CHAPTER IV

Terminal Pleistocene–Early Holocene Relics of Northeast Asia and the Zhokhov Assemblage

Because of the unique location and excellent preservation of different organics, which are usually absent in contemporaneous sites, the Zhokhov assemblage considered in the previous chapter is undoubtedly one of the most illuminating archaeological sites of the Stone Age in Northern Asia, and it could be said that the Zhokhov materials are both a simple subject for discussion and at the same time a difficult one. In general, it lacks exact similarities with contemporaneous assemblages (with relics of Northern Asia that are approximately contemporaneous with Zhokhov). However, a lot of artifacts make it possible to find broad analogies illustrating more general trends of Late Pleistocene–Early Holocene cultural development in the region, rather than a few similar features of the Zhokhov assemblage with neighboring sites and cultures. This is important because the information contained in the Zhokhov finds is a real and important contribution to general notions of human history.

Through the collection and carbon dating of the site, one can easily point out the general background for the Zhokhov Island site. These are Mesolithic relics of Northeast Asia comprising the Sumnagin cultural phenomenon or the Sumnagin culture of the Holocene Palaeolithic in the view of Yuri A. Mochanov, and supported by other Yakutian archaeologists. At the same time, the Sumnagin materials can be interpreted as Mesolithic from the theoretical point of view (see above).

The previous (Late Pleistocene) stage of human occupation of the Northeast Asian region is considered to be connected with the spread and development of the Palaeolithic Dyuktai culture. Although these questions were partially discussed above with respect to the correlation between environmental and climatic changes and human migrations in the Arctic, I will now revisit with regard to the archaeology itself.

Knowledge of the history of the early occupation of the East Siberian Arctic (as well as notions on other stages of Stone Age occupation in Northeast Asia identified by Yu. A. Mochanov and S.A. Fedoseyeva) differs distinctly from that of areas southward from the Arctic Circle, where the eponymous sites are located. Numerous and well-studied, the latter provided a basis for the outline of cultural development later applied to the archaeological materials of the continental regions of the East Siberian Arctic. It must be stressed that ideas on both the chronology and the cultural interpretation of the northern sites are based primarily on southern materials, owing to scarce information from the northern ones. Once again, a number of the sites representing different stages of the Polar Stone Age are extremely unequal. If there are a few dozen Neolithic sites in the continental regions of the East Siberian Arctic, the early sites are quite rare. Thus few sites are considered to be of the Dyuktai or Sumnagin culture, whose connection with the Late Palaeolithic (or the Mesolithic) culture is relative at best.

First, let us consider the Late Palaeolithic sites. Although the Berelekh findings are the best known among them (Vereschagin and Mochanov 1972; Mochanov 1977), there are others pointed out by various authors as the Late Palaeolithic: the Bochanut (Mochanov 1977:93, Map, Fig. 2) and Chokurdakh sites (Mochanov 1972:251; 1977: Fig. 2); Kigilyakh (Mochanov and Fedoseyeva 1980: Map, Fig. 2); Maiorych (Mochanov 1977:90–92), Olenek I (Mochanov, Fedoseyeva, Konstantinov et al. 1991:57–58); Kuranakh I (Scherbakova 1980:64)—in Yakutia. Farther eastward are Ryveyem on the Aion Island (Dikov 1960:98); Kymynyikei Mount in the Vankarem Depression, Chukotka (Laukhin, Drozdov et al. 1989:136–140), and six sites found by Dikov (1993a, 1993b) on the Chukchi Peninsula—Ul'khum, Chaatam'ye I, Kymynanovyvaam VII, VIII, and XIV, Ioniveem VII, and Igel'khveem XVI, which are supposed by N.N. Dikov to comprise the Beringian Late Palaeolithic Tradition together with previously known sites such as Ines'kvaam I (Dikov and Kolyasnikov 1979:20–28) and Kurupka I (Dikov and Kazinskaya 1980:24–29; Dikov 1993a). This new cultural phenomenon, i.e., the Beringian tradition, is presumed to date to 13,000–10,000 BP (Dikov 1993b:46).

The Kigilyakh and Bochanut sites mentioned above are represented by accumulations of fragmented bone remains of animals of the Late Pleistocene faunal assemblage, and they can be discussed as a good argument for prognosis rather than direct evidence of Pleistocene human occupation of the East Siberian Arctic. However, justice demands noting that some bone fragments from Bochanut, examined by S.A. Semenov, have in his opinion use-wear traces recognized as discontinuous polishing, scratches, and struck surfaces (Mochanov 1977:93). Unfortunately, these observations are not helpful in clearing up the most interesting question—the age of the finds. In that connection Mochanov notes the skeptical opinions advanced in the discussion of the Old Crow bone industry.

The Kuranakh I site (Yana River), where "a mid-size flake of patina-encrusted slate and three slate chips," together with "a scraper, a piece of a scraper, and a small scraper," found in talus (Scherbakova 1980:64), as well as the Chokurdakh site (lower reaches of the Indigirka River) where a very few flakes were gathered, are considered Palaeolithic sites for unknown reasons—even if the location of the Chokurdakh site, discovered on a high terrace, is taken into account. The Olenek I site, discovered in the area of the same name, appears to be more informative. But unfortunately the cultural layer of the site was disturbed by recent human activity, and the artifacts collected by Konstantinov are undoubtedly a composite of several chronological generations of archaeological material. That is, distinct Neolithic types can be easily recognized, and some early artifacts (most probably Mesolithic) are mixed with them; it is impossible to identify them precisely because of the great similarity between Early Neolithic (and even later) and Mesolithic materials observed in Northeast Siberia. However, it is supposed that a few artifacts of the Late Palaeolithic Dyuktai culture are represented in the collection (Mochanov et al. 1991:57). I do not share this view, considering the artifacts published by the researchers (Mochanov et al. 1991:Table 105–109). There is a rather large selection, most likely including the best and the most characteristic items. And only one artifact would have been recognized by Konstantinov as a wedge-shaped core. Judging by the picture (Mochanov et al. 1991:Table

106:2), I see this as a fragment of a bifacially flaked tool generally resembling a wedge-shaped core but lacking a striking platform and blade negatives. Another site with a few surface finds is on the lower reaches of the Kolyma River at 63°N (Mochanov 1977)—the Maiorych site, which looks good in comparison with the Palaeolithic admixture of the Olenek-I assemblage. A perfect wedge-shaped core, three flakes, and two combination tools were found there (according to Mochanov, they can be identified as a knife-scraper and knife-chisel). Wedge-shaped cores similar to the Maiorych core are known from the Ikhine I and Verkhne-Troitskaya sites, and from Dyuktai Cave where they are dated, according to Mochanov, to 30,000–25,000 BP, 23,000/22,000–18,000 BP, and 13,000–12,000 BP respectively. The period of most extensive distribution of cores of that type is thought by Mochanov to be contemporaneous with the Verkhne-Troitskaya site (Mochanov 1977:92). Thus the question remains open, especially with regard to the Holocene wedge-shaped cores of the Siberdik culture, which are on the upper reaches of the Kolyma River (Dikov 1979:90–93, Fig. 31).

An amusing story about the "Ryveem microblade": a find was made in an exposure in a precipice of the Ryveem River on the Aion Island (very close to the northern Chukotka coast near Chaun Bay) in 1959 (Dikov 1960:98), and it was transformed into evidence of the populating of the Arctic as far back as in Palaeolithic times (Dikov 1973). This was carefully traced back by Mochanov (1977:95–97), who concluded that the artifact mentioned, though a microblade, really proves nothing.

