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Some results from the Posiet Grotto investigation in the context of Bohai studies

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Abstract: The multi-layer site Posiet Grotto located on Tyrol Cape near Posiet Port in Expedition Bay, Khasan District, Primorsky Krai, was utilized from 1,000 B.C. until the 16th century A.D.

The earliest layer was formed approximately 5,000 years ago (Zaisanovka Culture: final Neolithic Age) as a seasonal camp. Several successive layers contained material from the Yankovskaya culture of the Early Iron Age. In the upper part of these layers were discovered two burial sites from the Yankovskaya culture.

The next layer contained artifacts from the Mohe culture (approximately 6–7 A.D.). Numerous shards of hand-made earthen vessels, fishes, and animals bones constituted a majority of the findings in this layer. The whole collection was represented by 68 fragments of hand-made as well as wheel-made pottery, but the latter was the minority (less than 5%).

The next epoch (8–11 A.D.) was represented by several horizons of the Bohai culture. Human bones belonging to this culture (4 young men under the age of 30 years) were found with dog bones.

Undoubtedly, there was a connection between the Grotto ritual complex and that of Kraskino, an ancient fort and port town located nearby. The Grotto possibly served as a ceremonial place for people departing to or returning from long voyages.

The next epoch (12–13 A.D.) was represented by several horizons with materials from the Jurchen culture (12–13 A.D.) and a small dwelling with a three-channel floor heating system called "kan" or "ondol" in local dialects.

The post-Jurchen time is represented by several occupation horizons left by numerous seasonal camps of hunters, fishermen, and gatherers. The last of these horizons, according to archaeological data, is dated no earlier than the 16th century A.D.

Keywords: Bohai, cave site, Mohe culture, shell midden, Yankovskaya culture

1. Introduction

According the most recent data of the Culture Heritage Department there are more than 400 archaeological sites in Khasan District of the Primorsky territory as of December 2011. Only 10% or less are related to the real Middle Ages—the Bohai and Jin epochs. Many more sites we can determinate as Mohe.

The archaeological site of Posiet Grotto is located on a steep south-west rock coast of the steep massive Tyrol Cape near Posiet Port in Expedition Bay (Fig. 1, 2), Khasan district of Primorsky Krai (reg. number of the site list of Khasan district - Posiet 18). It was discovered in 1926 by an employee of TINRO¹⁾ A. Razin (Разин 1925), and then examined by V. Tatarnikov (Татарников 1973) and from 1988 till 1991 studied by Y.G. Nikitin (НИКИТИН 1991).

It is a grotto of erosive origin, formed by sea waves not earlier than seven thousand years ago. It is 12 m long and from 6 to 8 meters wide, and the height of the domelike ceiling is 4.5 m. The funnel-shaped oval hole of the entrance faces south (Fig. 3).

This multi-layer site was located in two levels inside the Grotto and on a space in front of its entrance. The archaeological layer is divided into 28 layers of various thicknesses - occupation floors and horizons of habitat in the grotto and releases in front of it related to various archaeological cultures from the Fourth millenium BC until the 16th Century A.D. The general depth of cultural deposits inside the Grotto near the entrance reaches up to 3 m, in the space in front of the Grotto up to 4.8 m (Fig. 3)

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2. Prehistory

The earliest layer was dated to the final Neolithic Age (Zaisanovka Culture), perhaps it was formed approximately 5 thousand years ago, when a seasonal camp of ancient fishermen was located inside the Grotto. Several successive layers contain material from the Yankovskaya culture from an early iron age. A seasonal camp remains of fishermen and seaside food gatherers including many small shell-mounds, fish bones, numerous sherds and broken stone and bone tools were found in the main part of the Yankovsky layers both in the cave, and before the entrance. Inside the grotto, within the latest horizon on the layer of fine gravel with a small numbers of large fragments, which lies directly on the rocky floor of the cave, two burials from the Yankovskaya culture were discovered.

The first burial (Fig. 4, 5) revealed the remains of a male skeleton, buried lying on his left side, both arms bent at the elbow by the head. The remains of the shoulder, forearm and skull were found with a stone polished axe and beads. In the area of the wrist was a large scallop, under which lay several broken off slate arrowheads. To the north of the remnants of the skull was found a large shuck oyster, and between the fragments of rib bones were found a few stone beads and pendants made of two small sea shells. The bones of the legs, pelvis and spine were absent, but around the preserved bones, especially west of the burials, was an accumulation of bone chips.

The remains in the second burial (Fig. 6, 7) were not preserved in such good condition. Remains of the bones and the skull were unearthed, the arm bent at the elbow at the head, the remains of the spine bones and both legs. Another part of the pelvis bones, spine, and the remains of the second hand were found almost a meter to the west of the main skeleton. Near the foot of the body were found the remains of a large bowl and a small vessel with a dedicated neck, which was closed by a large scallop. On the area near the chest and on the middle of the thighs were found two polished stone axes, several bones from the spine, fish bones, stone beads and shell pendants. Not far from the bowls were several fragments of arrowheads, punch and details of toggling harpoons.

