

THE DIFFUSION OF METALLURGY IN EARLY CENTRAL ASIA

Karl Jettmar ✓

Following a common trend in the last fifteen years, Soviet archaeologists began to use the trace-element analysis of metal objects by spectography as an important tool of research. By 1966, five thousand tests had been made for Soviet Eastern Europe, unveiling the diffusion of mining and the system of trade during the Copper and Bronze Ages. Thereby the views of West European scholars working in the same field were considerably supplemented or corrected. In the last few years the tests have been extended over the whole of the Soviet Union--to Caucasia and Transcaucasia, to Kazakhstan, Southern Siberia and Western Turkestan. I endeavoured to sum up the most important results of this activity in a paper read at Columbia University in 1969 (Jettmar 1970; 1971; cf. Chernykh 1967; 1969).

One of the spectacular outcomes of Soviet research is the disclosure that during the second part of the third and the first part of the second millennium B.C., influences from Northern Iran were spread over many parts of Western Turkestan, i.e., the area called "Middle Asia" by the Soviets. Most probably the stimuli for the exploration and exploitation of local mines in East Kazakhstan and Southern Siberia also came from this direction. What this impact from the southwest means for the ethnogenetic process is still under discussion (Kuz'mina 1966:86-90; Sarianidi 1970).

However, a large gap still remains in our knowledge of what happened during this crucial period in all the areas of Inner Asia which are at present under Chinese control.¹ If we stick to the old hypothesis that the sudden growth of a metallurgical focus in China was due to contacts with the West, then we have to look for links in the regions which in later centuries were crossed by the Silk Road, and here we still do not have assemblages from systematic excavations representing the local Copper and Early Bronze Ages. Unless this situation is basically changed, we can only make some rather bold proposals. As far as I can see, two different approaches are feasible.

1. Firstly, we may assume that clear relations in somewhat later periods should not be dealt with as isolated phenomena. We may consider them as hints about permanent traffic routes which had already been responsible for earlier diffusions.

¹Soviet archaeologists call these regions "Central Asia" as opposed to "Middle Asia," the term reserved for Western Turkestan (Novgorodova 1970).

In fact it is a quite normal assumption that the horse-drawn war chariot used in Shang China almost exclusively as a symbol of royal dignity must have derived from Near Eastern prototypes (Nagel 1966:41-42). In this case it is probable that the idea of building such elaborate vehicles came via the extreme northeastern outpost of the West Asiatic civilisations, i.e., East Iran and Southern Turkmenia. This would mean that the so-called Silk Road already existed in the middle of the second millennium B.C.

It cannot be overlooked that the evolution of the harness developed along parallel lines in Western Asia and in the Far East. In both West and East, the first effective system of horse-bridling consisted of plaques fixed to the cheeks of the horse (Fig. 1, No. 1) and connected by an organic bit, perhaps made of plaited leather straps (Hančar 1955:496-499; Dewall 1964: 112-114). At the end of the second millennium B.C. in both cases this apparatus was replaced by curved prongs made of antler-horn (Fig. 1, No. 4) (or cross-bars made from metal) still connected by an organic bit (Smirnov 1961: 52-67; Dewall 1964:233). Somewhat later this bit was also made of metal. It consisted of two or more parts linked together with rings at each end for the reins.² Such repeated coincidences were surely not by chance and cannot be completely explained by technical efficiency, but mean a repeated transfer of ideas across the whole of Asia.

A convincing confirmation of such contacts is the fact that a dagger belonging to a type common in Eastern Transcaucasia north of the River Kura was recognized by the Soviet scholars Pogrebova and Členova among the objects published in L. Hájek's book, *Chinesische Kunst*, Prague, 1954 (Fig. 1). The text does not mention in which museum in China the photograph was taken (Pogrebova & Členova 1970:290-292, fig. 2). However, the possibility that Caucasian types may have spread towards the East via Middle Asia is underlined by the find of another dagger with Caucasian peculiarities near Ramit in the mountains of Tadzhikistan (Fig. 3). This dagger too has parallels in Eastern Transcaucasia (Pogrebova & Členova 1970:293-294).

Such daggers belong to the later part of the second millennium B.C. The parallels between Caucasia (and Eastern Europe) on the one hand, and China on the other, frequently stressed by Heine-Geldern, belong to a still later period (Heine-Geldern 1951). So it is not enough to assume that there was only one wave--called the Pontic Migration by Heine-Geldern--but we have to reckon with a whole series of contacts of different kinds at different times, through trade, migrating craftsmen, military expeditions, etc. This would mean that it would not be too bold to include the origins of Far Eastern metallurgy in this picture also.

2. Now we shall proceed to the second approach. If we accept the idea of the existence of intermediate cultures responsible for the transmission of ideas between Turkmenia and China, we may assume that there was a certain radiation out from such cultures towards the north. The north in this case means Central and Eastern Siberia, Transbaikalia, and Northern Mongolia, all

²The parallels are evident when we compare Middle Asia (Sulimirski 1970: fig. 17) and China (Dewall 1966: pl. VIIIB, d).

areas which are the domain of Soviet archaeology and therefore much better explored than further south. Even for Transbaikalia, spectographic tests have been made showing the rise of local tin mining (Grishin 1968).

By a careful analysis of the influences reaching this marginal belt, we may gather information on the events which took place along the main route. We may use the remote regions of the north as a kind of mirror reflecting the cultural situation in the south.

