FIGURES

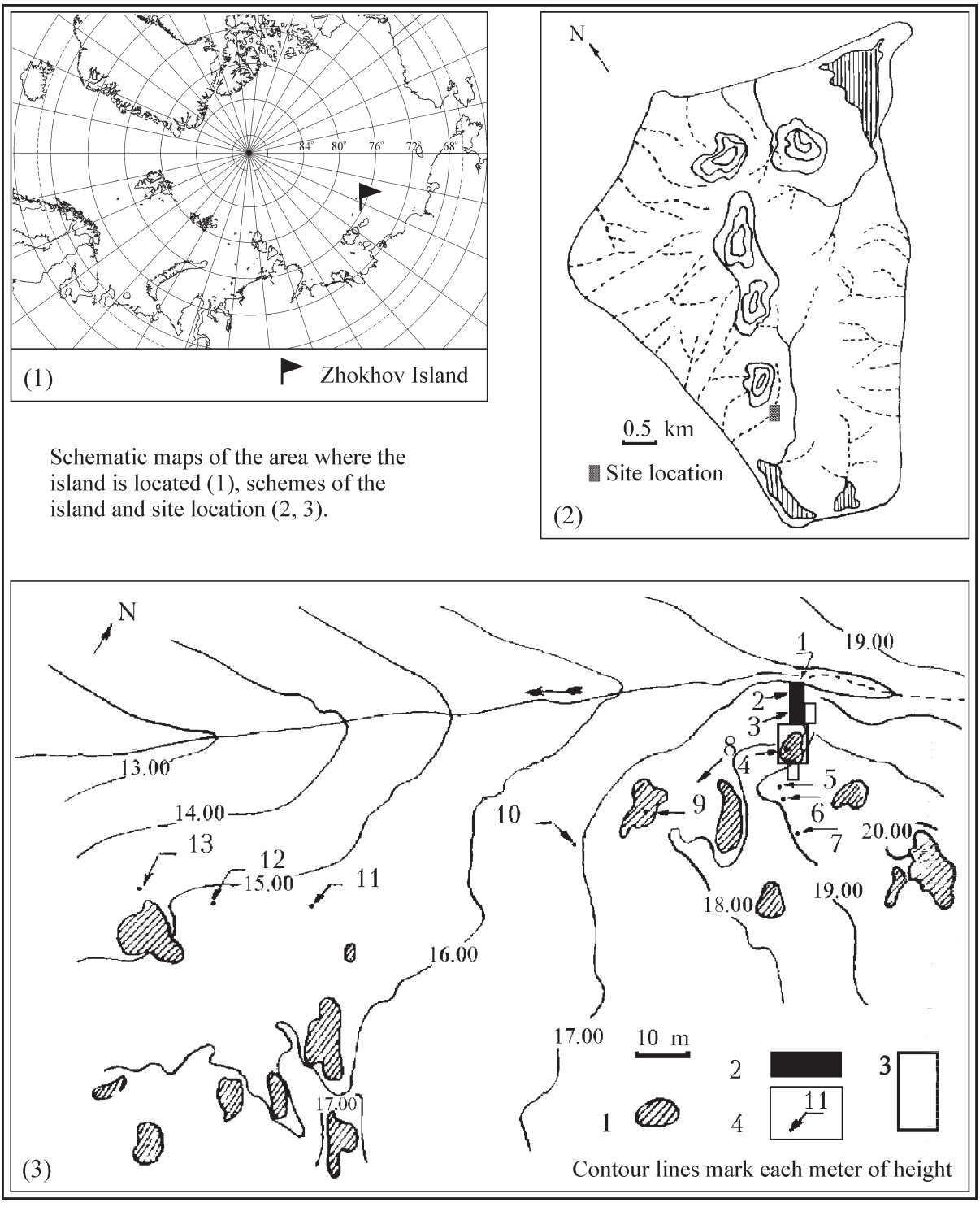

Figure 1. Scheme of area surveyed (1, 2) and map of the site location on Zhokhov Island (3).

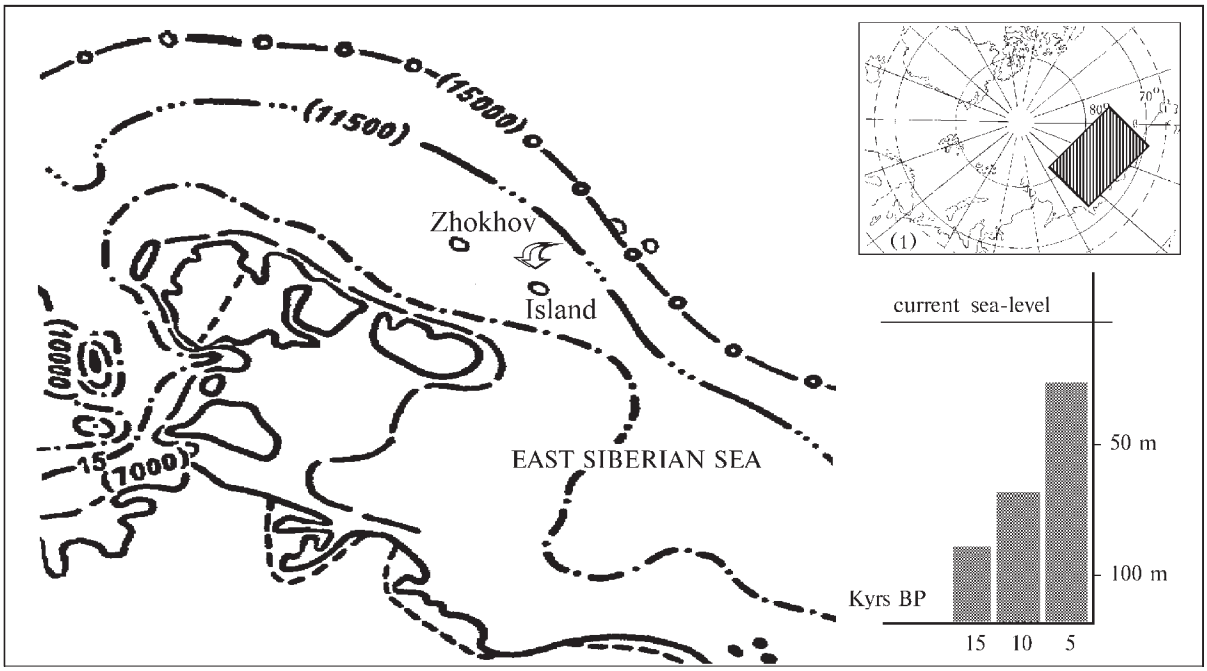

Figure 2. Schematic map of the New Siberian Islands with the Late Pleistocene and Holocene coast lines (15,000, 11,500, and 7000 BP respectively), after Yu. P. Degtyarenko, M. G. Blagoveschensky, and A. P. Puminov (1982), and relative diagram showing transgression dynamics.

Figure 3. Zhokhov Island site. South view.

Figure 4. The surface near Dwelling 10 (Fig 1). One can observe a rounded accumulation formed by wooden pieces and bone fragments that were pushed to the surface by cryogenic processes. The slope of a thermokarst depression at Accumulation 9 is seen in the left background. View from the SW.

Figure 5. View from the east to the west slope (along Line 7 of the excavation grid) of the thermokarst depression in the center of the excavated area (Figs. 11, 16).

Figure 6. View from the west to the east slope (along Line 9 of the excavation grid) of the thermokarst depression in the center of the excavated area (Figs. 11, 16).

Figure 7. The most elevated part of the site area—the "cape" jutting out into the stream valley (see Fig 1:3), where the excavations were carried out in 1989–1990. View from the west side.

Figure 8. Surface of the cultural layer in melting (Square 23). View from the south.

Figure 9. The eastern part of the excavation area (1990 field season)—Square 53, where the cultural layer appeared to be moved down because of solifluction; a surface of thick ice interbed discovered in Squares 53 and 54 is suggested to be a slickenside. Isolated flints, bone fragments, and pieces of wood were found that were thought to be redeposited together with the layer (Figs. 16, 17). View from the west side.

Figure 10. Square 24 during excavation. This square, as well as adjacent ones, had the most favorable conditions for excavation, being well drained naturally due to a slight sloping of the surface. South view.

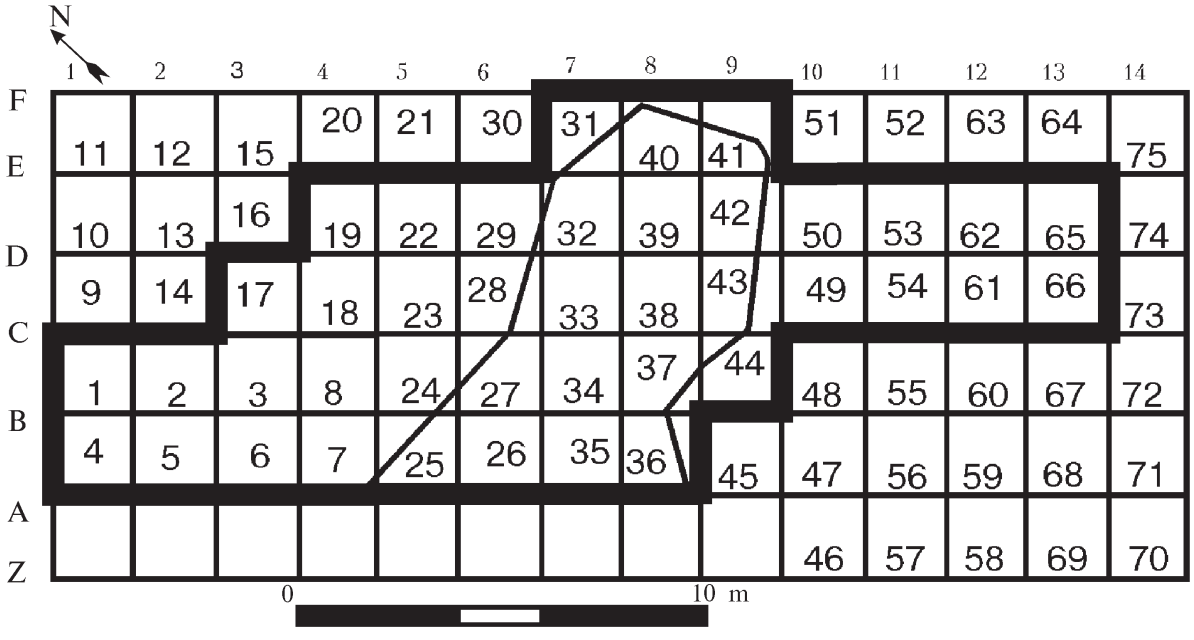

Figure 11. General schema of the area excavated in 1989–1990.

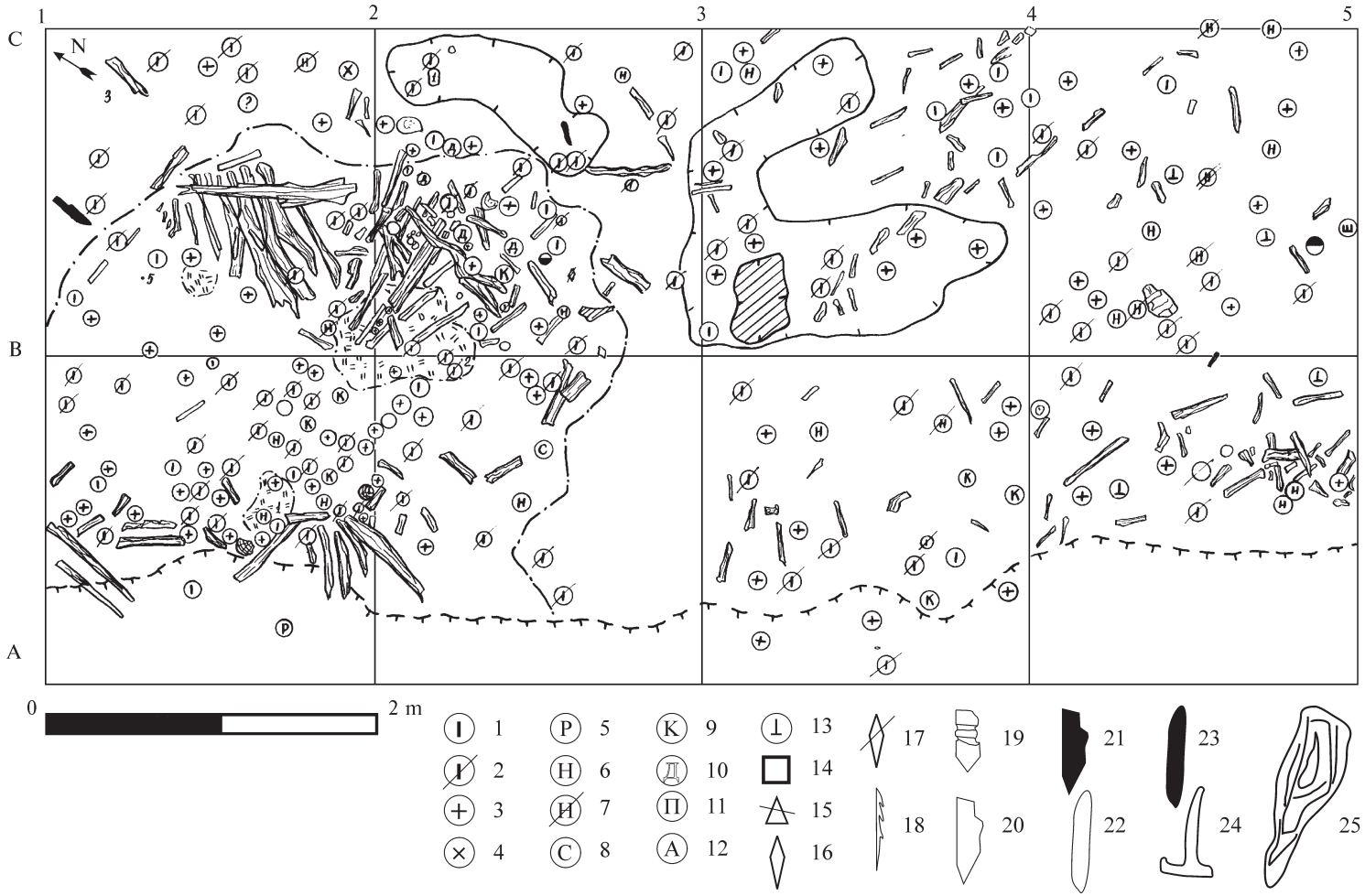

Figure 12. Map of the area excavated in 1989 (Squares 1–8). Legend: (1) microblade or bladelet; (2) fragmented microblade or bladelet; (3) flakes; (4) chips; (5) cores; (6) fragmented cores; (7) manufactured wooden pieces; (8) manufactured bone fragment; (9) human tooth (?); (10) large wooden pieces; (11) pit; (12) border of the spot saturated with charcoal; (13) area saturated with charcoal and broken bones; (14) a border of talus; (15) arrow head; (16) a fragment of a point; (17) antler pick-axe; (18) wooden scoop; (19) ridged blades; (20) a large piece of flaking surface knapped off a core; (21) tablette flakes; (22) large flint debris; (23) scraper (?); (24) primitive greenstone side scraper (?); (25) flint insets; (26) volcanic silicious slag; (27) bone or antler tools; (28) organic material sampled for carbon-14 dating; (29) pebble used as a hammerstone.

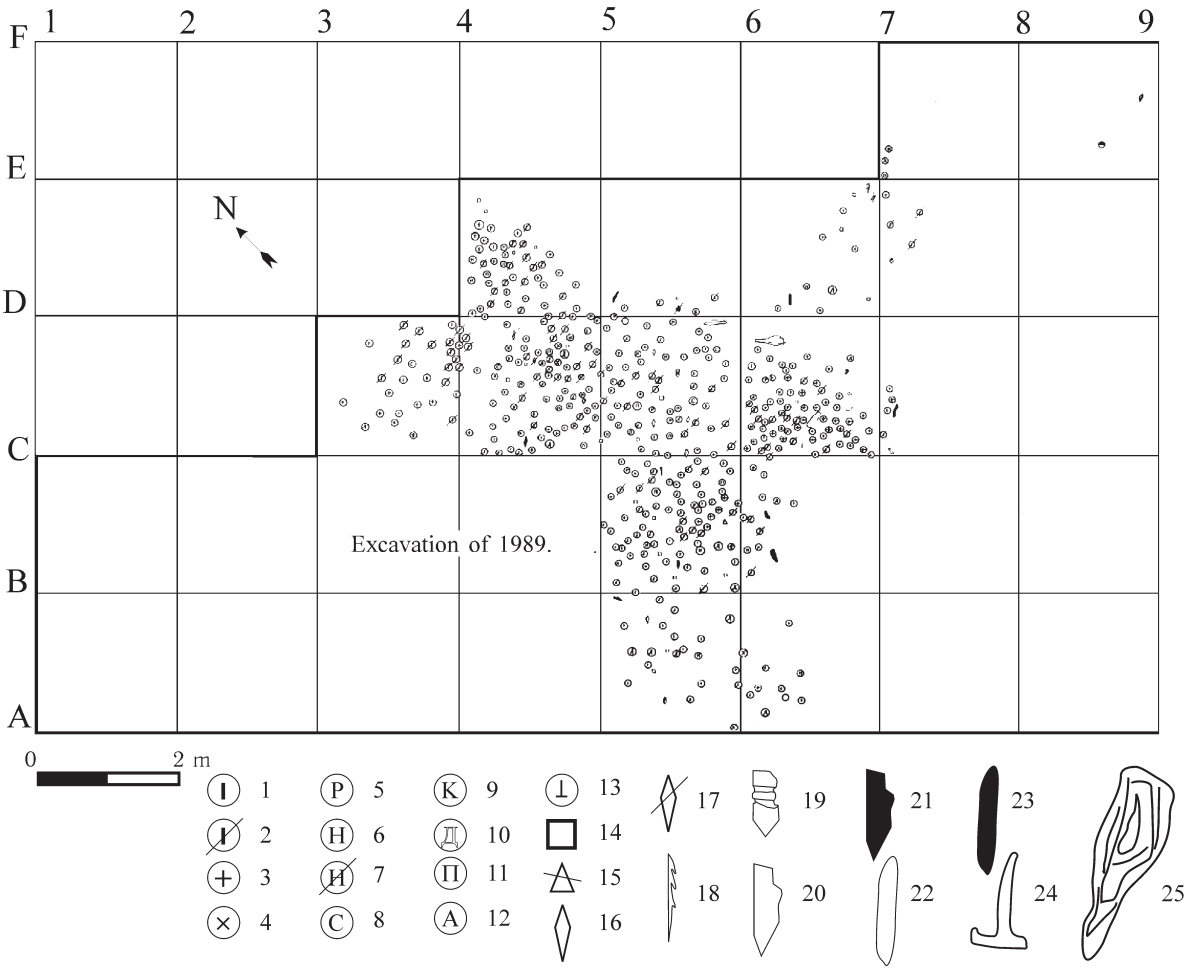

Figure 13. Map of the area excavated in 1990 showing artifacts and the dig of 1989. West section. Legend: 1 – microblades; 2 – fragmented microblades; 3 – flint flakes; 4 – mammoth ivory flakes; 5 – ridged blades; 6 – cores; 7 – fragmented cores; 8 – large flakes; 9 – bone artifacts; 10 – fragmented arrow shafts; 11 – pumice stones; 12 – grinding stones; 13 – T-shaped antler handles; 14 – pieces of a stone raw material; 15 – fragments of stone axes; 16 – bone points of small size (out of scale); 17 – fragmented bone points of small size (out of scale); 18 - «harpoon»; 19 – pickaxes of mammoth ivory; 20 and 21 – pickaxes of antler; 22 and 23 – large performs of inset tools or non-bladed points; 24 – antler handles for axes or chisels (?); 25 – wooden home utensils; 26 – sled runner. Note: Items marked # 19 – 26 are shown in scale.