3. Mohe period

The next layer contained artifacts from the Mohe epoch (approximately VI–VII A.D). Numerous shards of hand-made earthen vessels, fish and animals bones constituted the majority of findings in this layer. Remains of a stone structure with a low chimney in front of the entrance to the Grotto belong to the same epoch (remnants of an oven?) (Fig.8). The whole space around the structure was filled by shards of Mohe molded hand-made pottery (Fig. 8). It should be noted there were some differences between the Mohe earthenware collections found at the entrance and inside the Grotto. The whole collection consisted of 68 fragments of hand-made as well as the wheel-made pottery, the latter in the minority (less than 5%). Ornamentation of the vessels, surface treatments, including a brilliant polished area, were very similar to the materials from the Troitsa 2 kilns, Troitsa 5 and Manchu Base-1 sites (Пискарева 2005: 420). Many vessels with patterns made by a rolled stick were unearthed in all three sites. But the most clearly distinctive pottery at these sites are marked by ornamentation. First of all, there was a great variety of ornaments, which were inscribed on the body of vessels, with the prevalence of embossed ornaments caused by a notched tool. Only on the shoulders were patterns in the form of “vertical zigzag” and “horizontal zigzag.”

A very similar group of pottery stands out from the collection of Mohe ceramics found in the lower layers at Kraskino walled town. But it is important to note that this same collection is ceramic and of other types of Mohe – without traces of the paddle and anvil technique, without stick’s rolls on the shoulders, but with small ones under the collared rim, poorly ornamented in all areas (Гельман, Пискарева 2002). The principle sources of similarity are between the second group of ceramic finds of pottery from the earliest of Bohai sites of Suifen Basin like Sinelnikovo 1, Chernyatino 2 and Konstantinovka 1 (Пискарева 2001, 2001a).

It should also be noted that sites with Mohe pottery, similar to what was found in Posiet Grotto and Troitsa Bay, are located along almost the entire coast of Primorsky Territory from the Peysa River mouth in the north to the Tumen River mouth in the south. You can list the main groups of sites, represented mainly as small settlements or seasonal camps in several areas: Posiet Bay (Posiet 4, 18, Gladkaya1, Suslova, 1.2; Krabbe 7.8), Aleut Bay (Aleut 6, 13, 14, 15, 20), Spasenia Bay (Spasenia

1, 2, 3; Antipenko 1), Troitsa Bay (Troitsa 2.5), Vladivostok area (Manchuria-base 1.2, Lazurnaya 4, Popov 2), Nakhodka area (Zolotari 2), Preobrajzenie Bay (Kievka 4, Kievka 7; Zapovednoe 7), Valentin Area (Glazkovka 1, Glazkovka 4, Zarya 2) Zerkal'noye area (Ust- Zerkal'noye 4, Zerkal'noye 2) Dalnegorsk area (Rudnaya Pristan, Pravoberejnyi, Monastyrka 3) Terneisky district (Krasnoye Ozero, Mys Teplyy etc.) .

The lack of an archaeological study of these Mohe shore sites does not allow us to say right now exactly what Mohe tribes have left these sites. In “The story of the Bohai,” “Xin Tang shu” / 27 / it reads: “[Bohai] on the ancient lands of VEYMO / 28 / established the eastern capital, called Lunyuanfu / 29 /, in its submission were four districts (zhou): Qingzhou / 30 / Yanzhou / 31 / Muchzhou / 32 / and Hezhou / 33 /. According to a study in the 2nd volume of “Historical Geography of Northeast China”, the capital of the Eastern District of Yanzhou Lunyuanfu was in the modern Posiet Gulf (Сунь Цзиньцзи 2001: 54). It is likely that the Mohe people who accumulated experience of swimming in the sea for hundreds of years, were used by the Bohai State as seafarers.

4. Bohai period

The next epoch (VIII–XI A.D.) is represented by several horizons of the Bohai period. The major part of the artifacts from these horizons have a pronounced religious character (Fig. 9, 10) : two small bowls made from the top bone of human skulls, animal bone necklaces, and a silver plate with the image of Buddhist symbols. Findings in the mouth of the grotto of two round holes, overlaid on a circle with stones, are probably related to these complexes. The pits, whose depth does not exceed 0.5 m, were filled with ashes, the remains of animal bones, fish, shells and fragments of Bohai pottery.

In both the pits were found human bones with clear signs of blows on the surface, including a few chopped fragments of jaws, skulls, leg bones (Fig. 11). The human bones belonged to the 4 young men under the age of 30 years (age and sex determination by the teeth carried out in the laboratory of A. Heysler). The hacked bones of two dogs were also found. It is very interesting that human bones were mixed with the bones of dogs. All the bones showed obvious traces of impacts including fragments of cut jaws (Fig. 11-1.2), skulls (Fig. 11-3), and shin-bones which were also found in these pits. Now we can only guess at what we found - the remains of burials or archaeological evidence of some unknown religious ceremony with human sacrifices. It is interesting to note that almost all the tubular bones of the humans were split so as to be able to get the bone marrow (Fig. 11-4,5).

