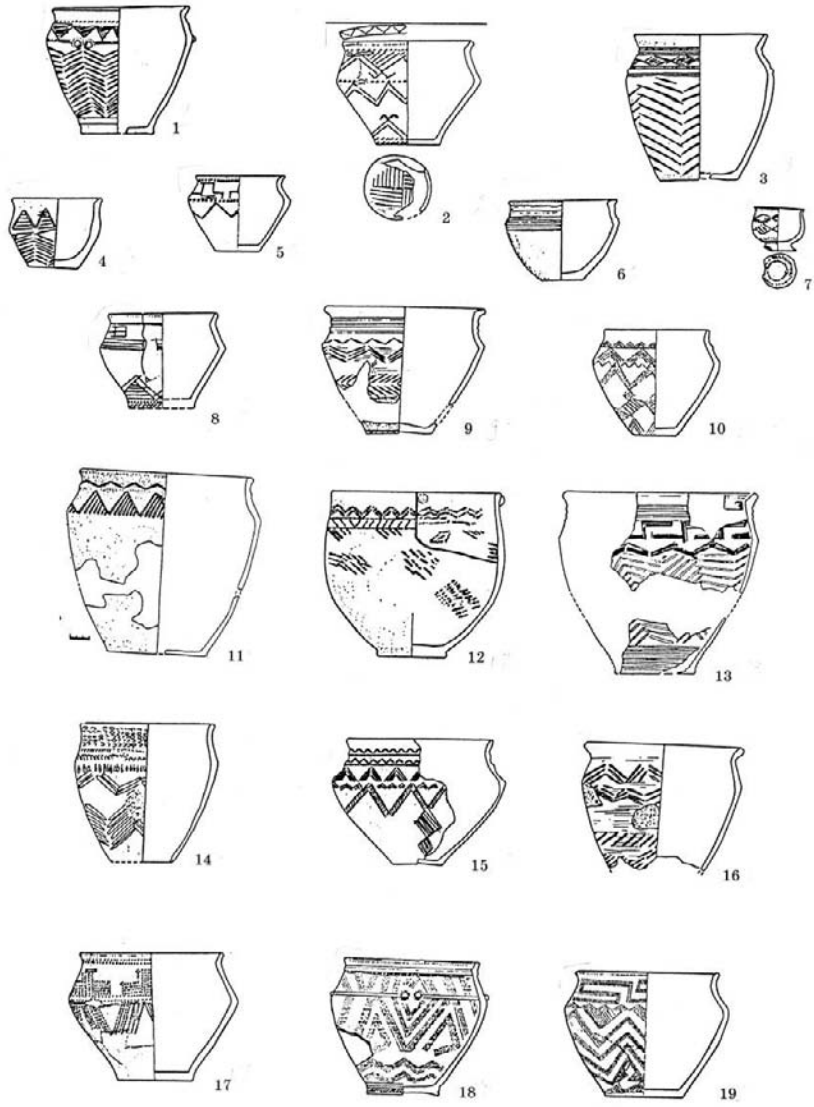

Fig. 61: Pottery from the cemetery of Kamenny Ambar.

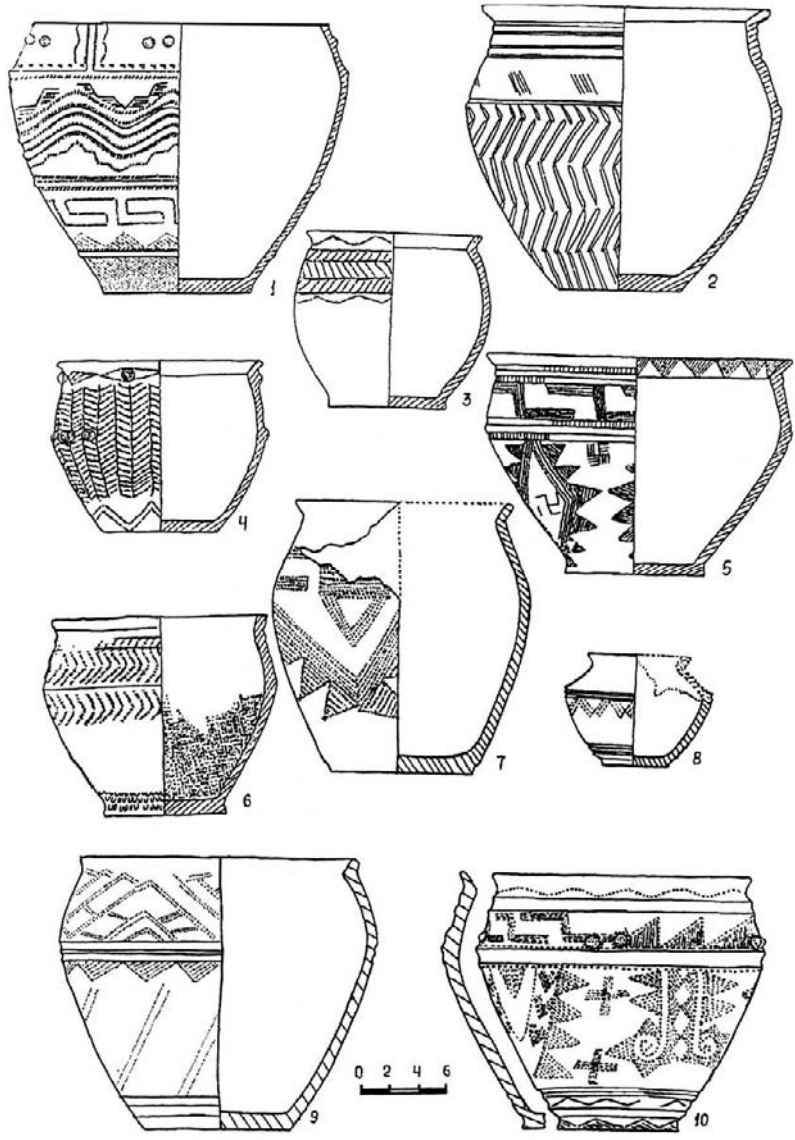

Fig. 62: Pottery from the cemetery of Tanabergen.

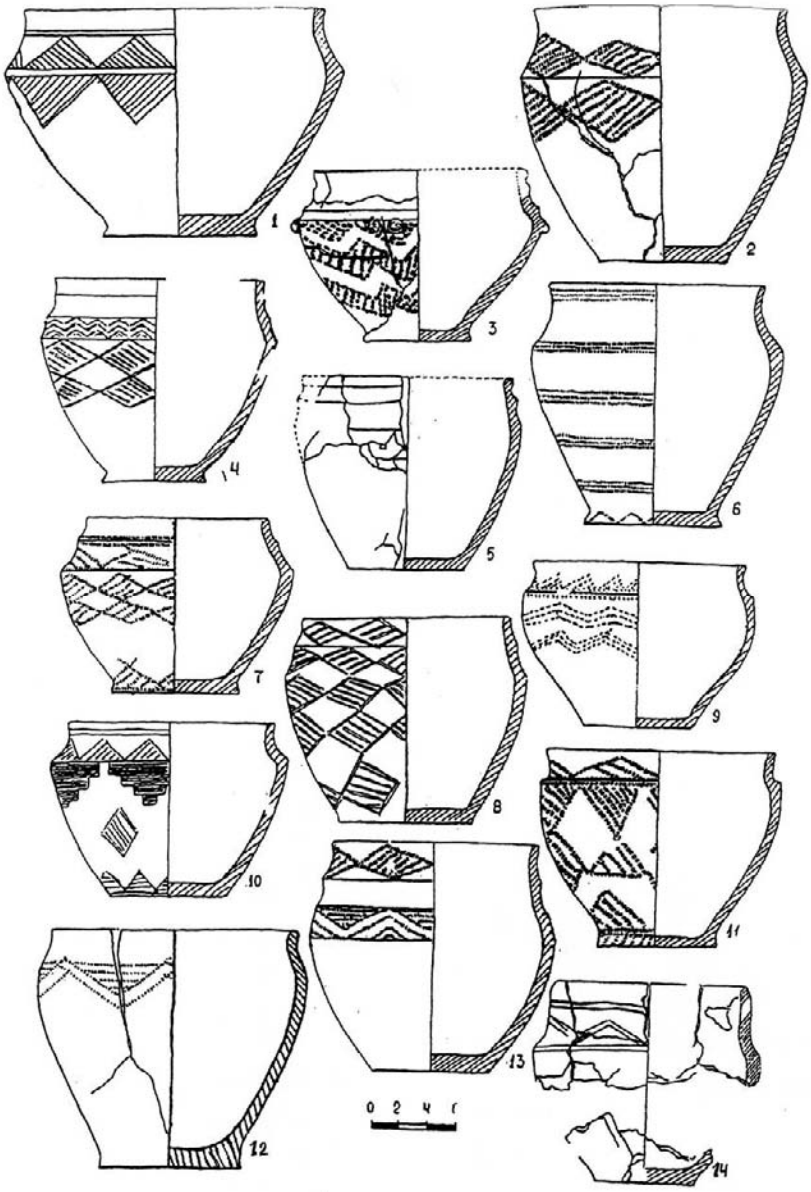

Fig. 63: Pottery from the cemetery of Tanabergen.

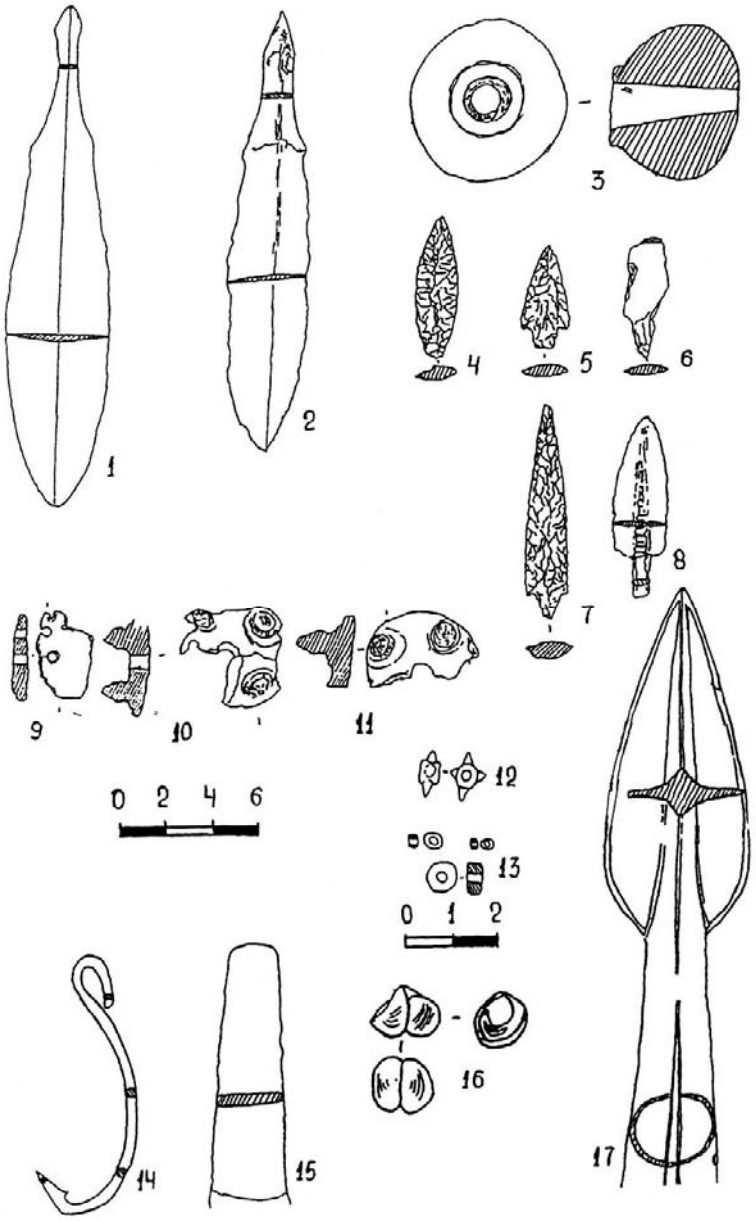

Fig. 64: Assemblages from the cemetery of Tanabergen.
1-2, 8, 14-17: metal; 4-8: stone; 9-11: bone; 12-13: paste.

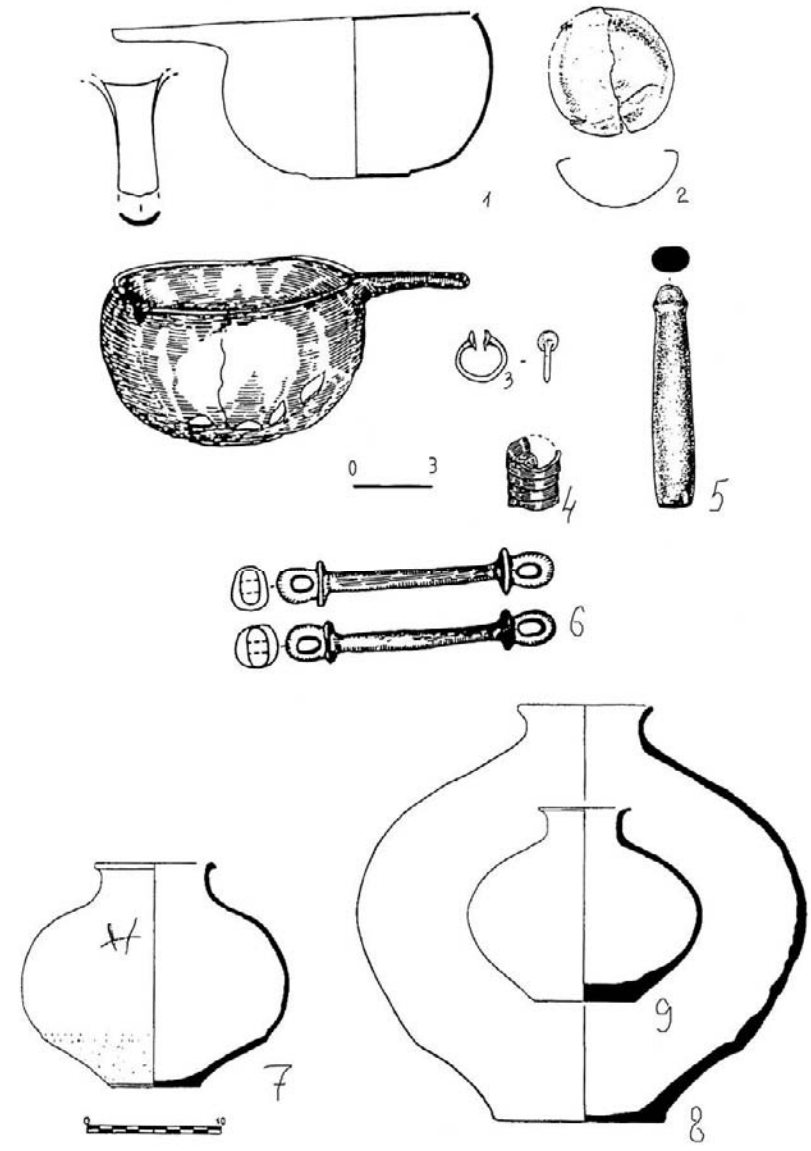

Fig. 65: Assemblage from the grave of Zardcha-Halifa.
1, 4, 6: metal; 2-3: gold; 5: stone; 7-9: pottery.

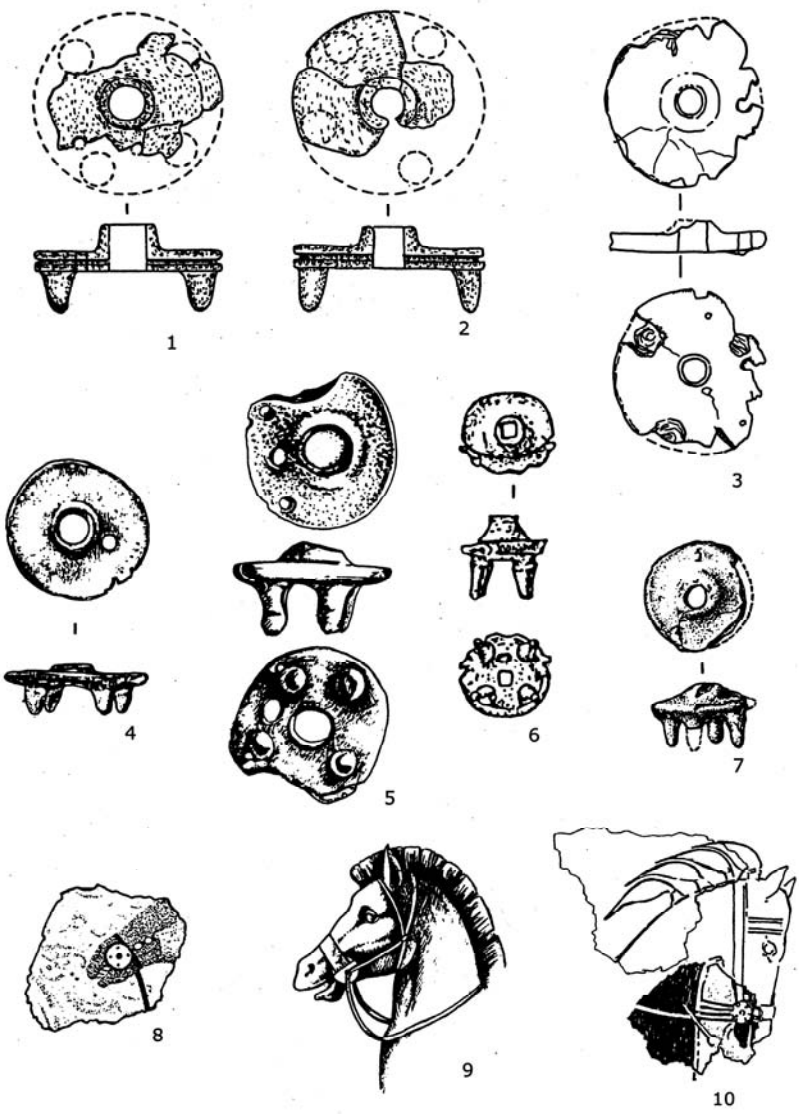

Fig. 66: Cheek-pieces.
1-2: Zardcha-Halifa; 3: Dzharkutan; 4, 7: Potapovka; 5: Kamenny Ambar; 6: Sintashta; 8, 10: representations of bridles on Tiryns frescoes; 9: reconstruction of the Potapovka bridle.

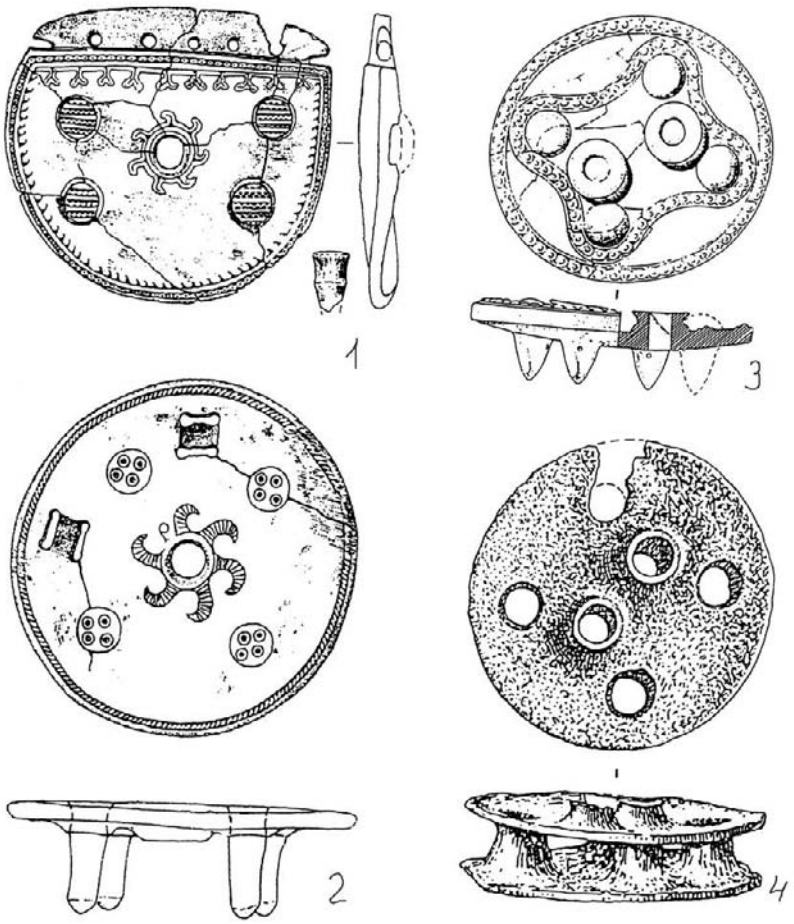

Fig. 67: Cheek-pieces from the Don and Mycenae.
1-2: Selesni 2 cemetery; 3-4: Mycenae; 4: bronze.