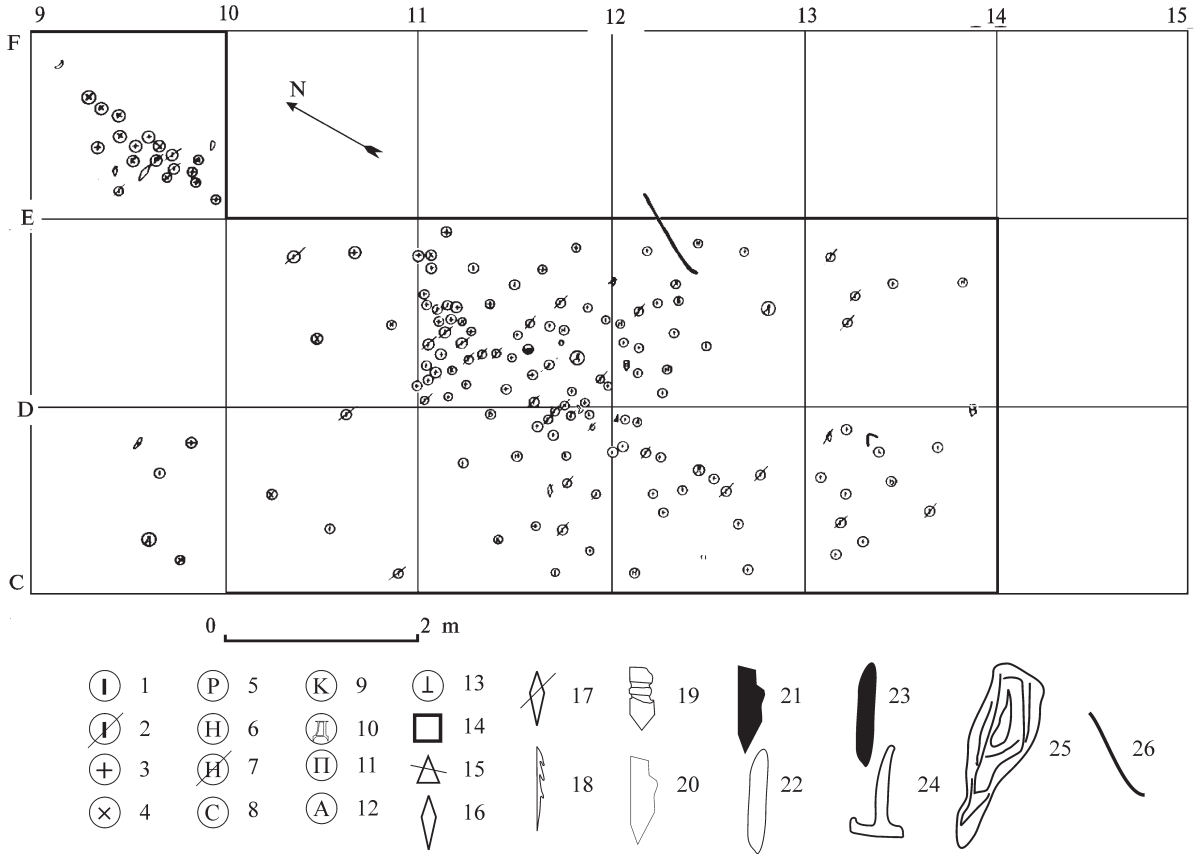

Figure 14. Map of the area excavated in 1990 showing artifacts. Legend of excavation map (Figs. 13, 14): (1) microblades or bladelets; (2) fragmented microblades or bladelets; (3) flint flakes; (4) mammoth ivory flakes; (5) ridged blades; (6) cores; (7) fragmented cores; (8) large flakes; (9) bone artifacts; (10) fragmented arrowshafts; (11) pumice stones; (12) grinding stones; (13) T-shaped antler handles; (14) pieces of a stone raw material; (15) fragments of stone axes; (16) small bone points (not to scale); (17) small fragmented bone points (not to scale); (18) "harpoon"; (19) pickaxes of mammoth ivory; (20, 21) pickaxes of antler; (22, 23) large preforms of inset tools or non-bladed points; (24) antler handles for axes or chisels (?); (25) wooden domestic utensils; (26) sledge runner. Note: Items marked 19–26 are shown in scale. East section.

Figure 15. Excavations in solimixture with cultural remains in Square 33 (Line 7 of the excavation grid, the west slope of the thermokarst depression dissecting the dig area into west and east parts). A view from the south. A lot of split driftwood had been turned up almost vertically by permafost. One of the wooden domestic utensils was discovered in the same position (Figs. 55, 56).

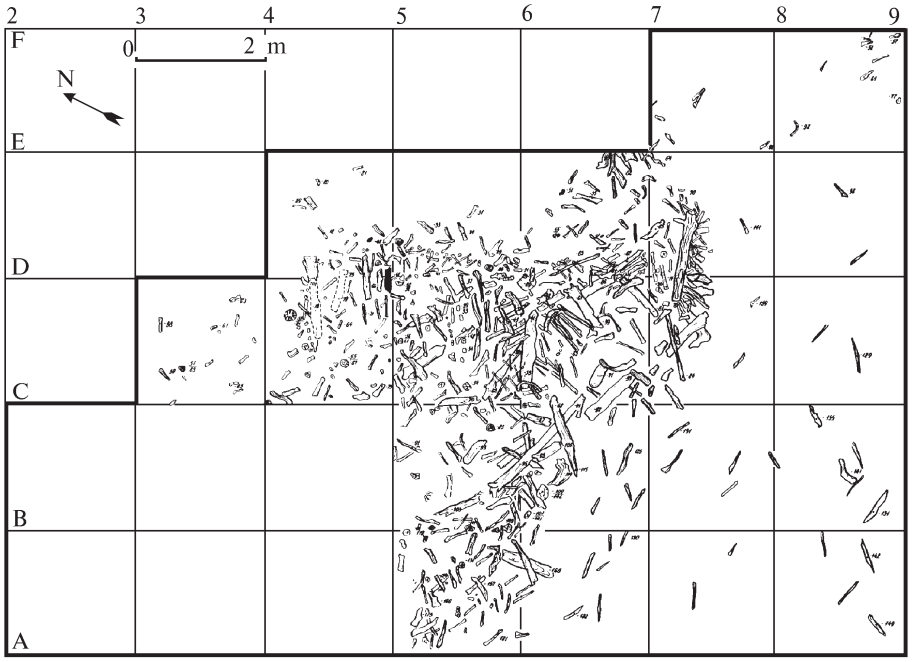

Figure 16. Map of the area excavated in 1990 showing wooden pieces and the dig of 1989. West section.

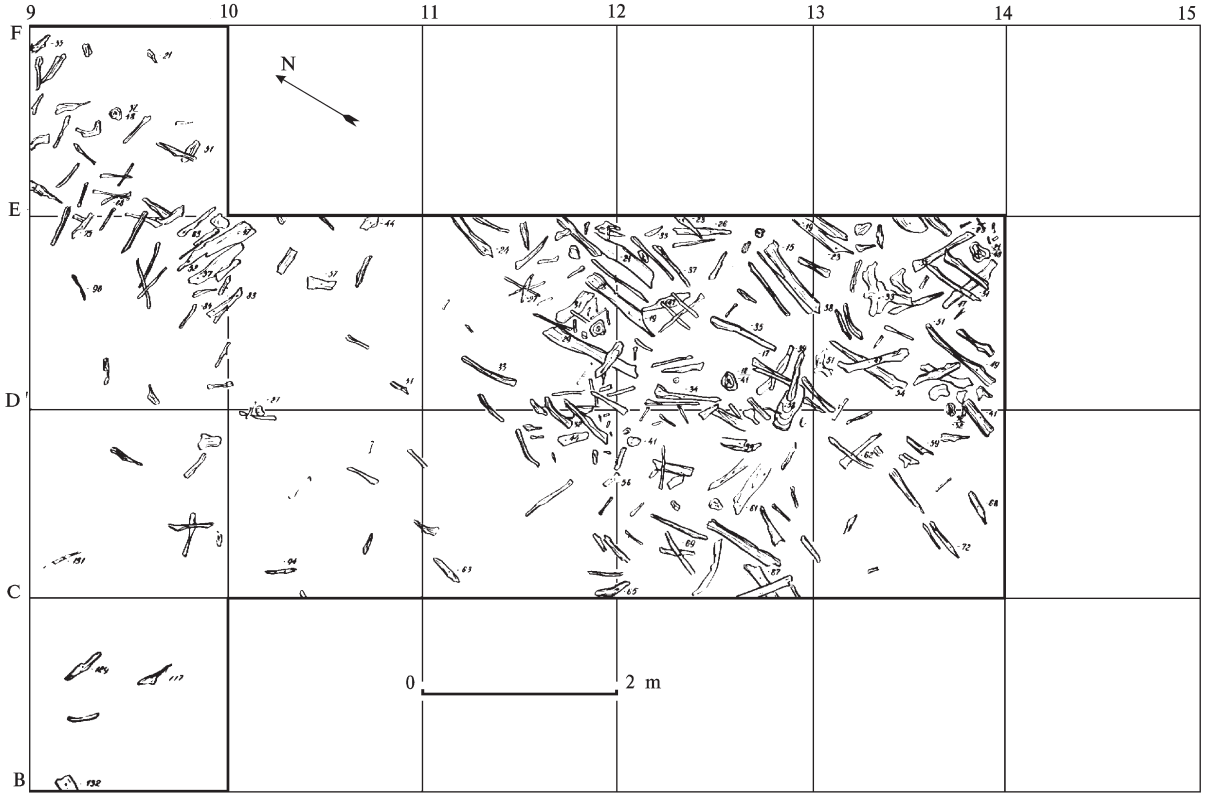

Figure 17. Map of the area excavated in 1990 showing wooden pieces. East section.

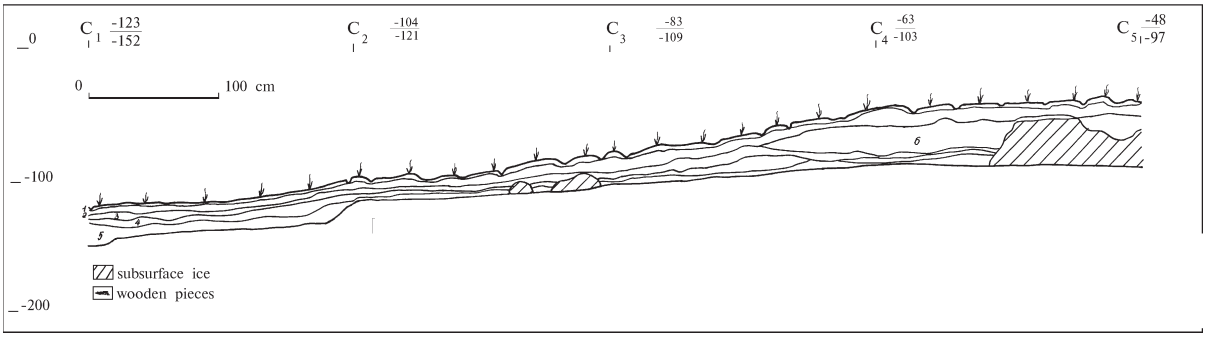

Figure 18. Profile B1–B5. Legend: 1 – turf; 2 – grey-brown loamy soil; 3 – bright-brown loamy soil (cultural layer); 4 – channel sediments; 5 – blue-grey hard loamy soil; 6 – peat-bog sediments which were deposited in the Holocene in thermokarst lake disturbed in upper part of the cultural layer; peat sampled from the mid-level had been dated to 2200 ± 30 BP, LU 2435.

Figure 19. Profile B. A fragment near B5 picket seen from the west.

Figure 20. Profile B, B5 picket, blown up. The ice interbed 10 to 15 cm thick is easily visible. View from the west.

Figure 21. Ruins of wooden structure (flooring-like construction) discovered in Squares 1 and 2, excavations of 1989 (Fig. 12). Seen from the SW.

Figure 22. A section of cultural layer in excavating the west part of the dig (Square 28) with abundant wooden pieces, some of which are in vertical position or inclined at an angle to a surface.

Figure 23. Subsurface ice vein, about 3 meters thick, discovered along the east slope of the thermokarst depression covering the center of the dig (excavations of the 1990 field season).

Figure 24. Square 41, profiles seen from the NW.

Figure 25. Polar bear skull discovered in excavating Square 41. Seen from the NW.

Figure 26. A piece of sledge-runner found in Square 62, east part of the excavated area. View from the NW.

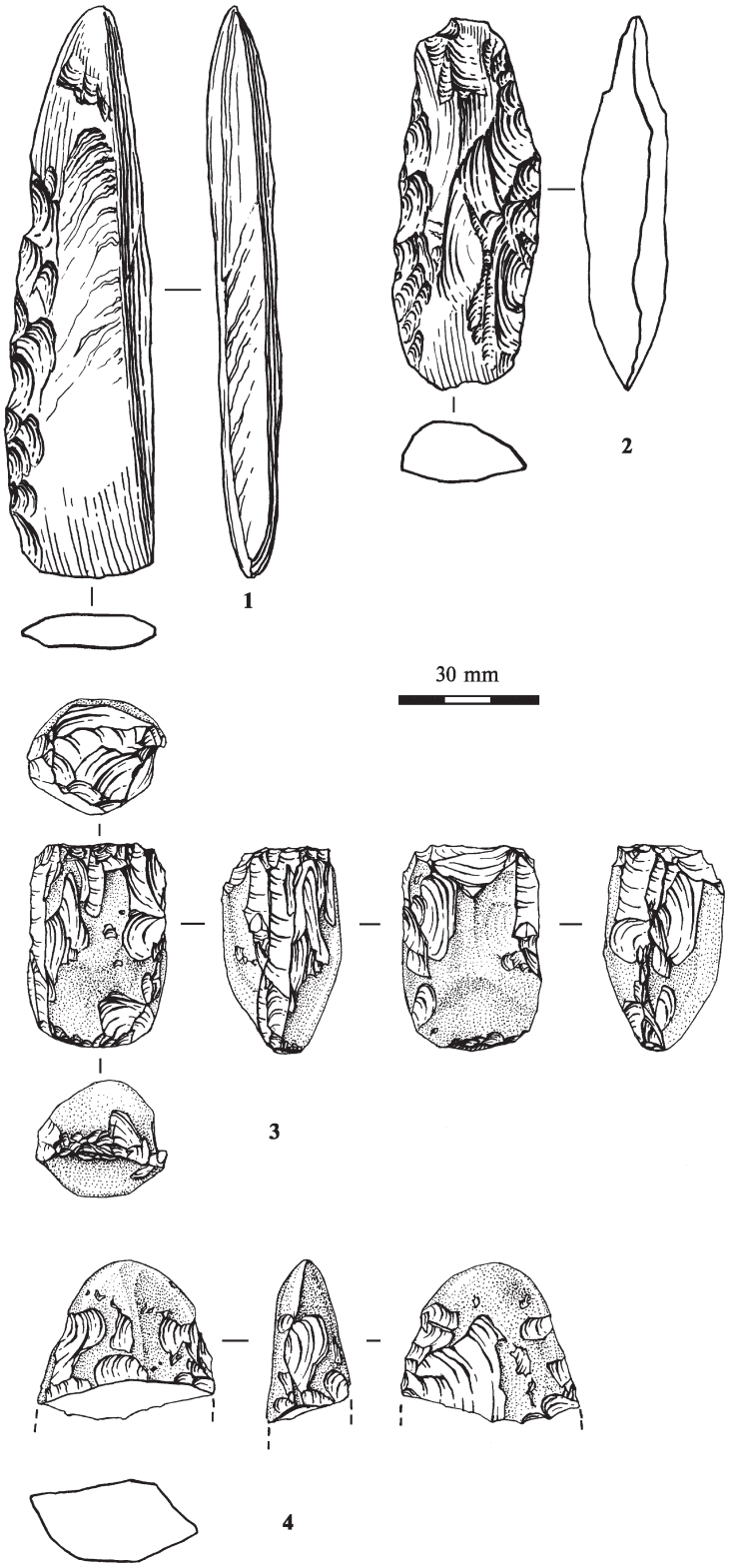

Figure 27. Stone implements from the Zhokhv Island site: (1, 2) ground axes (surface findings of 1989); (3, 4) fragments of such tools discovered in the cultural layer in 1990; (3) an attempt at reshaping a broken axe into a microblade core.

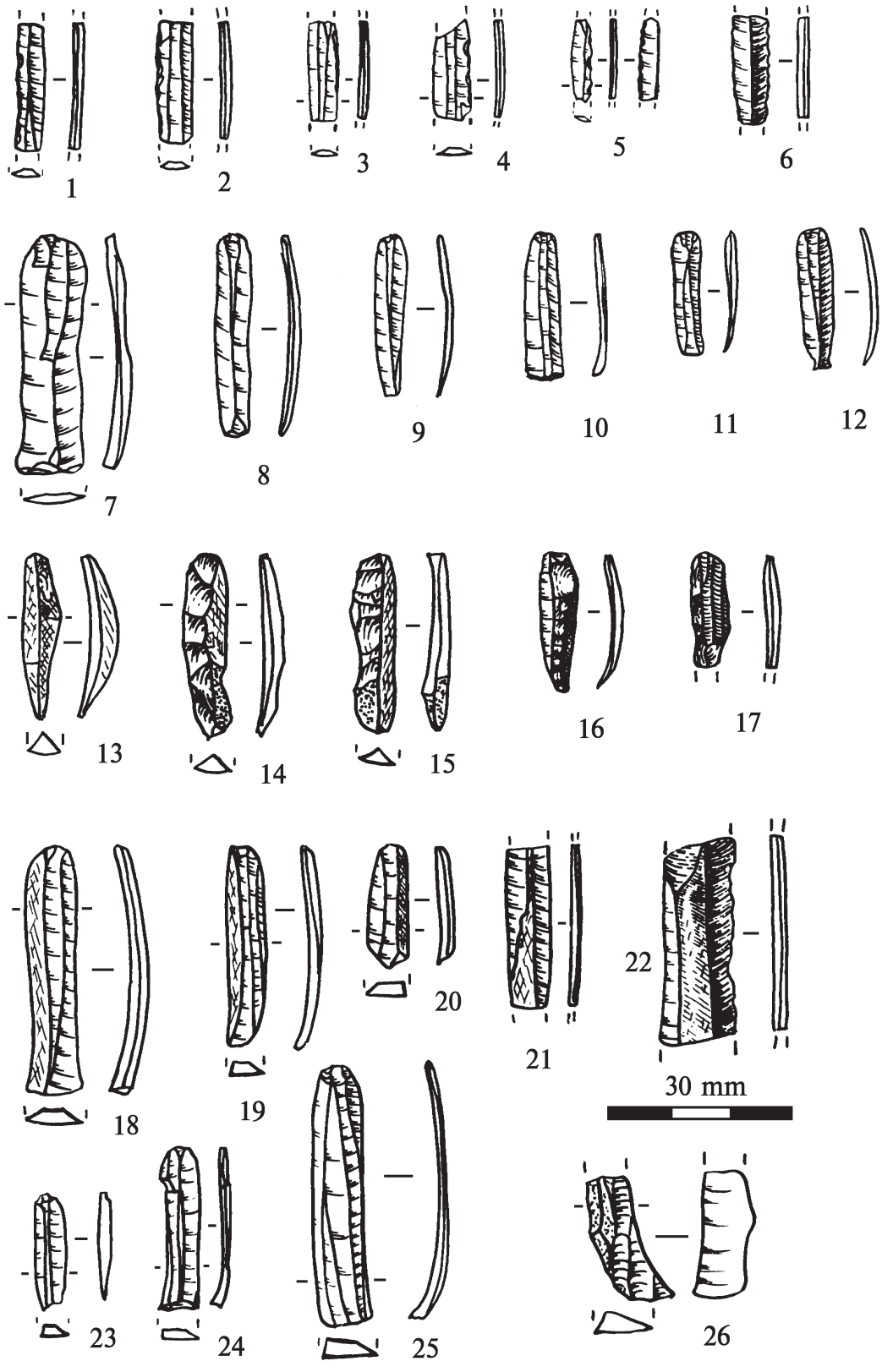

Figure 28. Stone industry of the Zhokhov Island site. Flint insets, lamellar flakes, and bladelets: (1–6) insets; (7–12) bladelets; (13–26) flakes removed in forming the prismatic relief of the core flaking surface.