Finds discovered in a core sample taken from a hole drilled near Mount Kymynyikei were discussed in Chapter II. Although their chronology remains disputable (I could advance at least three scenarios explaining the age and position in a way other than that by Laukhin and coauthors), one should still point out that this is the only site in Chukotka that makes it possible to discuss the Palaeolithic occupation of the territory. Nevertheless, the problem of antiquity there remains open.

As for the Palaeolithic sites discovered by Dikov in Chukotka, it is difficult to consider the finds (Pitul'ko 1992a:79–82) since the artifacts come mainly from surface collecting—except the Ul'khum site, where the findings were excavated from a surface cultural layer (Dikov 1993a:40, 41). In addition, the assemblages generally lack diagnostic artifacts. The published articles (Dikov and Kazinskaya 1980:Fig. 1; Dikov 1985:3–11, Figs. 1–7; Dikov 1990:Figs. 4, 5, 8, 9; Dikov 1993a:Tables 1, 6, 107, 108; Dikov 1993b:Figs. 17–20) suggest that there is a rather large quantity of microprismatic cores of the tortsovy type (naturally flat, or flattened, with narrow flaking surface), which are mainly fragmented. A considerable number of the cores are made on massive flakes, flat stones, or slabs of raw material; it is difficult to understand why some of the latter were identified as wedge-shaped cores, especially since dating of the assemblages is based precisely on identification. Accordingly, these are misdated, yet interesting, carbon dated complexes of early Holocene sites discovered by Dikov while surveying the eastern Chukotka area (Dikov 1993a). With regard to primitive stemmed points that for the finder resembled those from Cultural Layer VII of the Ushki site, I do not want to discuss ideas connected with the situation in which the artifacts were found.

It is not out of the question that the dating of the sites will be revised in the future. For instance, the Ioni X site, considered previously as a Palaeolithic site (Dikov 1990:17), was never mentioned later among these new-found sites.

Summing up, one might note that only three sites—Berelekh, Maiorych, and Kymynyikei—represent real evidence of an early stage of peopling of the continental Arctic areas in the Late Pleistocene. The upper chronological boundary of this stage is marked more or less definitely (13,000–12,000 BP) by the Berelekh carbon dating, which shows Dyuktai people to be the pioneers. Strictly speaking, Late Pleistocene sites are not particularly numerous in Eastern Siberia, even southward from the Arctic Circle, except for the Lena River basin (Mochanov 1977; Mochanov et al. 1983, 1991, etc.). However, the Kheta site on the upper reaches of the Kolyma River (Slobodin 1992), and probably the Bolshoy El'gakhchan site on the Omolon River in Western Chukotka (Kiryak 1993), could be mentioned.

The greatest cultural phenomenon in the history of Northeast Asia near the Pleistocene-Holocene boundary is the Sumnagin culture. Sites of this culture defined by Mochanov are known from west to east (from the Taimyr to Chukotka), and from the coast of the Arctic Ocean southward. In Mochanov's opinion, which is neither supported nor disproved by anyone, sites belonging to this superculture (or affected at least by the latter) occurred in Alaska during the terminal period of its development (Mochanov 1977:252). This huge, powerful archaeological culture, which affected cultural evolution over an extremely extensive territory, is the great mystery of Early Holocene archaeology of Northeast Asia. Although its sites are well known and studied (mainly in southern areas), nobody can advance a realistic theory explaining the origin of the phenomenon that occurred about 11,000 BP and covered the above-mentioned territory in only 3,000 years. The point is its complete dissimilarity to the Dyuktai culture, which covers approximately the same areas. There is no succession, and they are different in every significant feature of both knapping technology and secondary tool processing. The former is of distinct bifacial style, while this was almost totally absent in the latter; the wedge-shaped cores predominating in the former have never been found in Sumnagin contexts. Mochanov tends to explain the sharp change in cultural tradition near the Holocene boundary as the result of forceful migration, supposedly from the Yenisei region, where similarity can be found between the Sumnagin and the Kokorevo culture of the Late Palaeolithic Malta-Afontovo tradition (Mochanov 1977:255). I do not share this view but still do not see the possibility of advancing an alternative.

The major part of the Mesolithic Sumnagin sites is known outside of the Arctic region of Northeastern Siberia—in the Aldan, Vilyui, and Olekma valleys (the Lena River system). In the Arctic they are thought to be in the Taimyr—the Pyasina I, III, and IV sites (Khlobystin 1973a), the Tagenar VI site (Khlobystin 1973c)—and probably some others, such as the Lantoshka II and Malaya Korennaya III sites (Khlobystin 1973a:94). Numerous assemblages have been discovered in North Yakutia—Staraya II, Delingde II, III, and IV, Chuostakh-Yuryuge, Yakutsky Tyubelyakh, Ulakhkhan-Kyuel'-Seene, Baian, Berelekh-Aian, Ochugui-Manyngda, Khotugui-Neiuo, km 255 I and II, Khorbusuonka I, and the Bilir site (Mochanov, Fedoseyeva, Konstantinov et al. 1991). Sumnagin sites are fewer farther eastward, perhaps due to scantier

research carried out in this area. Thus there are the Panteleikha I–VIII sites and the Pirs site on the lower reaches of the Kolyma River (Mochanov 1977:203, 204); in addition, other sites probably contain Mesolithic materials. The Tytyl Lake I–III sites were discovered in Western Chukotka, at the source of the Maly Anyui River (Kiryak 1991). And Dikov found some sites while surveying the easternmost territories of the Chukchi Peninsula—Puturak, Itkhat IB, Ul'khum ("lower part" of the site), and Chel'kun IV. It is also possible that Early Holocene complexes were recognized by Dikov as partly Palaeolithic (Dikov 1993a).

It can be easily seen that the Mesolithic sites are distinctly more numerous than the Palaeolithic ones. Of course, this is evidence of the more concentrated occupation of the Arctic in the Early Holocene, but these materials are not of much value. They give a good impression only if listed. Thus most of the North Yakutian assemblages thought to be Mesolithic are represented by surface finds collected here and there, and both sites with few finds and those where numerous artifacts were collected are known. The latter are often of a mixed character and contain Neolithic ceramics of different types and implements belonging to late periods of the Stone Age. The Yakutsky Tyubelyakh, Ulakhkhan-Kyuel'-Seene, Khotugui-Neiuo, and Khorbusuonka I sites, thought to contain some Mesolithic artifacts, are of this type; typology-based interpretations of some of the materials as Sumnagin finds have never been proven. It is almost impossible to recognize actual Sumnagin artifacts comprising assemblages along with Neolithic tools inasmuch as many of the implements from pure Sumnagin complexes can be found in Neolithic sites. In general, researchers restrict themselves to statements of possibility regarding the presence of Mesolithic Sumnagin artifacts as part of a group among these sites. At the same time, a lot of sites are assumed to be from the Early Holocene (i.e., which are thought to belong to the Sumnagin culture), where few artifacts (blades and/or flakes and no diagnostic tools) were found. These are often surface finds: Delingde I and IV, Chuostakh-Yuryuge, Baian, Berelekh-Aian, km 255 I and II, and Bilir site (Mochanov et al. 1991). Other assemblages, such as Staraya II, Delingde III, and Ochugui-Manyngda, contain some atypical artifacts that are diagnostically useless. This quick view on the Northern Yakutian sites—thought to be from the Early Holocene—shows that they are interpreted unsystematically; the general diagnostic principles used by the authors of the Handbook of Yakut Archaeology (Mochanov et al. 1983, 1991) in considering the assemblages still remain unclear, and I fail to understand why at least half of the above-mentioned sites are identified as Early Holocene. For example, I was unable to find a difference between the Delingde I and II sites. Eighteen flakes and 9 microblades were collected on the former from an eroded cultural layer (?) that was dated to the Early Neolithic—no more than 6000 BP (Mochanov et al. 1991:52). But the latter, which contains only a ridged flake and one preform (for what?), is supposed to be from the Early Holocene. It is interesting that the former were collected in talus of the 25–30-meter-high Anabar River terrace, while the latter were discovered in accumulations of an 11–13-meter-high terrace. The reverse order looks more logical, if one assumes the height of the terraces to be a basis for local chronology. Although some relative observations could be obtained in that way, the problem was never studied from that angle.