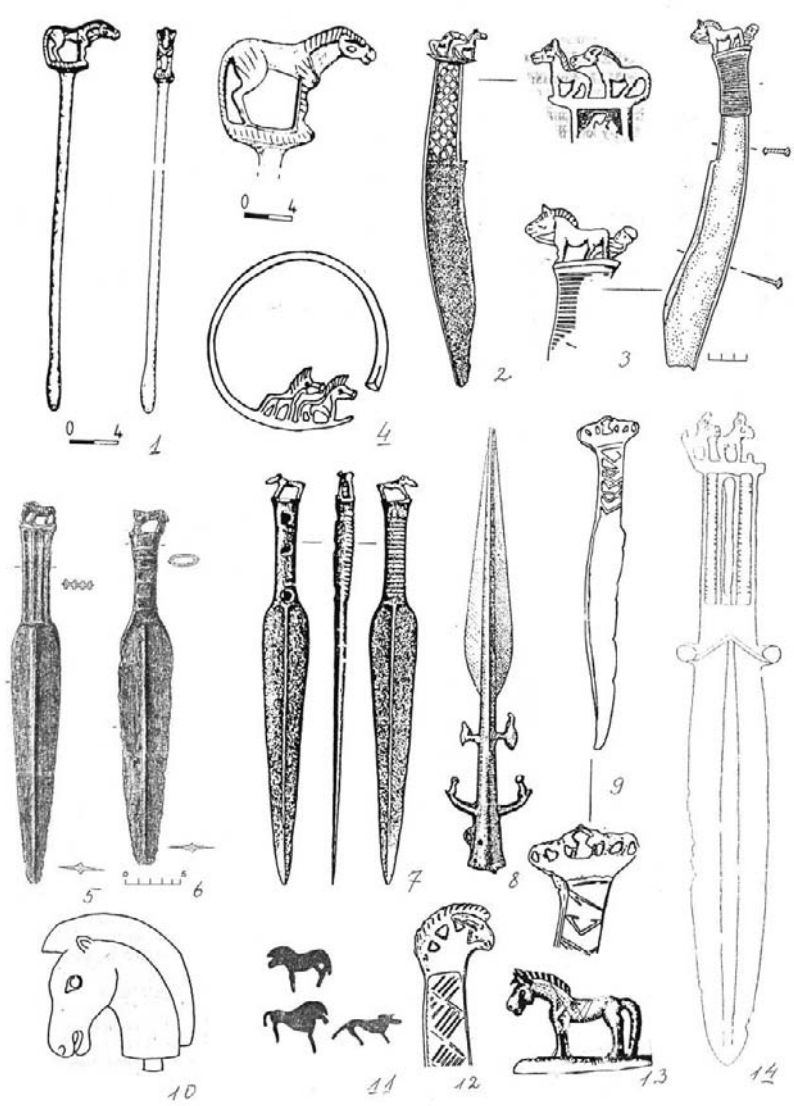

Fig. 68: representations of the horse and other equids.
1: Zardcha-Halifa; 2: Seyma; 3: Rostovka; 4: Mynchunkur; 5-6: Karakol II; 7: Kurchum; 8: Dzhetygara; 9; Dzhumba; 10: Kulturgunas (Iron Age); 11: petroglyphs from central Kazakhstan; 12: Elunino; 13: Semipalatinsk; 14: Tuva.

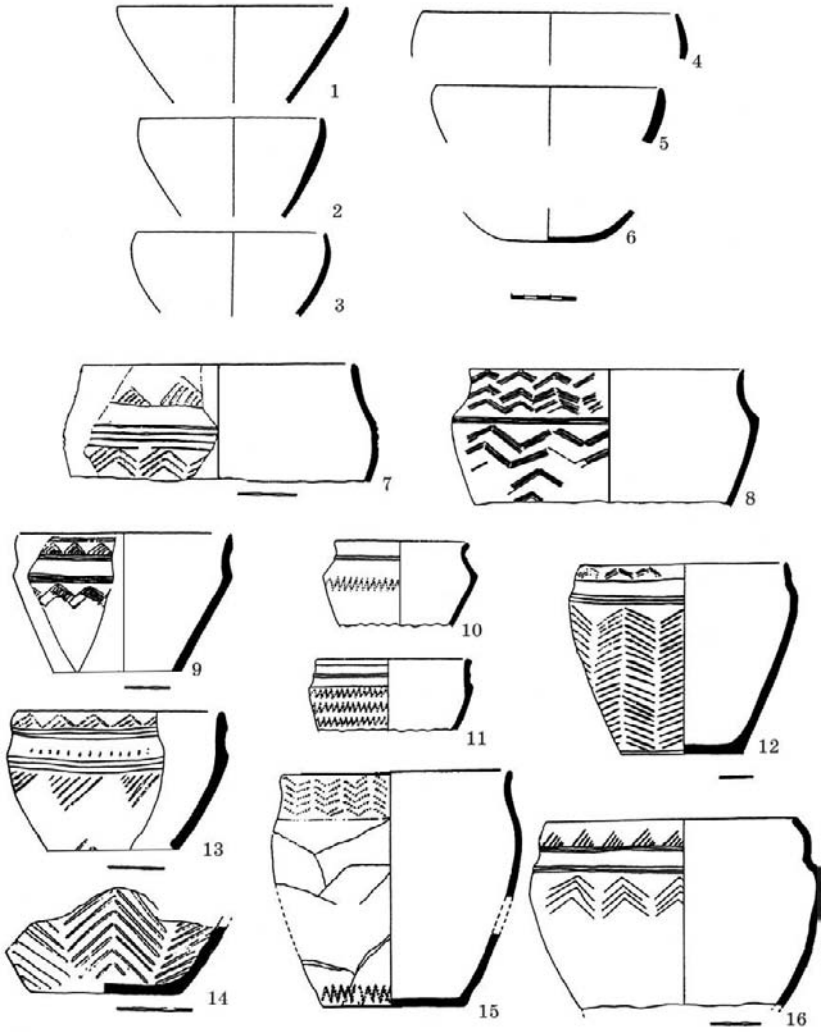

Fig. 69: Ceramics from the settlement of Tugay.
1-6: imports from Sarazm; 7-16: Petrovka-type.

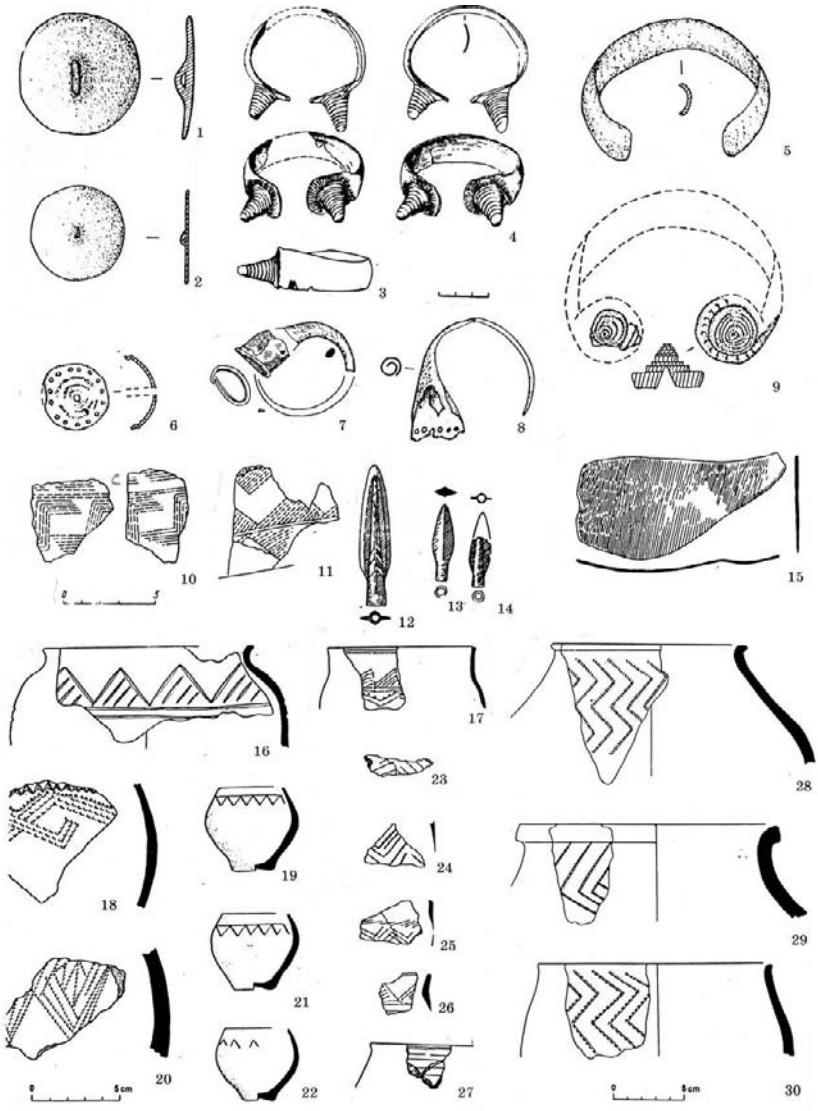

Fig. 70: Andronovo material from Uzbekistan and Fergana.
1-2, 5-6, 8-9, 16-27: Bustan VI cemetery; 3-4: Dzhappa-Sadda; 7, 10-12: Sazagan settlement; 28-30: cemetery of Dzharkutan IV; 1-9, 12-15: bronze; 10-11, 16-30: ceramic.

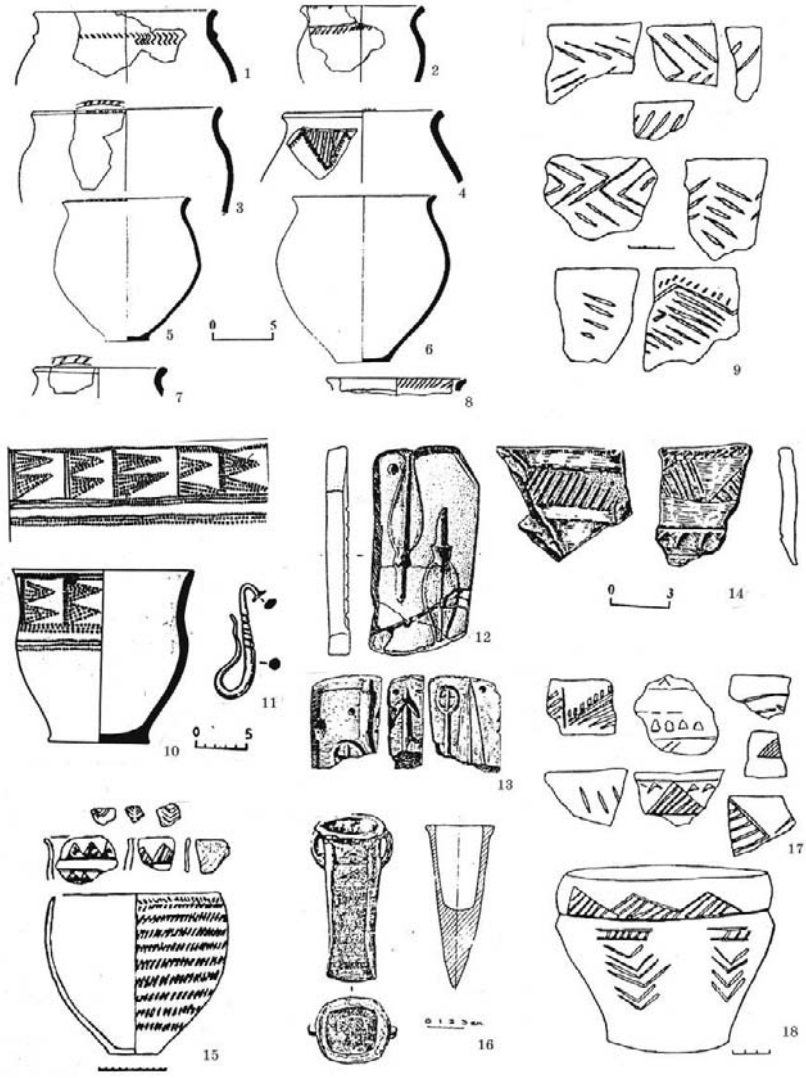

Fig. 71: Andronovo material from Turkmenistan and Tadjikistan.
1-8, 12, 14: Tekkem-depe; 9: Auchin; 10-11: Tuyun; 13: Namazga-depe; 15: Tash-depe; 16: Bedak; 17: Takhirbay; 15: Takhirbay 3; 1-10, 14-15, 17-18: pottery; 11, 16: bronze; 12-13: stone.

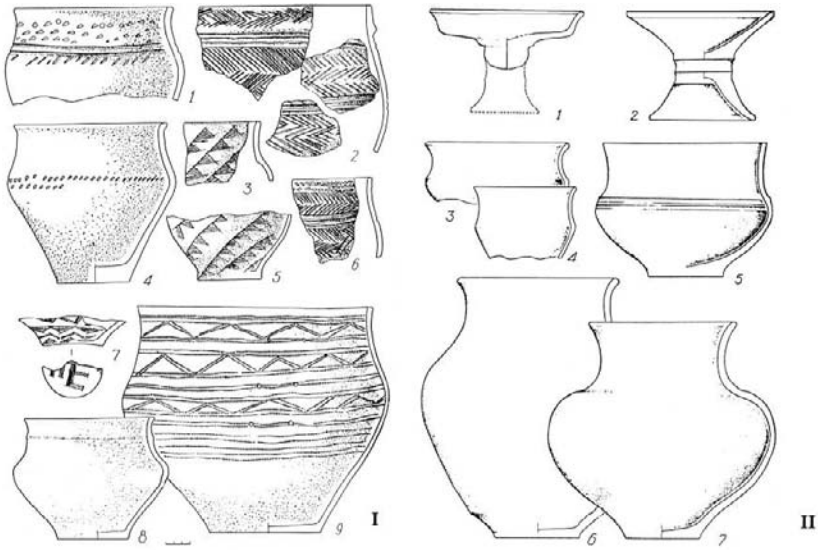

Fig. 72: Material from the settlement of Pavlovka.
I: Late Andronovo; II: Namazga VI type.

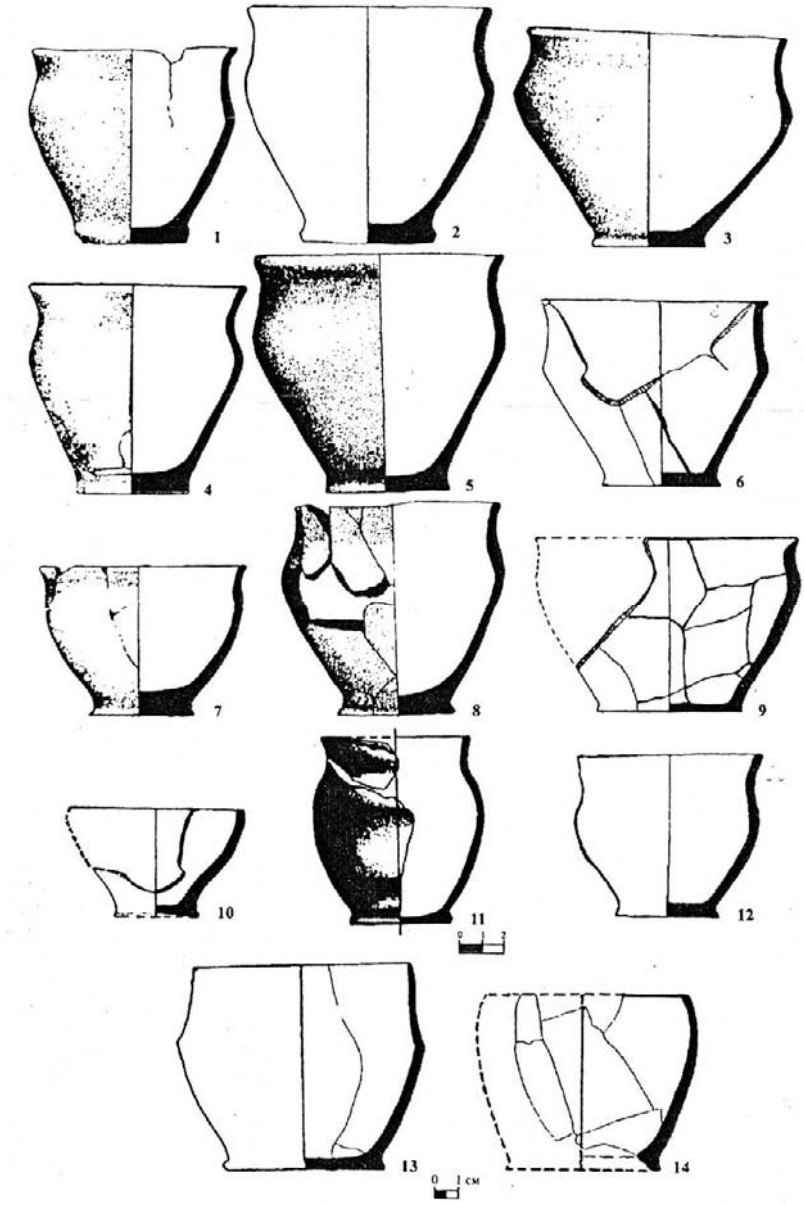

Fig. 73a: Pottery from Usunbulak I cemetery, Semirech'e.

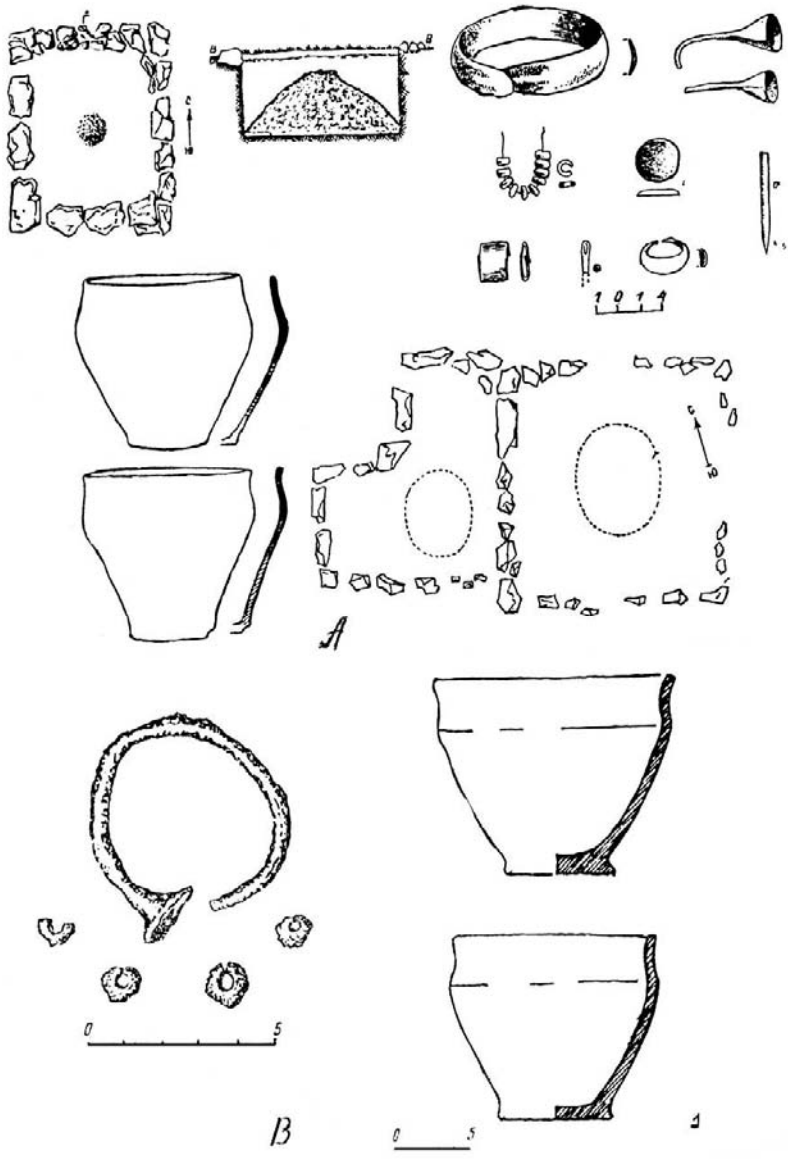

Fig. 73b: Material from Semirech'e cemeteries.
A: Tash-Tyube II; B: Tegermen-say.