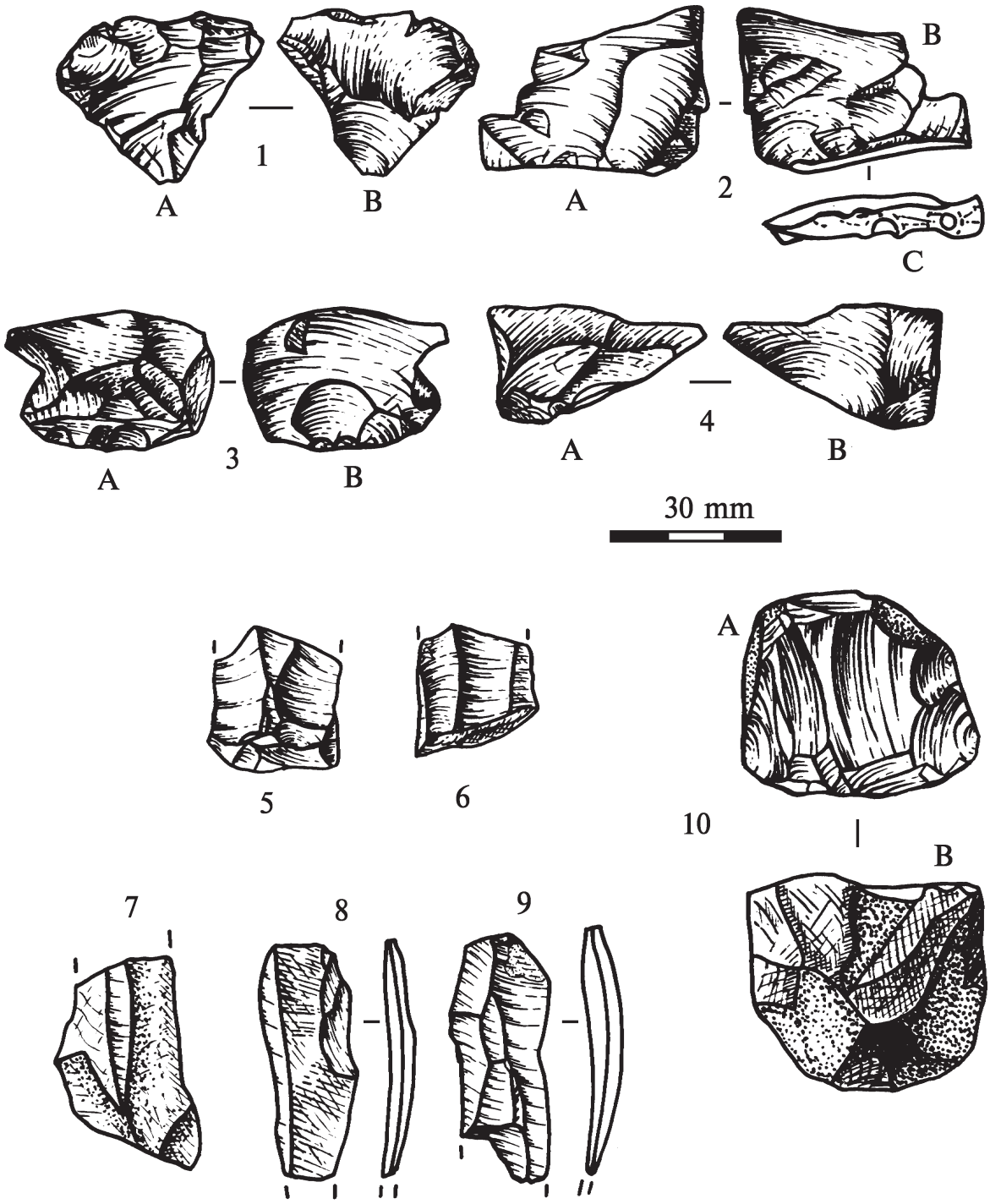

Figure 29. Stone artifacts of the Zhokhov Island site: (1–4) flakes for shaping of platforms on core preforms; (5–9) fragments of large blades; (10) core preform.

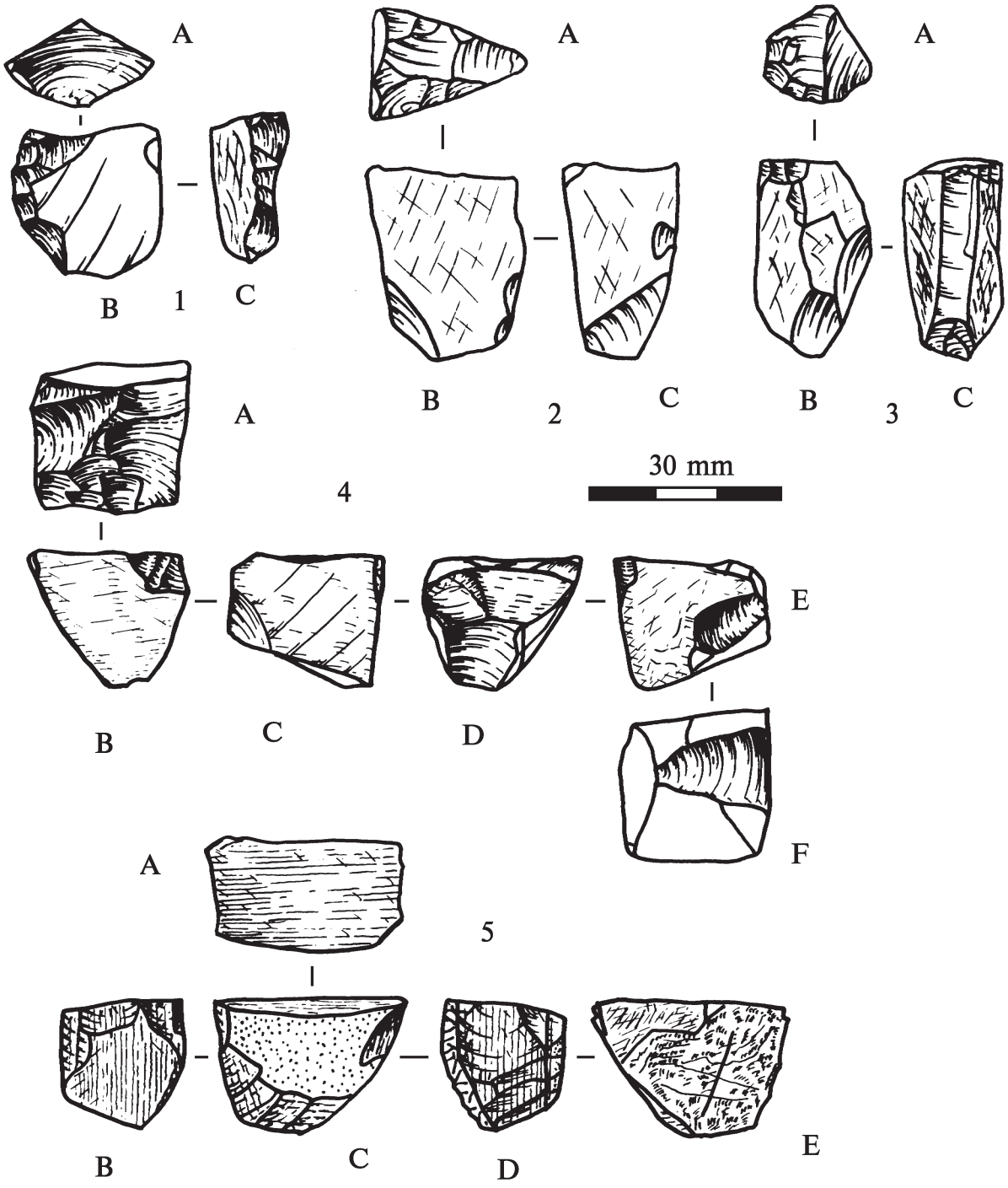

Figure 30. Core preforms from the Zhokhov Island site (1–5).

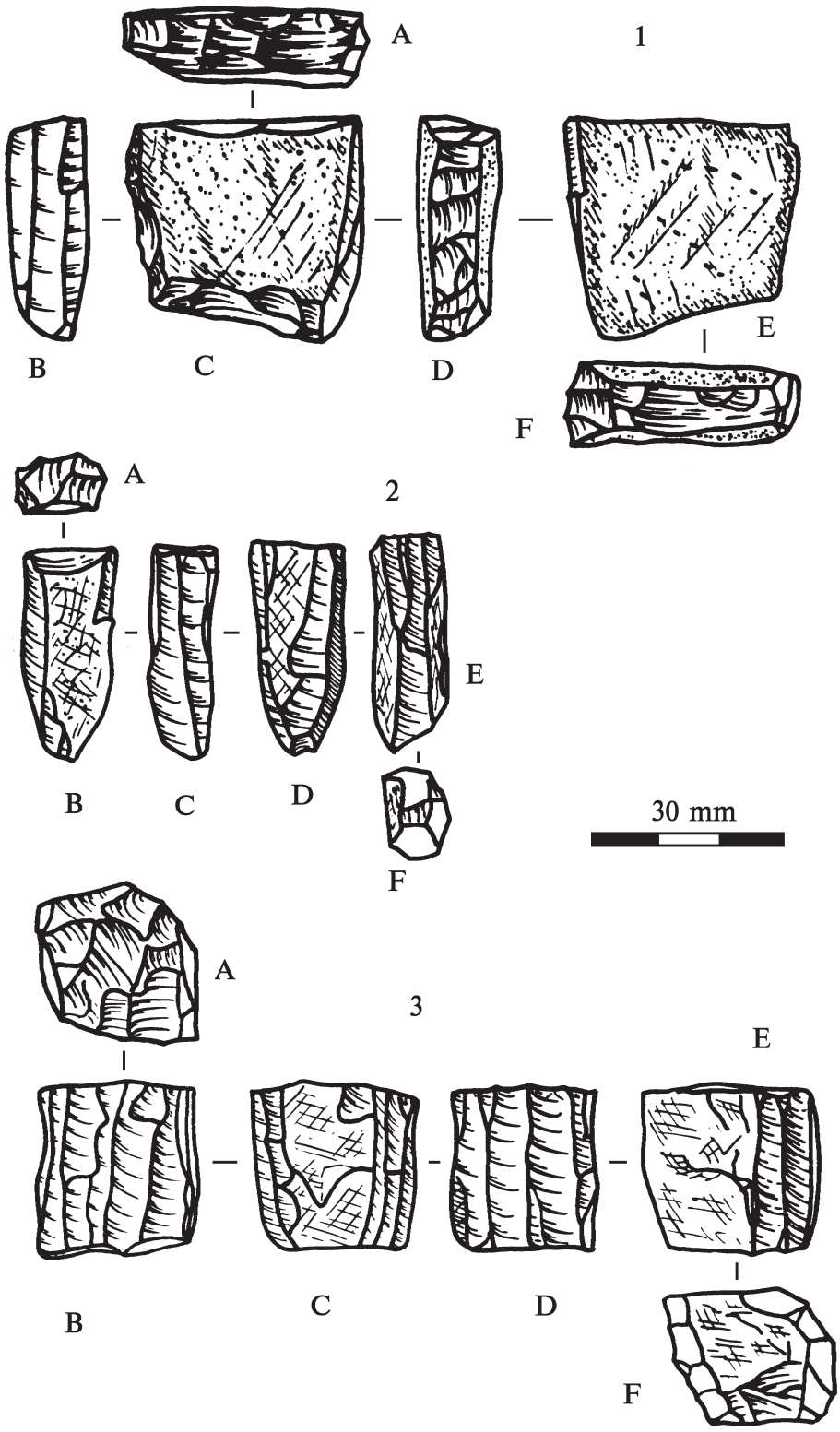

Figure 31. Cores from the Zhokhov Island site: (1) prismatic core with one flaking surface (tortsovy type) and with a flattened platform and base, prepared to begin shaping a second flaking surface; (2) core with two opposing flaking surfaces and the process of shaping a third flaking surface in its initial stage; (3) core with two opposing flaking surfaces.

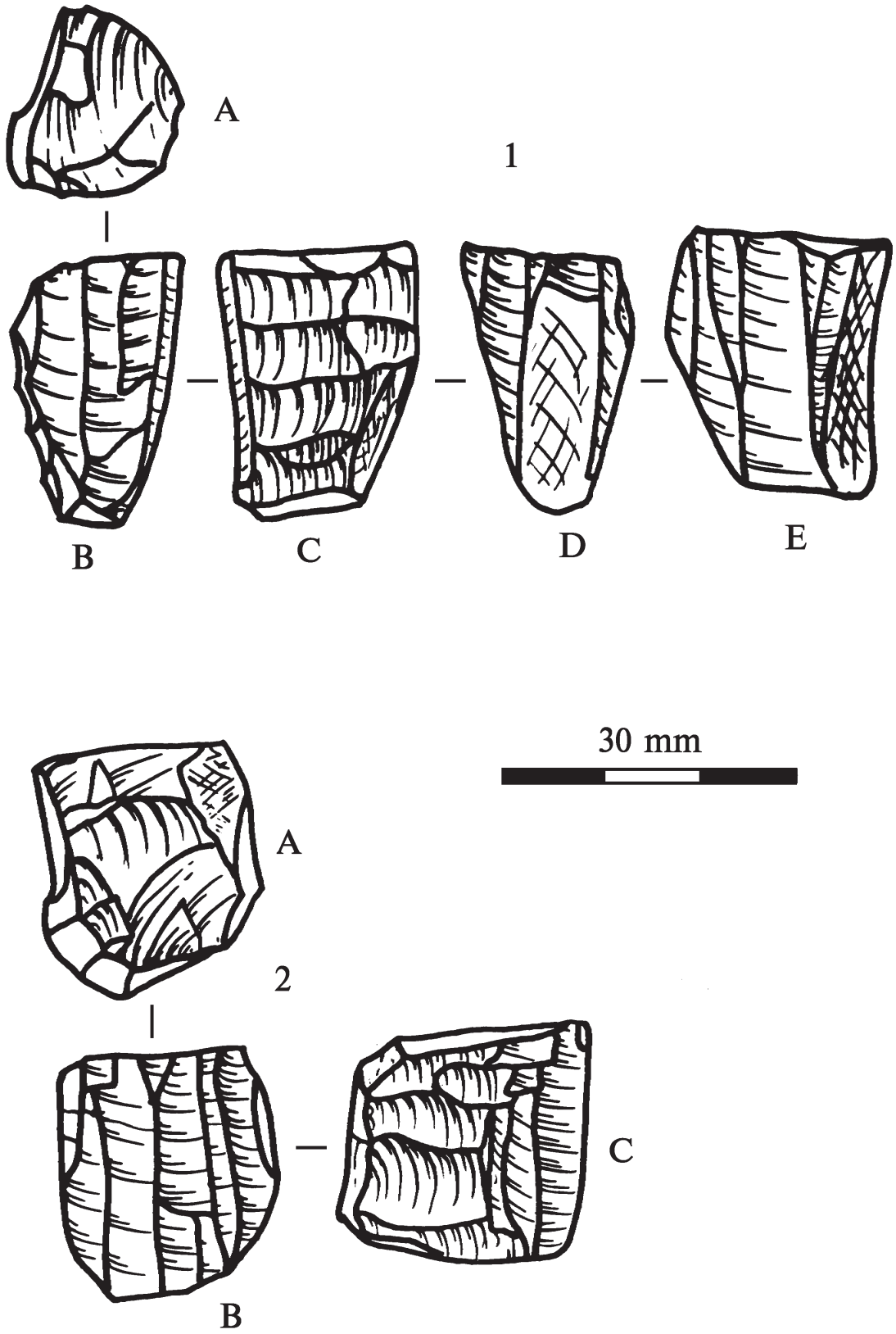

Figure 32. Cores from the Zhokhov Island site with trimming of lateral core surfaces by transverse flaking (1, 2).

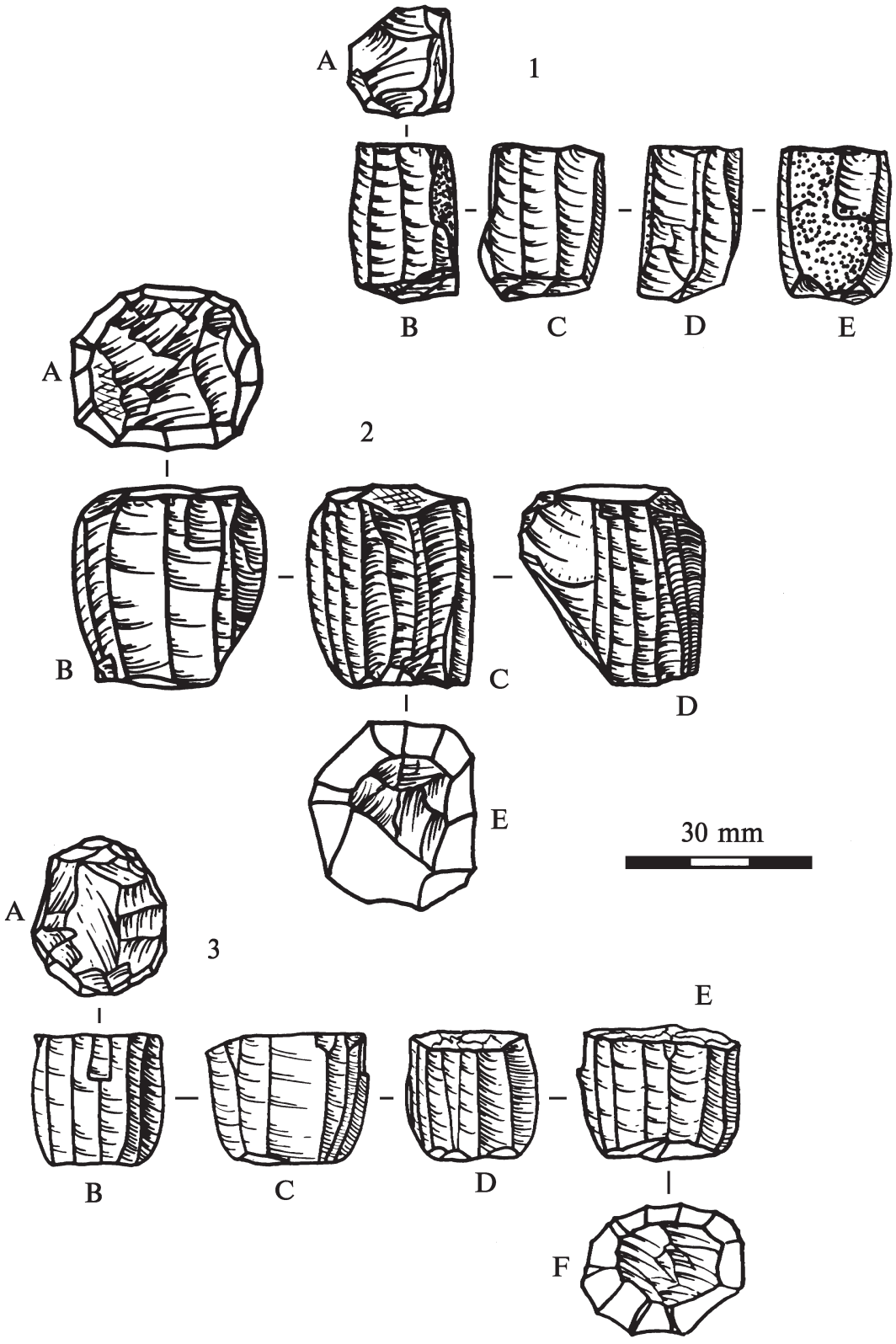

Figure 33. Cores from the Zhokhov Island site: (1) core with three flaking surfaces and initial shaping of a fourth; (2) core with three flaking surfaces; (3) core with four flaking surfaces.