A large area of the Northeastern Yakutia—the Yana River basin—was surveyed in the 1980s. More than 70 archaeological sites of different chronology and belonging to different cultures were found there (Scherbakova 1980; Mikhalev and Yeliseyev 1992). The majority of the artifacts come from mixed assemblages. This is why V.I. Mikhalev and E.I. Yeliseyev do not want to discuss the cultural chronology of the finds, noting that the assemblages discovered are in general from the Holocene.

The sites known on the lower reaches of the Kolyma River (the Panteleikha I–VIII and Pirs sites) contain mixed assemblages of Neolithic, Bronze, and even Iron Age artifacts, as do a major part of the North Yakutian complexes (Mochanov 1977:204). The early component (Sumnagin) is recognized by the presence of end scrapers on massive blades or lamellar flakes with a ventrally retouched oval-convex working edge (Mochanov 1977:Table 75:11, 12, 15, 17, 18), or carinate scrapers whose working edges are sometimes shaped in a peculiar style. Mochanov calls the latter the ear-like prominences of the working edge (Mochanov 1977:Table 75:14, 15), which is supposed to be characteristic of Early Holocene Sumnagin scrapers. It is noteworthy that in commenting on the Upper Kolyma finds, N.N. Dikov (one of Yu. A. Mochanov's critics) has pointed out the inconsistency in Mochanov's consideration of this category (Dikov 1979:93). Namely, Mochanov is not inclined to assume a Final Palaeolithic interpretation for the carinate scraper from Shilo Brook, Upper Kolyma area (Dikov 1979: Fig. 34); at the same time he supposes the carinate scrapers from the Panteleikha sites (absolutely the same, in Dikov's view, or at least very close to each other) to be a chronological feature of the Early Holocene "Palaeolithic" cultural component of the Panteleikha assemblages. Dikov's opinion was later supported by Kashin (1983), but a discussion concerning the theoretical possibility of dating a part of the Panteleikha cultural remains to the Early Holocene is less important since the most significant questions of the Early Holocene archaeology of Northeast Asia have already been answered without these materials. Thus it is revealed that both the Pleistocene and the Early Holocene occupations markedly exceed the geographic position of the site locations under consideration; the Sumnagin cultural phenomenon occupied the territory covering the locations, and the chronology is well grounded without the support of data from the Panteleikha sites.

Reviewing the Mesolithic sites of the Taimyr Peninsula, one should note that the artifacts excavated from the Tagenar VI site (Khlobystin 1973c:11–16) appear to be the only subsurface context of the Sumnagin culture (or more properly, the terminal Sumnagin context) known in the entire Siberian Arctic, and the only carbon-dated one (6020 ± 100, LE-884). The collection is rather scanty, yet both Khlobystin and Mochanov definitely identified it as Sumnagin material (Khlobystin 1973c:15; Mochanov 1977:212). The assemblage from the Pyasina I site, although composed partly of surface finds, has definite Sumnagin features too (Khlobystin 1973a:89, 90). Conclusions on the surface contexts from the Pyasina III and IV, Lantoshka II, and Malaya Korennaya III sites were cautious. The same is true of other sites such as Pyasina V, IX, and XV, Malaya Korennaya II, and Kapkannaya II, which were later considered as from probable Mesolithic contexts (Khlobystin 1973c; 1982). However, the researcher noted that at least some of the materials could be discussed as Early Neolithic because of topography or other reasons. It

is interesting that L.P. Khlobystin identifies as definite Mesolithic contexts containing simple points made on prismatic blades that are supposed to be arrowheads (Khlobystin 1982:7). But no indisputable projectile points were ever discovered in a subsurface context, though Mochanov assumed that at least a part of the undated lamellar arrow points found here and there in Northeast Asia could belong to the Sumnagin culture (Mochanov 1977:246). The implements mentioned are represented by both willow-leaf and tanged points made on prismatic blades with discontinuous marginal retouch. The latter is known only in rare cases, and the tips and basal parts of the points are bifacially trimmed (Mochanov 1977:Table 86). Considering the Yubileinaya assemblage, Kashin has noted that exactly the same points are known from Neolithic contexts, including Yakutian stratified sites (Kashin 1983:100, 101).

The Mesolithic of Western Chukotka is known from surface contexts at the Tytyl Lake sites, Loci I, II, and III (Kiryak 1980:39–52; 1993:23–31). The numerous stone artifacts collected at the sites are represented by prismatic cores (primarily with a circular flaking system), microblades, end scrapers, burins, and miscellaneous waste material; unifacial secondary retouch and a burin spalling technique are recognized as features of the assemblages. The artifacts are scantily published (Kiryak 1993:23, 26). At the same time the researcher has found space for a description and consideration of both the dwelling and the hearth structures, which had never been published previously. It remains unclear but would be interesting to know whether any of the artifacts were connected with the structures, and by what means the artificial origin of the latter could be proven (such as charcoal, thermal coloration or, on the contrary, the specific color of burnt stones). It is worth noting in this connection that the sites where so-called structures were discovered are located in the permafrost region where structured soils, occurring everywhere, are well known—even at the site location. As seen in the photo published by Kiryak (1993:Fig. 7), the Tytyl area is covered by typical tundra landscapes with circular structured soils. Therefore it is possible to assume that the circular accumulations of boulders and rock debris (Kiryak 1993:10–14), especially those that are identified as hearth structures, are most likely natural compositions occurring because of cryogenic sorting of fragmentary material. As a peculiar feature of the Arctic landscapes, the latter is well described in classic studies on cryolithology (e.g., Washburn 1958:106–119, Photos 2, 3, 6, 9, 10; Hopkins et al. 1958), and the artificial character of the structures needs to be precisely proven. Despite the brief description of the stone inventory from the Tytyl sites, its morphology is declared to be similar to the Mesolithic Puturak industry discovered by Dikov in easternmost Chukotka (Dikov 1993a), and to the origin of the Mesolithic of Chukotka region in general. In laying the groundwork for the latter, Kiryak notes that the difference between Sumnagin and Chukotka materials can be proven by a "series of end scrapers made on massive blades" and other implements found both at the Puturak and the Tytyl sites, inasmuch as the Sumnagin culture is characterized by numerous prismatic blades, bladelets, and microblades, and diverse tools made on them (Kiryak 1993:26). Still, prismatic blades and microblades are represented in both Tytyl and Puturak assemblages (corroborated in publications), which, in truth, are not numerous for unknown reasons. Though there are poor grounds for being diagnostic, the Tytyl contexts have no distinct differences from

the standard Sumnagin collections, which include a perfect prismatic knapping technology, and microprismatic as well, and a characteristic series of end scrapers. Both Dikov (1979:132) and Kiryak (1980:51) have previously written about the indisputable analogies between Tytyl and Sumnagin finds, and the occurrence of the latter in the zone separating the Yakutian and Chukotkan Sumnagin sites identified by Dikov (1993b:52) in Chukotka cannot be unexpected. In my view, there is only the theoretical possibility of discussing the difference between the Sumnagin and Chukotkan Mesolithic, taking into consideration the frequency of artifacts with retouched dorsal surfaces in the Sumnagin and those in the Chukotkan Mesolithic sites respectively. Artifacts of this morphology are relatively frequent in Tytyl and Puturak sites, but I do not think that is the way to make accurate cultural definitions. There is a lack of information concerning numerous Sumnagin collections that have not been published completely; on the other hand, the morphology could be a feature of local cultural development. Most likely, technological flakes broken off from flaked core-preforms were utilized. One cannot help but note one end scraper has a peculiar morphology of the ventral surface: the latter is flattened by fine oblique parallel retouch (Kiryak 1993: Table 29:3), which is interesting because this technology is generally known in the Arctic from Late Neolithic sites where triangular massive scrapers with trimmed ventral surfaces are characteristic. Perhaps this is an indication of a late component bringing together Mesolithic finds from Tytyl Lake, which is typical for surface contexts found anywhere. And it is generally accepted that assemblages of this kind usually have an indisputable but unknown origin.