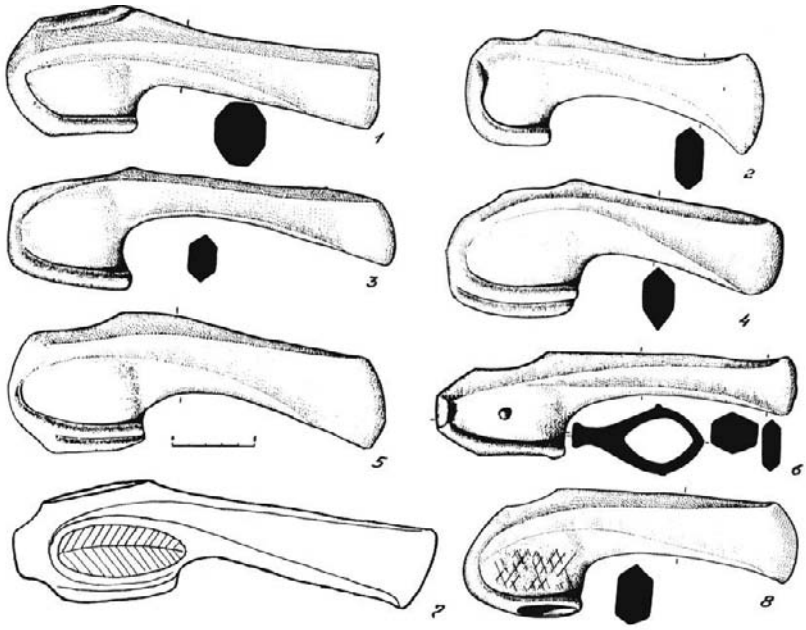

Fig. 74: Andronovo-type axes from Semirech'e, Fergana and Xinjiang.
1: Novo-Pavloka; 2: Ivanovka; 3: Kairak-Kumy settlement (mould). Hoards (4, 5, 8: Sukuluk; 6: Issyk-Kul'; 7: Agharsin (bronze)).

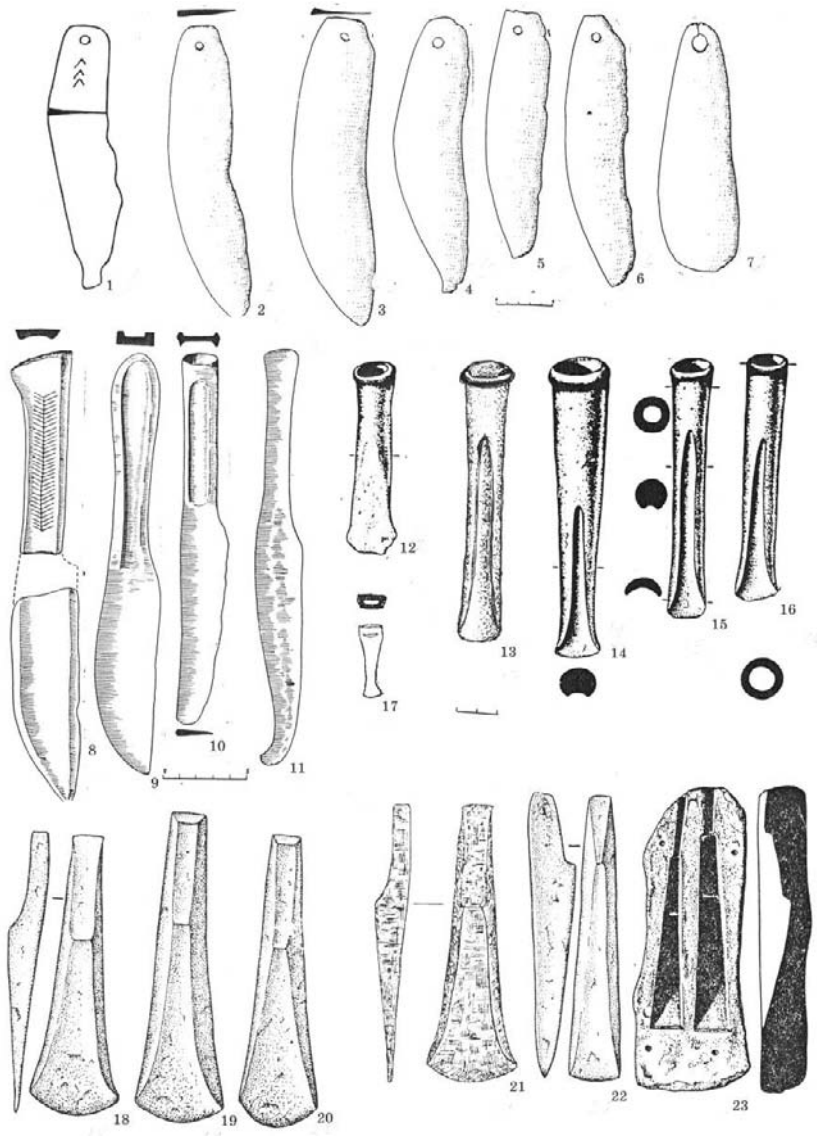

Fig. 75: Sickles, knives, gouges, adzes and chisel from Semirech'e and Xinjiang. 1, 13, 17, 21: Agharsin hoard; 2-3, 5-6: Chu river canal; 4, 7: Ivanovka; 8, 15, 19: Sadovoe hoard; 9: Issyk-Kul'; 10-11: Preobrazhenka; 12, 20: Beshek; 14, 16, 18: Sukuluk hoard; 22: Karakol; 23: Aleksandrovka.

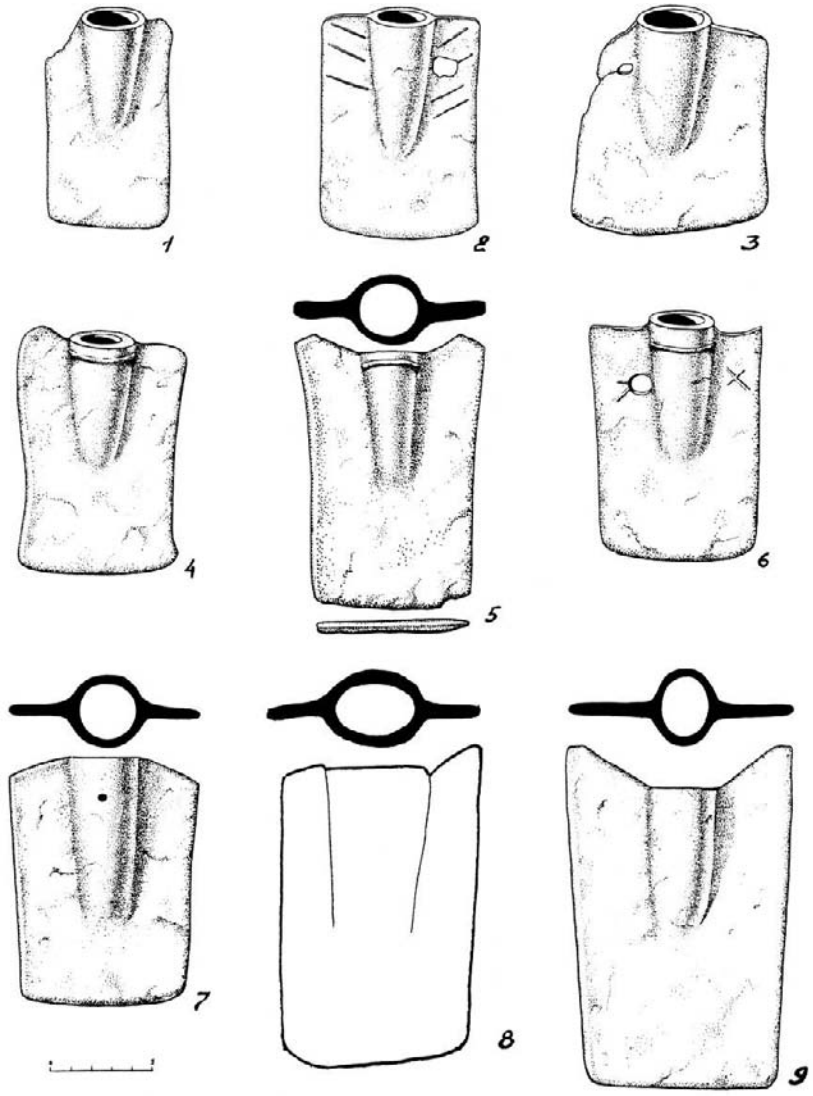

Fig. 76: Celt-spades from Semirech'e, Fergana and Xinjiang.
1, 4: Novo-Pavlovka; 2: Ivanovka; 3: Kent; 5: Ringitam; 6: Beshkek; 7: Upper Syr-Darya; 8: Urumchi; 9: Tup.

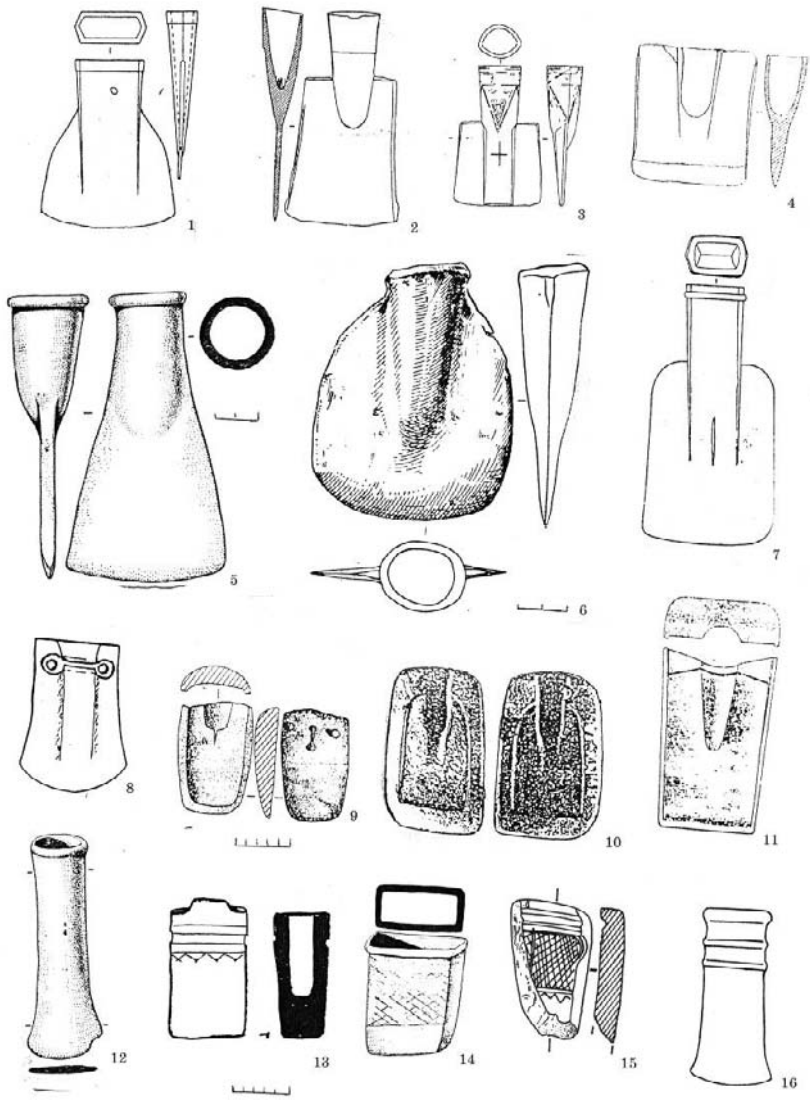

Fig. 77: Celts-spades from Semirech'e, Fergana, Siberia, Xinjiang and China.
1: Singan (Shang grave); 2-3: grave of Fu-Hao; 4: Tachen; 5: Lebedinovka; 6: Dzhappa; 8: Ustinskoe; 9: Osernoe; 10: Ke'ermuqi; 11: Samus' IV; 12, 14: Sadovoe; 13: Agharsin; 15: Zhukaigou 5; 16: Xintala; 9-11, 15: stone moulds; the rest: bronze; 4: nephrite blade.

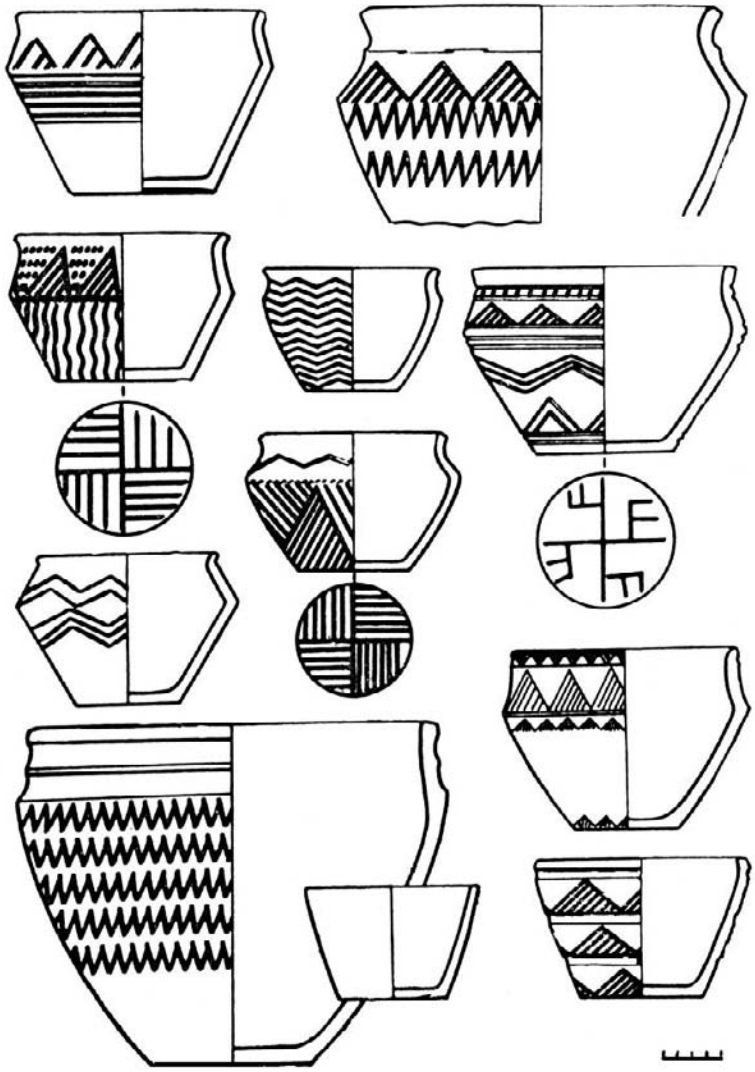

Fig. 78: Petrovka-type pottery.

Fig. 79: Bone whips and staffs from Eastern Europe and their analogies.
1: Tiszafüred; 2: Toszeg; 3, 4, 8: Vatina; 5, 7: Bluchin; 6: Nitrianski Hradok; 9: Alalach; 10: Petryaevskiy; 11: Yubileynoe; 12: Krasnoselskiy; 13: Novy Rizadey; 14: Privetnoe; 15: Konstantinovskiy; 16: Pasekovo; 17: Shilovskoe; 18, 27: I Fedorovskiy; 19: Radchenskoe; 20: Borodaevka; 21: Grafskaya; 22: Kashpirskiy; 23, 24: Pokrovskiy; 25: Vil'no-Grushevka; 26, 32: Novopavlovskiy; 28: Staraya Kalitva; 29: Istomin; 30: Mirny; 31: Pavlovskiy Plodosovkhoz; 33: Bykovo; 34: Berezovskiy (after Besedin 1999, fig. 2).

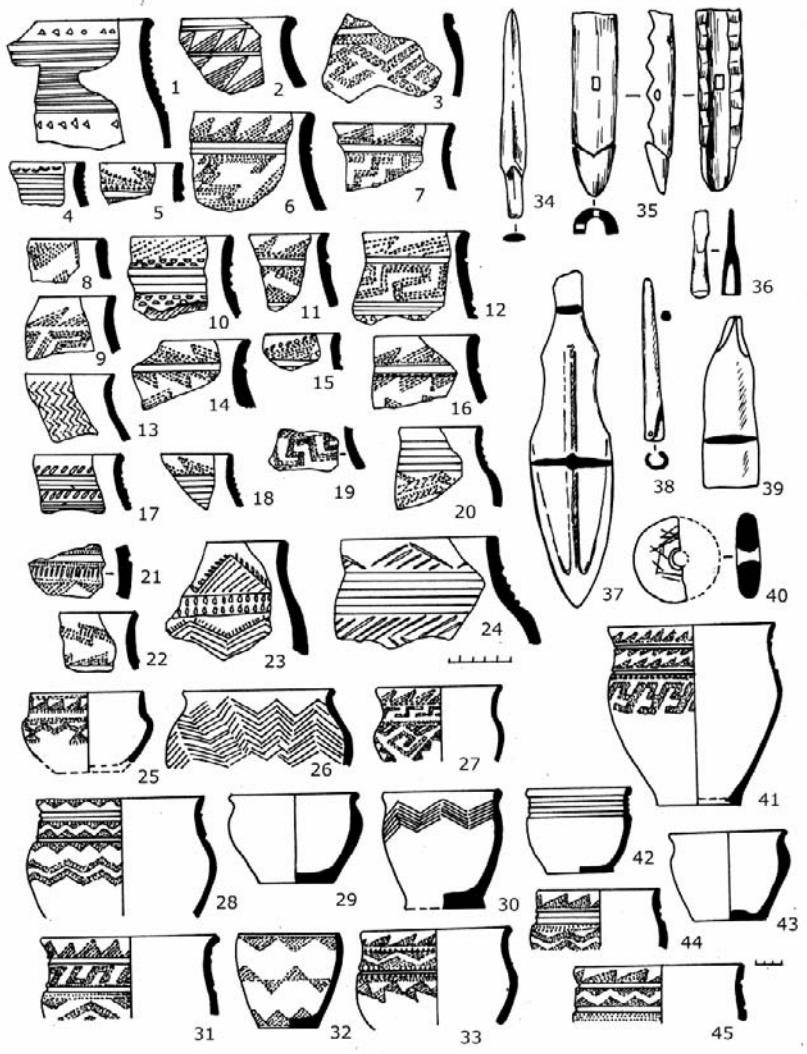

Fig. 80: Assemblages from Fedorovo (Nura) houses. Settlement of Ikpen'.