After a long discussion in which Soviet and Western scholars were involved (see Novgorodova 1970:10-32 for summary), it can now be taken for granted that at least one lot of the metal types of the so-called Karasuk culture in the Minusinsk Basin and Transbaikalia was brought by immigrants belonging to the Mongoloid race. They came from an area outside the reach of Soviet archaeology, most probably Southern Mongolia, an environment favouring the development of animal husbandry and possibly nomadism (Novgorodova 1970:171-6, figs. 50 and 51) (Fig. 4). This complex in the background, documented only by stray finds so far, may be called Proto-Karasuk.

The Proto-Karasuk complex of Central Asia evidently had connections with the East, attested by the animal-head knives found at Anyang, and with the West as well. However, it must be conceded that even during the initial phase of this contact the explosive development of metallurgy in China had already reached such standards that the current of diffusion flowed from East to West. Kiselev even believed that the socketed celt occurred in China earlier than anywhere else. He supposed that this useful implement reached Europe via Western Siberia and the Urals, which became a source of metal for the Bronze Age of the Western Steppes (Kiselev 1951:262-264; cf. Childe 1954 and Gimbutas 1956).

So the Proto-Karasuk complex is not in itself the clue to the coming of metallurgy to China. In fact, Karasuk is not the first culture in the Minusinsk Basin to be suspected of having a Central Asian origin.

The complex which we formerly called Afanasievo is now split by Soviet authors into two cultures. The first is the Afanasievo culture proper, the later one is now called Okunev Ulus (Fig. 5) and dated from the beginning of the second millennium B.C. onwards. The bearers of the Okunev Ulus culture were evidently hunters and cattle breeders who had far-reaching connections. Their religious life, as revealed by carvings on slabs used for the building of their chamber tombs, is of fascinating complexity (cf. Fig. 6) (Okladnikov 1968:159-72; Lipskii 1961; Vadetskaia 1965; Leont'ev 1970; cf. Gryaznov 1969: 61-68; and Maksimenkov 1965).

Some unusual ceramic types show affinities to those of the borderlands of China (Lipskii 1961:270-271). The metal inventory, however, was restricted to a few implements, many of them made of pure copper. The alloy used in other cases is arsenic bronze. From such materials they made fishhooks, knives, awls, and ornaments, for instance rings of copper wire (Bogdanova-Berezovskaia 1963:135-158). There is only one small shaft-hole axe cast from pure copper. It was found in the central grave of a cemetery at Tas-haza, and was evidently a symbol of authority (Lipskii 1961:272). The composition of this simple set of implements (Fig. 7) becomes highly interesting

when we take into consideration that we can now discern an earlier phase of Chinese metallurgy, preceding the casting of bronze vessels, weapons and tools in complex moulds during the later part of the Shang period. In this earliest phase we hear about arrowheads, awls, fishhooks, a "shapeless" knife, a simple bell (Loehr 1968:14). The late Professor Kiselev, who was able to study the relevant assemblage on the spot (e.g., at Cheng-chou in Honan) in the days when Soviet-Chinese friendship and collaboration still flourished, already saw a chance of connecting this embryonic stage of Chinese metallurgy with the contemporary development in Eastern Turkmenia, an area also preserving flat axes and simple knives from the second millennium B.C. He pointed out parallels to the Chinese types in a hoard found near the Issyk-kul (Kiselev 1960:264; cf. Kuz'mina 1966:48, pl. X, 19-22). This very hoard contains a shaft-hole axe comparable to the specimen found at Tas-haza mentioned above (Kuz'mina 1966:40, pl. I/3).

When Kiselev wrote his valuable report, printed in 1960, the peculiarities and the connections of the Okunev Ulus culture were still unknown. The monuments of this group were considered as part of the Afansievo complex. Afansievo was, however, mainly regarded in the light of its affinities to the Pontic cultures of the third and early second millennia B.C., the Pit Graves and the Catacomb Burials.

Now quite different aspects of the situation are becoming visible. A metallurgy of Okunev Ulus style would fit in as the missing link between the traditions of Turkmenia and China.

The fact that Okunev Ulus in the Minusinsk Basin is definitely not on the route does not constitute a serious hindrance. Similar finds were made in Tuva and in the Western Altai (Kyzlasov 1958:72-74, pl. I). Many more may still be hidden in the deserts of Central Asia, as we presumed in the first part of the study. I think we must see such diffusions in a broader context. Some marginal areas of the evolved civilisations of Near Eastern type were surrounded by cattle-breeding or even nomadic communities who had a very complicated social and religious life but only a rather simple technology where metals were concerned. Much of the progress already made in the settled areas was missing here. Instead, such communities were geared towards great mobility. Some of them penetrated deep into Central Asia and came into contact with China, which had reached a surprising level of technical ability and flexibility in many fields, especially in ceramics, but had no metallurgy of its own. So a small spark, the basic knowledge of copper mining and casting, was sufficient to induce a development which almost immediately took a divergent line, deeply influencing the transmitters in their turn.

M. Loehr once told me that in his opinion the Chinese became perfect in bronze-casting so quickly because they were already excellent potters. I would add that the rather poor stimulus they got was favourable to the foundation of an independent tradition.

We should not forget, however, that besides the hypothesis just presented, namely, that mobile tribes in the steppes with a material equipment similar to that of the Okunev Ulus complex brought the stimulus of metallurgy to China, there are at least two alternatives which cannot be ruled out at the present state of our knowledge.