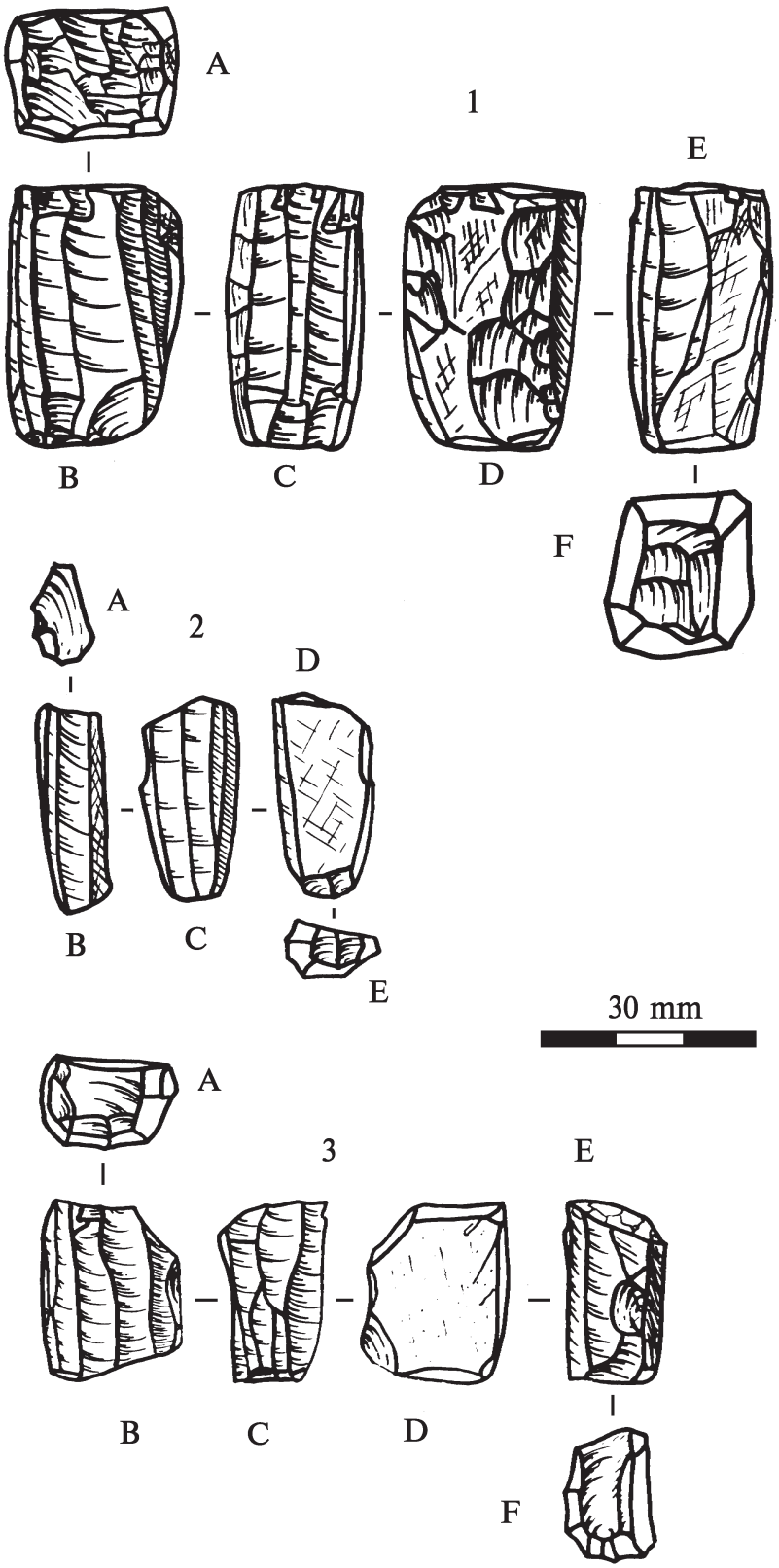

Figure 34. Cores from the Zhokhov Island site: (1) core with two adjacent flaking surfaces, with the process of shaping the third flaking surface; (2, 3) cores with three adjacent flaking surfaces.

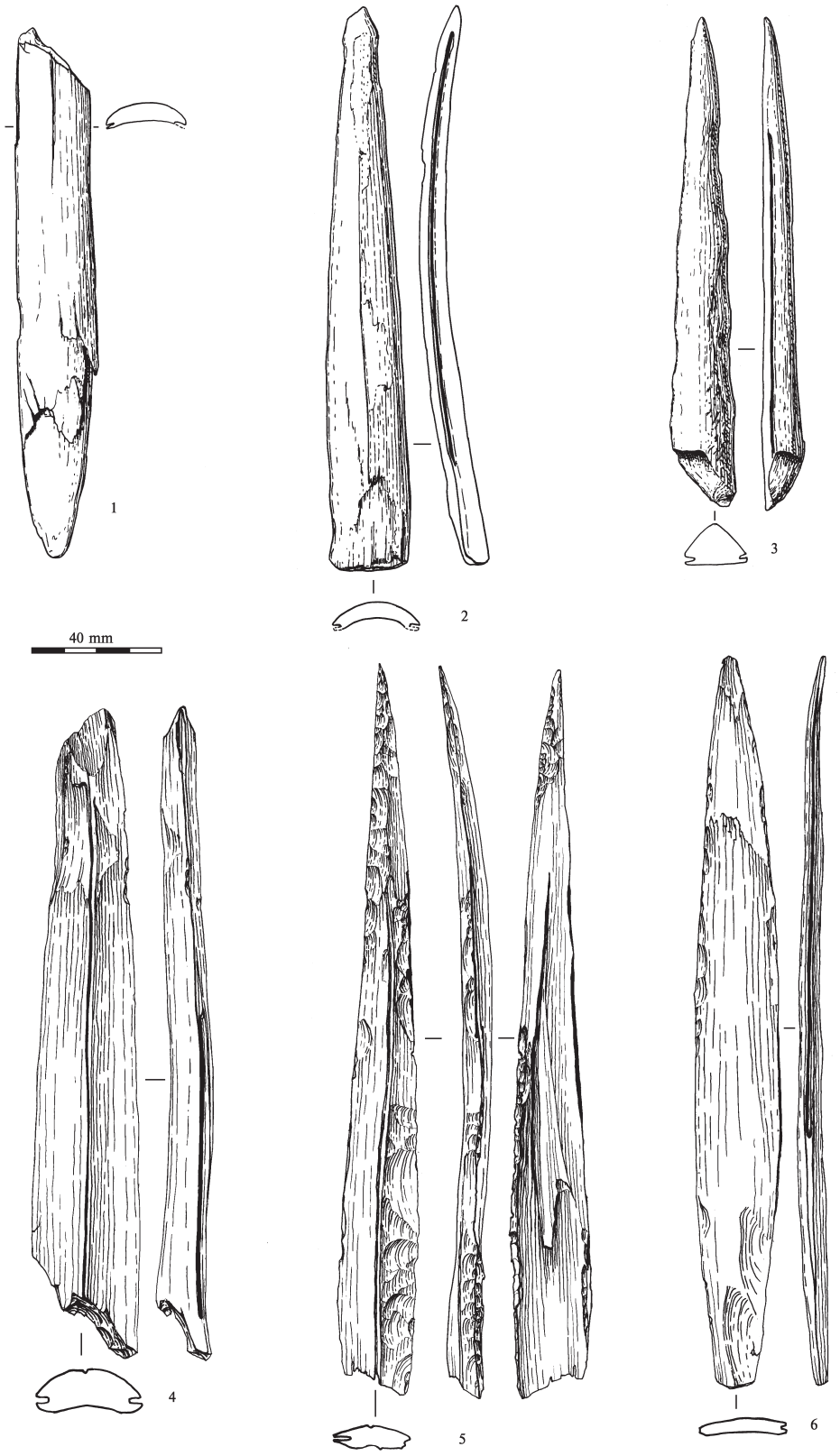

Figure 35. Hunting equipment from the Zhokhov Island site: bilateral (1–5) and unilateral (6) tools with side grooves; (1, 2, 4) of antler, (5, 6) of bone, (3) of mammoth ivory.

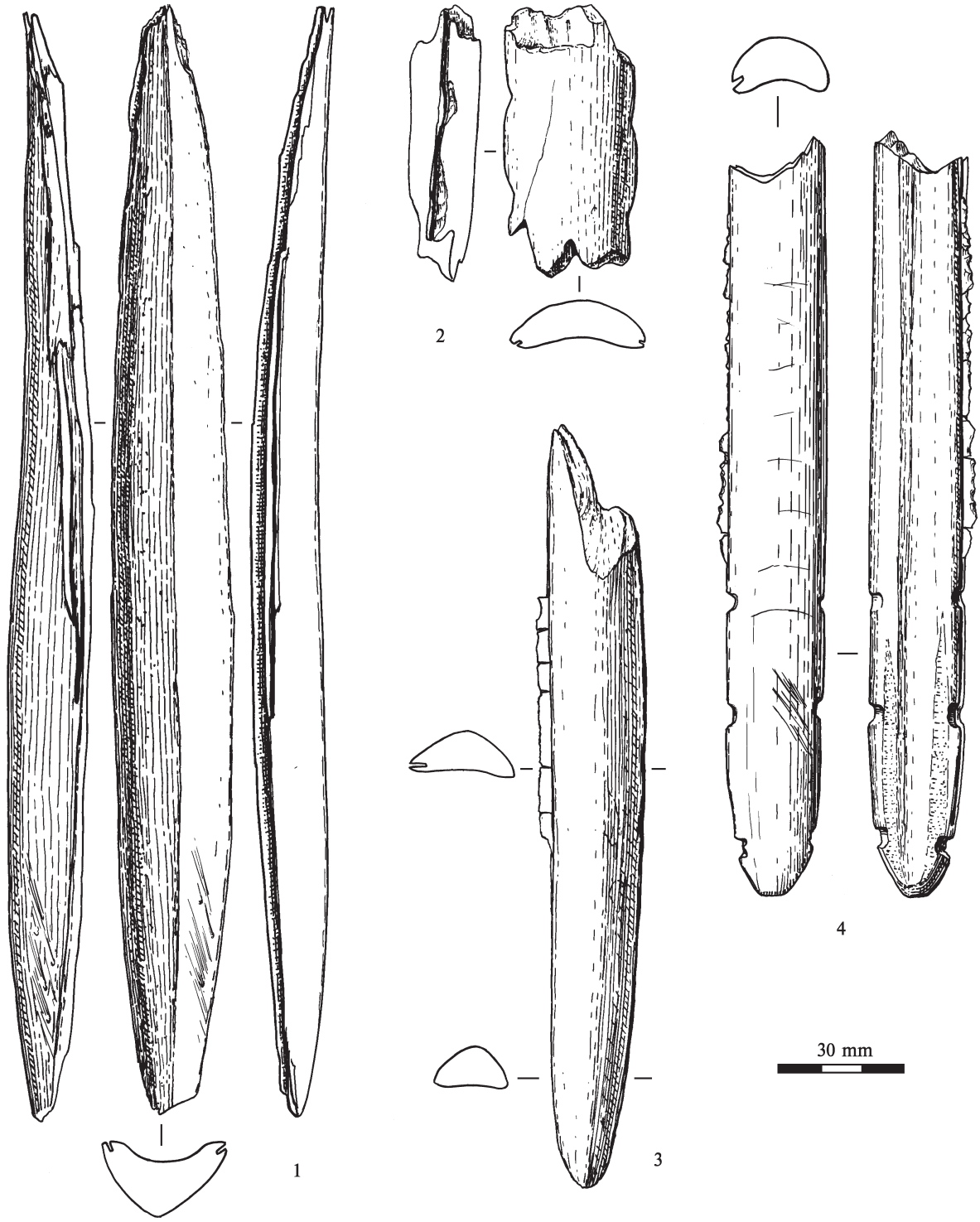

Figure 36. Hunting equipment from the Zhokhov Island site: bilateral side-grooved, massive point of antler, with three-edged cross section (1), and (2) fragment of bilateral side-grooved point with unilateral convex cross section, and with three pairs of grooves for mounting with a binding strip; (3, 4) unilateral side-bladed point (fragmented) with side blades in situ, and with unilateral convex cross section; one of the latter (4) has additional shaping at the base such as found on a bilateral point (2); (1–3) of antler, (4) of walrus tusk.

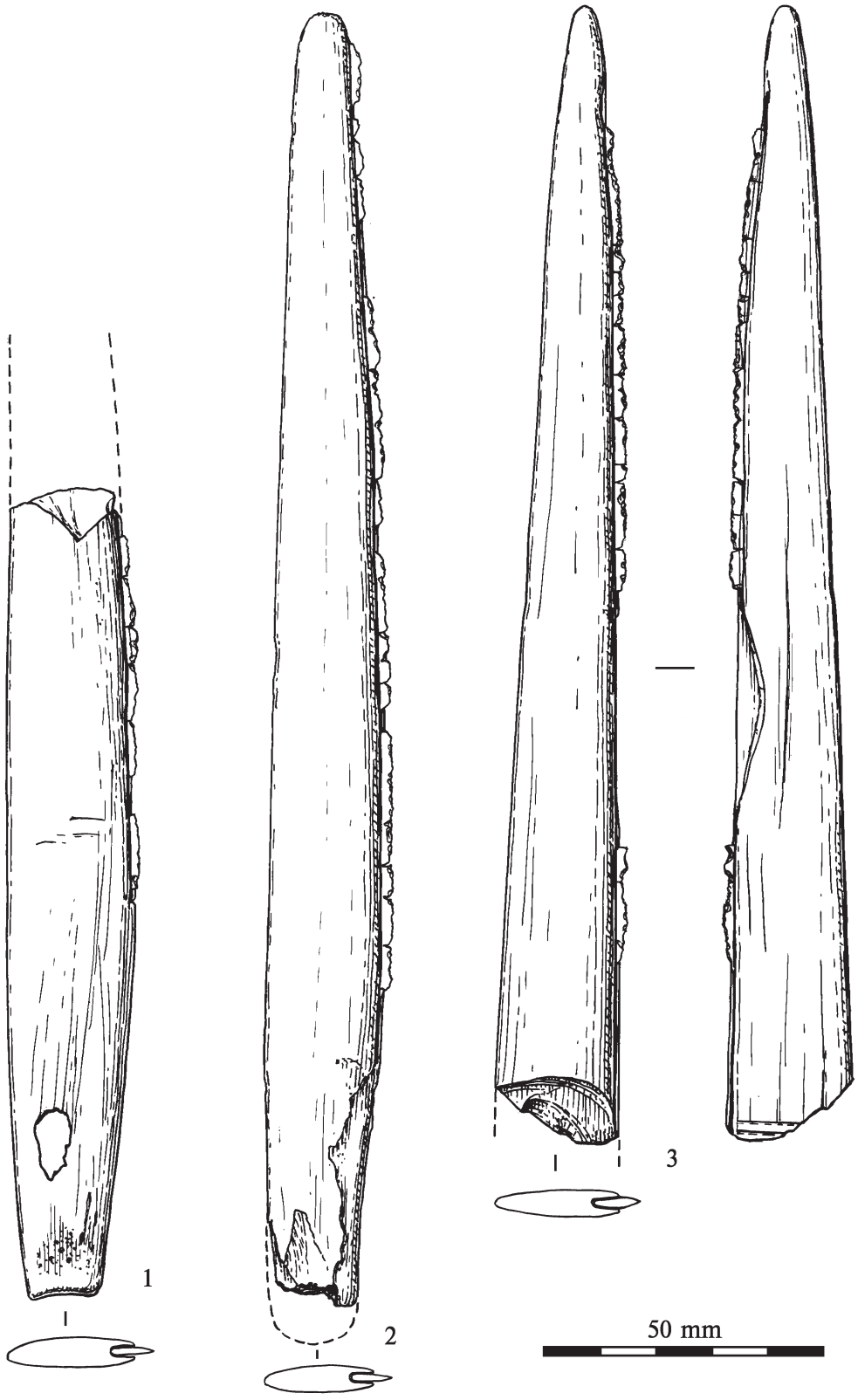

Figure 37. Compound tools from the Zhokhov Island site ("knives"?). Unilaterally side-bladed tools with side blades in situ (all of bone).

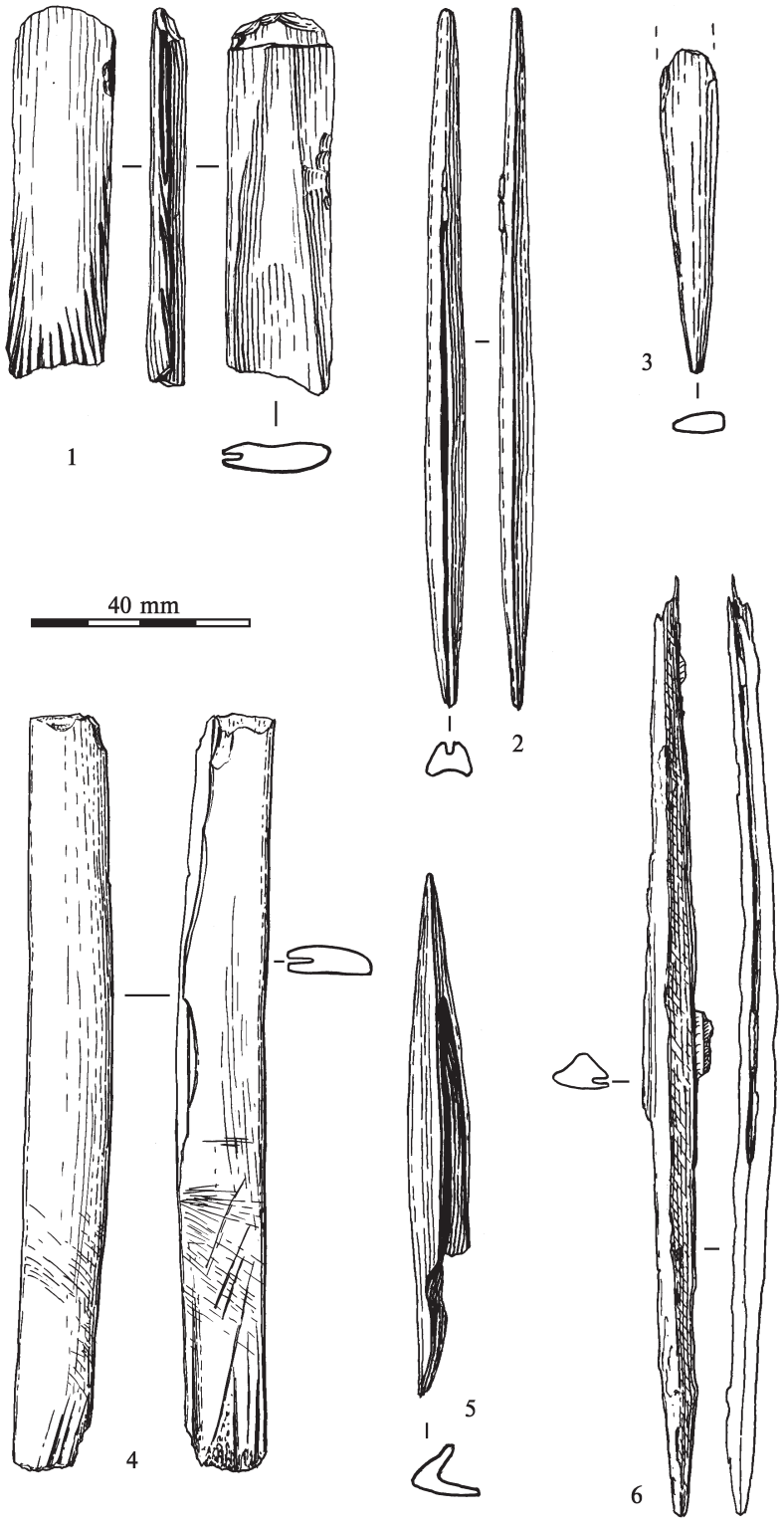

Figure 38. Hunting equipment from the Zhokhov island site: fragments of unilateral side grooved dart points (1, 4); needle-shaped projectile points with one groove and side blades partly preserved *in situ* (2, 6); fragment of bone point (3); non-bladed missile point of simplest type. All of the artifacts are made of bone.

Figure 39. Hunting equipment from the Zhokhov Island site: (1–3) fragments of small missile points (of bone); (4) antler preform in initial stage of treatment; (5, 6) broken bilateral side-grooved tools in reshaping, with former grooves abraded almost totally (4–of bone, 5–of antler); (7) a preform of large a bilateral side-bladed tool finished almost completely, in initial stage of the process (a long-bone of the fossil Pleistocene animal, well preserved in permafrost, was most likely used as raw material, as was the case with pickaxes of fossil mammoth ivory, Figs. 42, 45, 46).