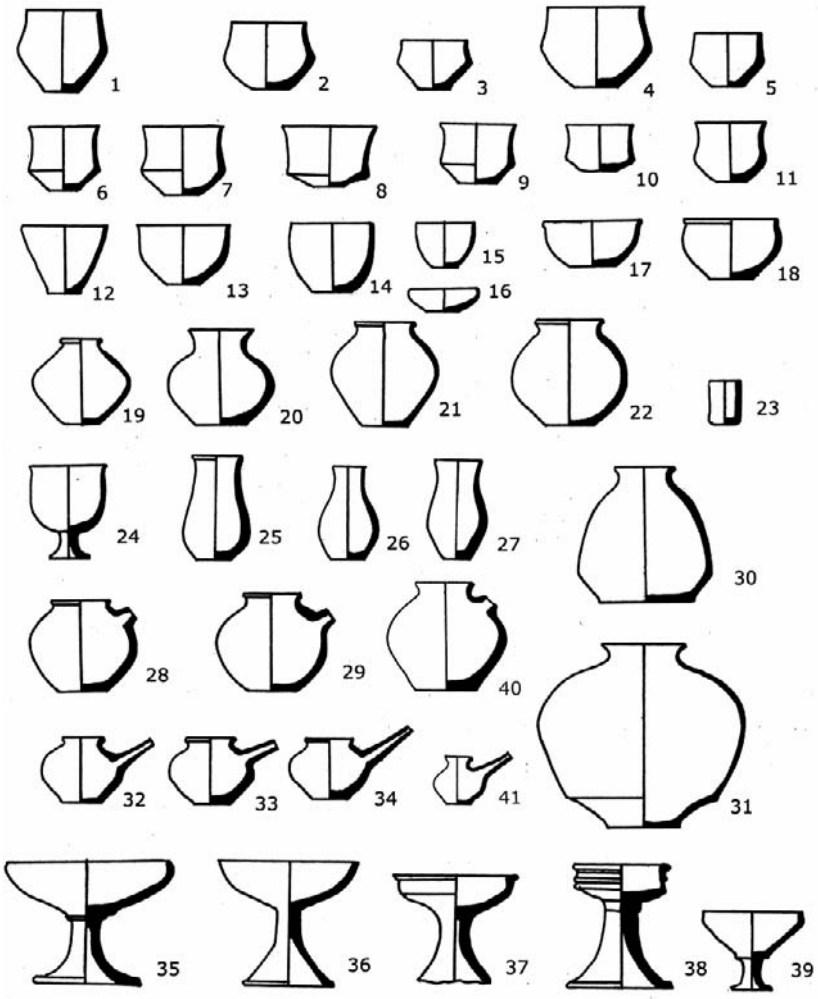

Fig. 81: The main ceramic forms characterizing the Final Bronze Age of Margiana. Settlement of Takhirbay 3 (Cattani 2004, fig. 3, 4).

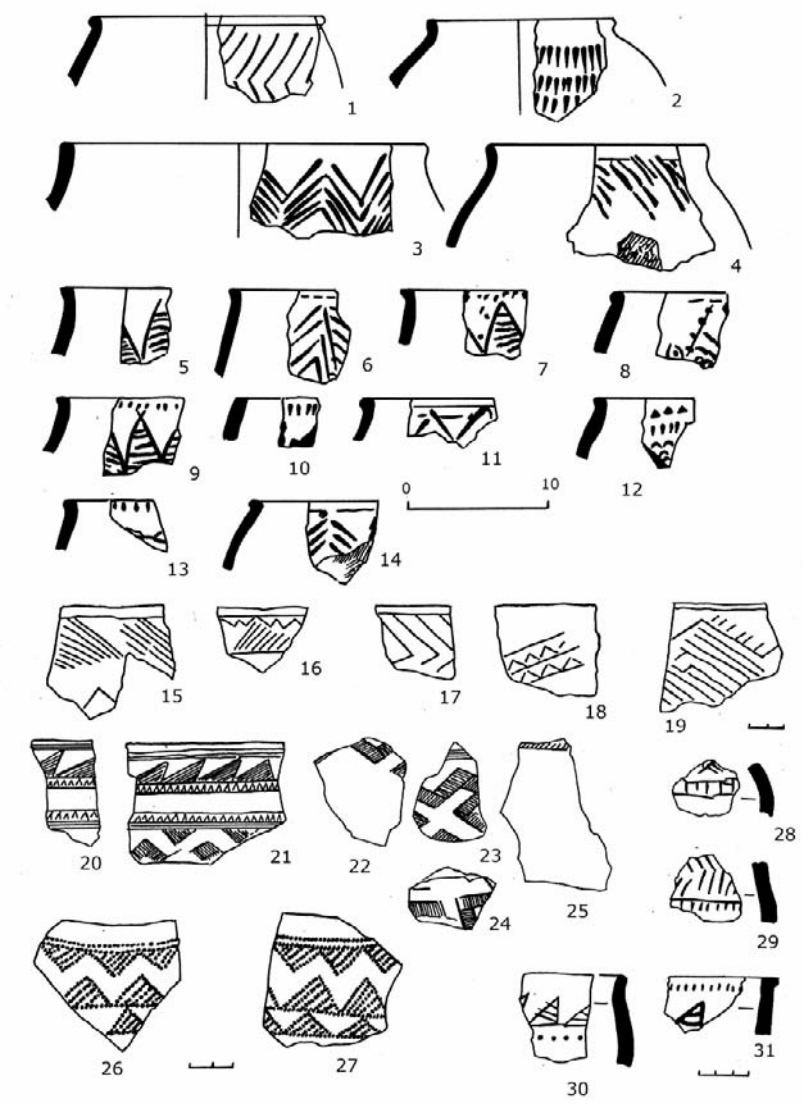

Fig. 82: Andronovo pottery from Margiana settlements.
1-14: Gonur; 15-19: Margiana (after a photo); 20-25: Andronovo grave, Takhirbay 3; 26, 27: Togolok 1, room 14; 28-31: Gonur, surface.

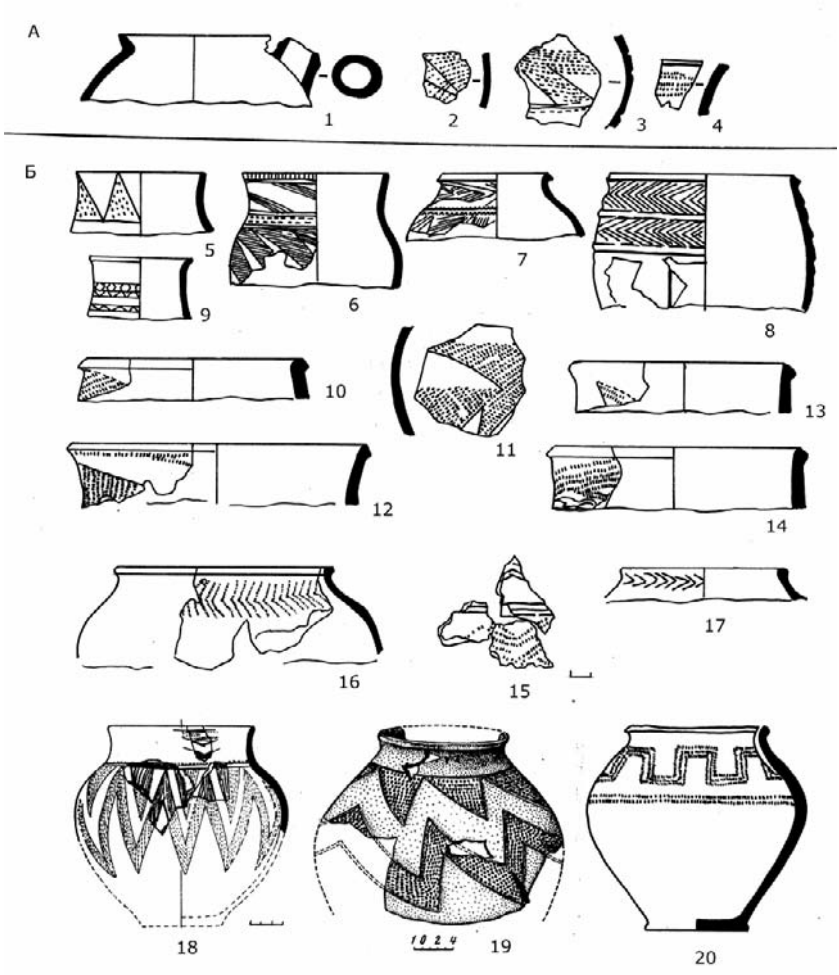

Fig. 83: Ceramics.
1-13: site near Kirov sovkhoz (A: 1-4: top horizon; B: 5-13: bottom horizon); 14: Karnab mine; 15-17: cave of Ak-Tangi; 18: settlement of Stigan, Trans-Caspia; 19: Saksan-Okhur; 20: grave at Karadimir, the Pamirs.

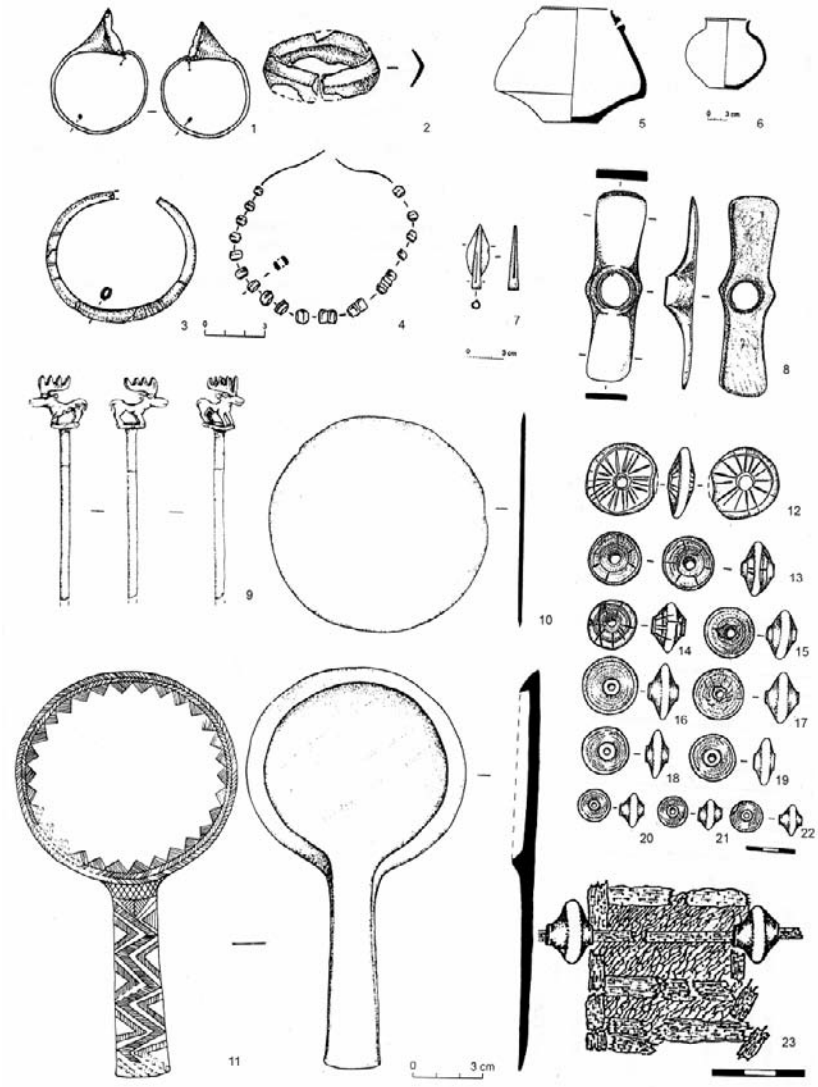

Fig. 84: Artifacts from Uzbekistan.
1-11: Dzham hoard; 12-22: clay models of wheels and car (12: Dzharkutan, citadel; 13, 17, 19-22: Bustan VI; 18: cemetery M 328; 23: grave N 327).

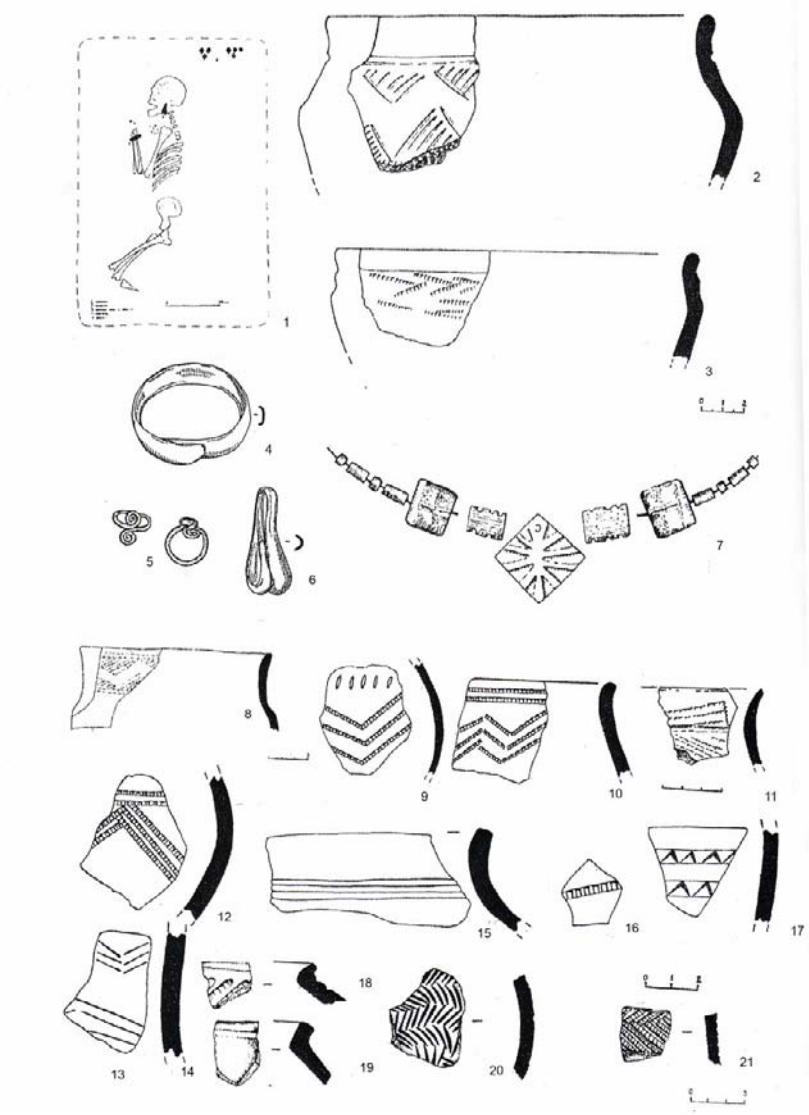

Fig. 85: Artifacts from Uzbekistan.
1-7: complex of grave, Siab; 8-21: pottery, settlement of Afrasiab.

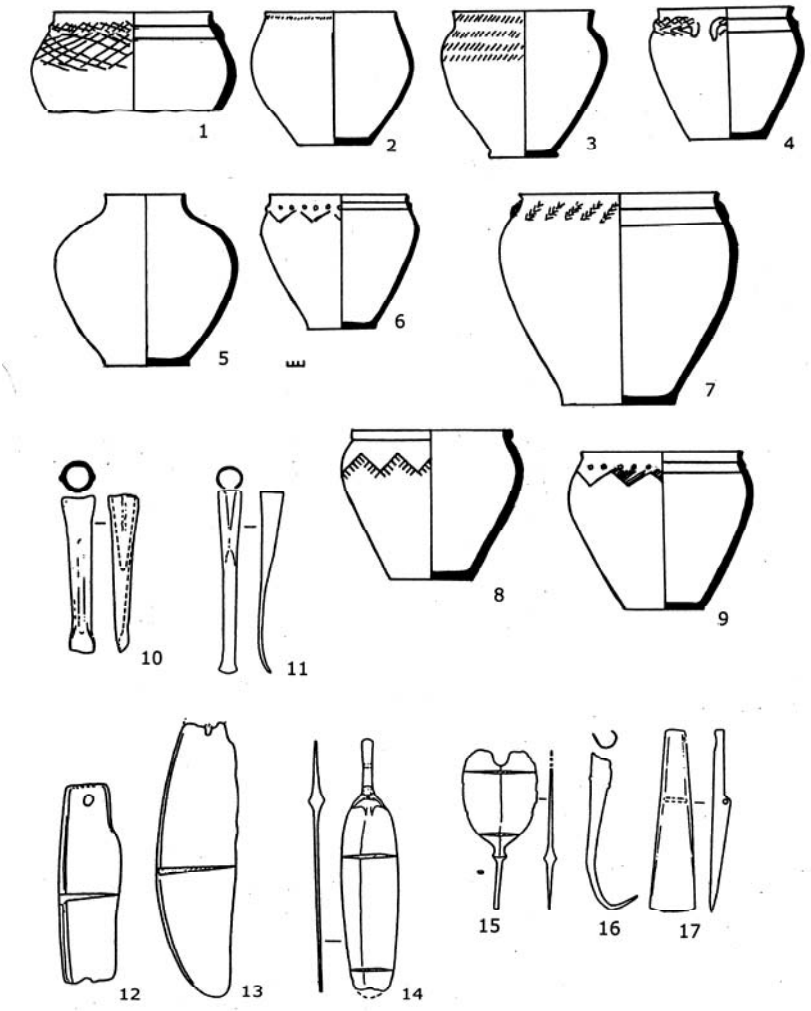

Fig. 86: Pottery and bronze implements of the Final Bronze Age.
Settlements: 1-9: Sargary; 10, 11, 13: Novonikol'skoe I; 12, 17: Petrovka II; 14, 15: Sargary cemetery; 16: Zhabay-Pokrovka II.

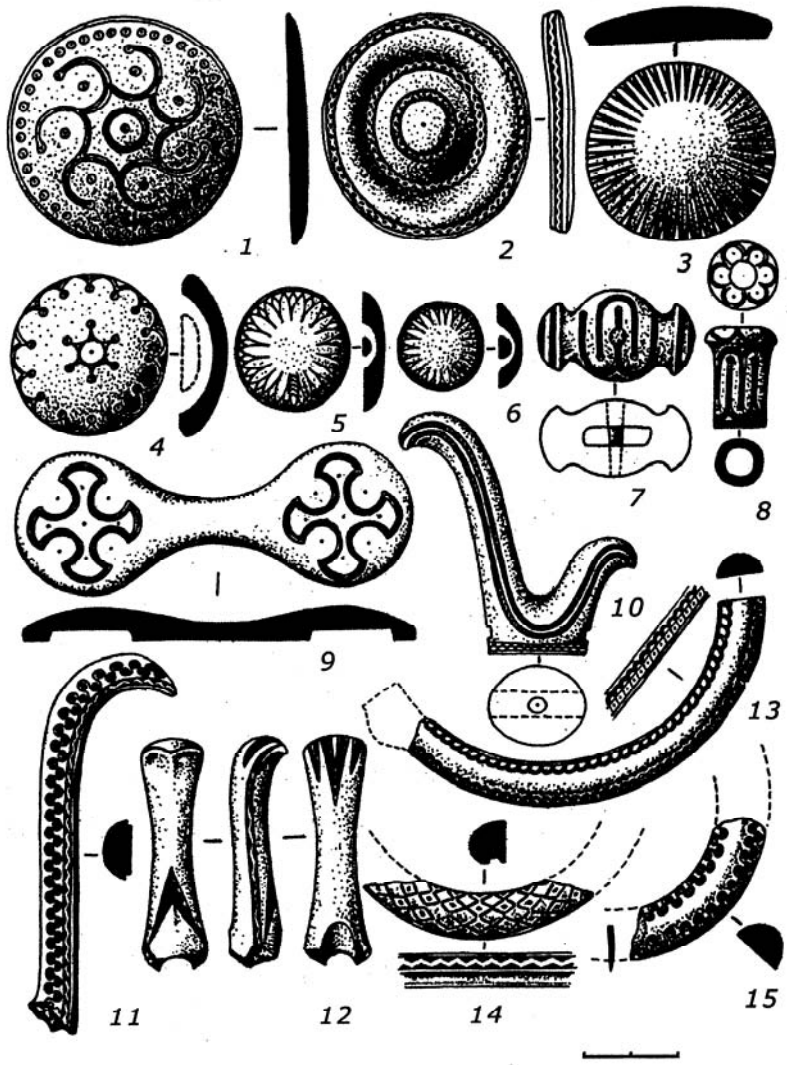

Fig. 87: Ornamented bone and horn artifacts from the settlement of Kent.