- a) There may have been an independent invention of metallurgy in the "nuclear area" of Chinese civilisation, as maintained by N. Barnard in his lecture at the 28 International Congress of Orientalists.
- b) If bronze and the making of socketed tools were really known in South-east Asia as early as is indicated by the C¹⁴ dates, then we could easily assume that there was a diffusion from the south, from Thailand or Vietnam, to the "nuclear area" of China. W. C. Solheim II has proposed an "alternative framework of Southeast Asian prehistory". This framework would bring quite new aspects to the problem I have dealt with (Solheim 1969:135).³

REFERENCES

BOGDANOVA-BEREZOVSKAIA, I. V.

- 1963 Khimicheskii sostav metallicheskih predmetov iz Minusinskoi kotloviny. In *Novye metody v arkheologicheskikh issledovaniiah*, edited by S. I. Rudenko, pp. 115-158. Leningrad: Akademiia nauk SSSR.

CHERNYKH, E. N.

- 1967 O terminakh 'metallurgicheskii tsentr', 'ochag metallurgii' i drugikh. *Sovetskaiia arkheologiia* 1:295-301.
- 1969 Izuchenie istorii drevneishei metallurgii v SSSR za 50 let. *Kratkie soobshcheniia Instituta arkheologii* (Moscow) 118: 69-82.

CHILDE, V. GORDON

- 1954 The Socketed Celt in Upper Eurasia. *Tenth Annual Report of the Institute of Archaeology, University of London*, pp. 11-25.

DEWALL, M. von

- 1964 *Pferd und Wagen im frühen China* (Saarbrücker Beiträge zur Altertumskunde, Vol. I). Bonn: Habelt.
- 1966 New Data on Early Chou Finds. Their Relative Chronology in Historical Perspective. *Symposium in Honor of Dr. Li Chi on his Seventieth Birthday*, Part II: 1-66. Taipei: Academia Sinica.

GIMBUTAS, M.

- 1956 Borodino, Seima and their Contemporaries. Key Sites for the Bronze Age Chronology of Eastern Europe. *Proceedings of the Prehistoric Society* 22(9):143-172.

³Bronze at Non Nok Tha (Northeastern Thailand) at a level dated 2,300 B.C., but also a socketed implement in a lower stratum 3,600 B.C. At Hang Gon 1 near Saigon (2,000 ± 250 B.C.) metalworking was observed.

- GRISHIN, Iu. S.
1968 K voprosu o drevnei dobyche olova v Zabaikal'e. *Kratkie soobshcheniia Instituta arkheologii* (Moscow) 114:10-12.
- GRYAZNOV, M.
1969 *Sibérie du sud* (Coll. Archaeologia Mundi 15), trans. into French by M. Avril and J. Marcadé. Paris: Nagel. (Trans. into English by J. Hogarth as *South Siberia*. London: Barrie and Rockcliff.)
- HANCAR, F.
1955 *Das Pferd in prähistorischer und früher historischer Zeit* (Wiener Beiträge zur Kulturgeschichte und Linguistik, Vol. XI). Vienna: Verlag Herold.
- HEINE-GELDERN, R.
1951 Das Tocharerproblem und die Pontische Wanderung. *Saeculum* 2:225-255.
- JETTMAR, K.
1966 Review of M. v. Dewall, *Pferd und Wagen im frühen China*. *Central Asiatic Journal* 11(4):311-316.
1970 Metallurgy in the Early Steppes. *American Journal of Archaeology* 74:229-230.
1971 Metallurgy in the Early Steppes. *Artibus Asiae* 23:5-16.
- KISELEV, S. V.
1951 *Drevniiaia istoriia Iuzhnoi Sibiri*. 2nd ed. Moscow: Izd-vo Akademiia nauk SSSR.
1960 Neolit i bronzovyi vek Kitaia. *Sovetskaia arkheologiia* 4:244-266.
- KUZ'MINA, E. E.
1966 Metallicheskie izdeliia eneolita i bronzovogo veka v Srednei Azii. *Arkheologiia SSSR*, Svod arkheologicheskikh istochnikov 5:4-9.
- KYZLASOV, L. P.
1958 Etapy drevnei istorii Tuvy (v kratkom izlozhenii). *Vestnik Moskovskogo Gosudarstvennogo Universiteta*, Seriia IX--Istoriia 4.
- LEONT'EV, N. V.
1970 Izobrazheniia zhivotnykh i ptits na plitakh mogil'nika Chernovaia VIII. *Sibir' i ee sosedii v drevnosti*. *Drevniiaia Sibir'*, 3rd ed., pp. 265-270. Novosibirsk: Akademiia nauk SSSR.