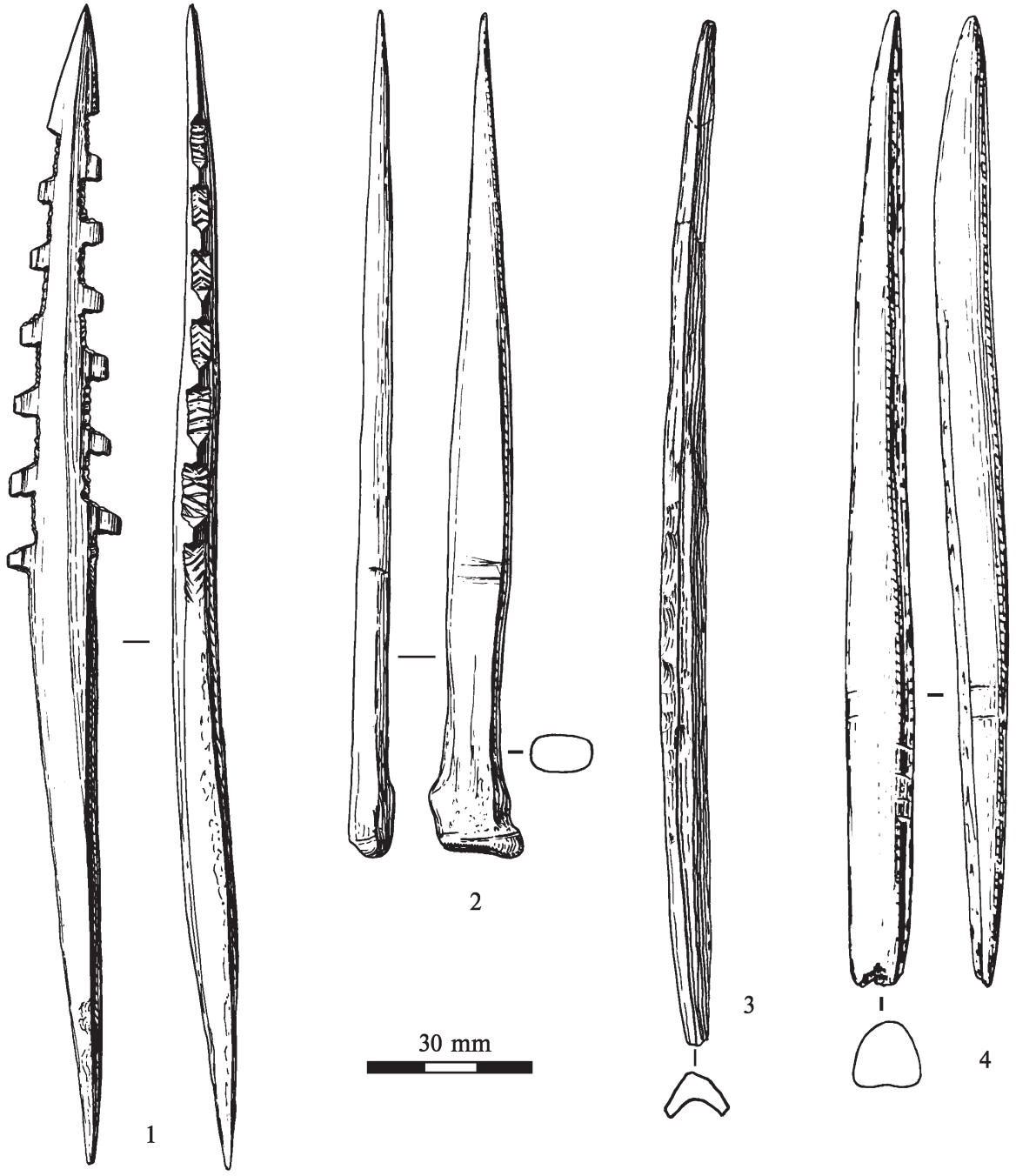

Figure 40. Bone implements from the Zhokhov Island site: (1) fish-spear point; (2) awl; (3) regular needle-shaped projectile point (non-side-bladed or grooved). (1) of antler, (2, 3) of bone.

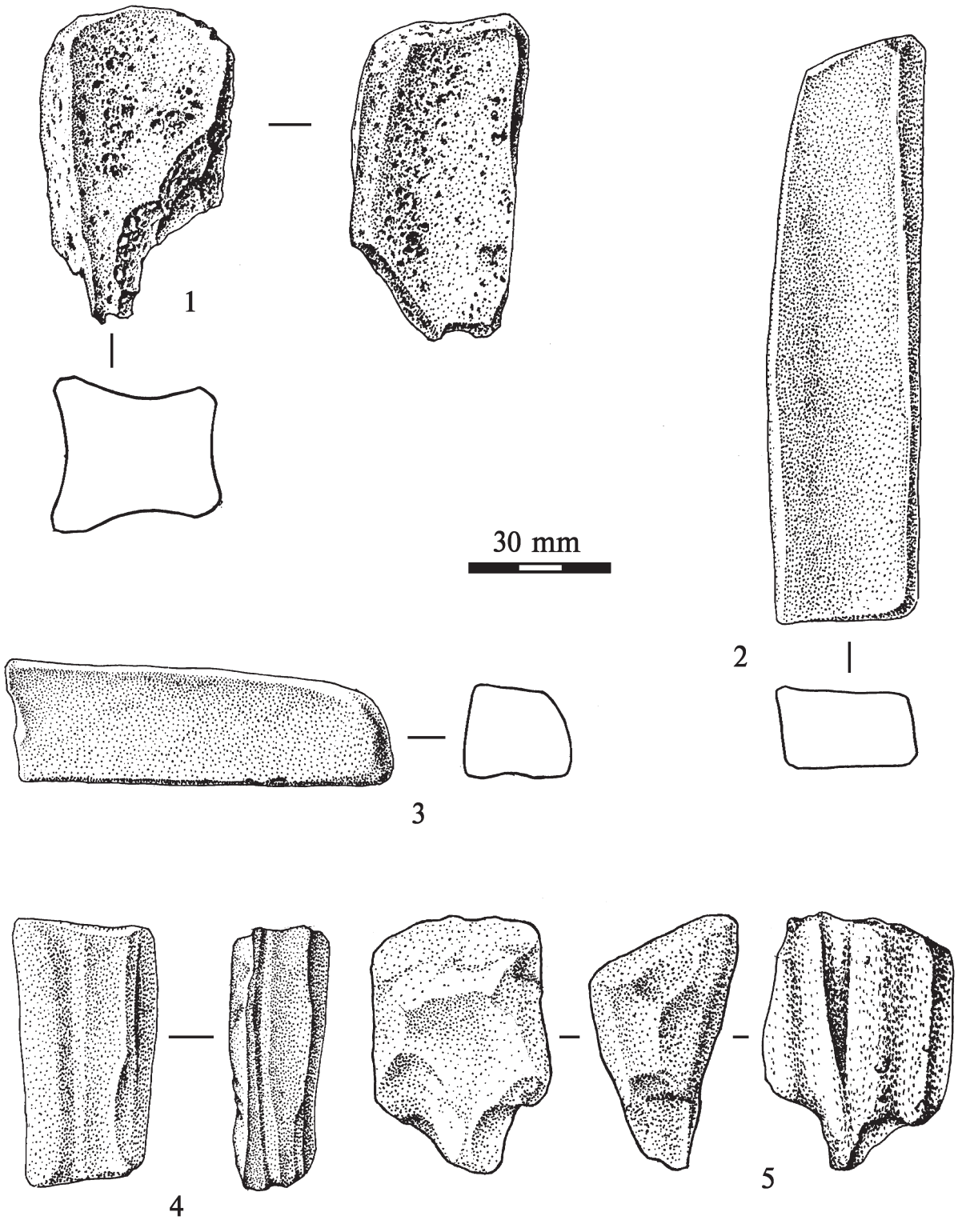

Figure 41. Diverse coarse grinding stones from the Zhokhov Island site, (1) of pumice stone, (2–5) of sandstone.

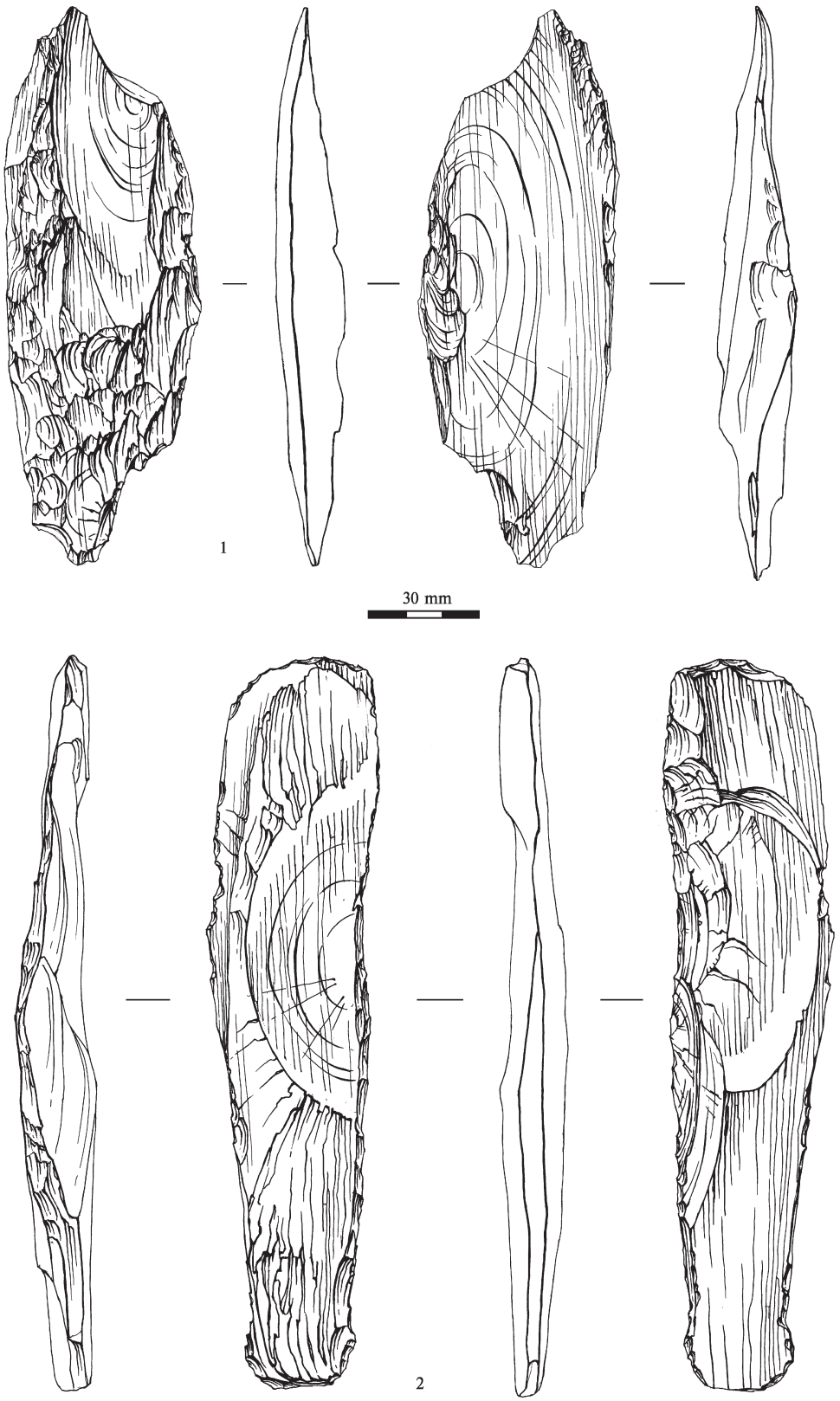

Figure 42. Implements from the Zhokhov Island site made of mammoth ivory flakes: (1) side scraper; (2) skinning knife.

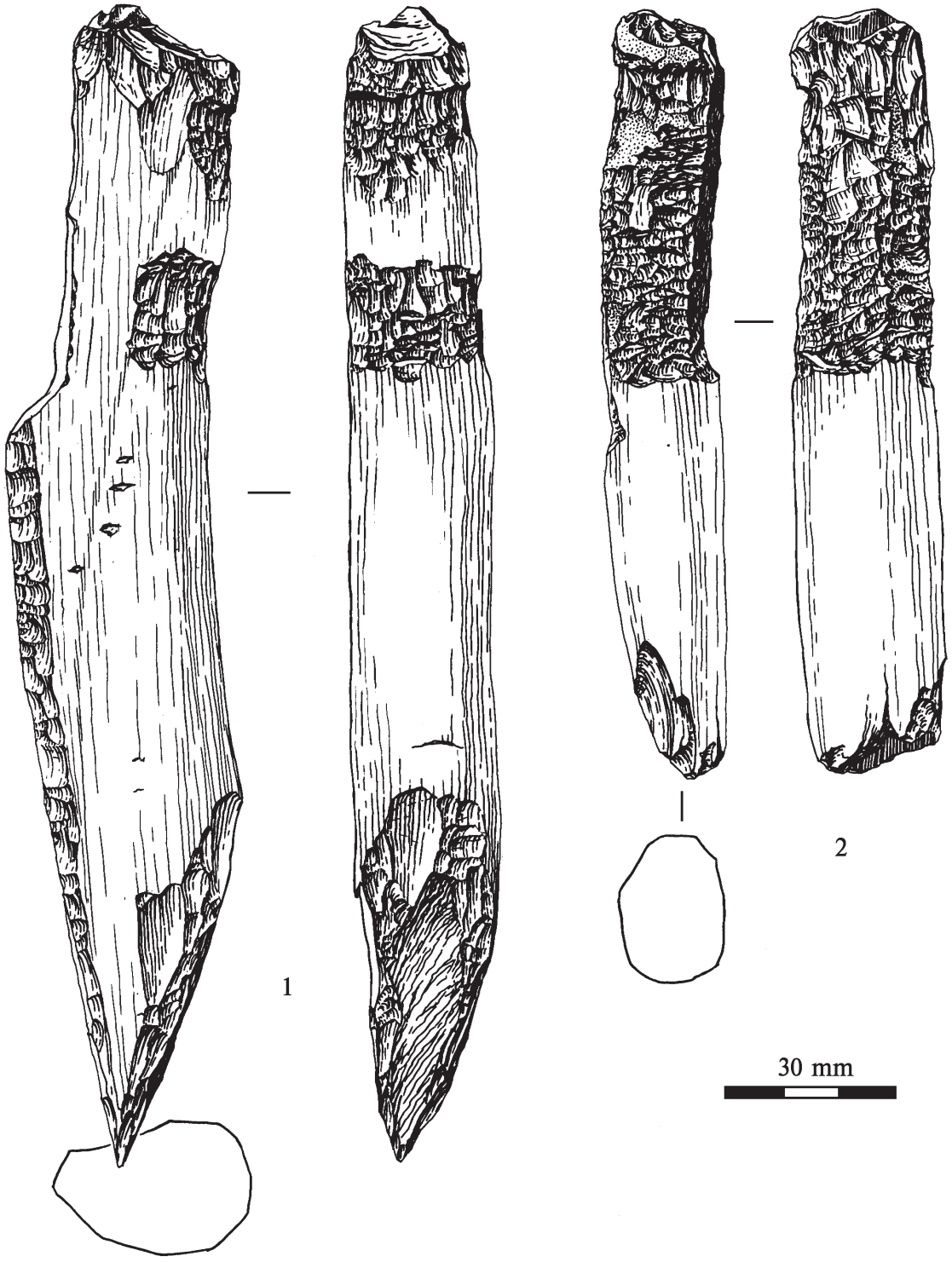

Figure 43. Implements from the Zhokhov Island site. Pickaxes of antler (1, 2).

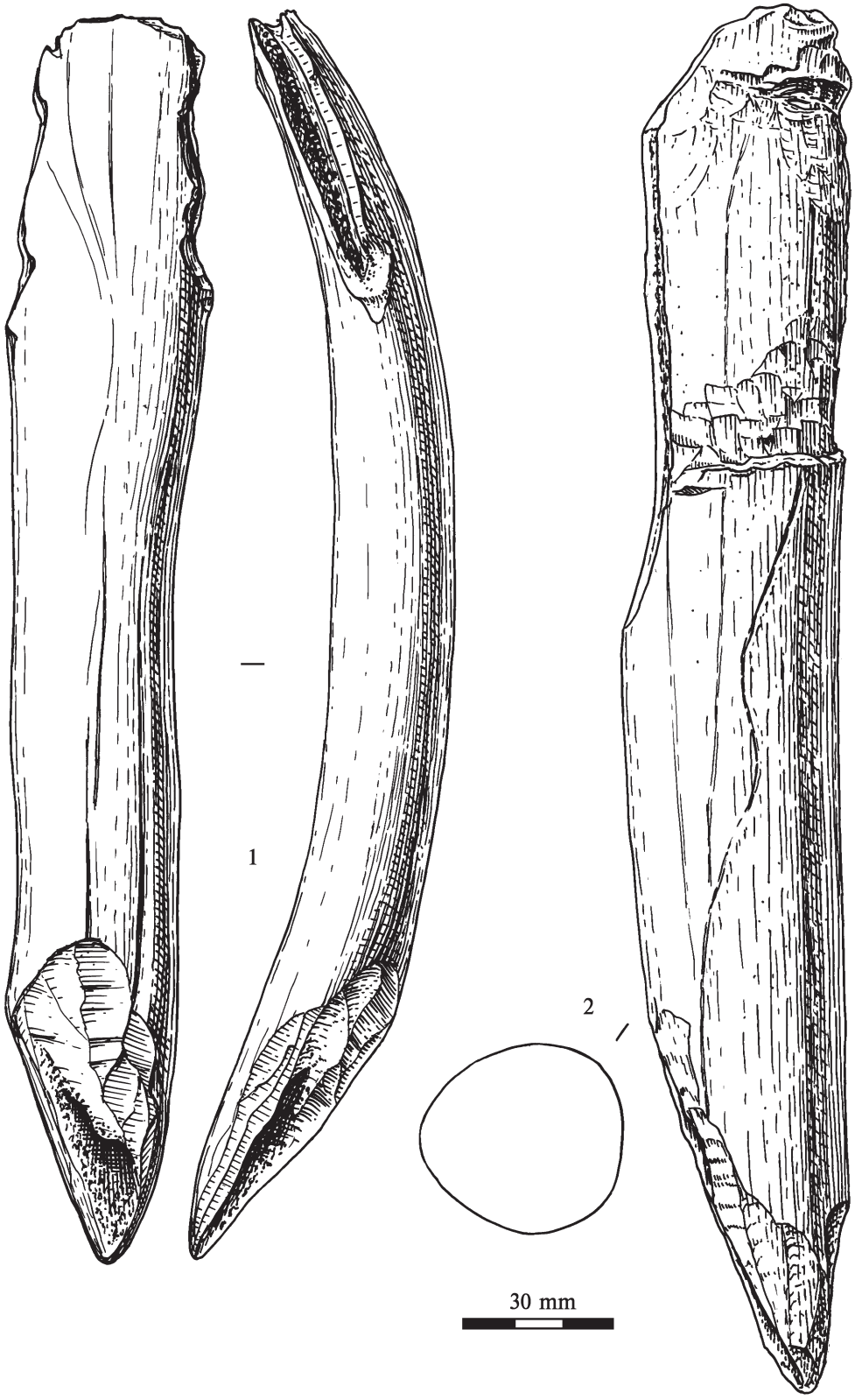

Figure 44. Implements from the Zhokhov Island site. Pickaxes of antler (1, 2).