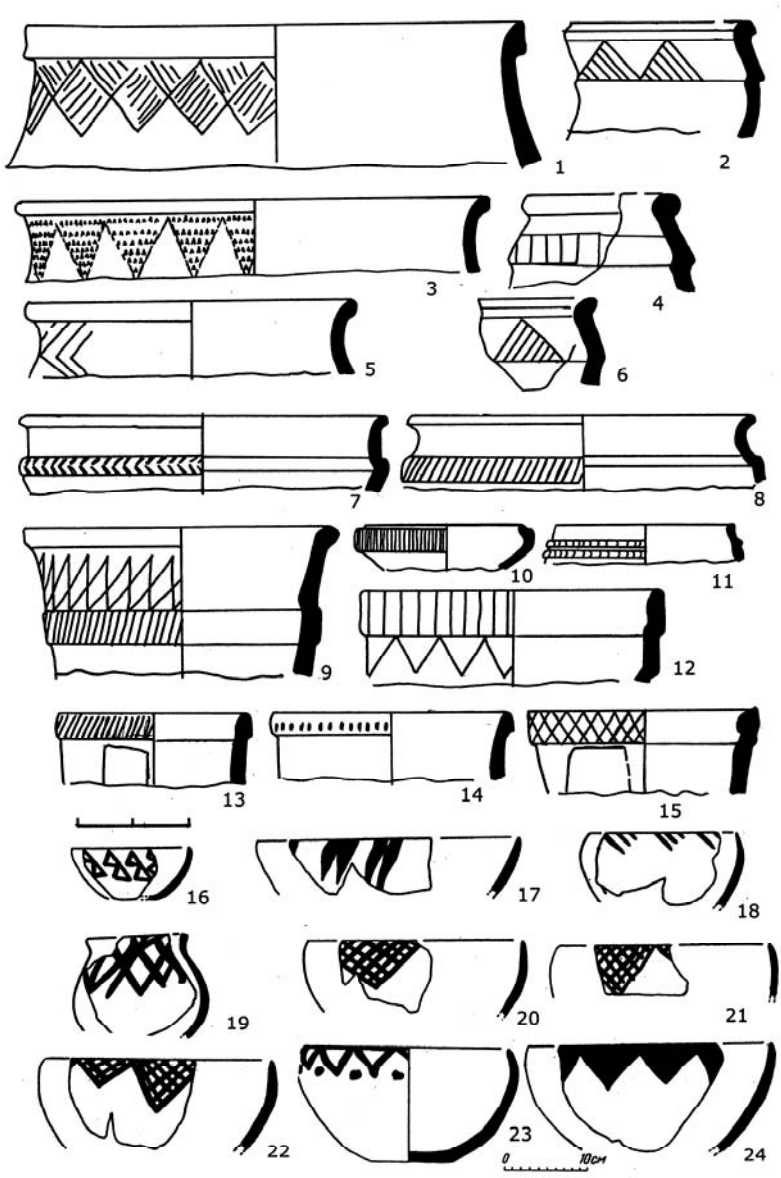

Fig. 88: Pottery with stamped, painted or applied roller ornament from the settlement of Dzharkutan, upper layer.

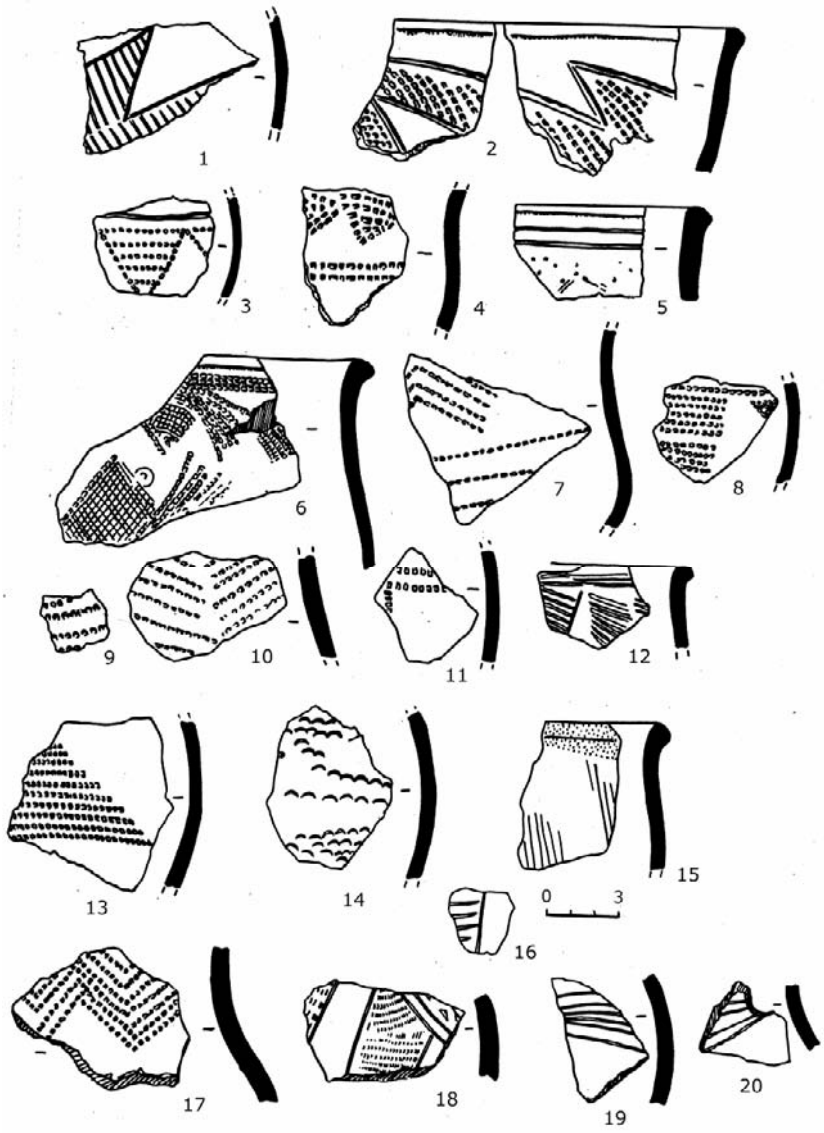

Fig. 89: Andronovo pottery from the settlement of Kangurt-Tut.

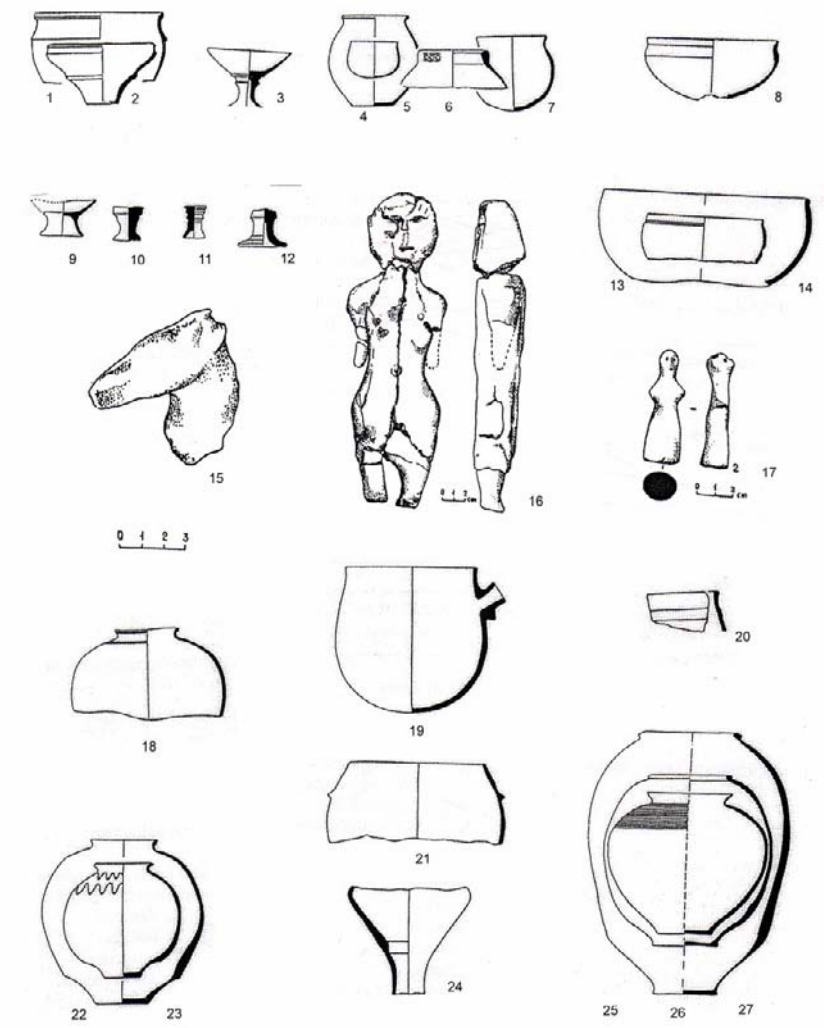

Fig. 90: Pottery and figurines from the settlement of Kangurt-Tut.

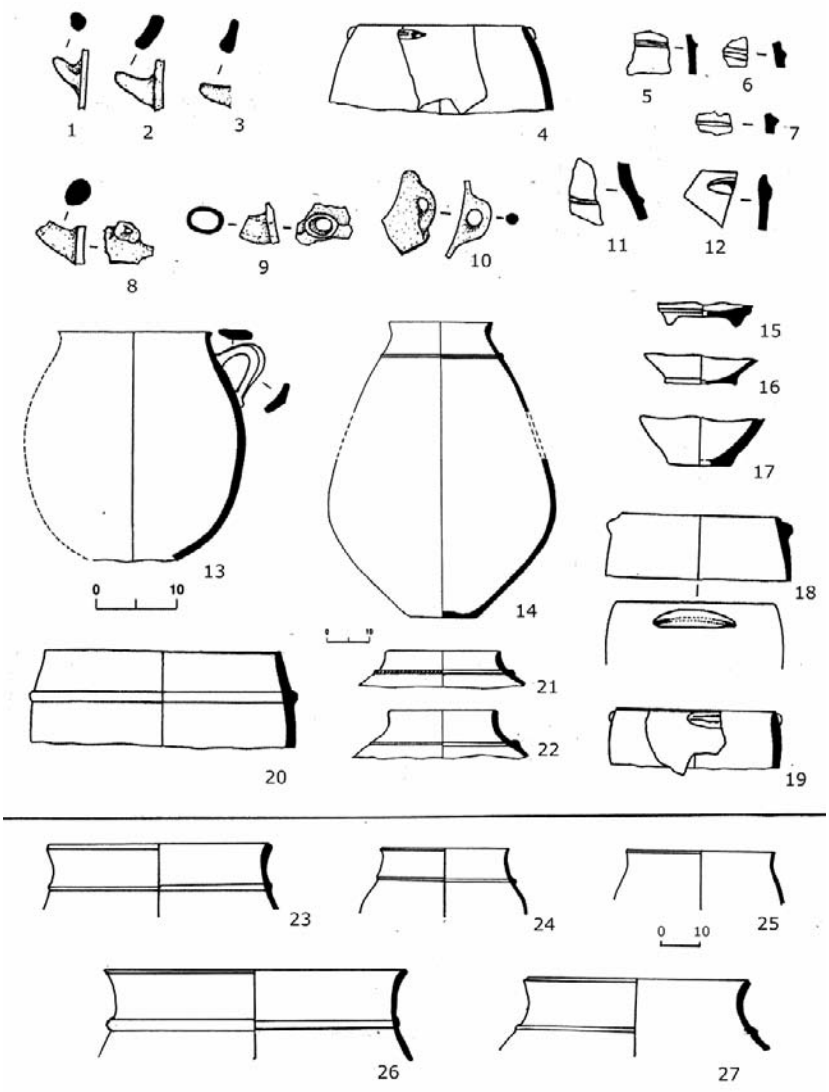

Fig. 91: Hand-made pottery, including applied-roller technique.
Settlements: 1-22 – Tashguzor; 23-28 – Shortugai.

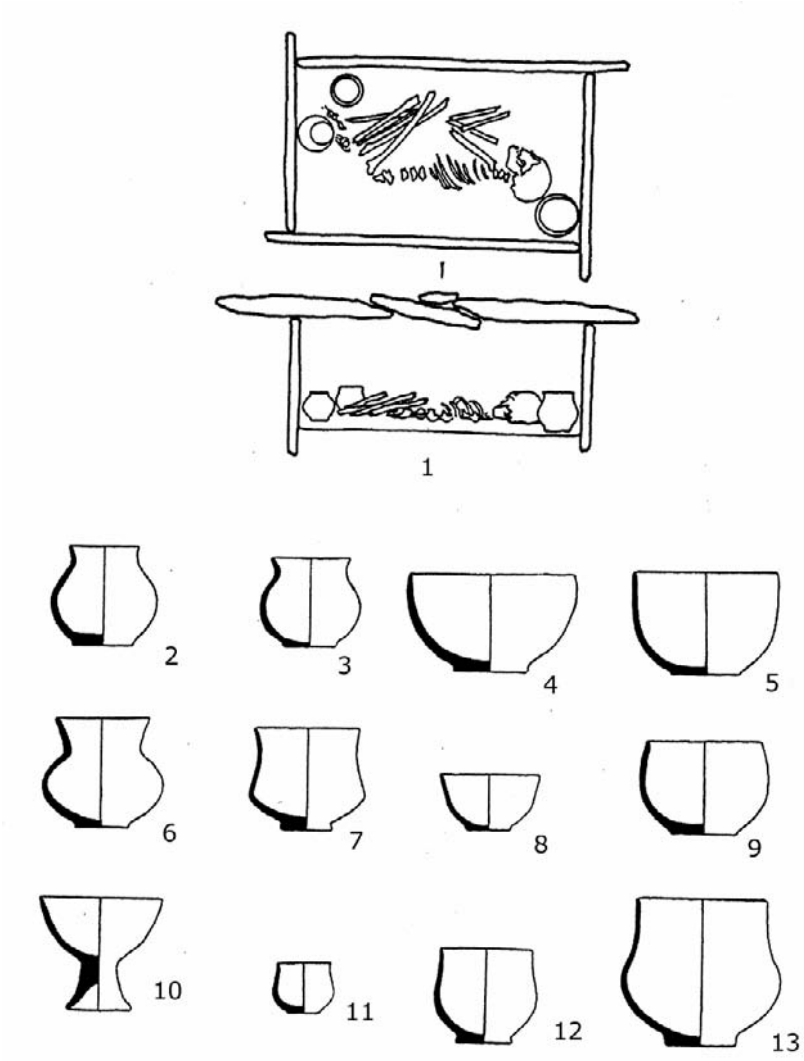

Fig. 92: Assemblage from the cemetery of Kheray.

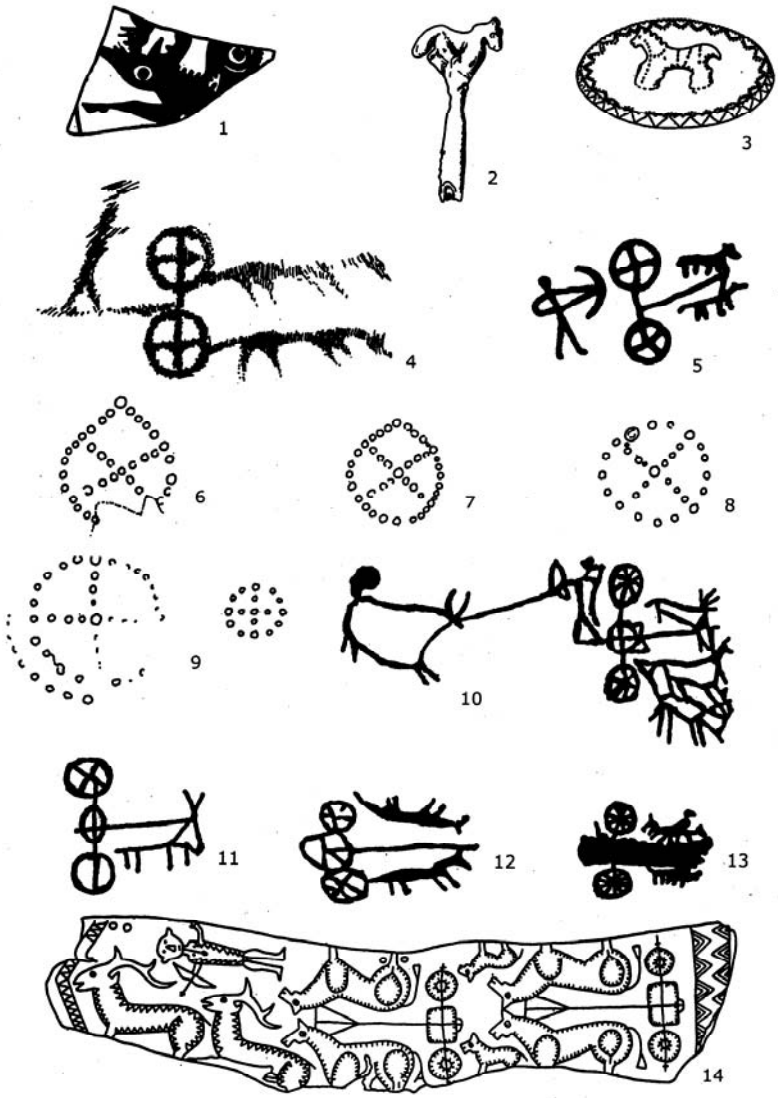

Fig. 93: Representations of horses and chariots from Swat, Xinjiang and Mongolia. 1: pottery, Bir-Kot-Ghundai, period Ghaligai IV; 2: bronze rod, Katelai cemetery; 3: clay cover, Loebanr cemetery; 4-9: petroglyphs from Swat: 4: Lecha-gata (from photo Olivieri and Vidale 2003); 5: Thor; 6-9: Dur-Bandai, site 23; 10-13: petroglyphs of Xinjiang: 10: Lunshan, province Zinhaj; 11: Lizsyavanzsy, district Balikun; 12: Badakhshan, the Pamirs; 13: Tsynchen, Hami; 14: bone plaque from tomb 102, Nanshangen, Inner Mongolia.