- LIPSKII, A. N.
1961 Novye dannye po afanas'evskoi kul'ture. *Voprosy istorii Sibiri i Dal'nego Vostoka*, pp. 269-278. Novosibirsk.
- LOEHR, M.
1968 *Ritual Vessels of Bronze Age China*. New York: Asia House Gallery.
- MAKSIMENKOV, G.A.
1965 Okunevskaiia kul'tura v Iuzhnoi Sibiri. Novoe v sovetskoi arkheologii. *Materialy i issledovaniia po arkheologii SSSR* 130. Moscow: Izd-vo Akademiia nauk SSSR.
- NAGEL, W.
1966 *Der mesopotamische Streitwagen und seine Entwicklung im ostmediterranen Gebiet* (Berliner Beiträge zur Vor- und Frühgeschichte, Vol. 10). Berlin: Hessling.
- NOVGORODOVA, E. A.
1970 *Tsentral'naiia Aziia i karasukskaia problema*. Moscow: Nauka.
- OKLADNIKOV, A. P. (ed.)
1968 *Istoriia Sibiri s drevneishikh vremen do nashikh dnei*, Vol. I: *Drevniaia Sibir'*. Leningrad: Nauka.
- POGREBOVA, M. N. and N. L. CHLENOVA
1970 Kavkazskii kinzhal, naidennyi v Kitae. Sibir' i ee sosedi v drevnosti. *Drevniaia Sibir'*, 3rd ed., pp. 290-295. Novosibirsk: Akademiia nauk SSSR.
- SARIANIDI, V. I.
1970 Drevnie sviazi Iuzhnogo Turkmenistana i Severnogo Irana. *Sovetskaia arkheologiia* 4:19-32.
- SMIRNOV, K. F.
1961 Arkheologicheskie dannye o drevnikh vsadnikakh Povolzhsko-Ural'skikh stepei. *Sovetskaia arkheologiia* 1:46-72.
- SOLHEIM, W.G. II
1969 Reworking Southeast Asian Prehistory. *Paideuma* 15:125-139.
- SULIMIRSKI, T.
1970 *The Sarmatians* (Ancient Peoples and Places, Vol. 73). London: Thames and Hudson.
- VADETSKAIA, E. V.
1965 Izobrazheniia zveria-bozhestva iz Khakassii. Novoe v arkheologii. *Materialy i issledovaniia po arkheologii SSSR* 130. Moscow: Izd-vo Akademiia nauk SSSR.

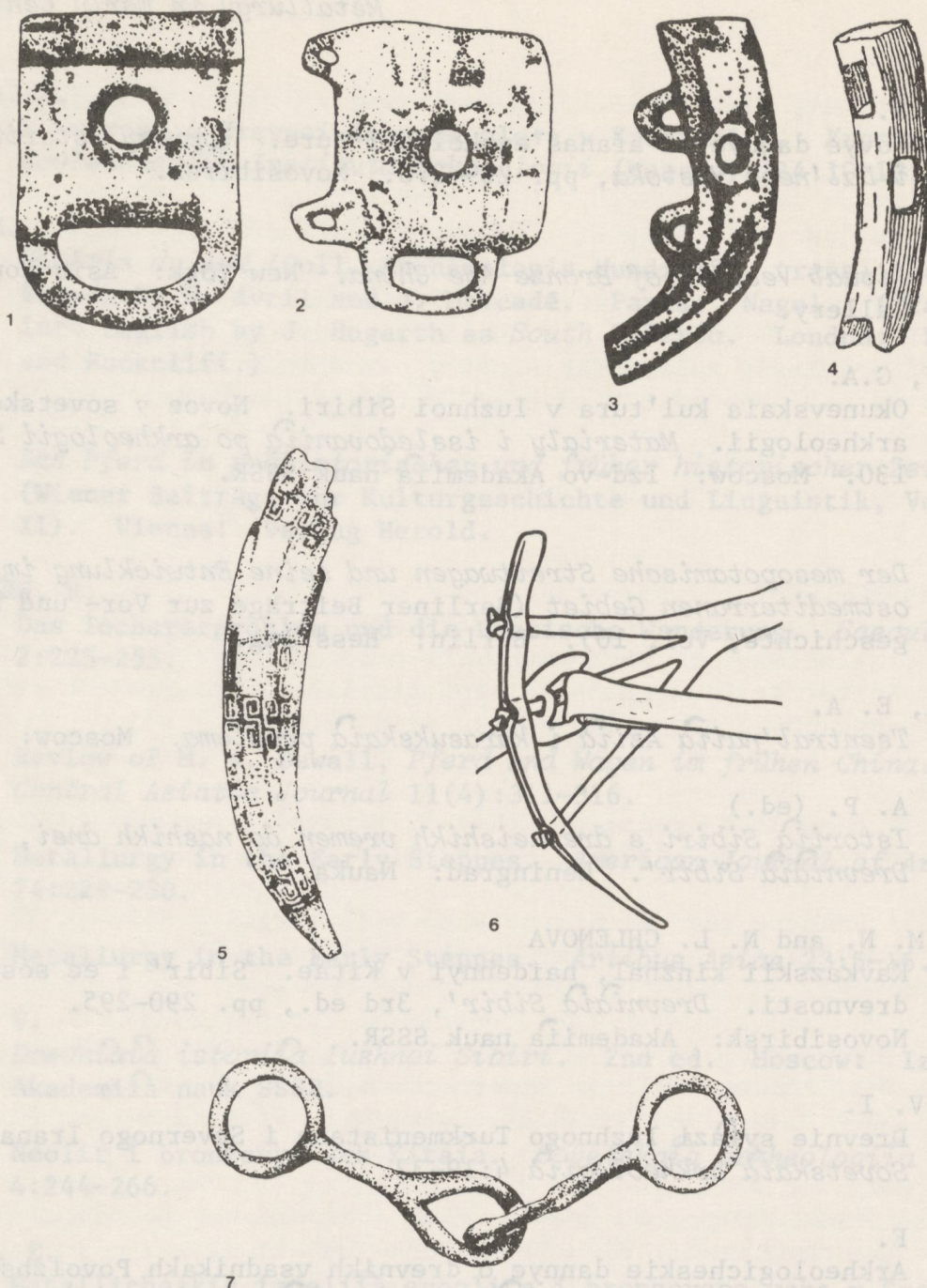


FIGURE 1 Parts of the bridle mentioned in the text (not to scale).