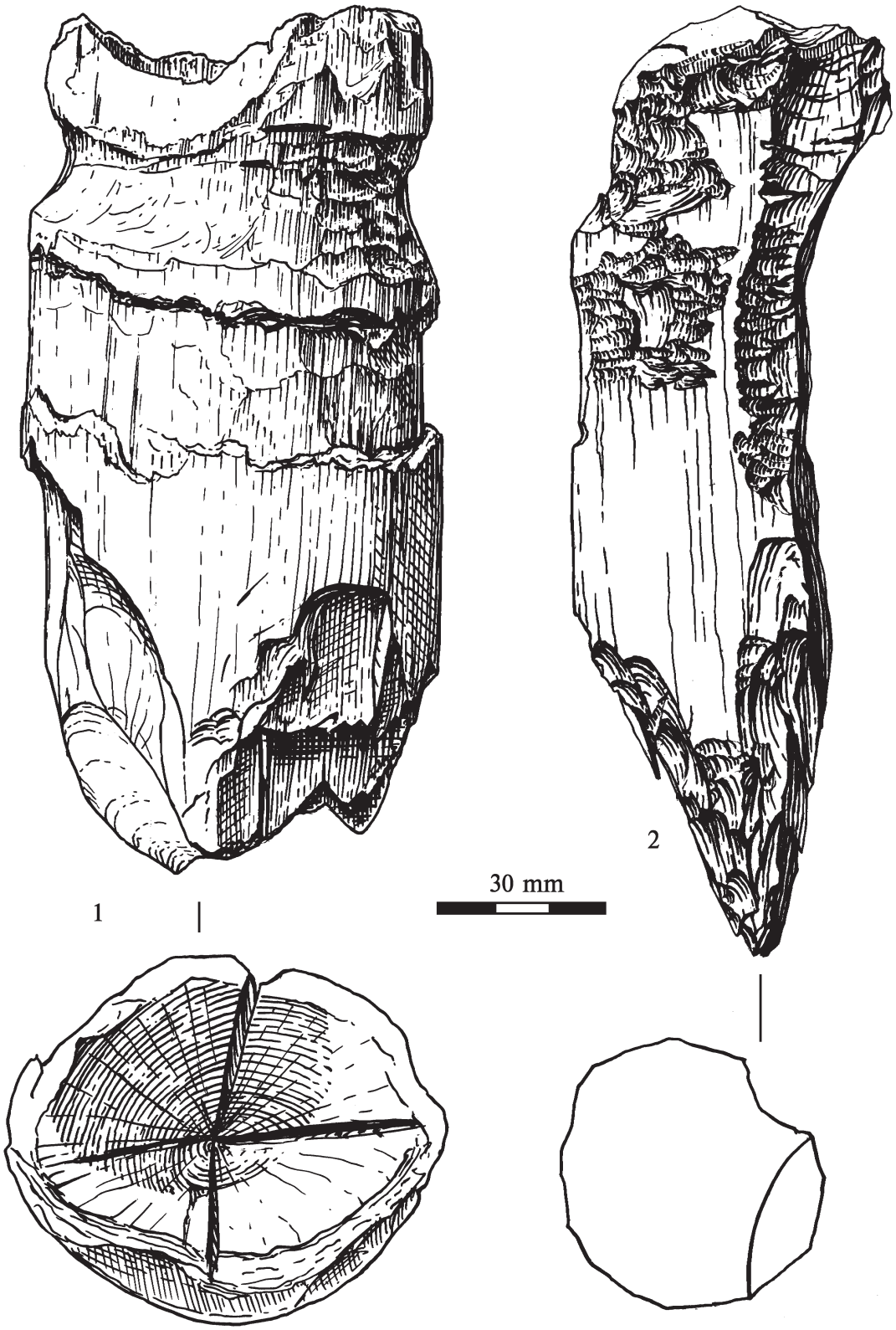

Figure 45. Implements from the Zhokhov Island site. Pickaxes of fossil mammoth ivory (1, 2).

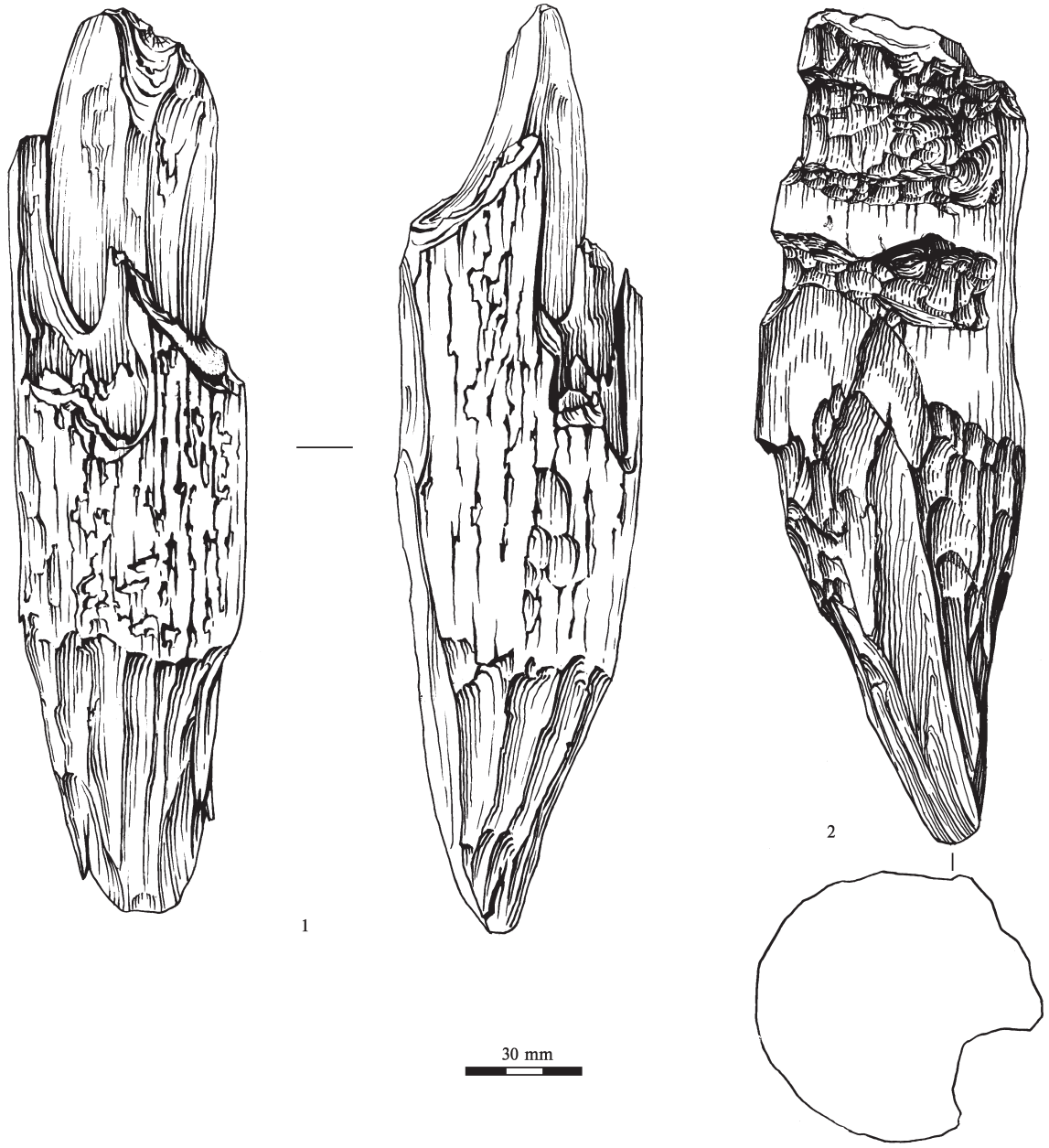

Figure 46. Implements from the Zhokhov Island site. Pickaxes of fossil mammoth ivory (1, 2).

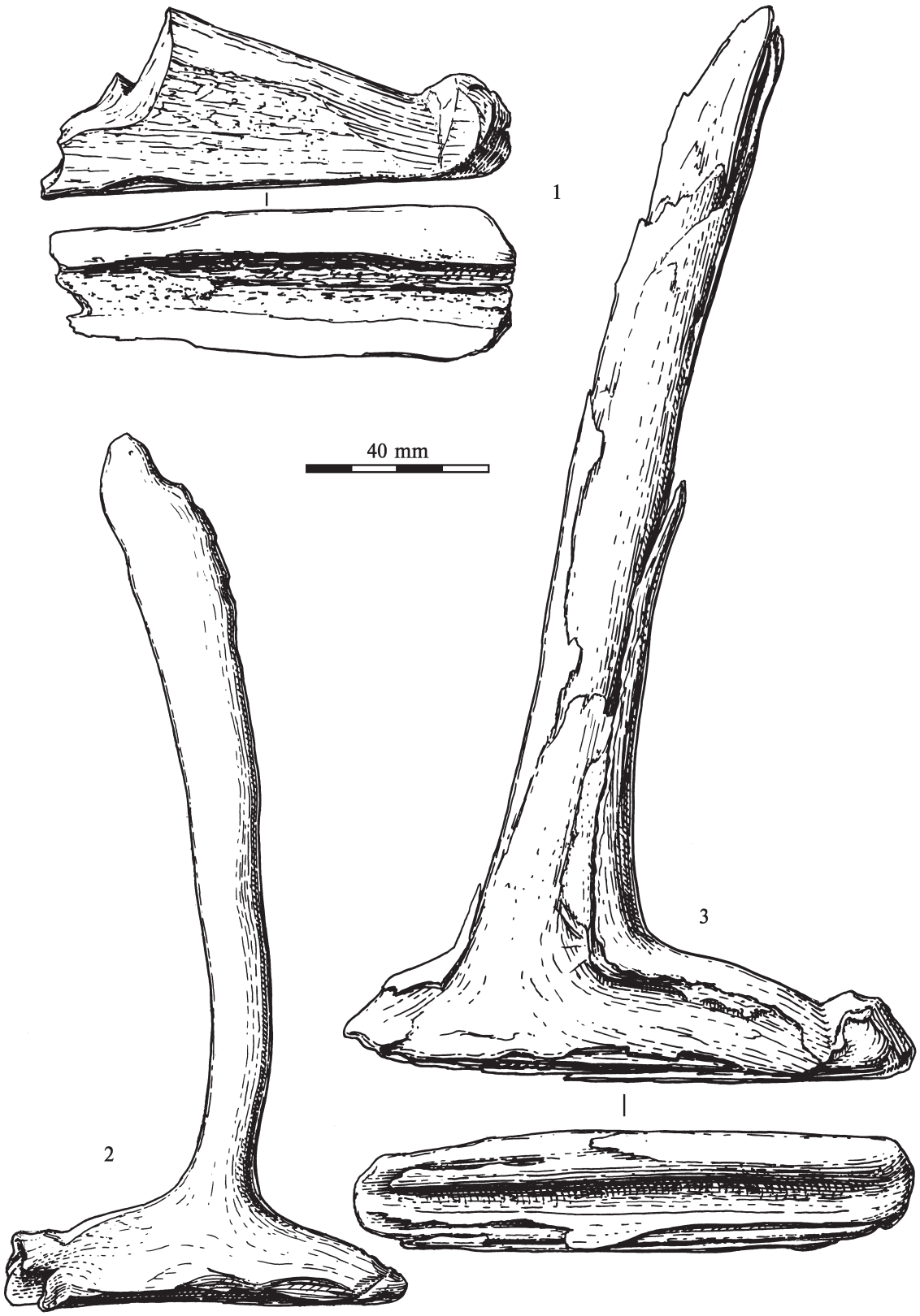

Figure 47. Implements from the Zhokhov Island site. T- or L-shaped antler handles for hafting stone axes or chisels (2, 3); (1) fragment of such a tool.

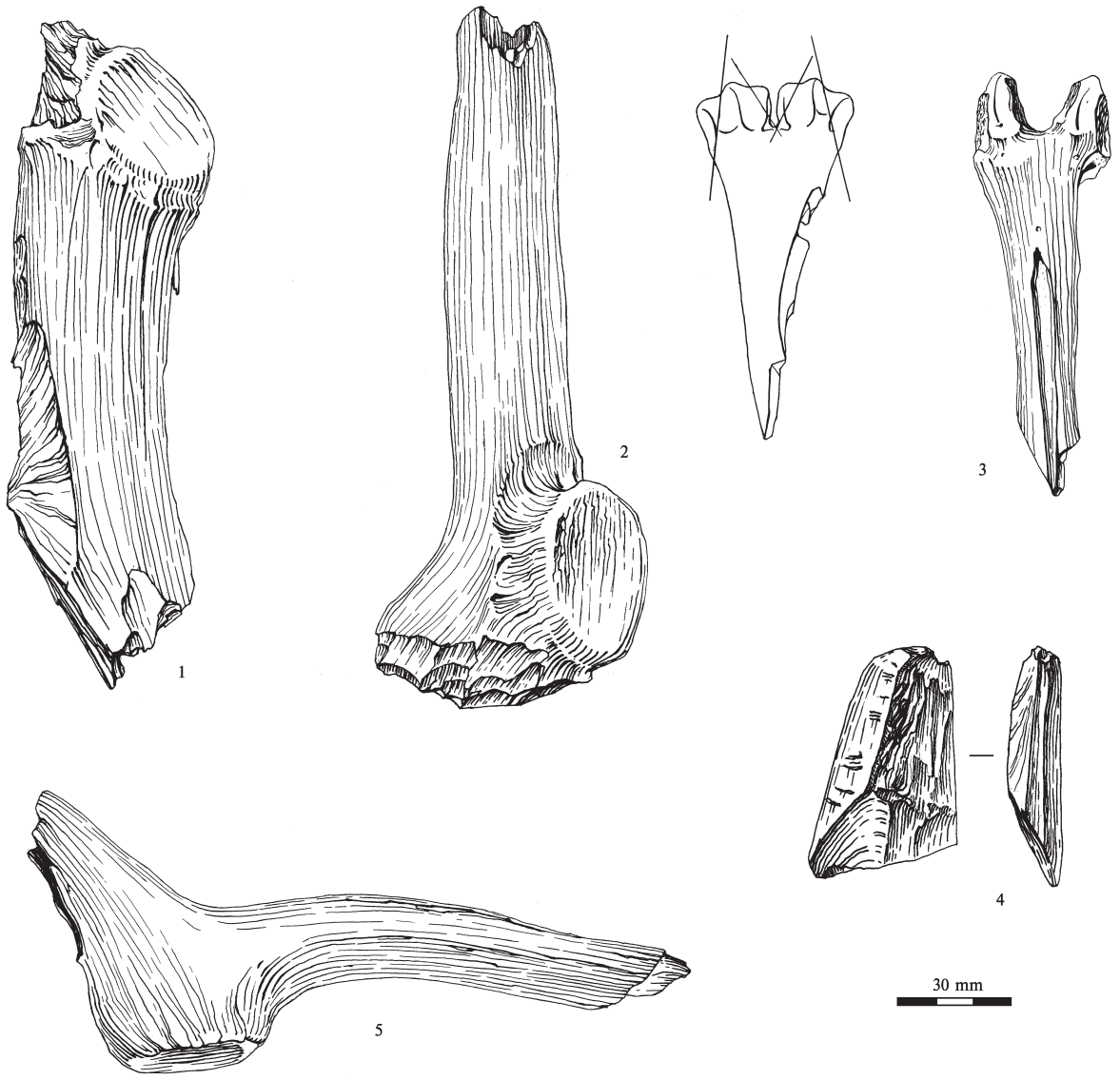

Figure 48. Implements from the Zhokhov Island site: (1, 2, 5) hammers of antler stumps; (3, 4) unidentified articles: (3) reindeer metatarsal bone with a scheme of shaping, (4) a fragment of a massive ivory tool.

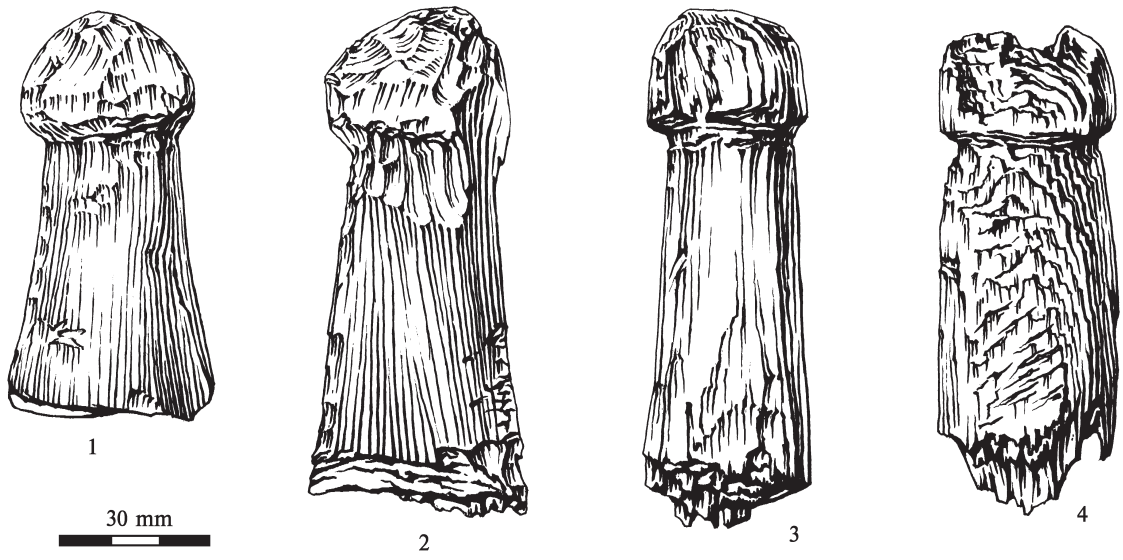

Figure 49. Implements from the Zhokhov Island site. Unidentified handles broken from an artifact in the usual way: (1) of mammoth ivory, (2) of a massive bone, (3, 4) of wood.

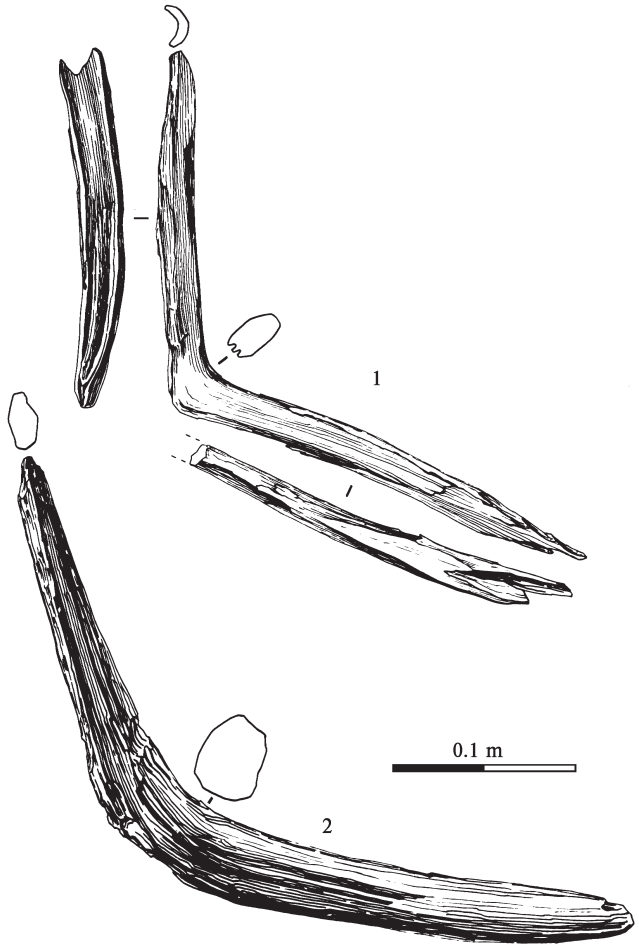

Figure 50. Unidentified implements from the Zhokhov Island site. (1) of antler, (2) of wood.

Figure 51. Wooden artifacts from the Zhokhov Island site: (1, 2, 4) fragments of household equipment; (3) spoon or cooking ladle; (5–8) fragments of arrowshafts.