It is necessary to say a few words about the new-found Mesolithic sites of easternmost Chukotka such as Puturak, Chel'kun IV, Ul'khum (the lower part), and Itkhat I-B (Dikov 1993a). At least some of them represent not only surface contexts but excavated finds as well. One of the sites—Chel'kun IV—is carbon dated to 8150 ± 458 BP (MAG-719). The assemblages give the impression of homogeneous material even though they are composed of both surface and excavated finds. The characteristic feature of the latter is a "primitive" habit occurring because of the specific raw material of poor quality used for manufacturing the artifacts, of which a major part comes from various flinty rocks such as slate, tufa, and calcareous argillite. Assemblages are of poor and unstable typology and contain relatively large artifacts, although microprismatic technology is also well presented. Considering the collections, Dikov notes that the Chel'kun IV site (as well as the Achchen and Ananiveem sites) "marks the penetration of Mesolithic technology of regular Sumnagin type" into the easternmost territories of Chukotka (Dikov 1993b:52), while the "primitive unifacial technologies" of the Puturak, Itkhat I-B, and Ul'khum sites resemble to the researcher "finds from the the Galagher Flint Station, Trail Creek, and Anangula sites, which is a little younger." Dikov concludes that these sites are evidence of "the most important cultural component that participated in the formation of the ancient Beringian maritime culture, including finally the proto-Aleutian Anangula site," which he believes spread from Chukotka to Alaska around the Holocene boundary (Dikov 1993b:48).

Thus the continental part of the Siberian Arctic was undoubtedly occupied by the Sumnagin culture during some millennia. But it should be noted that the Sumnagin is not the only cultural

phenomenon that existed in Northeast Asia during the Early Holocene. Very few sites with wedge-shaped cores, bifacial projectile points, and choppers—Kongo and Siberdik belonging to the Siberdik culture of the "relic Palaeolithic," as defined by Dikov in the 1970s—appear to be original on the Early Holocene "Sumnagin background" (Dikov 1979). Another cultural complex—the Maltan site, discovered also in the Upper Kolyma area—differs markedly from both Sumnagin and Siberdik sites (Dikov 1979), but it is unclear whether there are cultural distinctions or other specifics.

The most recent research carried out in Northeast Asia give results picturing the Terminal Pleistocene–Early Holocene cultural evolution in the region as much more complex. If it were possible previously to consider only two probable tendencies—the Sumnagin line, the starting point of which is most likely connected with a powerful influence or a migration that affected the sharp replacement of the cultural tradition in Northeast Asia, according to Mochanov; and an autochtonous one presented by the relic Palaeolithic Siberdik complex (according to Dikov)—the current situation becomes more complicated after the finds in the Northern Okhotsk Sea area, known from I.E. Vorobei (1992). The collection from the Druchak-B site, discovered by Vorobei, contains a diagnostic trio that can be described as follows: "wedge-shaped micro cores, Verkholensk-type (transverse) burins, and biface points." The trio is associated with large, massive blades flaked from monofrontal cores with one or two platforms, which are said to be uncharacteristic for Northeast Asia but still make it possible to discuss questions of a third direction for regional cultural evolution, connected with the pre-ceramic complexes of the Far East (Vorobei 1992).

However, the Sumnagin relics are the proper cultural background for the Zhokhov assemblage in the Arctic areas of Northeast Asia. As noted above, identification of the materials could be relative to some extent, and even if the presence of the Sumnagin component is indisputable, it is impossible to define exactly the Sumnagin implements in surface contexts since the Early Neolithic Syalakh culture covering the same area presents numerous artifacts in common with the Sumnagin. Normally, the artifacts can be considered Sumnagin when, on the one hand, there are no wedge-shaped cores or bifacial tools in any context, or on the other, the context is lacking bifacial implements and ceramics (but contains a microblade industry). If these two conditions are satisfied, the context could be interpreted as Sumnagin, as has been the case with numerous sites (Pitul'ko 1991). Except for a few of the latter, Sumnagin materials discovered in the Arctic come from surface contexts that are obviously useless for defining the cultural chronology of the Arctic area of the Sumnagin culture, its local distinctions, etc. However, there are a lot of stratified sites southward (including the eponymous one) whose materials were first defined as Sumnagin (Mochanov 1969; Mochanov and Fedoseyeva 1976). In general, they share the same characteristics, which permit extrapolating the conclusions to the Arctic area occupied by the culture. Published data reveal that they are extremely uniform assemblages, containing microprismatic cylindrical cores with one or two opposite striking platforms, abundant microblades, flakes, chips, and other artifacts; the implements are made primarily on blades. The total content of the latter reaches 90% in some assemblages, but most tools made on blades

(simple lateral burins, angle burins on broken blades, borers, insets) are useless for diagnosis. Other artifacts made on blades, such as knives (blades with continuous retouch on the edges), points, end scrapers, and notched tools, are not numerous. A few of the Sumnagin implements are made on waste flakes. According to Mochanov, there are two characteristic features of this culture—the absence of any bifaces and projectile points and the presence of so-called worked pebbles constituting no more than 5% of the total Sumnagin collection. To put it another way, this is a series of microblade industries defined as a culture due to a common chronology and general similarity of the materials. No subdivisions of the culture were defined; perhaps precise statistics of each context will make it possible later.

Concerning Zhokhov, it can be said that the opportunities for comparing its artifacts with those of Sumnagin are extremely restricted by the nature of the materials. If all of the bone, antler, and wooden artifacts were removed from the Zhokhov collection, the rest of the collection would be another normal microblade industry containing some blades and bladelets, waste flakes of different size (including a big one that could be recognized as a primitive side-scraper), microprismatic cores, pre-cores, seven insets, and a single fragment of a notched blade. And it would be associated with abraders, ground tools, and flakes with ground dorsal surfaces broken off during reshaping or resharpening of the latter. This is a typical picture, well known from surface or even subsoil contexts in Northeast Asia. If the homogeny of the assemblage is not proven, the conclusion about its mixed character might be objective. Or perhaps one should date them to a later period because of the ground tools, etc. But as at the Zhokhov site we have observations on the perfect stratigraphic position of the artifacts, the assemblage is carbon dated by a series of isotope dates obtained in different laboratories. Concerning the age, the Zhokhov Island site, being dated to 8000 BP, is an early one for the high Arctic (see Chapter III). However, ground tools (mainly adzes) occur in the region much later, around 6000 BP (Mochanov 1977:222), and are completely unknown in sites contemporaneous with the Zhokhov site. Among the Sumnagin ground implements found in Horizon IV-b of the Ust-Timpton site (Mochanov 1977:Fig. 54:25), one adze appears completely analogous to that from Zhokhov (Figure 27:2). But while the latter is ground, the Ust-Timpton one is bifacially flaked. The horizon from which the adze came is dated to 9000 ± 100 BP, LE-832 (Mochanov 1977:152). It is interesting that a flaked adze with ground working edge was found in Horizon IV-a of this site (Mochanov 1977:159, Fig. 52:43), dated to 7000 ± 90 BP (LE-895). As follows from a description of the profiles, the cultural remains discovered in both horizons are contained in the second bedded layer of fluviatile (floodplain) facies of the bank ridge, where from 10 to 16 thin black-colored interbeds saturated with humus were counted. This bedded stratum was described as Horizon IV, composed of substratum "a" (the upper half) and "b"; the former has a general thickness of 20 to 30 cm including 5 to 7 humus interbeds; the latter horizon, of the same thickness, contains 10 or 11 interbeds (Mochanov 1977:152, 155, 159). This is the stratum of common lithology that was defined as a succession of layers "a" and "b" due to a 2 to 6 cm thick sand interlayer overlying Horizon IV-b in one part of the excavation (Mochanov 1977:152). At the same time the thickness, varying from 2 to 6 cm, is supposed to be a normal feature of the stratum composed