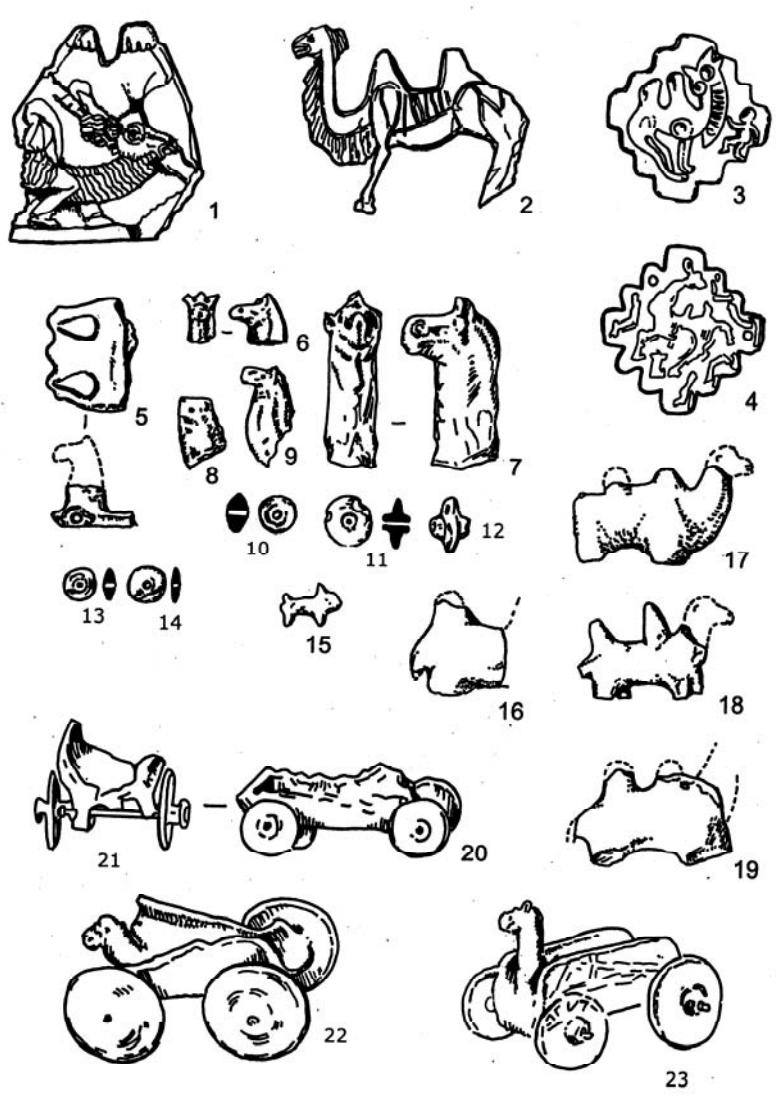

Fig. 94: Clay models of cars, wheels and figurines of camels from Turkmenistan, Uzbekistan and Afghanistan.
1, 2: Gonur; 3: Bactria; 4: Sapalli-tepe; 5-11, 15, 22, 23: Altyn-depe; 13, 14: Kara-depe; 12, 20: Namazga-depe; 16, 17, 19: Togolok 1; 18: Togolok 3.

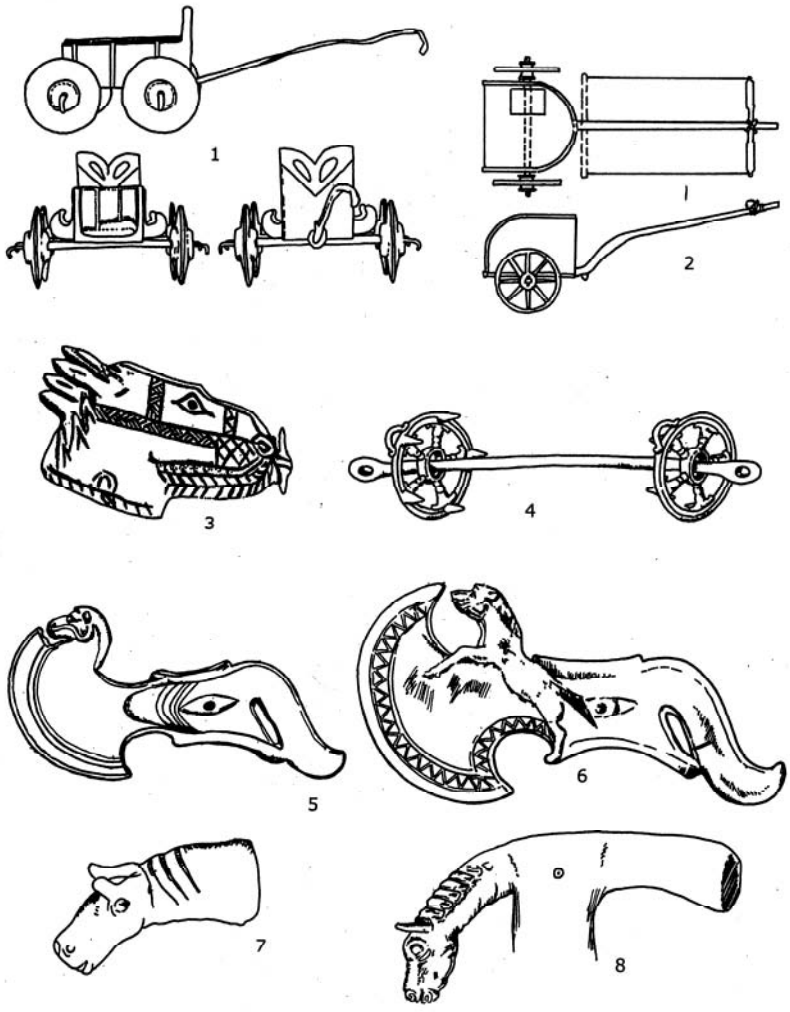

Fig. 95: Models of cart and chariot, bits and cheek-pieces, representations of equids.
1: copper model of car, Near East, Paris, Louvre; 2: reconstruction of chariot according the *Rigveda* (Rau 1983, fig. 5); 3: equid (Kunga?) with kapzug and nose-ring, Mari; 4: bronze cheek-pieces used for harnessing an ass, Tell el Ajjul (1, 3, 4 – Littauer and Crouwel 1979, fig. 14, 12, 48); 5-8: representation of horses from Bactria: 5, 6, 8: bronze axes; 7: shaft (5, 8: Ligabue, Salvatori 1988, fig. 101, 98; 6: Mahboubian 1997, fig. 15; 7: Pittman 1984, fig. 32).

Fig. 96: Carts and riders.
1: Gonur, grave 3200; 2: reconstruction of the wheel based on data from graves 3200, 3225 and 3240, Gonur; 3, 5-7: cylinder seals: 3: Tepe Hissar, 5: Bactria; 6:

Kültepe, Karum II; 7: Collection of Metropolitan Museum of Art N 66. 245. 17b; 4: terra-cotta plaque (private coll.); 8: seal impression rolled on a jar, Tell Brak; 9: sealing on tablet of Šu-Sin; 10: silver bowl with embossed and carved decoration, Bactria (Louvre).

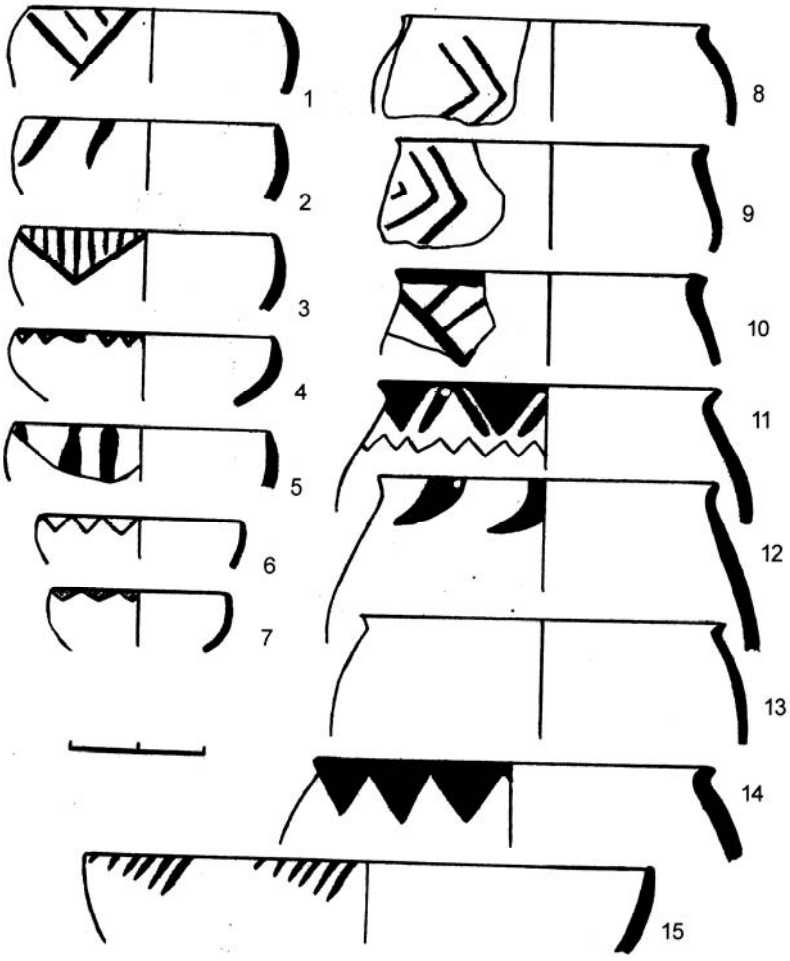

Fig. 97: Painted pottery from settlement of Kuchuk-tepe, level IA.

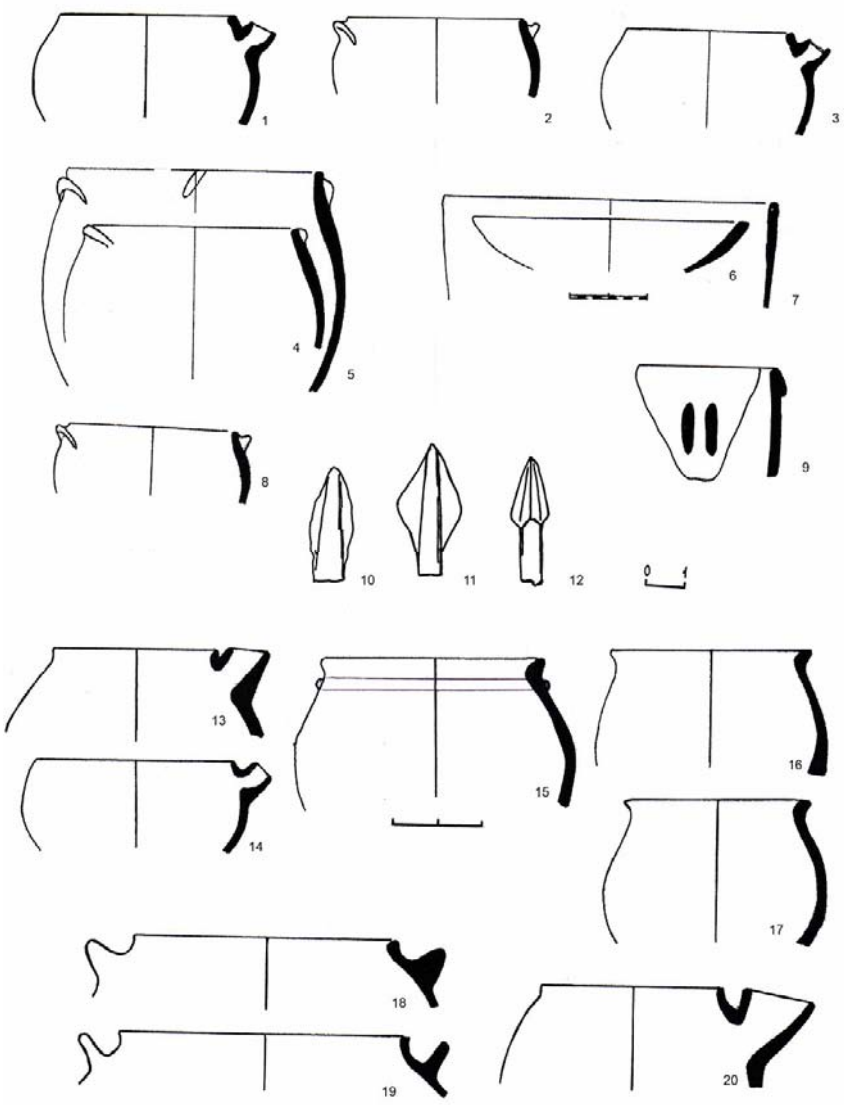

Fig. 98a: Painted and wheel-made pottery.
1, 4, 19, 20: settlement of Talashkan; 2, 3, 5-18: Dzharkutan, citadel.

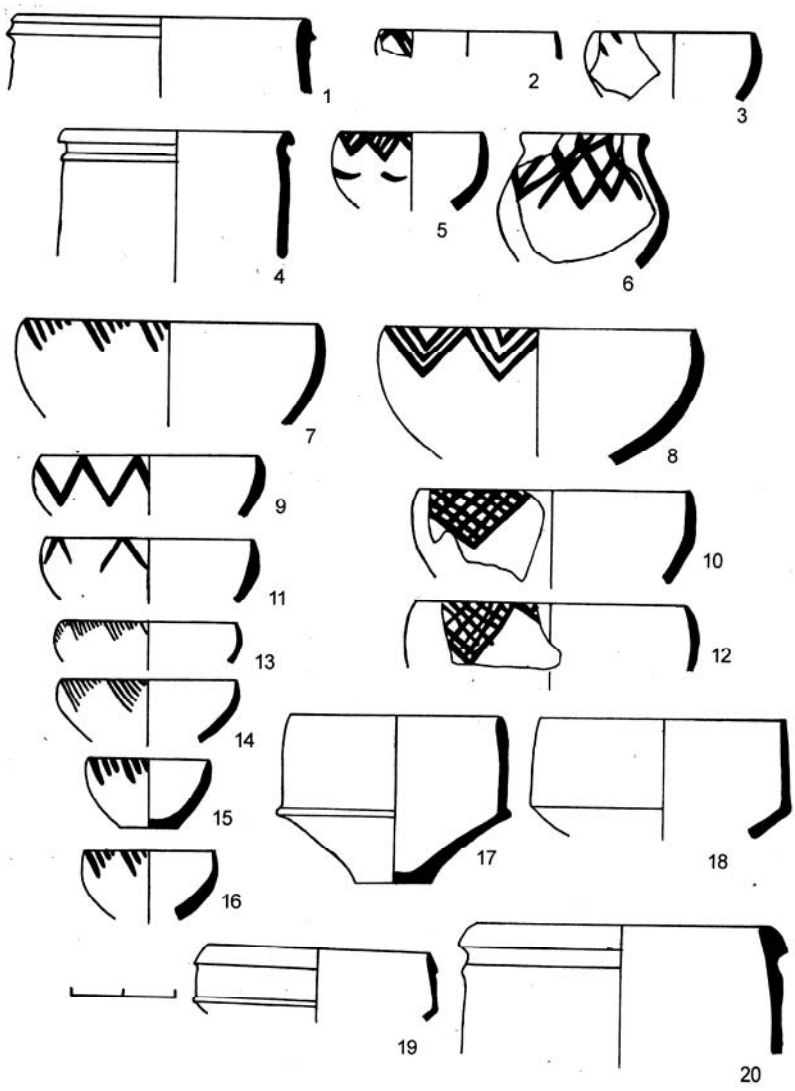

Fig 98b: Painted and wheel-made pottery.

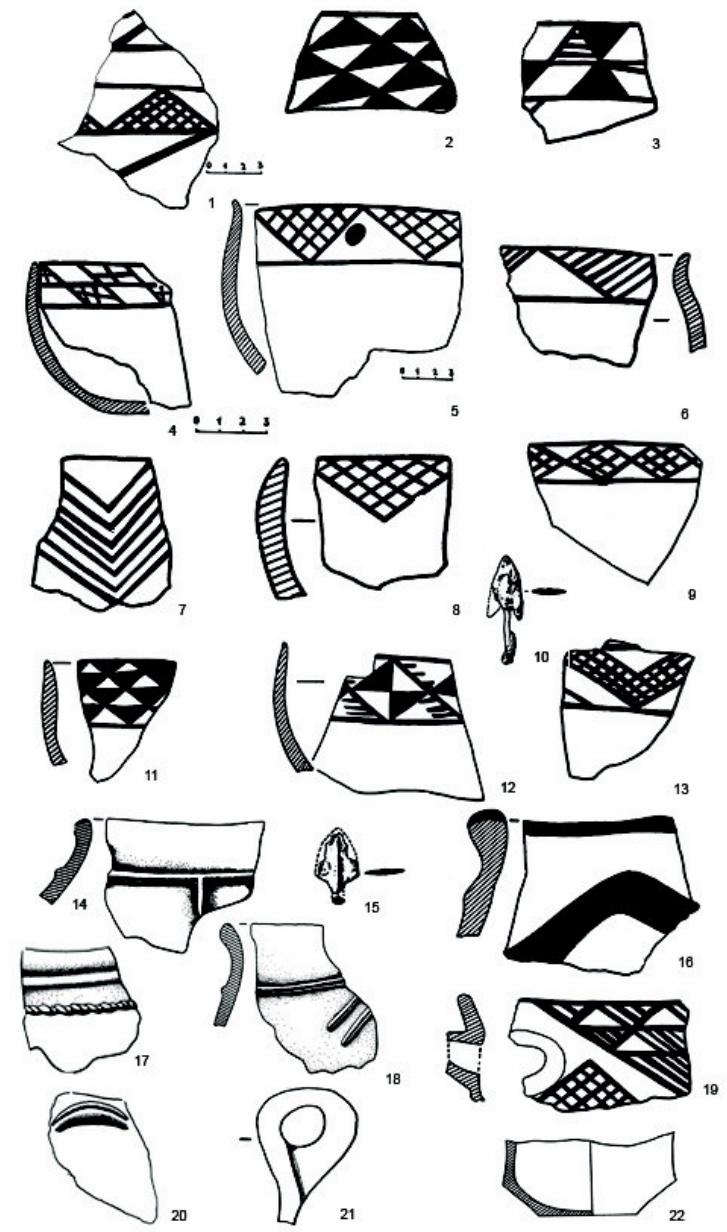

Fig. 99: Pottery from Tillya-tepe.

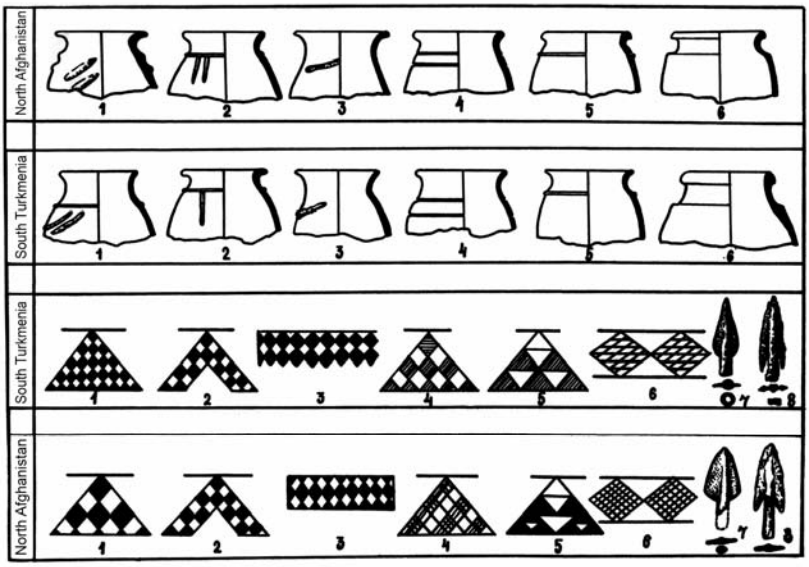

Fig. 100: Comparative table of materials from North Afghanistan and South Turkmenia (after Sarianidi 1972, fig. 7).

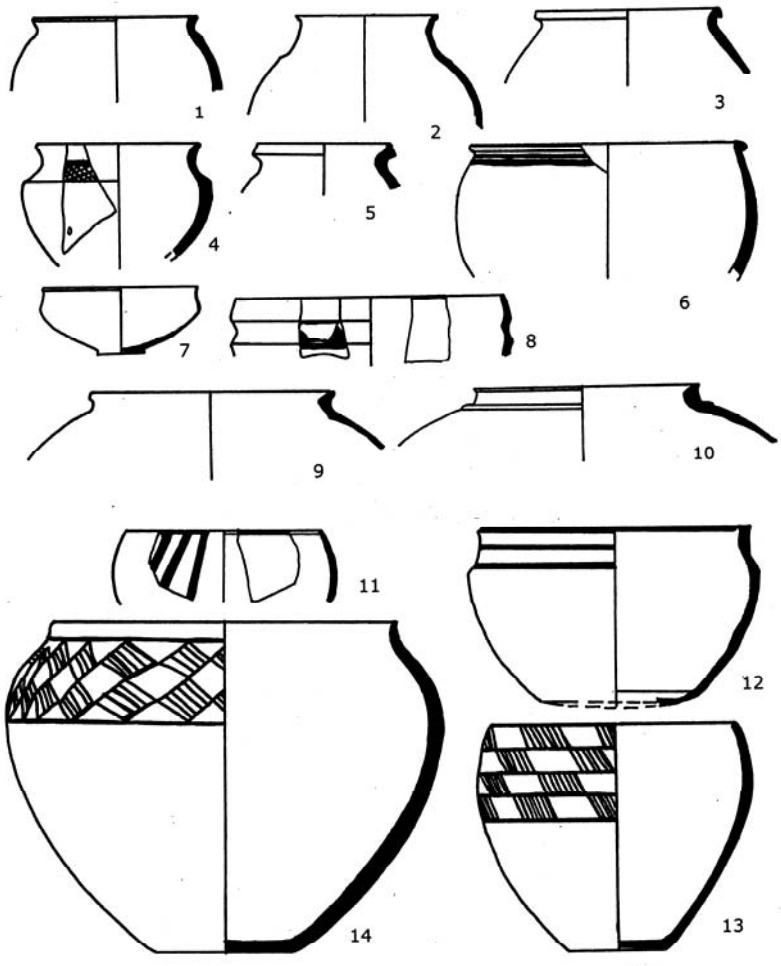

Fig. 101: Painted and applied-roller pottery from the settlement of Mundigak, Period VI.