- 1) Bronze plaque to be fixed to the horse's cheeks (Shang period) (after von Dewall 1964: pl. 16).
- 2) Plaque with same function, but influenced by the curved cheekpieces of West Asian type (bronze) (after von Dewall 1964: pl. 16).
- 3) Carved cheekpiece (bronze) with same function. The form is strongly Westernized (Shang period) (after von Dewall 1964: pl. 16).
- 4) Antler cheekpiece of Western type, found in Transbaikalia (after Jettmar 1966).
- 5) Chinese cheekpiece made of antler, "Western type" (Chou period) (after von Dewall 1964: pl. 16).
- 6) Method of attaching cheekpiece to bit by means of a leather strap split into three at the end (after Jettmar 1966).
- 7) Bit made of bronze (Chou period) (after von Dewall 1964: pl. 16).

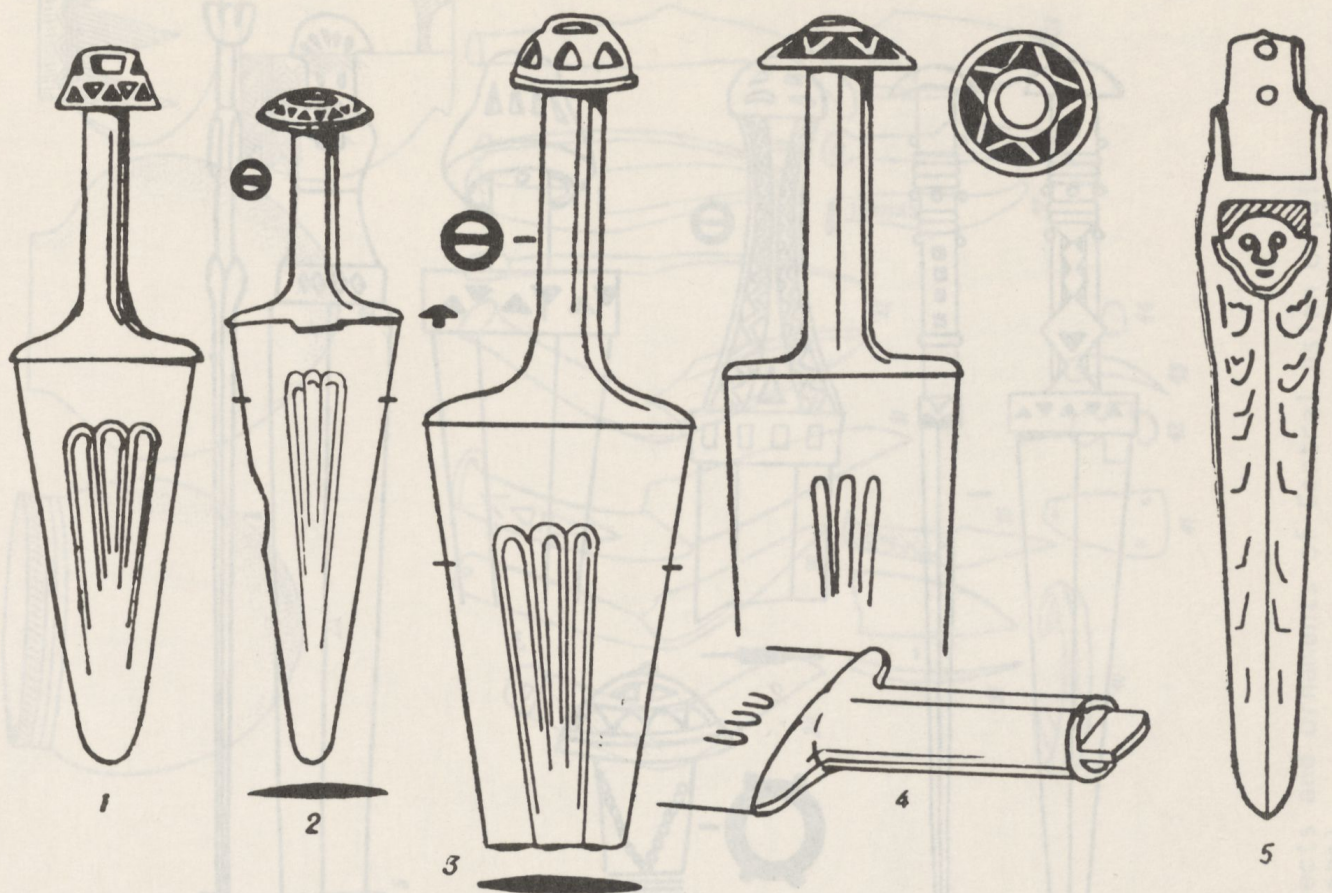


FIGURE 2 A Caucasian dagger found in China compared with daggers from the Caucasus and China (after Pogrebova & Chlenova, 1970: fig. 1).