of alternating sand and sandy soil beds; this is apparent from the profile description (Mochanov 1977:152). To put it another way, the defined horizons are the relative, artificial subdivisions applied to the stratigraphic succession. There are the two above-mentioned carbon dates that differ from each other by 2,000 years. To my mind, neither of these dates is objective enough and cannot be considered attesting to continuous accumulation of the stratum IV (a+b). The latter was most likely deposited during a relatively short interval around 8000 BP (the average of the two dates), that is, the cultural remains contained in the stratum are approximately contemporaneous with the Zhokhov site. In this connection I point once more to the series of carbon dates known from Zhokhov (Table 1), where the dates 7800–8000 BP are the most frequent but some deviations reach not just 2000 but even 4000 years.

Other artifacts from the Zhokhov site (flakes, blades, bladelets, insets, and the notched blade) are totally useless as diagnostics. For the stone artifacts, there is only one way to compare the core morphologies of the Zhokhov artifacts with those of neighboring territories.

Comparison becomes complicated due to the rather brief description of the Sumnagin cores published by Mochanov and others (Mochanov 1977; Mochanov et al. 1983, 1991). Surprisingly, a description of this very specific material was not included in the general description of the cultural evolution in Northeast Asia advanced by Mochanov (1977:241–246). Nevertheless, numerous publications make it possible to recognize the main features of Sumnagin core morphology. But first it must be noted that cores of Zhokhov morphology have never been found in the northern area of the Sumnagin culture, either in a pure or a mixed surface, or in a subsoil context.

Published data indicate that there are prismatic cores with one (pencil-shaped, cone-shaped, and flattened cone-shaped) or two opposite striking platforms (cylindrical) found at Sumnagin sites, tortsovy-type cores (with one narrow flaking surface on the edge), and wedge-shaped cores (Mochanov 1977:Table 48:4). The latter are extremely rare, discovered only at the Ust-Timpton site, where they are occasionally thought to be. According to the publications, the cores from Sumnagin sites are primarily exhausted ones or near the terminal stage of utilization, and it is difficult to advance an idea on their previous morphology (Mochanov 1977:Tables 32: 20; 35:17–21, 23, 24, 29; 40:20, etc.). However, some significant features of core morphology are noted in the descriptions that resemble to some extent that of the Zhokhov artifacts. Thus Mochanov notes that flaked pre-cores look like rectangular (parallelepiped shaped) items or partly flaked stone slabs or other more or less rectangular broken raw material (Mochanov 1977:110, 167). Opposite striking platforms (oval or rounded) of cylindrical cores are almost parallel to each other, being perpendicular to the long axis of the artifacts (Mochanov 1977:115, 121, 167). The upper platforms, which were used more intensively, are carefully trimmed in comparison with the lower platforms. As noted, microblades were knapped mainly from the upper platforms (Mochanov 1977:121, 167). But the knapping technology known from pure Sumnagin sites seems to differ in general from that of the Zhokhov, and Mochanov shares this opinion after examining the collection himself.

It is noteworthy that nothing analogous to Zhokhov stone implements has been found

in the few years of excavations in the entire Asian Arctic. But surprisingly, similar artifacts were recently discovered by Dikov in Eastern Chukotka at sites such as Puturak, Itkhat I-A and I-B, Chelkun IV, and Ulkhum (lower) site. Cores of just such morphology were collected there, which was described for the Zhokhov artifacts. Some of them seem to be exact replicas of the latter, being identical in detail to Zhokhov cores (Dikov 1993a:Tables 46, 52, 60, 107; 1993b:Table 24). The age of the finds corresponds well to Zhokhov too. Thus a charcoal sample from Chelkun IV site was dated to 8150 ± 150 BP, MAG-719 (Dikov 1993a:149). There are other sites where the Zhokhov-type microblade cores were found. Two of them are known from a surface context discovered by M.A. Kiryak in 1989 near Mount Kymynyikei in the Vankarem depression, Northern Chukotka (Kiryak 1989:Fig. 6). Due to the morphology, one of the cores could be defined as a double-tortsovy core made of stone slabs or a flattened piece of raw material. Its characteristics fully correspond to those of Zhokhov cores of the third group (microblade cores that have two separate flaking surfaces on two opposite edge facets and a single platform). Another one definitely resembles cores with two adjoining flaking surfaces (the second group of microblade cores from the Zhokhov site). A series of double tortsovy-type cores made of brown slate slabs is known from surface finds collected on the Palaeolithic Igelkhveem XVI site in Eastern Chukotka (Dikov 1993a:46, Fig. 20:1–4). And finally, a single core that seems analogous to Zhokhov cores of the third group was found by Kiryak on the left bank of the Kolyma River 25 km downstream from its confluence with the Taskan River, a tributary of the latter (Kiryak 1983). However, it is difficult to advance an idea explaining the analogies: on the one hand, it could be evidence of Early Holocene migrations, or a feature of convergent evolution of microprismatic knapping technology; on the other, both the former and the latter are reflected in the Mesolithic material culture.

Comparative analysis of the bone and antler implements from the Zhokhov site with those of contemporaneous assemblages discovered in neighboring territories is difficult because very few bone or antler artifacts have been found in the Northeastern Siberian sites of the Mesolithic period. At the same time, a variety of bone and antler artifacts of different chronologies are well presented in Siberian sites on the whole (the major part of them is from Southern Siberia). Inset tools, or tools with grooves (they can sometimes be identified in this way) occupy a specific place among artifacts of this category if when discovered they provide an origin to the archaeological contexts and possibilities for consideration of technical and technological capabilities of the ancient population, such as their economy, adaptation strategy, etc. It appears that only the Siberian materials, including inset tools of a wide chronological spectrum beginning from the earliest items known from Late Palaeolithic Kokorevo and Afontovo cultural complexes up to the most recent Eskimo patterns, which make it possible to see in proper perspective the evolutionary trends of these tools, which were first of all hunting equipment, and to recognize some general features of the cultural evolution in the entire region. Such research is confronted with difficulties—the publications are incomplete with standard descriptions of the artifacts and often lack good illustrations, or some of the materials are not available, parts being lost, as in the excellent collections from Okladnikov's excavations of the Angara River burial grounds,

published in very brief form. It is worthy of note that many researchers do not pay attention to the most important parameters when describing inset tools such as groove shape, depth, and width of the groove, and the method of grooving, if it could be determined.