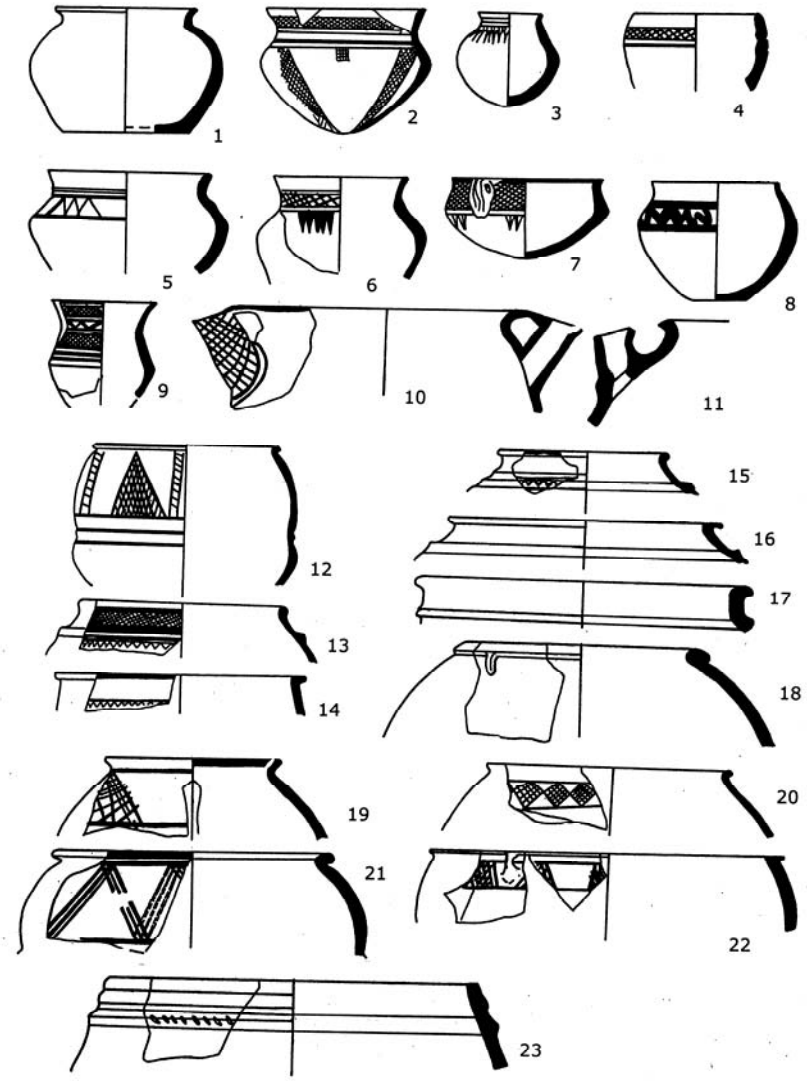

Fig. 102: Painted and applied-roller pottery from the settlement of Mundigak. 1-14: Period V; 15-23: Period VI.

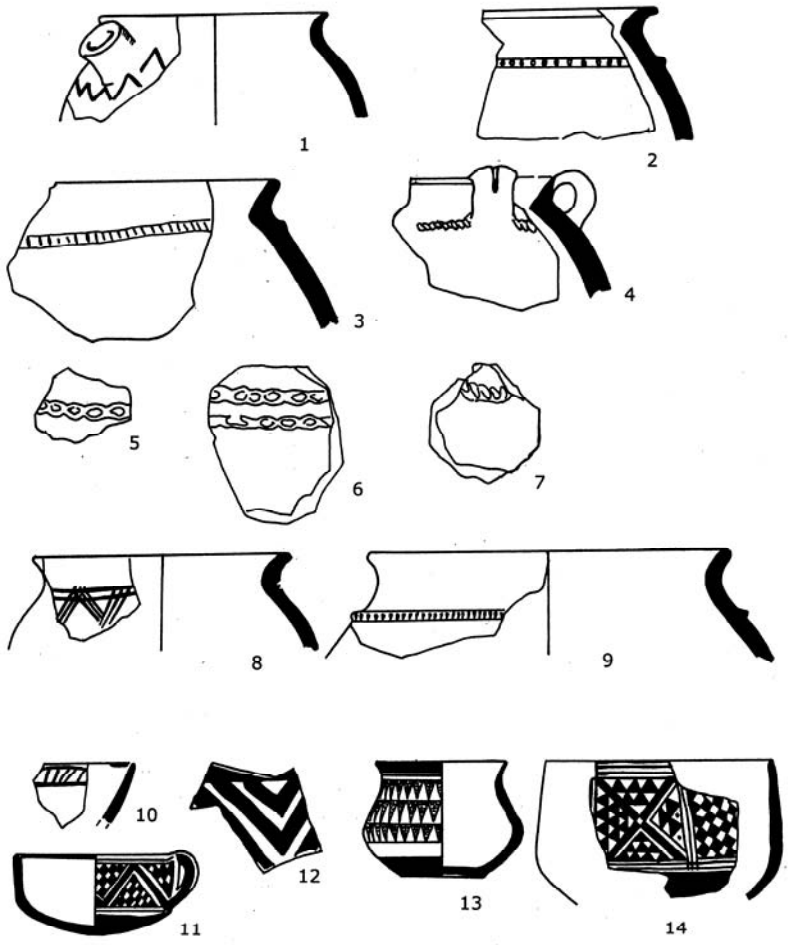

Fig. 103: Painted and applied-roller pottery from the settlement of Pirak, period II (Enault 1979, fig. 47, 48, 61).

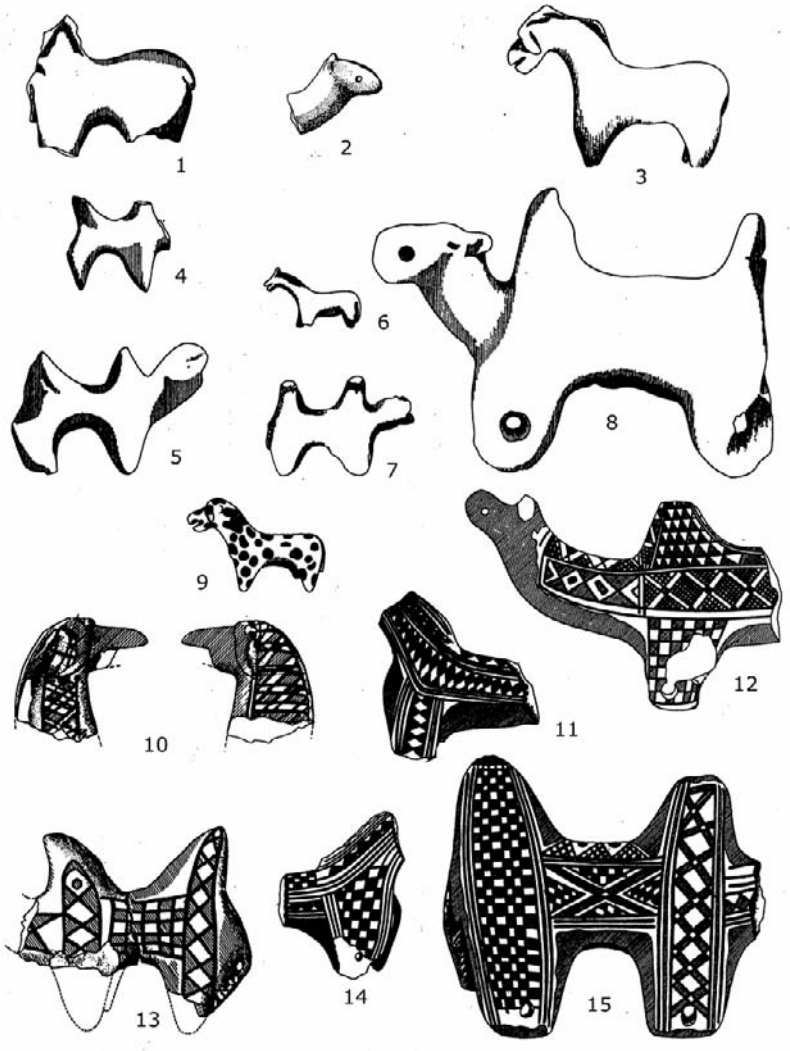

Fig. 104: Figurines of horses and Bactrian camels from Pirak.

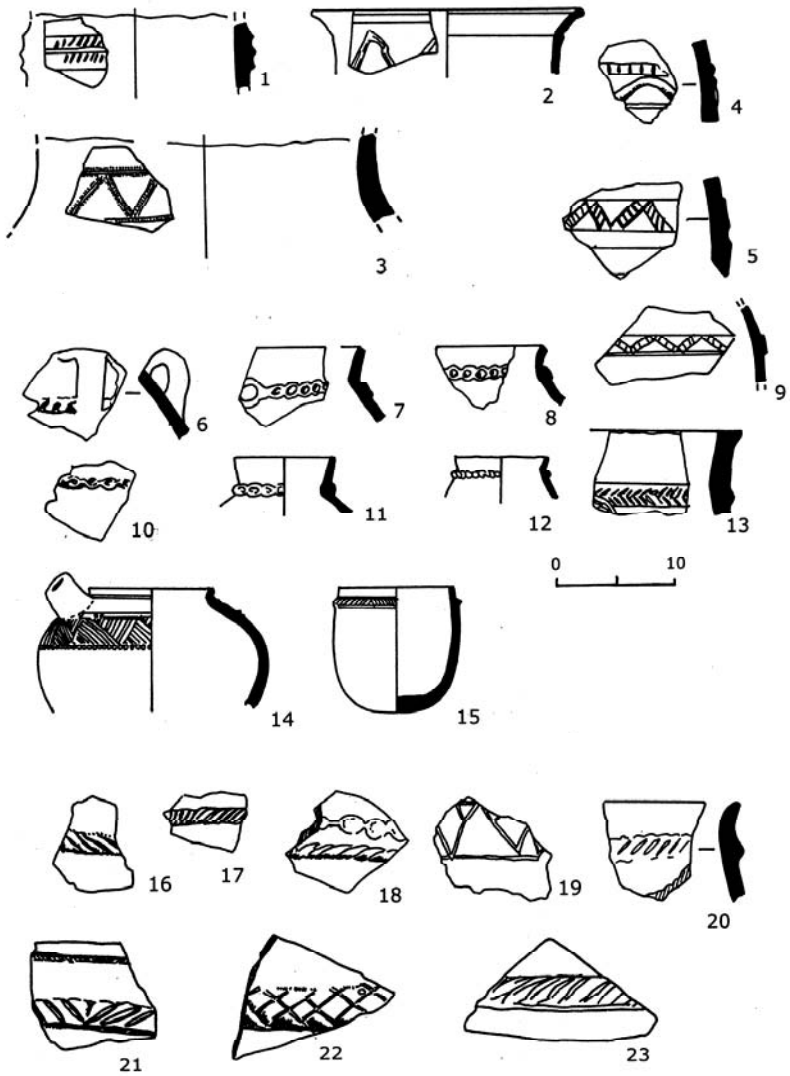

Fig. 105: Pottery with applied roller (appliqué ware) from India and Baluchistan. 1-3: Tulamba; 4, 5, 9, 13: Durrah-e Bast ware, Makran; 6, 10, 14, 15: Pirak; 7, 8: Dur-Khan; 11, 12: Patani Damb; 20: Rana-Ghundai, surface; 21-23: Mohul-Kala.

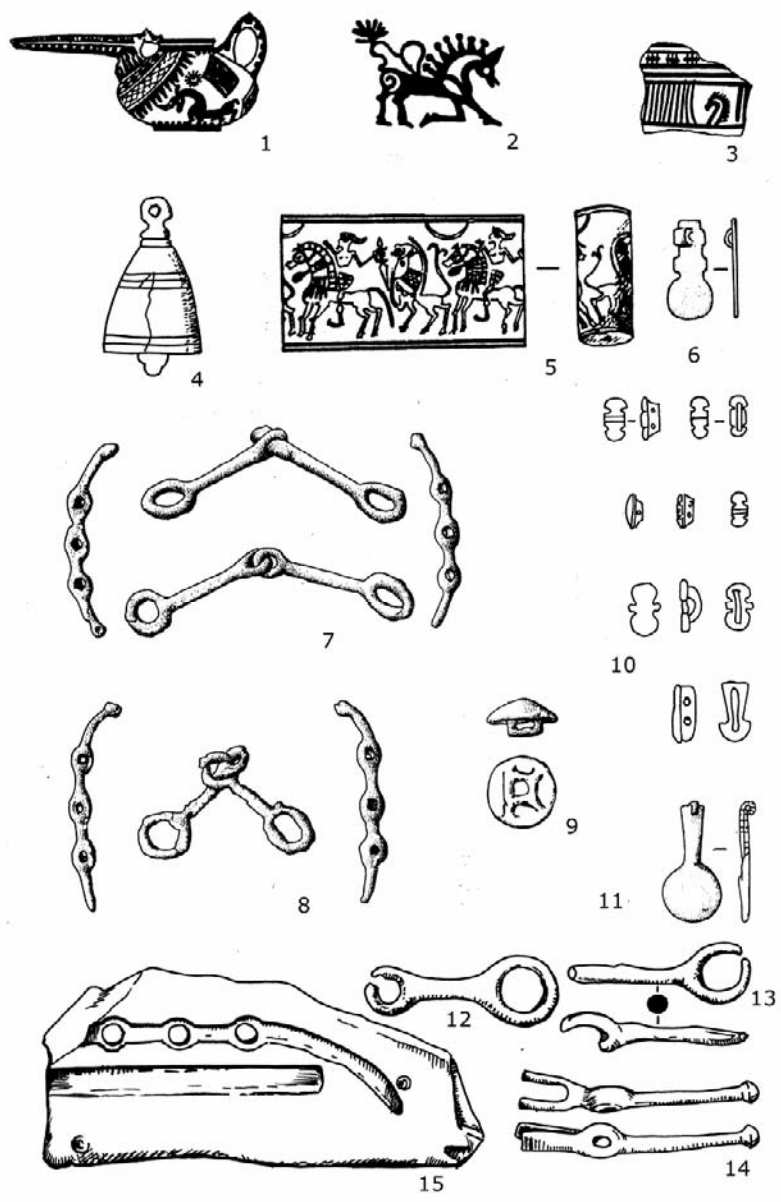

Fig. 106: Representations of horses and harness gear.
1, 4-11: Sialk VI, Cemetery B; 2, 3: Londo Ware, Baluchistan; 12: Kayrak-Kumy, settlement 9; 13: Chust; 14: Kyuzeligyr; 15: Dal'verzin (1-3: pottery; 5, 15: stone moulds; the rest: bronze).

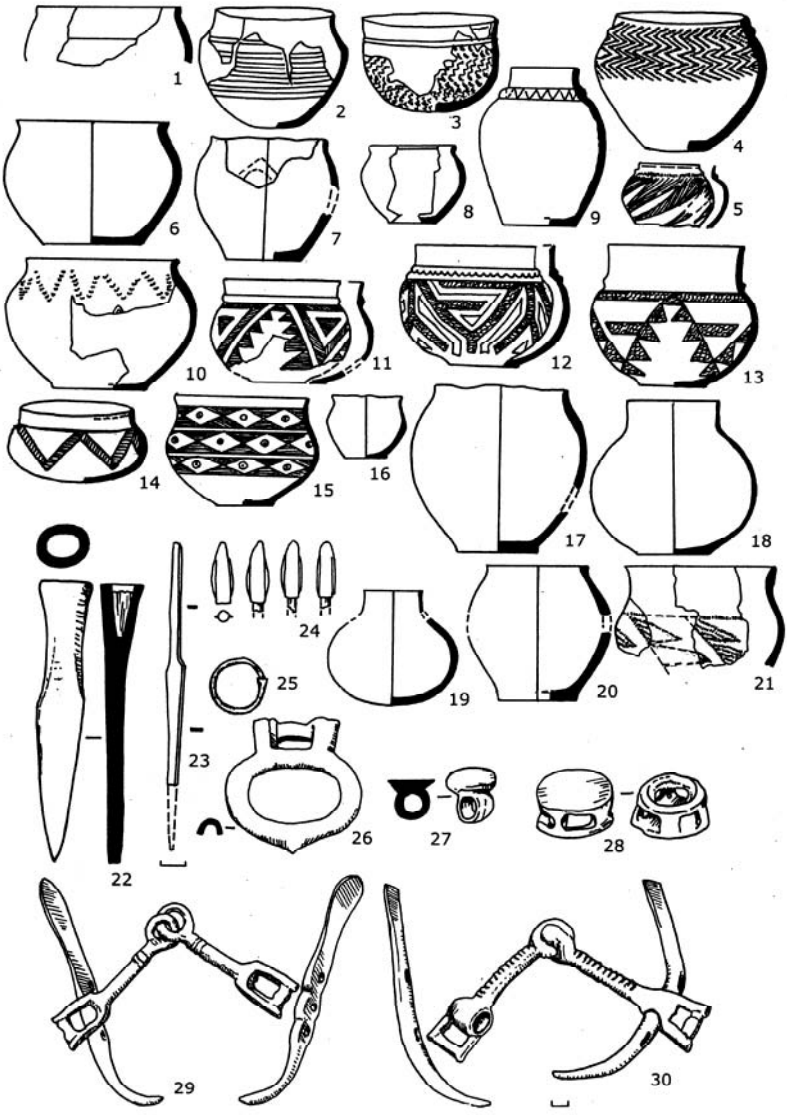

Fig. 107: Assemblage from the cemetery of Ismaylovka.