- 1) China (after L. Hájek)
- 2) and (3) Kahetia (Museum of Telavi)
- 4) Kahetia (drawing by K. Pichelauro)
- 5) China, Early Chou period (after M. Loehr)

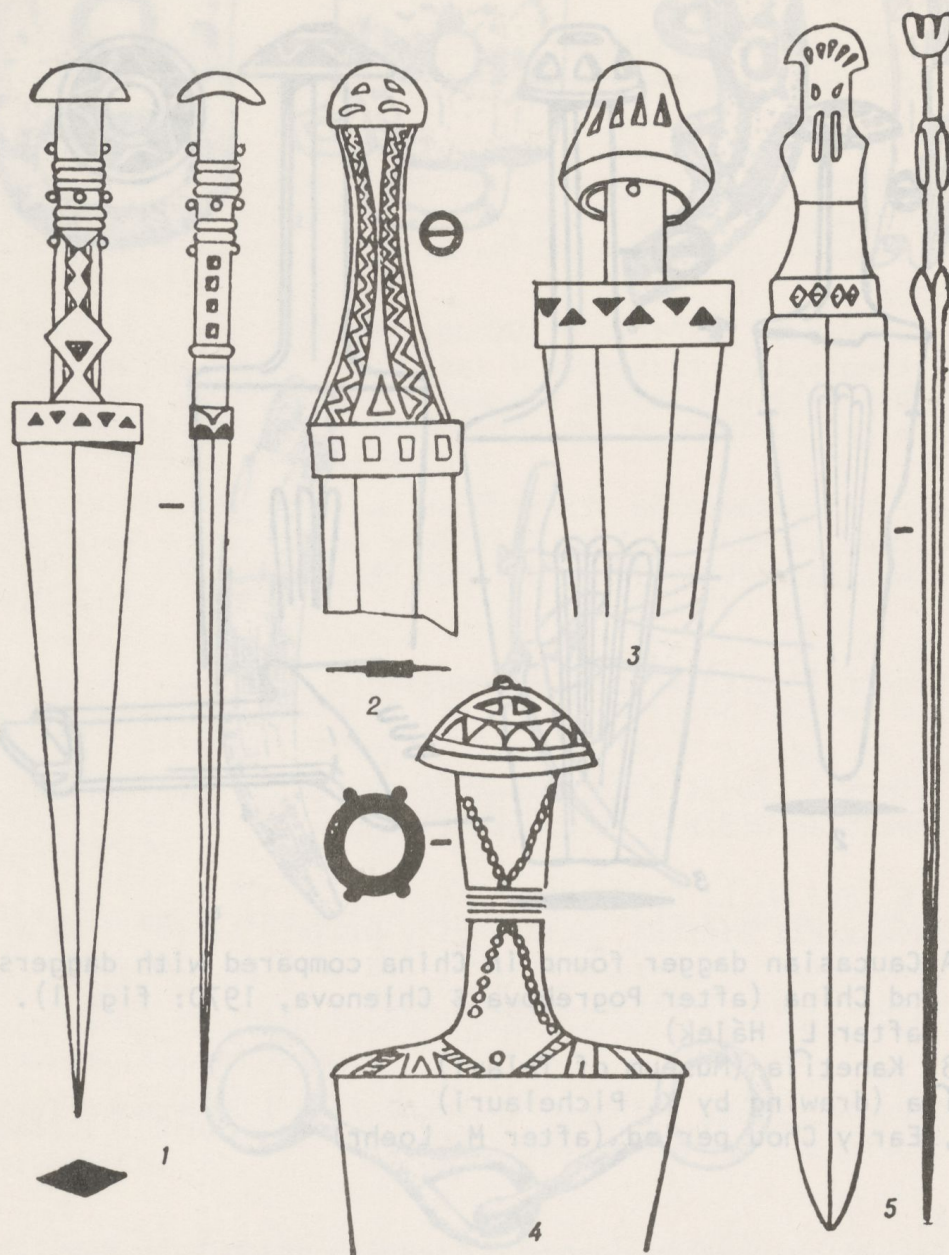


FIGURE 3 Daggers from Tadzhikistan and the Caucasus (after Pogrebova & Chlenova, 1970).

- 1) Rašit near Dušanbe (after B.A. Litvinskii)
- 2) From a kurgan near the Zigdifjur canal (Azerbaijan, Historical Museum, Moscow)
- 3) Kedabek necropolis (after A.A. Ivanovskii)
- 4) Kahetia (Museum of Telavi)
- 5) Fort Munro (after B.B. Lal)