Though they are not abundant, inset tools are known from some Southern Siberian Palaeolithic sites. The major part of them was collected in the Afontova Gora excavations (Auerbakh and Sosnovsky 1932) and from other Yenisei River sites studied by Z.A. Abramova (1979a, 1979b); single items were discovered in the Chernoozerye II site, Western Siberia (Petrin 1986); the Kurla (Shmigun and Filippov 1982) and Oshurkovo (Okladnikov 1959) sites, Baikal region; the Birusa site (Khlobystin 1972); the Maininskaya site, Main River (Vasil'yev and Ermolova 1983); the Berezovy Ruchei site (Vishnyatsky 1987), and in the Studenoye settlement, Trans Baikal area (Konstantinov 1983). There are grooved artifacts among the bone inventory collected at the sites that were recognized as bone settings for side blades because of the narrow, deep slots cut along the ruler, as well as grooved tools that most likely were not used as frames for side blades (Shmigun and Filippov 1982). Palaeolithic bone settings of inset tools have a simple typology, including both bilateral and unilateral side-bladed artifacts. For manufacturing both the former and the latter, antlers and animal bones split longitudinally were used. Artifacts with side blades that were found in situ in the grooves are of special interest. Very few have been found: a dagger from the Chernoozerye II site (Petrin 1986) and a projectile point from the Kokorevo I site (Abramova 1979b). The insets were made of the medial parts of unretouched microblades varying from 3.5/3.6 to 25.5 mm long by 4 to 6 mm wide. The reverse position of the insets found preserved in situ in the grooves should be noted as a particular feature of the bilateral side-bladed tool from the Chernoozerye II site. Because certain data are absent, it remains unclear if an organic glue or pitch was used for fixing the microblades in the grooves. Nevertheless, V.T. Petrin (1986:60–62, Fig. 46) supposes some organic matter to have been used for that purpose, though he believes it was replaced later by calcareous sinter due to the local soil chemistry. The profiles of the grooves on these earliest side-bladed tools have elongated-triangular outlines or are V-shaped. Judging by the parameters of both the insets (width and thickness) and the grooves, one can assume the latter to be 2.5 to 3.5 mm deep and about 2 mm wide. The length of side blades is rather irregular.

The Mesolithic inset tools found in Siberia contain numerous artifacts belonging to different stages of Mesolithic culture. Except for the Zhokhov site, there are the Ust-Belaya stratified site (Medvedev 1971), the Ityrhei site (Goryunova 1978), Gorely Les (Savelyev, Goryunova, and Generalov 1974), Sagan-Nuge (Goryunova 1987), Verkholenskaya Gora (Aksenov 1980), the Belkachi I stratified site (Mochanov 1977), and Trail Creek in Alaska, Caves 2 and 9 (Larsen 1968). Inset tools are represented by fragments of both bilateral and unilateral side-bladed implements, and the original tools were not large. Most likely the major part of them was projectile points. The exact metrical characteristics of the tools are generally not published. Judging by the fragments published, the profiles and metrical parameters of the grooves are nearly identical to those of Palaeolithic artifacts. The largest collection is known from the Zhokhov excavations (Pitul'ko 1991; Girya and Pitul'ko 1994; and Chapter III). Twenty-five frames of

bilateral and unilateral side-bladed tools (preforms, reshaped tools, fragments, and intact tools) were found there, including items with microblades preserved in situ in the grooves. These are mainly hunting equipment, but other implements are interpreted as knives. It is worth noting that the parameters observed on other Siberian inset tools of the Mesolithic period correspond fully to those of the Zhokhov finds. The latter make it possible to suggest that there was a kind of standardization of manufacturing inset tools. It is most likely that a standard, or more properly a combination of general technological methods, occurred as early as the Late Palaeolithic due to convergent evolution. Concerning the grooves, it can be said that they are basically deep and narrow, with elongated-triangular (V-shaped) profile, approximately 3 to 4 mm deep and 1.5 to 2 mm wide; the groove depth is constant—slightly shallow in the distal and proximal parts. Observations of insets in the grooves could leave one to conclude that they are made from the medial parts of blades. The best evidence of the latter is recognized on materials from the Zhokhov site. Technological analysis of the stone industry of the site shows that its purpose was mainly for manufacturing blades for insets (Chapter III). In general, it is possible to consider inset tools of the Mesolithic period to have been inherited from Palaeolithic ones. However, the typology of Mesolithic inset tools is more developed, though such an impression might appear because of the lack of data on Palaeolithic artifacts.

Concerning the typology of Mesolithic inset tools, it should be noted that needle-shaped projectile points of three-edged or rounded cross section, as well as both unilateral and bilateral side-bladed, occur in the Palaeolithic. Bilateral side-bladed artifacts are known only from Trail Creek in Alaska, but projectile points of similar morphology have been found in the Siberian Neolithic in the excavation of Shilkinskaya Cave, the Trans Baikal area, and in the Onyess Grave, Amga River, Yakutia. However, some forms known from the Palaeolithic—such as bilateral and unilateral side-bladed tools of more or less flattened cross section (or with the original cross section of bone preforms)—as well as large, massive unilateral convex points (the three-edged variant in the Zhokhov collection) remain the leading artifacts in Mesolithic assemblages. Both the fragmented and intact tools are of elongated triangular shape, although there is a dagger or unilaterally grooved spear point from Belkachi site with a leaf-shaped body transforming toward its base into a rectangular handle or stem.

It is worth noting that certain artifacts were discovered in the excavation at Trail Creek caves. These items of hunting equipment, though fragmented, might be defined as grooved implements strongly resembling those of Siberian Palaeolithic sites.

Inset tools of the Neolithic and Early Bronze Age are well represented in many sites surveyed in Southern Siberia, Baikal (Okladnikov 1950, 1960, 1974, 1976, 1978; Konopatsky 1982), and the Trans Baikal region (Okladnikov and Kirillov 1980; Grishin 1981; Ivashina 1979; Vetrov 1982, etc.), Yakutia (Fedoseyeva 1968; Arkhipov 1989; Kozlov 1980; Mochanov 1977). In generally characterizing these tools, one can see two definite tendencies in the further evolution of inset tools.

The first, defined most clearly in the Neolithic and Bronze Age of the Baikal region, is the rapid replacement of unretouched microblade insets by retouched ones in the sequence "un-

retouched microblade insets—partially retouched blade insets—fully retouched insets" in the evolution of hunting equipment, while the evolution of cutting tools is proceeding toward compound tools with a single, fully retouched large stone inset. These implements are significantly larger than the Mesolithic ones. Obviously thin bifaces, well represented in the Late Neolithic of Yakutia (Fedoseyeva 1982) and in other regions as well, are the side blades of compound tools such as those described above. Unfortunately, coherent transformations of shape (profile) and the size of the grooves have not been recognized inasmuch as these materials are very poorly published and no parameters can be referred to.

At the same time, another tendency observed in the succession of Siberian inset tools of Palaeolithic-Mesolithic tradition is based on the use of unretouched microblades as the simplest insets for compound tools. Evidence for this is known from the Onyess (Kozlov 1980) and Dzhikimdinsk Grave sites (Arkhipov 1989) and from the Tuoi-Khaya burial ground (Fedoseyeva 1968). Though the parameters of the grooves are noted in very few cases, the descriptions are generally informative. Thus, I can refer to the Tuoi-Khaya materials reported by Fedoseyeva, who notes that unretouched medial parts of microblades were used that project 1 to 2 mm out of the grooves, which are 4 mm deep and 1 mm wide (Fedoseyeva 1968). Projectile points discovered in the Onyess Grave site had tip insets made of almost whole microblades, from which the proximal parts with the bulb of percussion were broken (Kozlov 1980). Artifacts of just such morphology were found by Okladnikov (1960) in the mixed subsurface context of Shilkinskaya Cave. Of special interest are finds of bilateral side-bladed inset tools excavated at Tuoi-Khaya (Fedoseyeva 1980), the Molodovsk burial ground (Kirillov and Verkhoturov 1985), and microblade insets found in situ in a decomposed bone setting of a compound tool in a grave discovered at Stary Vitim settlement (Vetrov 1982). All of these tools had the insets placed in grooves in the reverse position, that is, if the microblades comprising one edge are put into the groove with ventral surface up, the insets of the other are turned over and placed with dorsal side up. At least some of the finds are dated to the Late Neolithic or Early Bronze Age; the Vitim burial is the most recent, being dated to the Early Iron Age based on the material in the assemblage (Vetrov 1982).