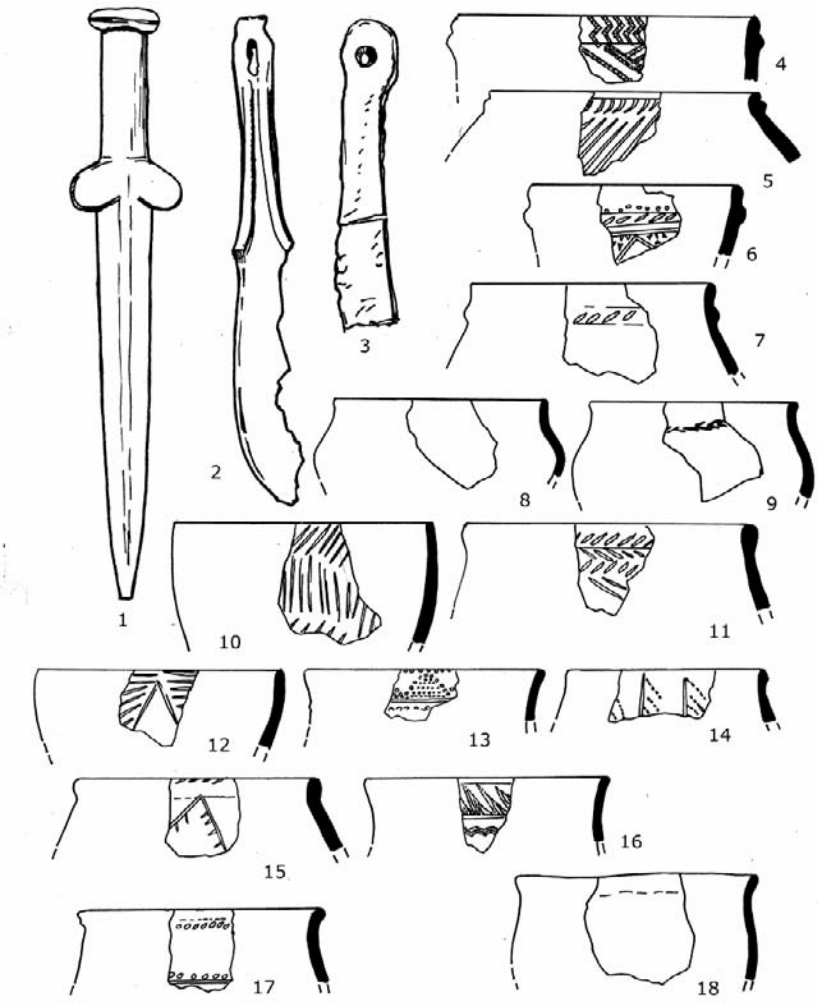

Fig. 108: Assemblages from settlements of Stalinskiy rudnik and Stepnyak.
1-3: bronze; 4-18: pottery.

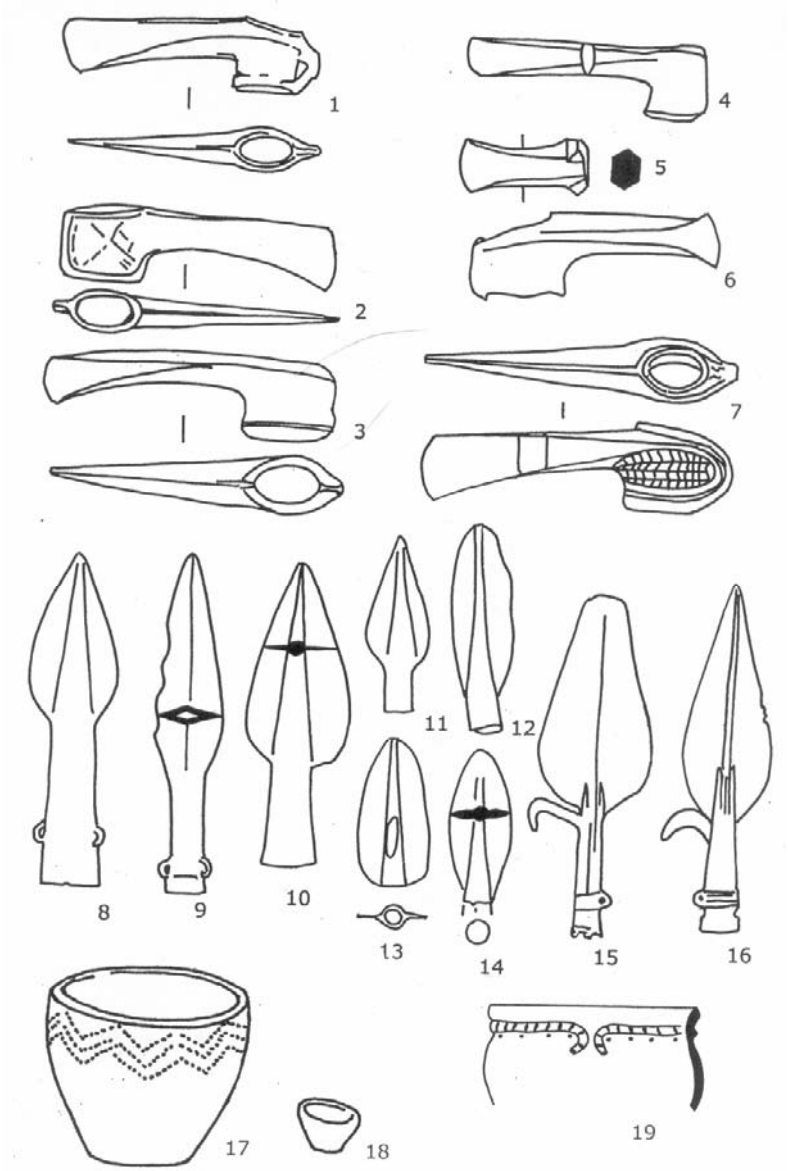

Fig. 109: Axes, spearheads, arrowheads and pottery from Siberia, Xinjiang and Mongolia. 1: Urlapovo; 2: Shemonaikha; 3: Krestyanskoe; 4, 6: Quital; 5, 7: Tacheng; 8-10: China, Shang graves; 11: Loulan; 12: Huayanzi; 13: Yanbulake; 14: Quranzhma; 15: Shenna, Quinghai; 16: Rostovka; 17, 18: cemetery of Weisyuo, Tacheng; 19: Ulus Verkhnekilgantuy, grave 43, Mongolia.

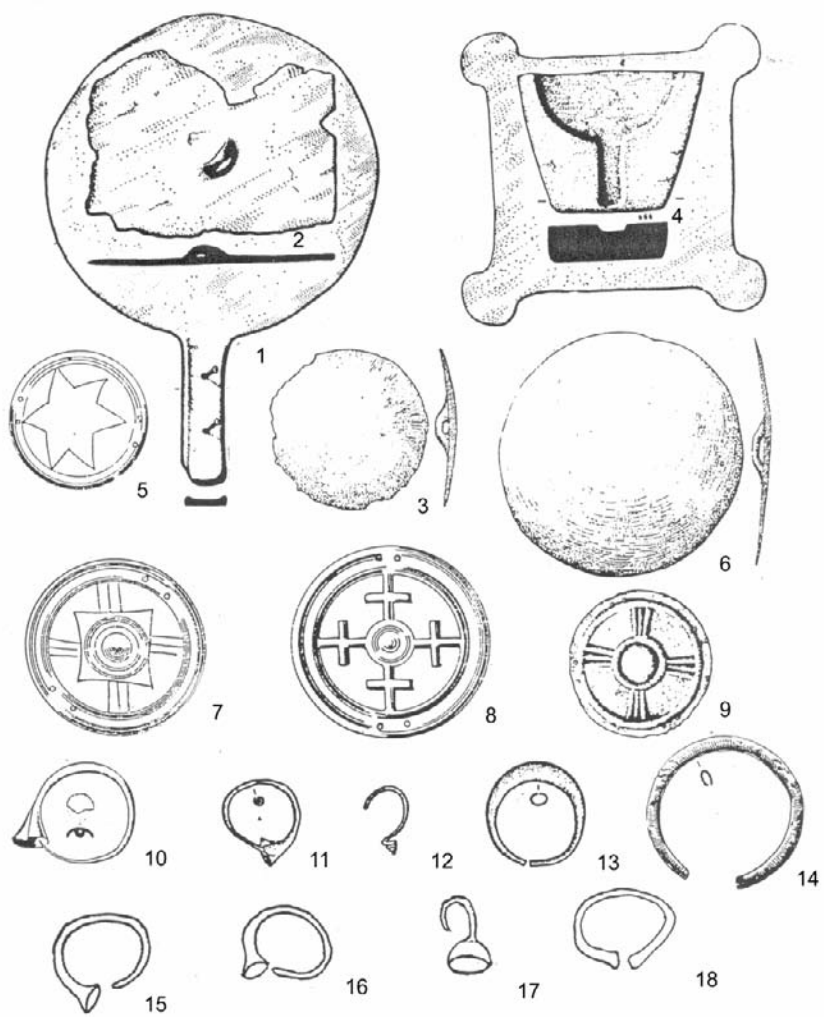

Fig. 110: Ornaments from Central Asia, Xinjiang and China.
Hoard: 1, 2: Sadovoe; 3, 6: Shamshi; 19: Sukuluk; settlement: 4: Chust (stone mould); cemetery: 5, 7, 8: Bylkyldak; 10, 11: Tash-Tyube; 12: Dzhasy-Kechu; 13, 14: Begazy; 15, 16: Dun-Bey; 17, 18: Liuli He.

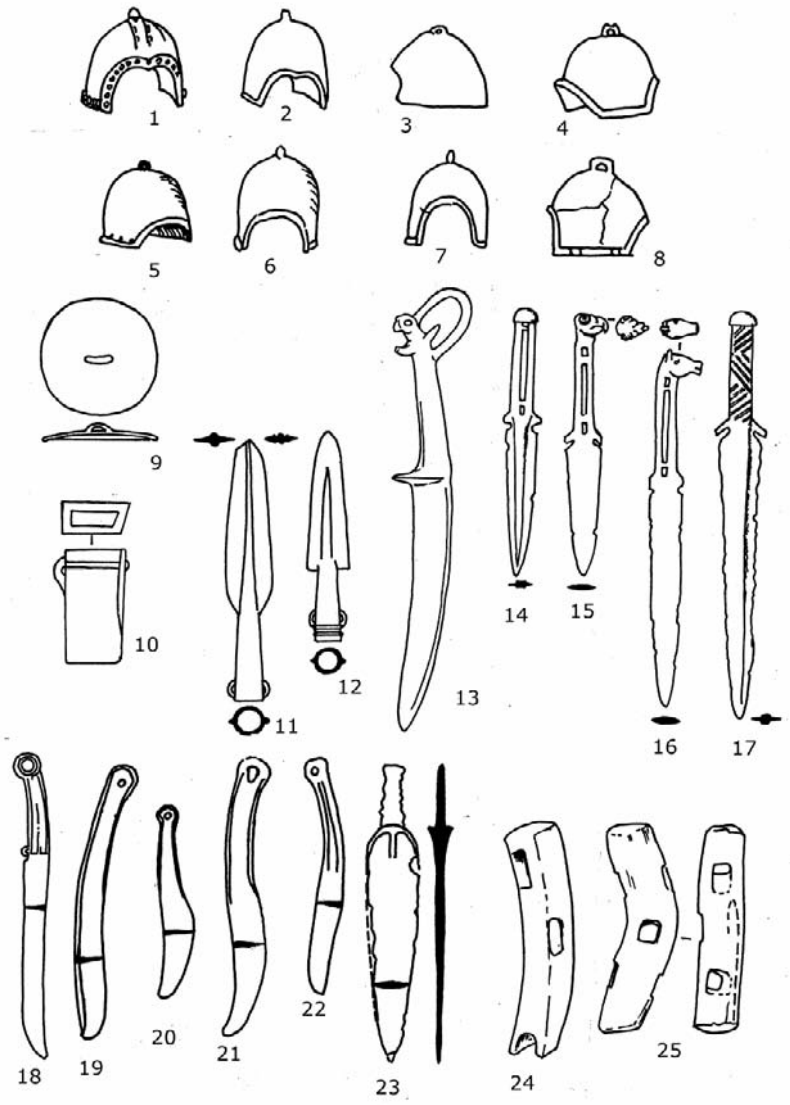

Fig. 111: Assemblage of armament and cheek-pieces from China and the Northern Provinces.
1-8: helmets; 9, 19-23: Tianshanbeilu cemetery; 14-17: Pai-fu near Peking; 13: Fu Hao tomb; 18: Zhukaigou, Phase V; 24-25 – China.

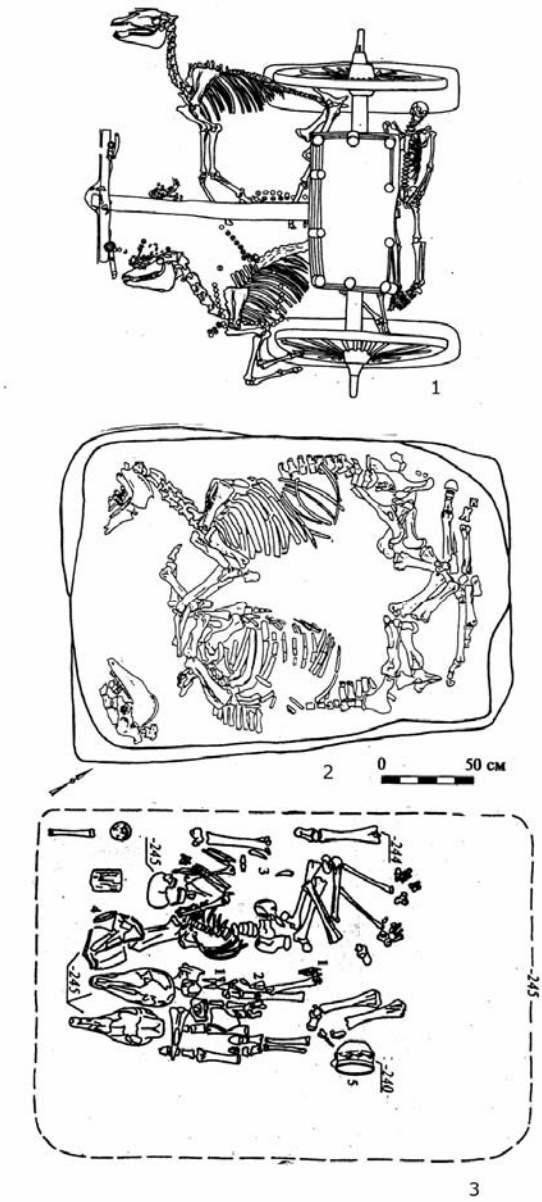

Fig. 112: Burials of pairs of horses
1: Che ma ken Hsiao-min-t'un (Anyang); cemetery: 2: Uvarovo II, 1/3; 3: Kamenny Ambar 5, burial mound 2.

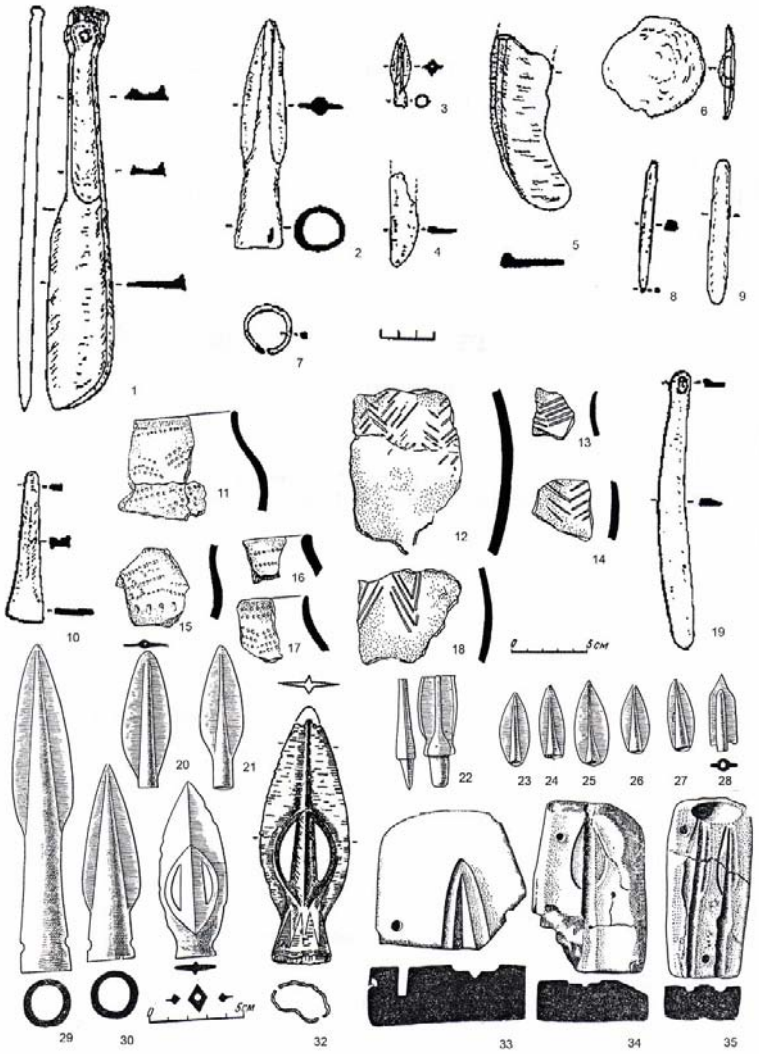

Fig. 113: Artifacts of the Burgulyuk culture and metal implements from Central Asia.
1-10, 19: settlement Burgulyuk 3, 14; 11-18: Tuyabugus 4a; 20: Bala-Ishem; 21: Uzbekistan; 22, 34, 35: Yakke-Parsan; 23-26: Brichmulla hoard; 27: Vuadil' cemetery; 28: settlement Kayrak-Kumy; 29: Margelan; 30: Asgabat; 31: Issykul; 32: Stary Termes; 33: settlement Chust (33-35: stone).

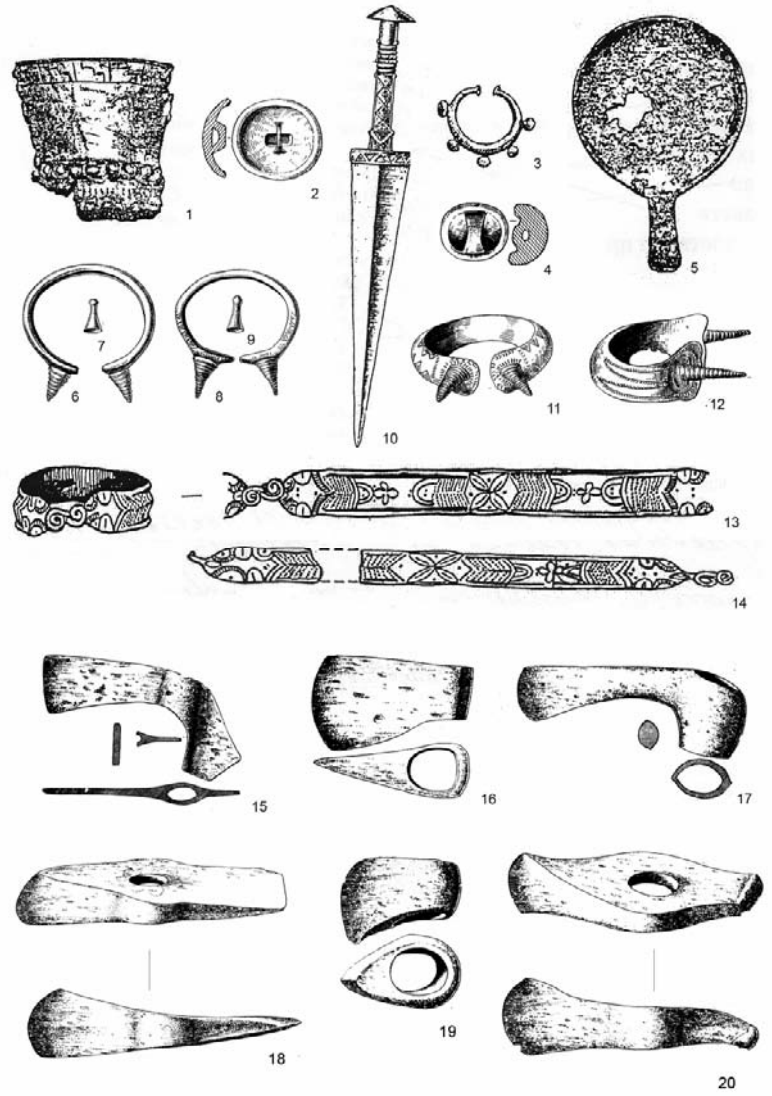

Fig. 114: Metal artifacts from Central Asia.
1, 3: Nurek; 2, 4: Brichmulla; 5: Kara-Pichok; 6, 8: Iskander; 7, 9: Sadovoe hoard; 10: Ramit; 11, 12: Uzgen; 13, 14: necropolis Parkhar; 15: Pul-i Khatun; 16: Sangvor; 17: Chimbaylyk hoard; 18: Yori-say (Pyandzhikent); 19: Arakchin; 20: Shar-Shar.

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