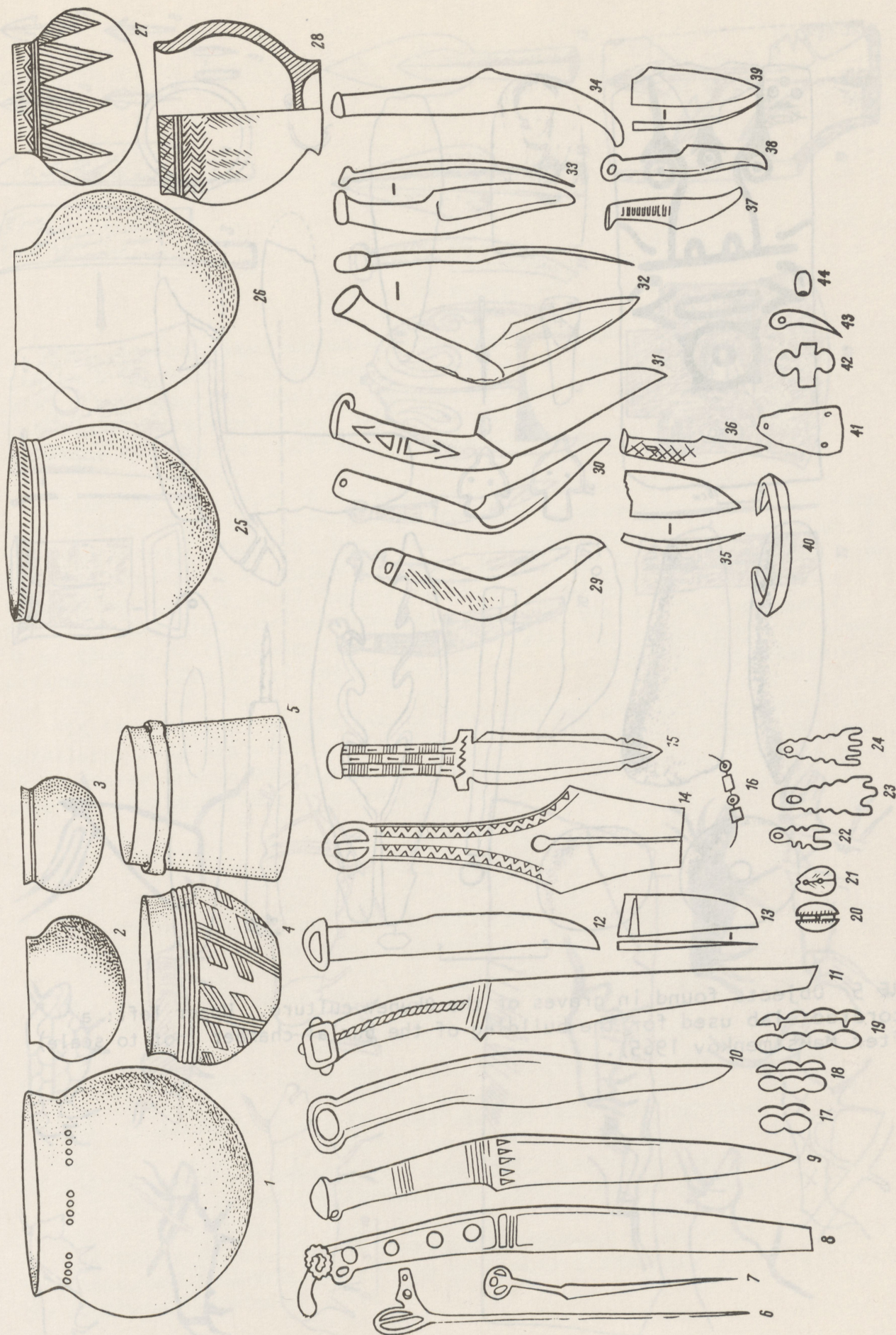


FIGURE 4 Karasuk pottery, metal objects and ornaments of Central Asian origin (not to scale) (after Novgoroda, 1970).