In this way, finds of compound tools known from Siberia make it possible to conclude that they existed for a very long time. Occurring for the first time as early as in the Late Palaeolithic, they gradually developed up until the Iron Age, being rather conservative in typology during most of their evolution. The Palaeolithic bilateral and unilateral prototypes survived successfully and became more perfected. Numerous finds show that needle-shaped projectile points of both types occurred in the Mesolithic by at least 8000 BP. Later, in the Neolithic, they became a wide-spread type of hunting equipment. A general evolutionary trend in hunting equipment can be seen in Southern Siberia, at least as found in the gradual replacement of bilateral forms by compound tools with single big side blades in the above-mentioned sequence. That is, a transition is observed from inset tools with microblades to proper compound tools composed of bone settings and stone blades. The diverse thin bifaces, well represented in Late Neolithic sites, are undoubtedly elements of such constructions. According to the published data, the

absence of a glue mass in the grooves is a particular feature of Siberian tools—in contrast to both Eastern European and Ural items. It can be said that as a rule the grooves are found to be deep and narrow on Siberian inset tools, and that is especially true for early types. The grooves are elongated-triangular in profile (V-shaped). The insets were probably fixed in them by drying the bone setting, which had been soaked or steamed out previously for successful placement of blades. At the same time, it is revealed that inset tools from Eastern European sites are generally characterized by rather wide grooves with a flat bottom, and with trapeziform profile in some cases (Oshibkina 1983). Perhaps these technological peculiarities could be considered regionally specific.

Finally, it is necessary to note the element of technology (or both technology and morphology) characteristic of large bilateral side-bladed points (I believe them to be spear points, though some researchers call them daggers); it is the reverse position of microblades. Tools of such morphology are distributed broadly both chronologically and geographically (the most ancient artifacts are known from the Chernoozerye II site on the Irtysh River in Western Siberia, where they are dated to 13,000 BP; the most recent were discovered at Stary Vitim settlement on the Vitim River in the Lena Basin in Eastern Siberia, belonging to an Iron Age layer from about 2000 BP. That is, this tradition survived over a period of approximately 10,000–11,000 years). Analogous implements are known far to the west—for instance, in the Late Palaeolithic Talitsky site, Ural area (Gvozdover 1952), and in the Mesolithic Oleneostrovsky burial ground, Karelia (Gurina 1989). Such a position of microblades was probably functionally needed for a purpose affecting balance or strength or both, or for improving the effectiveness of the tool, etc.

Traditionally (primarily due to excavations of Eskimo sites) it is estimated that the bone-antler-ivory inventory, and hunting equipment in particular, is more or less decorated, being connected with such things as rituals, magic, ideology, etc. Nevertheless, inset tools from Siberian sites (except Eskimo settlements) are poorly decorated, irrespective of the age or geography, if they are decorated at all. Lines drawn (cut, engraved, or perforated) along the axis of tools are found which could be substituted sometimes by the groove of the original relief of the bone surface. This is the only common feature. Few deviations from this normal sparse style are known—such as the perfect ornamentation of the dagger from the Chernoozerye II site, the perforating zigzag on the projectile point from Cave 9 at the Trail Creek site, and a fragment of a tool that is believed to be a dart point. The latter is decorated with a series of small diagonal incisions in the base, but at the same time it could be a functional or technological element and not an ornament.

Artifacts of fossil mammoth ivory occupy a particular place in the inventory of the Zhokhov site. Objects made of mammoth ivory are found infrequently at Pleistocene sites of Northeast Asia. As a rule, these are large ivory flakes that were not further processed (Mochanov 1977:Figs. 25:3–7; 26:4–5). Inasmuch as use-wear traces have not been examined, I cannot discuss the function of such tools. Both the known ivory and bone artifacts come mainly from the famous Berelekh site (Mochanov 1977:81–83). Tools made of ivory flakes were also found. The latter are commonly discussed as dart points (Mochanov 1977:Fig. 58:9,

Dyuktai Cave, st. VIII, ca. 15,000 BP) or spear heads (Mochanov 1977:Fig. 24:38, Berelekh site, ca. 13,000 BP). An excellent hunting spear head carefully made of ivory was also found at the Berelekh site. The tool appears as an elongate, rounded in cross section rod 940 mm long and about 25 mm in diameter (Vereschagin and Mochanov 1972:Fig. 4). The use of other parts of mammoths' skeletons (ribs and humerus bones) has been revealed at other sites such as Ust-Mil II, Ikhine II, and Berelekh. Evidently the natives used the bones and ivory of taken animals, though it is disputable for the Berelekh site inasmuch as it is quite possible that Berelekh people used the dead bodies of mammoths and other animals that had fallen prey to a natural trap—an oxbow of the Berelekh River, where a great quantity of Pleistocene faunal remains were accumulated (Vereschagin 1971:93). It is interesting in this connection a mammoth tusk with to point out a mammoth figure engraved on it that is supposed to have been discovered near the Berelekh site; in discussing the object some scholars have assumed that the drawing was made by an ancient artist who had seen a frozen mammoth's dead body exposed at the precipice of a riverbank.

It should be noted that the problem of the possibility of using fossil mammoth remains is still extremely important since the bone remains of mammoth and other Pleistocene animals are abundant in Northeast Asia and might be used at any time up to the present.

Excellent examples of the use of fossil mammoth ivory (and perhaps other bones) were discovered in excavating the Zhokhov site: bilaterally and unilaterally grooved points, a large series of massive pick-like tools, a side scraper, and a skinning knife (see Chapter III). The last two were made on large ivory flakes, which was determined in trace-analysis studies of the material. Unfortunately, the Berelekh finds—of exactly the same morphology (Figures 61, 62)—were never examined in this way.

Summarizing observations of rare ivory artifacts known from Late Pleistocene archaeological sites studied in Northeast Asia on the one hand, and the Early Holocene Zhokhov site on the other, allow the following possible conclusions:

1. The dorsal surfaces of the preforms (ivory flakes) commonly retain the natural ivory exterior; the flakes are short and wide, i.e., their outlines are close to extended discoid or oval. Obviously, both specially prepared and unprepared pieces of ivory were used. The striking platforms might or might not have been prepared; naturally split surfaces of the ivory (some kind of cleavage) could also be used, particularly on fossil tusks. The flakes were knapped off with powerful lateral strokes. In contrast to the Old Crow industry (Bonnichsen 1979), bone artifacts with a core morphology have not been found in Northeast Asia;
2. The ivory flakes have no traces of additional processing in most cases, though some artifacts manufactured from ivory flakes were carefully retouched like stone tools;
3. In the processing of large tools (e.g., hunting equipment, pickaxes, etc.) the methods of cutting, planing, and grinding (the last for final processing) were used extensively;
4. The methods of treating fresh ivory (i.e., ivory from prey) and fossil ivory (surface or excavated finds) seem similar. Thus, there are some traditional principles of use and treatment of this raw material that survived for a very long time, beginning as far back as 15,000 BP.