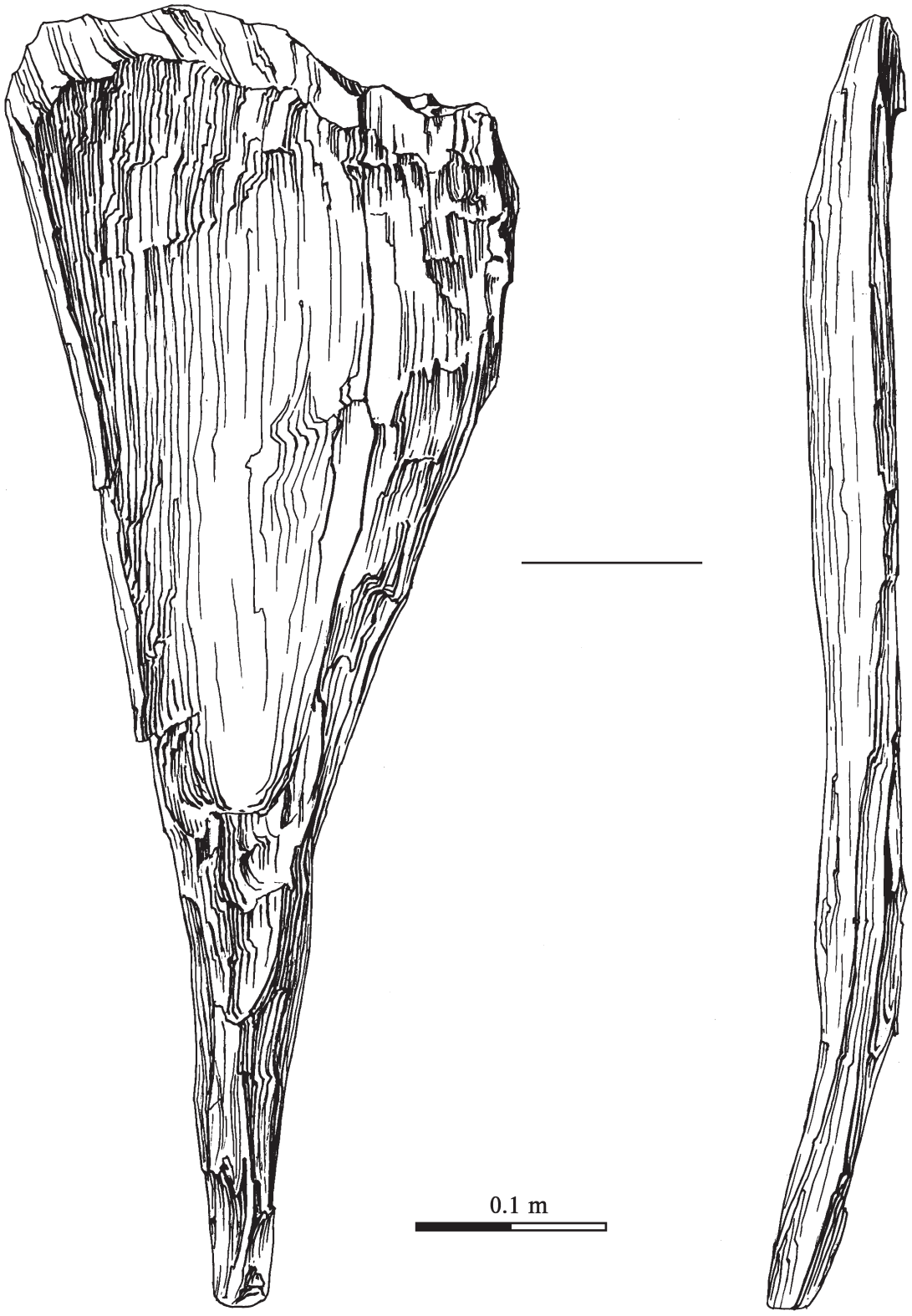

Figure 52. Wooden artifact from the Zhokhov Island site. Household equipment.

Figure 53. Wooden artifact from the Zhokhov Island site. Household equipment (burnt bowl).

Figure 54. Wooden artifact from the Zhokhov Island site. Household equipment (scoop).

Figure 55. Wooden artifact from the Zhokhov Island site at the beginning of excavations in 1990.

Figure 56. Two months later, before finishing.

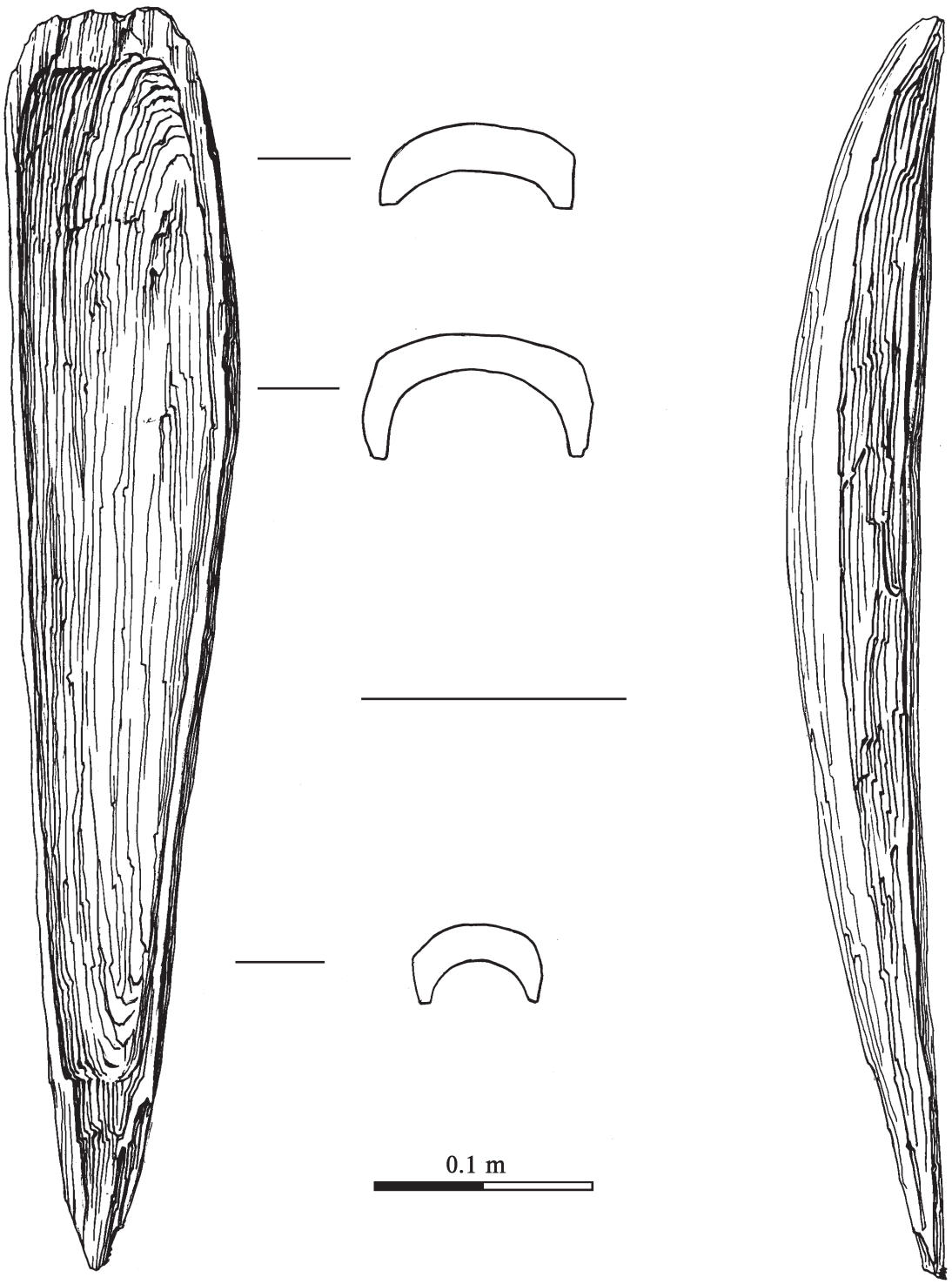

Figure 57. Wooden artifact from the Zhokhov Island site (a large scoop shown in pictures 55 and 56).

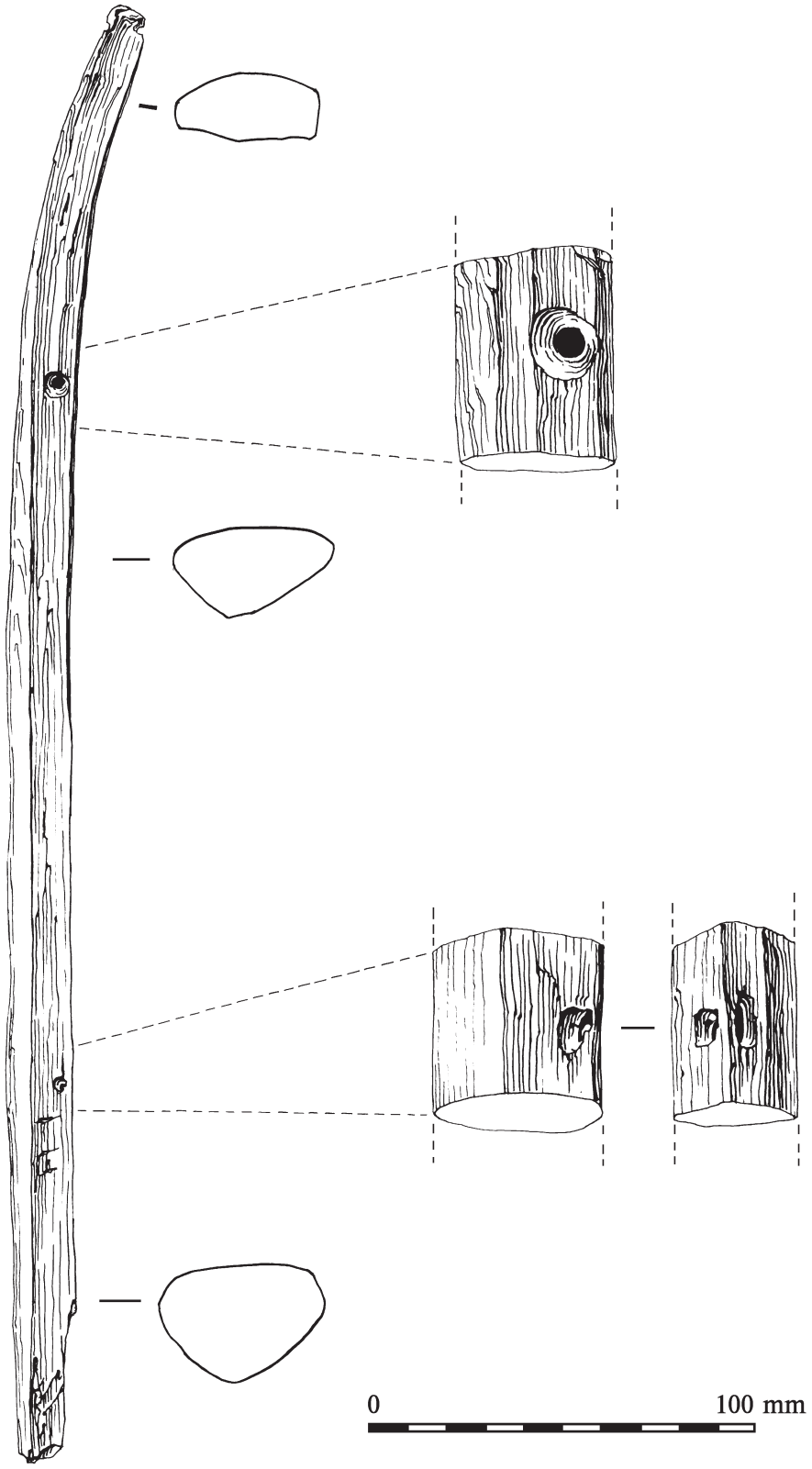

Figure 58. Sledge runner from the Zhokhov Island site.

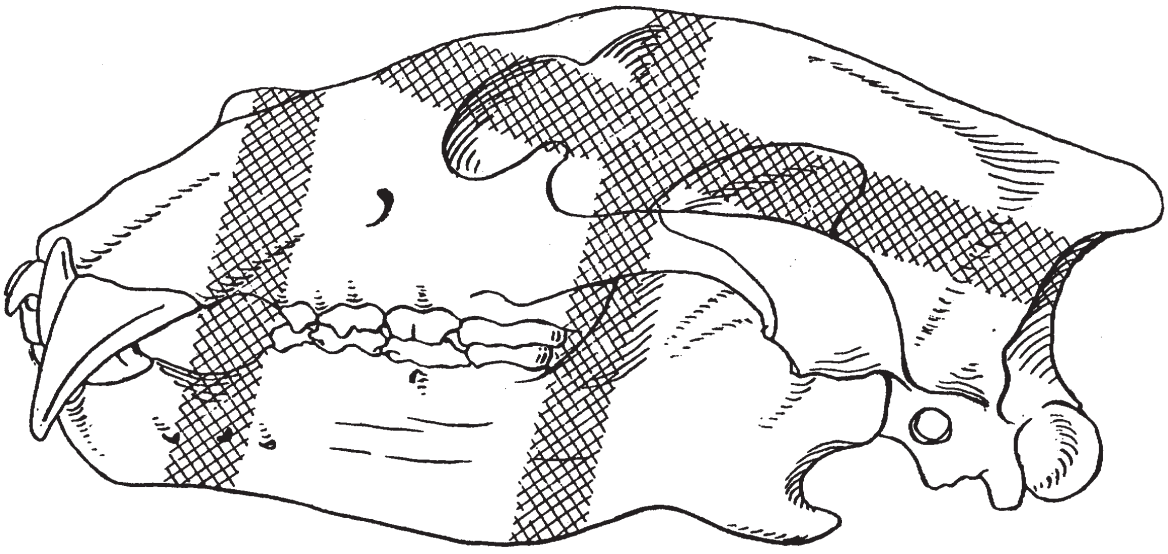

Figure 59. Scheme of the fracturing of polar bear skulls. Totally crushed zones are cross-shaded (after Pitul'ko and Kasparov 1996).

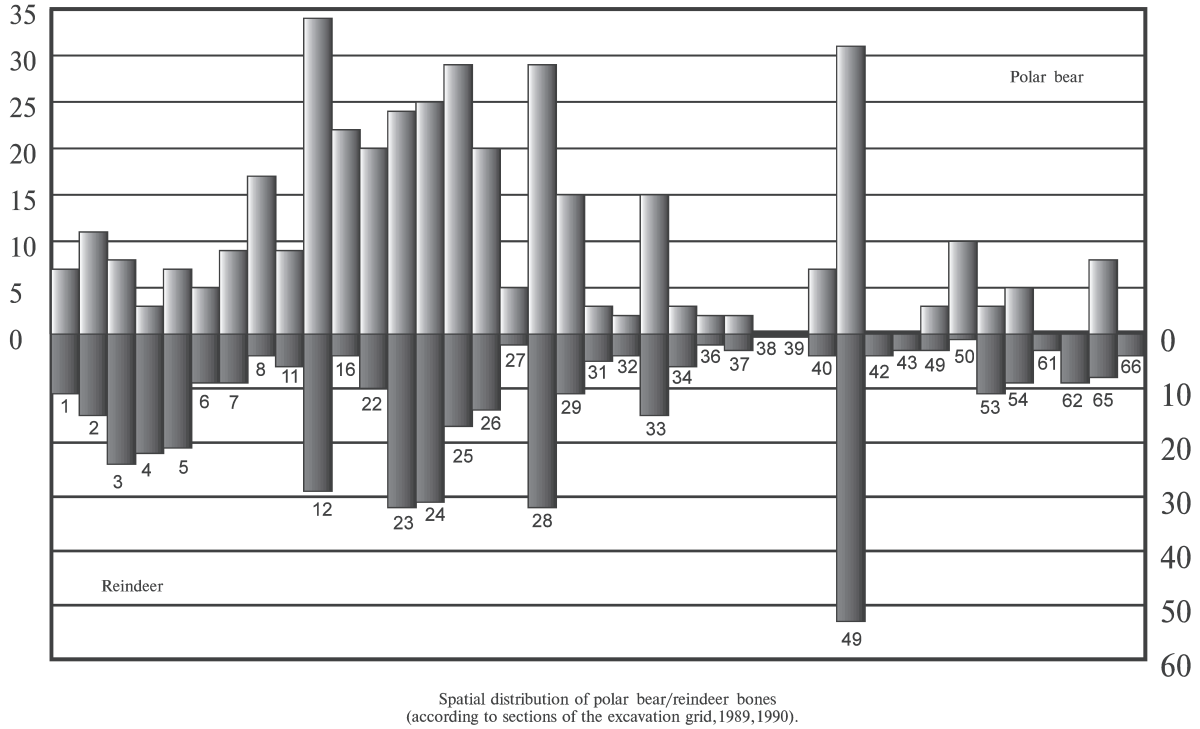

Figure 60. Spatial distribution of polar bear and reindeer bones, according to sections of the excavation grid (after Pitul'ko and Kasparov 1996).

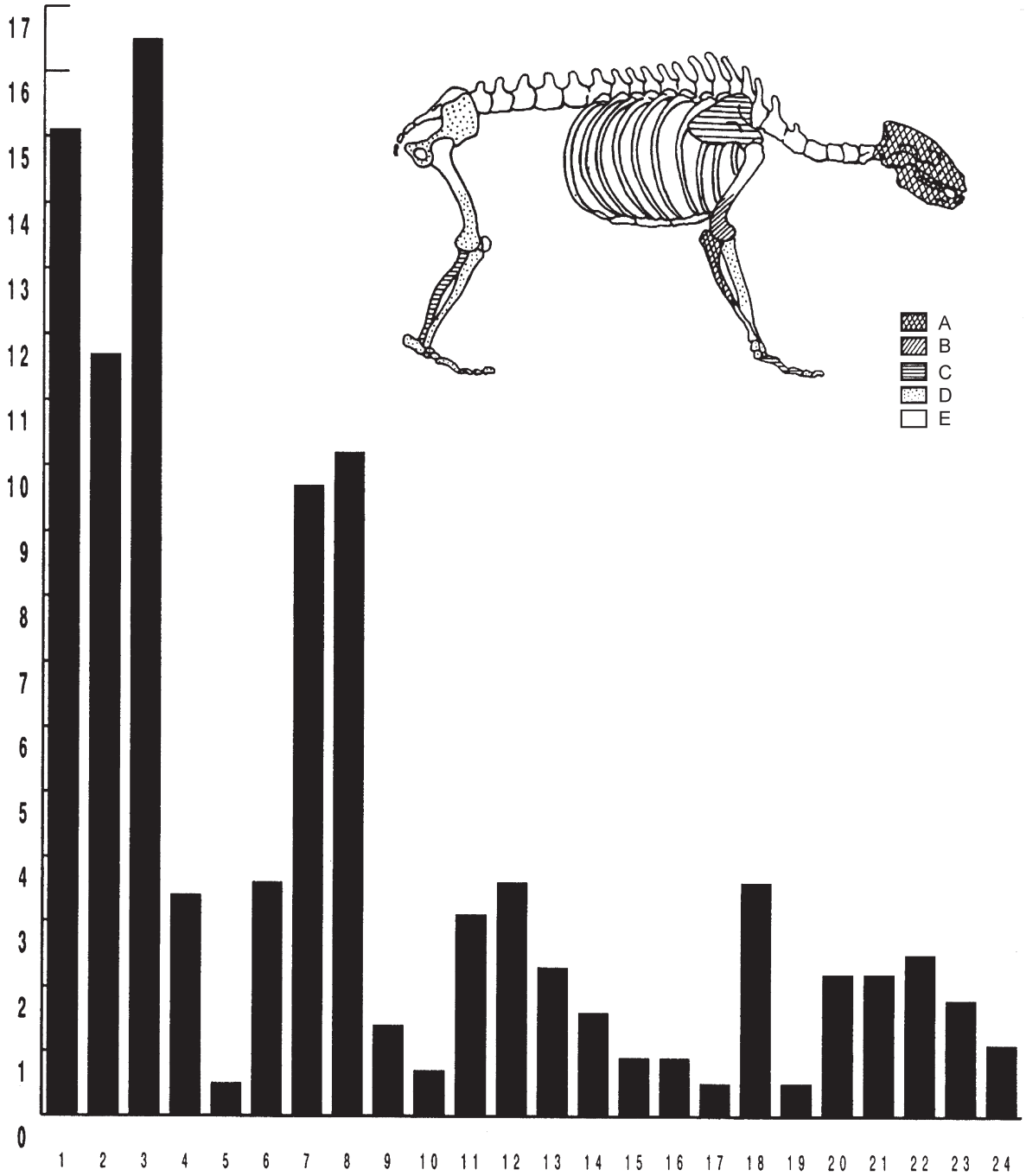

Figure 61. Range of skeletal remains of polar bears: (A) more than 10%; (B) from 5 to 10%; (C) from 3 to 5%; (D) less than 0.5%, (E) (empty) not found; general (graph) and specified percentage (diagram): (1) skull fragments (15.1%); (2) fragments of mandibles (11.7%); (3) teeth found separately from the jaws (16.5%); (4) atlases (3.4%); (5) axis (0.5%); (6) shoulder blades (3.6%); (7) distal humerus (9.7%); (8) ulnae (10.2%); (9) fragments of radius (17.4%); (10) carpal bones (0.7%); (11) metacarpal bones (3.1%); (12) phalanges I (forelegs, 3.6%); (13) phalanges II (forelegs, 2.3%); (14) claw phalanges (forelegs, 1.6%); (15) pelvis (0.9%); (16) distal femur (0.9%); (17) tibiae (0.5%); (18) fibulae (3.6%); (19) ankle bones (0.5%); (20) phalanges I (hind legs, 2.5%); (21) phalanges II (hind legs, 1.8%); (22) claw phalanges, hind legs (1.1%) (after Pitul'ko and Kasparov 1996).