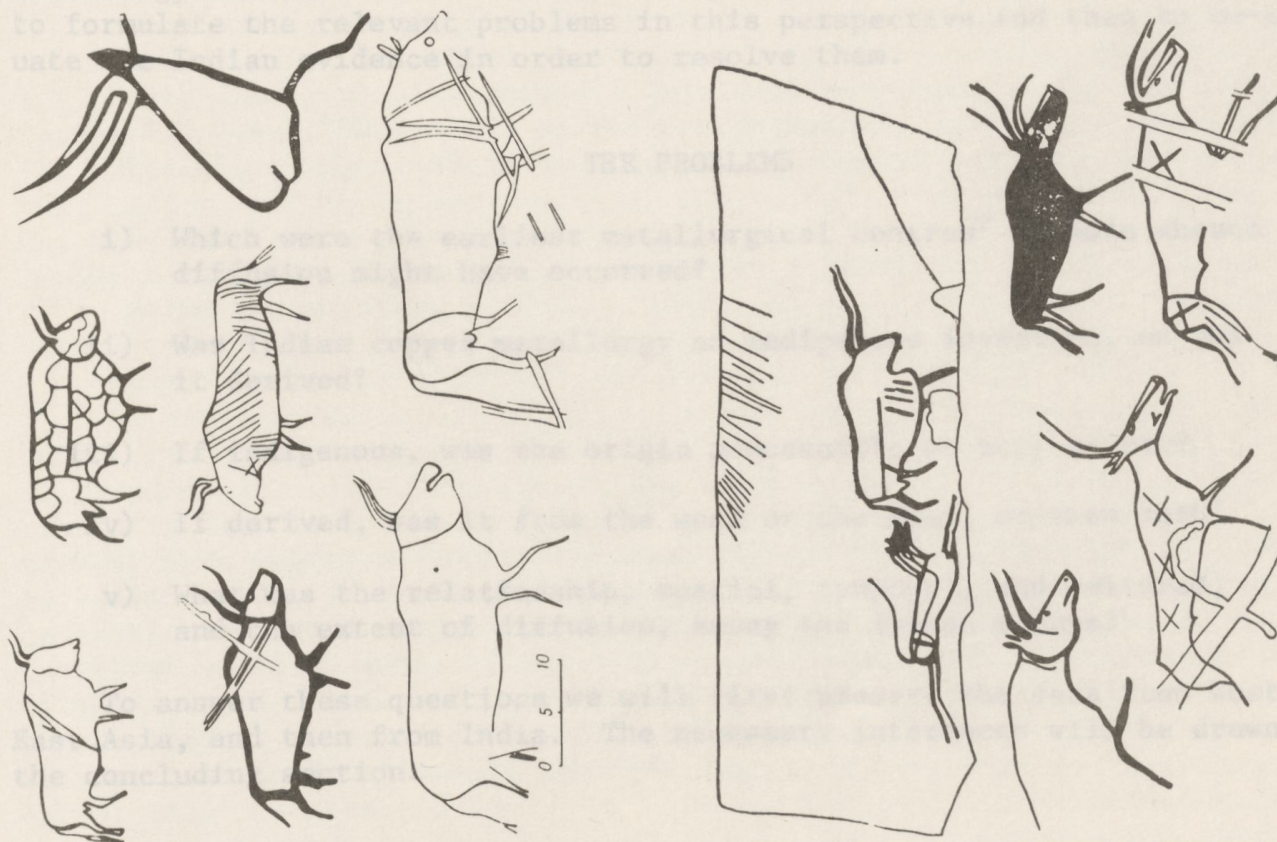


FIGURE 6 Carving on stone slabs used for burials in the Chernovaia VIII graveyard, showing bulls, cows and dogs (not to scale) (after Leont'ev 1970).

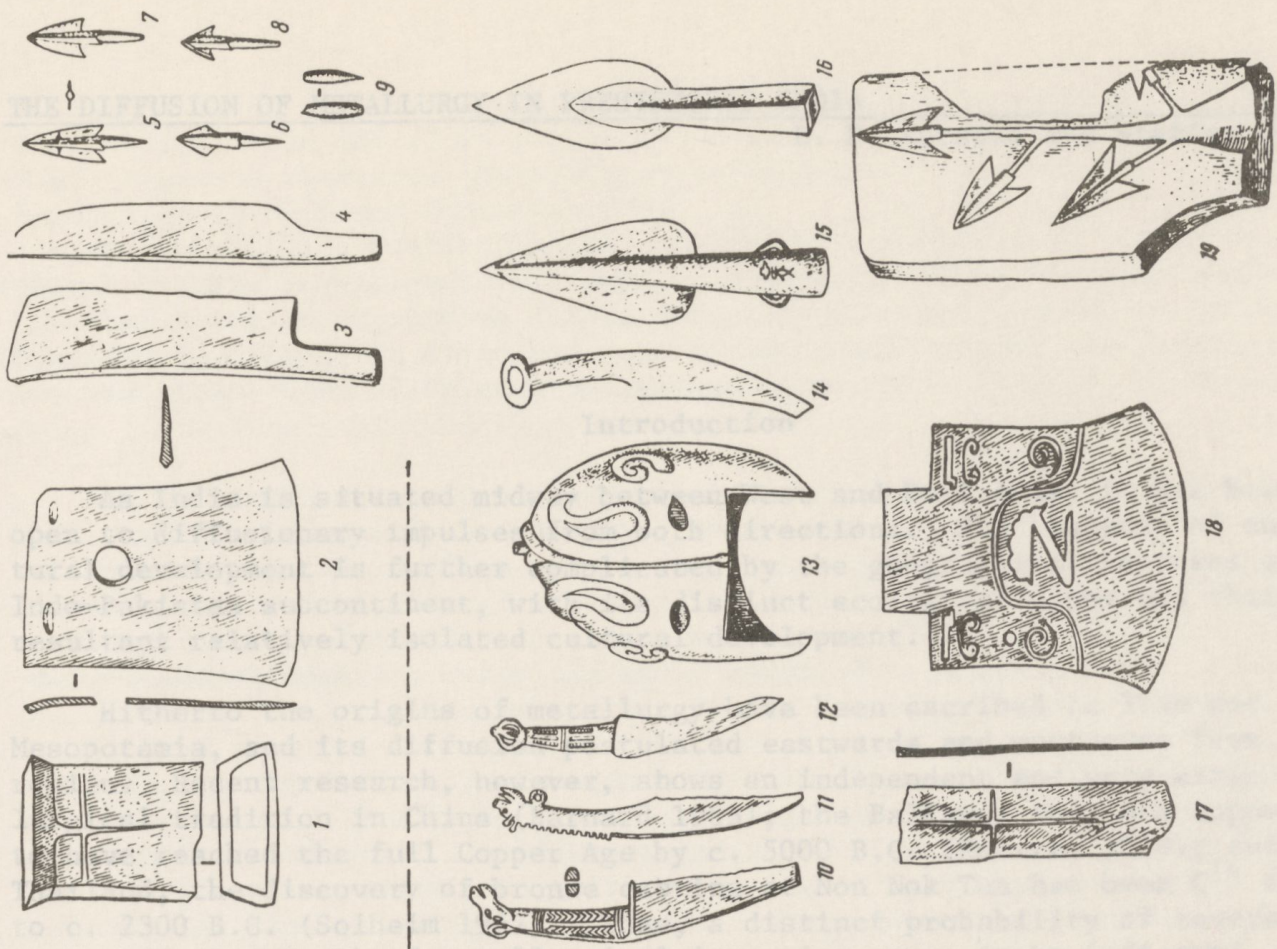


FIGURE 7 First stage (1-9) and second stage (10-19) of Shang metallurgy (not to scale) (after Kiselev 1951).