Two more categories of bone-antler artifacts are in the inventory from the Zhokhov site; they also have analogies of a broad chronology, found in the Neolithic and more recent assemblages. First, these are pickaxes of antler (Figures 43, 44), close analogies to which are known from Eskimo sites. Even though the latter differ in insignificant details from the former, they are both of the same general morphology and function. Another category includes T- or L-shaped handles of antler that were supposedly used for hafting stone chisels or axes (Figure 47). Similar articles are known from Northern Yakutian Neolithic sites such as Rodinka Grave, dated to approximately 4000 BP (Kistenev 1980:87, Table VI:5), and the Nizhne-Taloudskaya site (Mochanov, Fedoseyeva, Konstantinov et al. 1991:60, Table 118:8), the age of which is assumed to be no older than 6000 BP (the mixed context discovered there is defined as Neolithic in general). At the same time, a fragment of such a tool was found in the prehistoric (about 500 BP) layer of the Thule culture in the Walakpa site (Stanford 1976:90, Plate 113:i).

Among the wooden artifacts discovered at the Zhokhov site, a large fragment of sledge runner is the most interesting. Some distinct features of the excavated fragment show that it is part of an extremely advanced construction, which differs sharply from the Northern European (Berg 1934) and Russian (Burov 1974; Eding 1929) peat-bog sledge runners dated to 8000–6000 BP. The latter are rather primitive and discussed by archaeologists as flat sledges or the keel boards of boat-shaped sledges similar to Lapp sledges. Constructions with uprights are usually assigned to later times. Some general types of the built-up sledge described by anthropologists and polar researchers are well known in the circumpolar area (Bogoraz 1992:43–44; Chikachev 1991:72–73; Levin 1948:89–94). The mapping of bog-finds known in the European North propelled Georgiy Burov (1981:164, Fig. 8) to the idea that sledge transportation appeared in Northern Europe in the Mesolithic and gradually improved in this area throughout several millennia without any diffusion into neighboring territories. Nevertheless, it is obvious that the secret was very widely known, and the advanced built-up construction of Zhokhov sledges makes it possible to assume that ideas of sledge construction progressed for a very long time. Though direct analogies cannot be pointed out, some structural elements of the sledge runner from the Zhokhov site are surprisingly close to Eastern Siberian dog sledges used during the last two centuries by natives and Siberian Russians (Levin 1946:Fig. 16; Mason 1894:Figs. 244, 245).

But did the hunters use any animals for towing the sledge? Or did they pull the sledges themselves? We suggest facts, discussed below, that make it possible to assume that dog traction was practiced by Zhokhov natives, though dog bone remains and parts of a sledge cannot be considered indisputable evidence.

The age of dog traction is usually considered rather late. For example, in the American Arctic it is dated to about Thule times or later. Scanty archaeological materials known from Russian Eskimo sites show that dog traction here cannot be dated to more than 700–800 years ago, though perhaps it was invented earlier. The only real evidence for early dog traction in the Arctic was from the Ob' River estuary. A dog with harness is depicted on a bone knife handle excavated from the famous Ust-Polui site (Moshinskaya 1953:85, 86, Table VI). The materials are dated no

earlier than the first to third centuries AD (i.e., 1700–1900 BP). Harness equipment (toggles, swivel blocks) and features of sledges (bone pins or nails and antler sled-shoes for protection of the wooden runners from contact with the ground) dating to 1000–1500 BP were found at the Cape Vhodnoy and Karpova Bay sites (Pitul'ko 1991:27–31, Fig. 4). But Arctic peoples, who had to maintain constant mobility, had to invent the dog traction earlier.

Unfortunately, the archaeological materials yield no direct evidence of dog traction such as parts of a harness (or pictographs, figures, etc.), but dog bones were found during the excavations on Zhokhov Island.

Several bones were excavated. There are two fragments of mandibles (probably from one animal), a fragment of maxilla, an isolated fang, and postcranial bones: an intact radius and tibia, and zygomatic bone. These remains undoubtedly belong to canines. The bones certainly exceed in size the same ones from the Arctic fox skeleton, and appreciably less than those of a wolf. To illustrate this assumption we refer to the real dimensions: the radius bone is 175 mm long, the tibia 190 mm. The same parameters measured on the bones of a wolf are about 200 and 220 mm respectively. Fossil dogs are a rarity in Siberian Final Pleistocene and Early Holocene cultural deposits, and the only excavated dog remains we can refer to are from the Final Upper Palaeolithic Ushki site located in the central region of the Kamchatka Peninsula. The fossils (both the skull and the postcranial bones) were poorly preserved. They were examined by N.K. Vereschagin (1979:10–19), but due to the preservation only the general proportions of the cranium were described, which is useless for comparative analyses.

The fragments of dog jaws from the Zhokhov site have some distinguishing features indicating that dogs of this kind were not far from their wild ancestors. The jaw, when observed in profile, looks less curved than the standard dog jaw. The first molar is massive, but the dental system is weakly constructed on the whole. The teeth are not pressed close to one another, and the fangs are small.

For features of domestication to definitely be identified, the dog remains from Zhokhov Island were compared with the skulls of native huskies that were kept by the Yakuts over the last quarter of 19th century. The skulls, collected more than 100 years ago, are preserved now at the Institute of Zoology in St. Petersburg and are of the original genotype, dated to the period when cross-breeding of the aboriginal and imported dogs had not yet taken place. They are very valuable material for comparison (Pitul'ko and Kasparov 1996).

The teeth range of the jaw from the Zhokhov site (measured from the front line of the fang alveolus to the rear point of the alveolus of M1) is 101 mm long. The average dimension of the teeth range on wolf skulls from the Lower Indigirka River area is 131.3 mm, lim 124.2–139.0, N = 8 (Vereschagin 1971:151). For Northern Yakut huskies it is 99.8 mm long (average), lim 88.4–107.1, N = 7. The crowns of M1 are large on the fossil dog jaw from Zhokhov Island. They are 25.8 and 26.2 mm. The average length of the M1 crowns in the groups is 27.5 mm (lim 27.3–31.2, N = 8, wolves) and 21.5 mm (lim 20.0–24.1, N = 7, huskies) respectively. Discussing parameters with progressive dynamics clearly indicates the process of domestication. To illustrate we can refer to dog remains found at the Cape Baranov Eskimo site (Eastern Siberian Arctic),

which are much younger than the Zhokhov dog but 1,000 years older than the Yakut huskies; the M1 crown is (average) 20.7 mm long, lim 18.5–22.7, N = 6 (Vereschagin 1971:151).

The Mesolithic dog found on Zhokhov Island unexpectedly looks similar to dog remains discovered far from the island. The dimensions and outlines of the jaws are close to one another. Though the finds are rare we can point out dog bones excavated from the Koksharovsko-Yur'evskaya site in the Trans-Ural area (Serikov and Kuzmina 1985:89–92) and fresh data concerning the discovery of a buried dog skeleton from North America dated to about 8500 BP (Morey and Wiant 1992:224–229, Fig.). Unfortunately the parameters of the jaws are unpublished, but scaled photo illustrations allow understanding that the index M1 crown length to tooth row length is about 23 %, while the Ural dog is 22%, Yakut huskies 21.5 % (N = 7), and the Zhokhov dog 25.5 %—more than the index (22.1 %, N = 8) measured on the wolf skulls from Indigirka (Vereschagin 1971). These facts demonstrate that the Mesolithic dog from Zhokhov Island occupies the intermediate position between wolf and domesticated dog.

To complete the description of dog finds from Zhokhov Island, we must note a large quantity of well-preserved dog feces excavated from permafrost soil. They were located on a small rounded section and contained reindeer hair with half-digested fragments of phalanges or sometimes small pieces of corneous hoof covers. It is well known that such concentrations appear in the summer when draught animals are tied up individually to posts.

To summarize, we note that the natives of Zhokhov Island had dogs, which assisted them in the dangerous hunt for bears. Doubtless they knew the advanced construction of the built-up sledge and probably draught animals for mobility. Consequently, it is quite possible that the animals were for this purpose.

But there is no way to ascertain now that dog traction was really practiced in the high Arctic as early as 8000 BP.