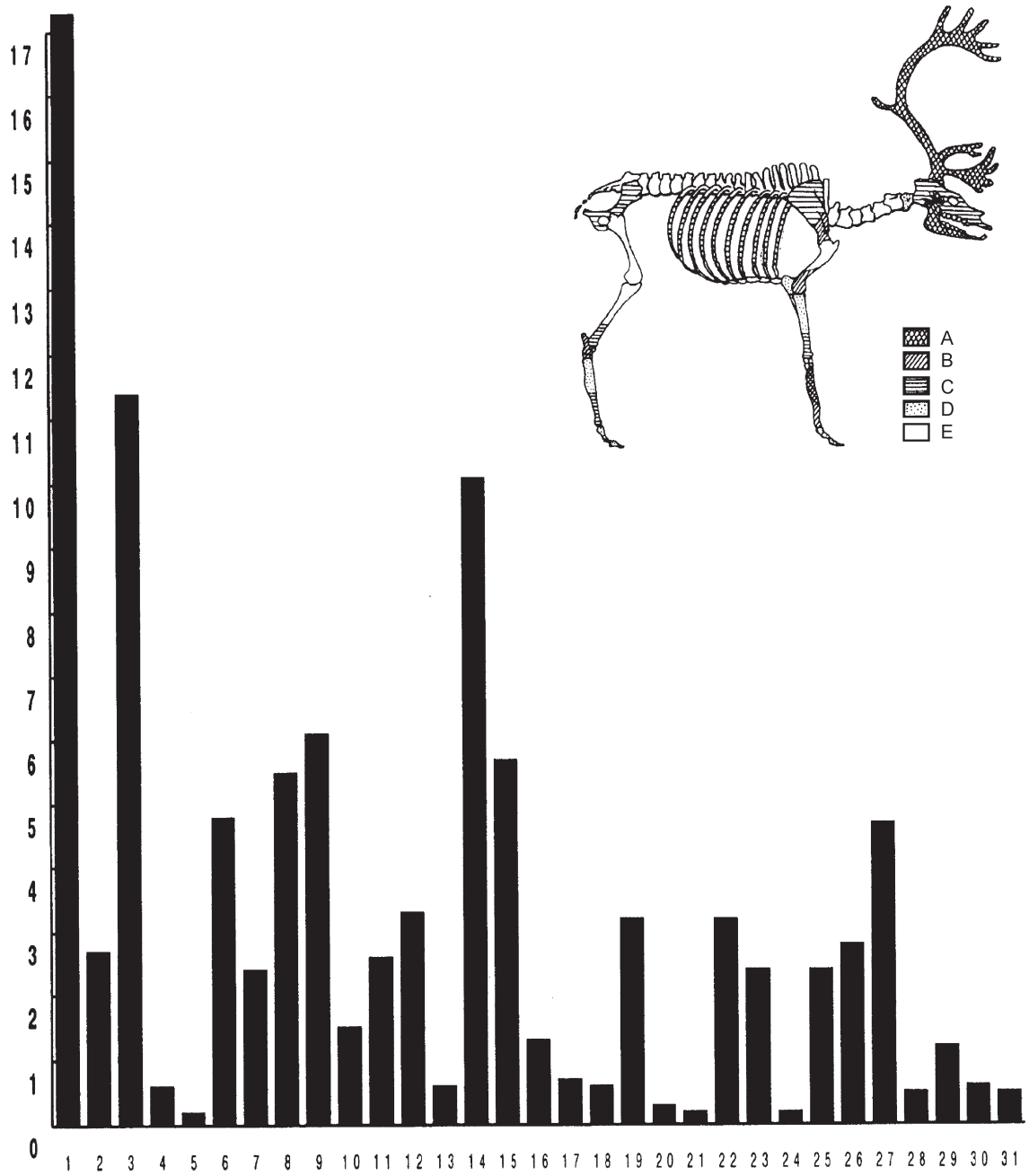

Figure 62. Range of skeletal remains of reindeer: (A) more than 10%; (B) from 5 to 10%; (C) from 3 to 5%; (D) less than 0.5%; (E) (empty) not found; general (graph) and specified percentage (diagram): (1) skull fragments (2.7%); (2) fragments of mandibles (11.4%); (3) atlases (0.6%); (4) axis (0.2%); (5) ribs (4.8%); (6) shoulder blades, fore sections (2.4%); (8) shoulder blades, rear sections (2.4%); (9) distal humerus (6.1%); (10) ulnae (1.5%); (11) proximal radius (2.6%); (12) distal radius (3.3%); (13) carpal bones (0.6); (14) proximal metacarpals (10.1%); (15) distal metacarpals (5.7%); (16) phalanges I (forelegs, 1.3%); (17) phalanges II (forelegs, 0.7%); (18) hoof phalanges (forelegs, 0.6%); (19) pelvis (3.2%); (20) proximal femur (0.3%); (21) distal femur (0.2%); (22) distal tibiae (3.2%); (23) ankle bones (2.4%); (24) heel bones, rear sections (0.2%); (25) heel bones, fore sections (2.4%); (26) proximal metatarsals (2.8%); (27) distal metatarsals (4.7%); (28) central carpal bone (0.5%); (29) phalanges I (hind legs, 1.2%); (30) phalanges II (hind legs, 0.6%); (31) hoof phalanges, hind legs (0.5%) (after Pitul'ko and Kasparov 1996).

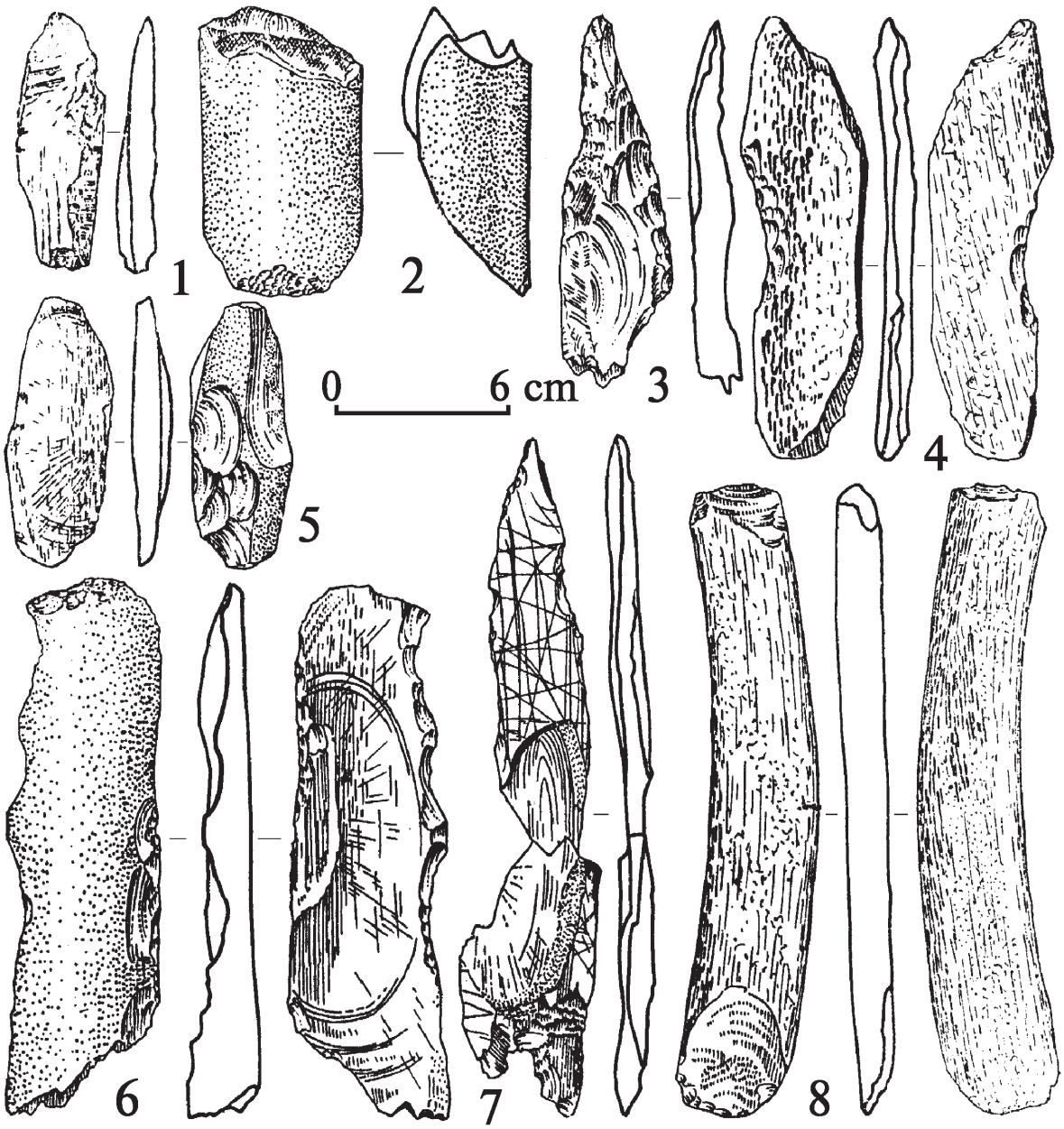

Figure 63. Worked bones (1, 2, 4, 5, and 8) and mammoth ivory (3, 6, and 7) from the Late Upper Palaeolithic Berelekh site, downstream of Indighirka River (after Y. A. Mochanov, 1977).

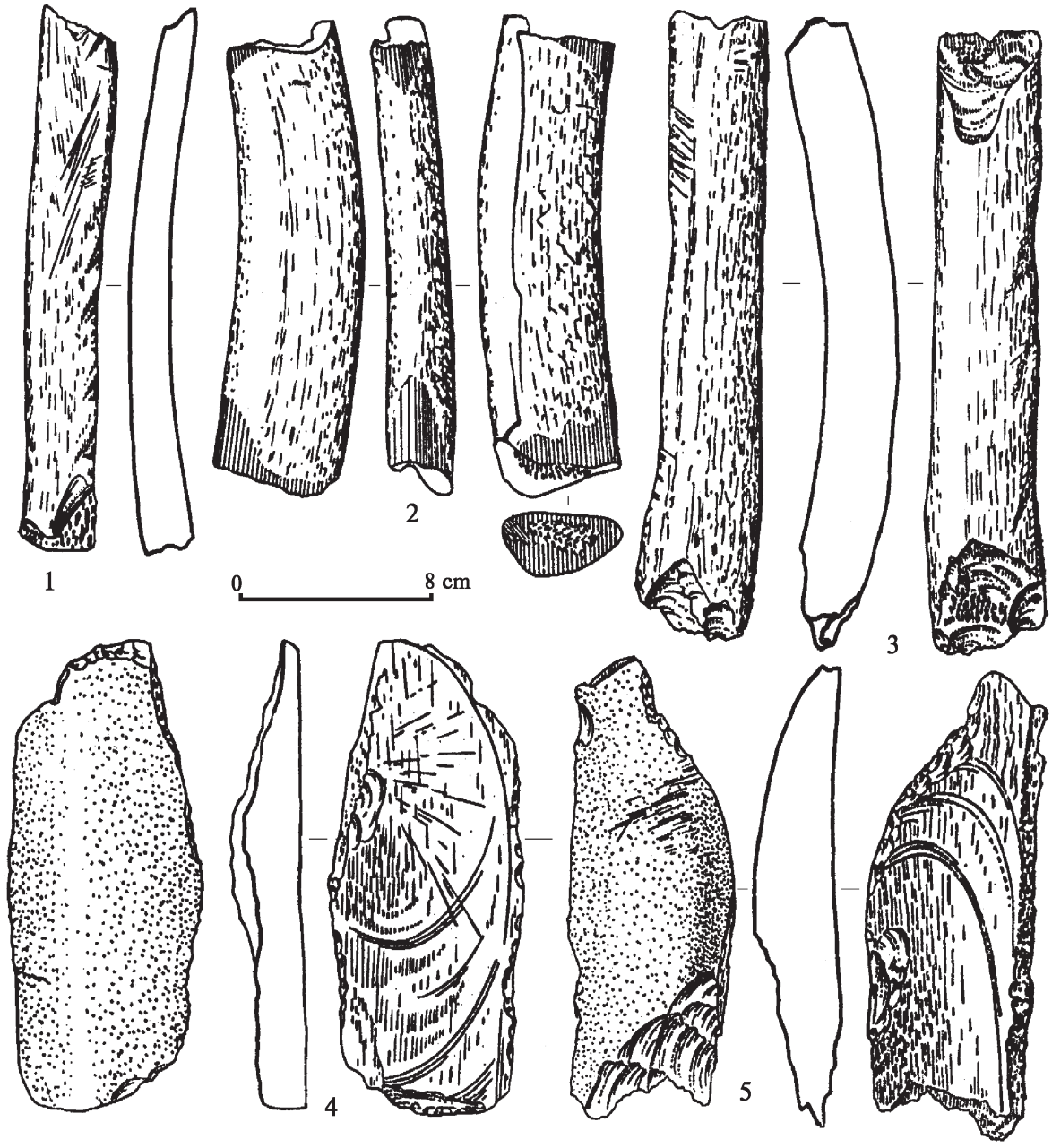

Figure 64. Worked bones (1–3) and mammoth ivory flakes (4, 5) from the Late Upper Palaeolithic Berelekh site, downstream of Indighirka River (after Y. A. Mochanov, 1977).

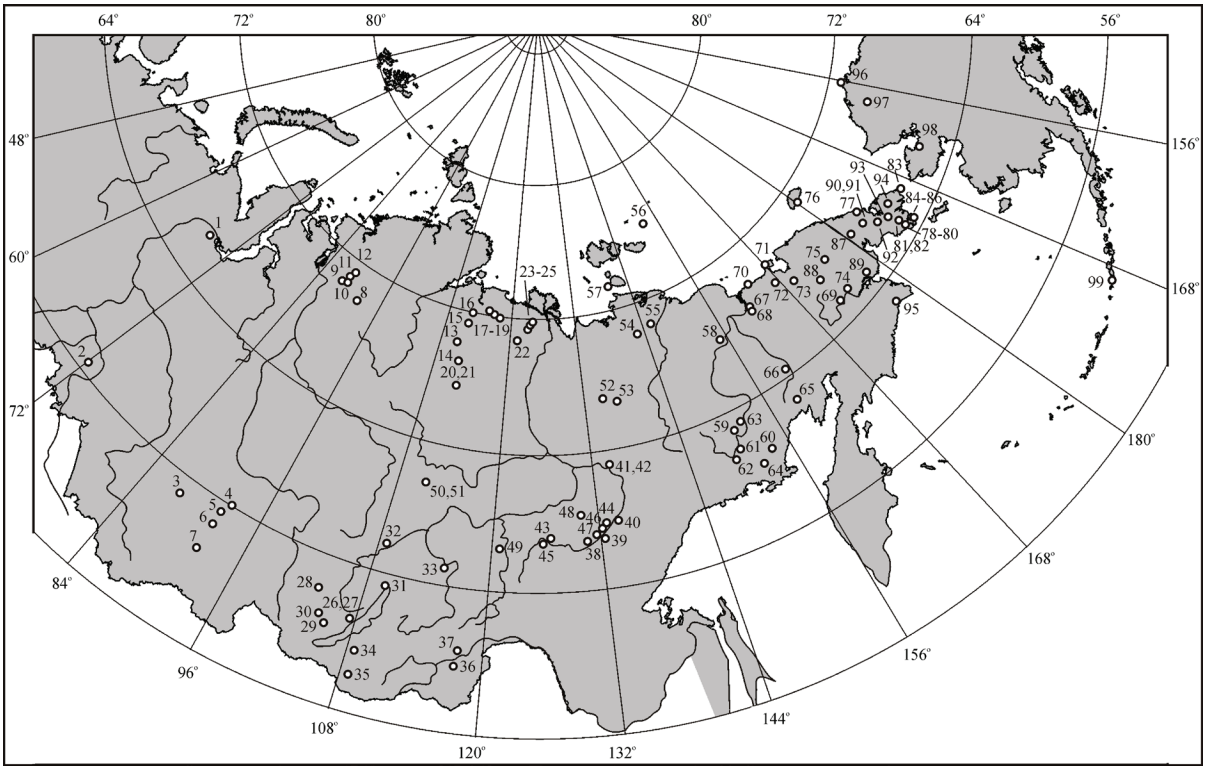

Figure 65. Siberian, Alaskan, and Aleutian archaeological sites mentioned in the text: 1 - Korchagi I-B; 2 - Chernoozerie II; 3 – Berezovyi ruchey; 4 – Afontova Gora; 5 – Birusa; 6 – Kokorevo I; 7 – Maininskaya; 8 - Tagenar VI; 9 - Lantoshka II; 10 - Pyasina I, II, III, IV, V, IX, XV; 11 – Malaya Korennaya II, III; 12 - Kapkannaya II; 13 - Staraya II; 14 - Delingde II, III, IV; 15 – Chuostakh-Yuryuge; 16 – Yakutskiy Tyubelyakh; 17 – Berelekh-Ayan; 18 – Bayan; 19 – Ulakhan-Kyuel-Seene; 20 – Ochuguy-Manyngda; 21 – Olenyok I; 22- Nizhne-Taloudskaya; 23 – Khotuguy-Neiuo; 24 - 255 km I, II; 25 - Khorbusuonka I; 26 – Ityrkhey; 27 – Sagan-Nuge; 28 – Gorelyi Les; 29 – Verkholenskaya Gora; 30 – Ust-Belaya; 31 – Kurla; 32 – Chastinskaya; 33 – Staryi Vitim; 34 – Oshurkovo; 35 – Studyonoye; 36 – Shilkinskaya Peschera; 37 – Mogilnik Molodovsk; 38 - Belkachi I; 39 – Dyuktayskya Peschera; 40 – Verkhne-Troitskaya; 41 - Ikhine I; 42 - Ikhine II; 43 – Sumnagin I; 44 – Ust-Mil II; 45 – Ust-Timpton; 46 – Bilir; 47 – Syurakh-Ary; 48 – Oniesskoye; 49 – Dzhikimdinskoye; 50 – Mogilnik Tuoy-Khaya; 51 - Tuoy-Khaya; 52 – Kuranakh I; 53 – Adycha; 54 – Berelyokh; 55 – Chokurdakh; 56 – Zhokhov Site; 57 – Kigilyakh; 58 – Bochanut; 59 – Mayorych; 60 - Buyunda III; 61 – Kongo; 62 – Siberdik; 63 – Seymchan; 64 – Kheta; 65 – Druchak-Vetrenyi; 66 – Bolshoy Elgakhchan I; 67 – Rodinkskoye Pogrebenie; 68 - Penteleikha I-VIII, Pirs; 69 – Vakarevo; 70 – Mys Bolshoy Baranov; 71 – Ryveem; 72 - Rauchuagytgyn I; 73 - Tytyl IV; 74 – Ust-Belskiy Mogilnik; 75 – Ozero Chirovoe; 76 – Chortov Ovrag; 77 – Vankarem; 78 - Kurupka I; 79 - Chaatamie I; 80 – Achen; 81 - Chelkun IV; 82 – Ananayveem; 83 – Naukan; 84 – Puturak; 85 - Itkhat IB; 86 – Ulkhum; 87 – Yakitikiveem; 88 – Elgygytgyn; 89 – Kanchalan; 90 – Kymyneykey; 91 – Mys Bezymyannyi; 92 - Kymynanovyvaam VII, VIII, XIV; 93 - Ioniveem VII; 94 - Igelkhveem XVI; 95 - Ineskvaam I; 96 – Walakpa; 97 – Gallagher Flint Station; 98 - Trail Creek; 99 – Anangula.