A similar ritual find has been excavated only in the lower layer of the Excavation Area 3 on Starorechenskoye 1 site in Primorye where at the bottom of one pit was discovered a burial ritual — the bones of a 10-year-old boy, whose limbs have been replaced by a calf's limbs (the definition of the bones made by E.V. Alekseeva). A similar replacement of missing bones in a human skeleton with those of an animal (goat) has been found in the North-Western Crimea. This is the burial of a warrior killed in battle dating back to XII, and, according to researchers, refers to the time of movement in the Crimea, from one of the hordes of Turkic nomads (Бужилова 1999).

Doubtless there is a connection of the Grotto ritual complex with Kraskino ancient town located nearby. In this case the Grotto could have served as a ceremonial place for people departing to or returning from a long voyage.

There is evidence in favor of the first-and second-guesses. The ritual link could have existed between Kraskino as the administrative center and Posiet as a port location during the Bohai period. It is possible that the cave could serve as a place of worship for people traveling on a distant voyage, or returning from one. Such a kind of connection between the port (Fukura) and the administrative center (Kanazawa, which was a location for Bohai embassies and a temple) and the performance of a pagan rite before a distant sea journey (Sado Island) is sufficiently well known in Japan. In this context, there is great interest in the Bohai-period archaeological materials found on Furugelm Island.

Kraskino walled town has been identified as the administrative center of Yanzhou County of Longyuanfu metropolitan area (eastern Bohai capital in 785–794 years). Already in the first third of the eighth century Kraskino could have been a major departure point on the way from Bohai to Japan (Шавкунов 1968; Ивлиев, Болдин 2006). Not only were Bohai-Japanese relations perhaps conducted through Kraskino, but it was also a very important location for communication

with other ports of the Korea Peninsula and Tan Empire on the west coast of the Japanese Sea. It probably also supplied that the Yangzhou eastern Bohai capital with fish and seafood.

However, the modern physical geography of Kraskino walled town casts doubt on the possibility of its functioning as a port, as it is now located about 300 meters from the old beach. At present this part of the bay is very shallow and quite unsuitable for the navigation of large vessels. But at the same time, abundant evidence of sea fishing were found at the Kraskino site - fishing hooks and net weights, harpoon heads and shells of mollusks, and bones of marine animals that live in the open sea coasts at a considerable distance from the site. Incidentally, in the Bohai layers of the Posiet Grotto tropical gastropod shells were found - *Cipro*, which is only found off the coast of the southern Japanese Islands and South China, an indirect indication of long-distance trips to the south.

Modern geographical research has shown that in the Bohai period the Sea level in the Posiet Gulf was about 0.5 m higher than at present and the depth of Expedition Bay near Kraskino was 1-1.5 meters deeper than today (Korotkiy 1994). Therefore, relatively large vessels could approach quite close to the shore near the South Gate of Kraskino walled town, where there is a fairly wide and flat earthen platform that could be used as a mooring.

Therefore, Bohai ships with a displacement of several tens of tons could come close to Yanzhou. Moreover, in the Bohai period the average annual water temperature was slightly higher than today, with less severe winters, so the shipping season could last longer than today - from early March until late November.

Yanzhou probably also supplied the population of Bohai with salt that was mined on the Posiet Gulf coast in the vicinity of Talmi lagoon, as well as in the former village of Hansi, where we can see today the remains of ancient salt-works, which 100 years ago gave up to 600 kg of salt per year (Unterberger, 1900). In addition, on the southern coast of Crabbe Peninsula and at Marble Cape ancient quarries with traces of broken stone blocks have been discovered.

Sailing near Yanzhou area in sailing vessels was associated with greater risk and it was impossible without the knowledge of local conditions and methods of simple navigation. It is likely that on the headlands, islands, and the tops of the hills there were notable special observation points, which used signal lights (fires). This is confirmed by archeological finds. So on the coast of Posiet Gulf on the capes of Tyrol, Shelekhov, Nazimova, Astafieva, Marble, Suslov the remains of hearths and structures of medieval pottery were found. These places are not very suitable for permanent settlement, but they can easily observe large areas of marine water. For example, on top of a high hill on Suslov Cape, from where the whole of Posiet Gulf from Crabbe Peninsula to Tumangang river mouth can be seen, there were found the remains of stone construction. At the foot of the hill between Kalevala and Pemzovaya bays a wall was found crossing the isthmus, as well as the remains of a medieval settlement. Another wall crosses the narrow isthmus of Crabbe peninsula (Никитин 1991).

It is possible that the choice of location of Yanzhou port near the mouth of Yanchihe was not accidental, but is closely related to navigation performance in the Posiet area. With knowledge of navigation aids the port can be found easily, even at night. Thus, the approaches to the port are on the line of the Casement Nazimova lighthouse - Cape Tyrol. On this same line is Suslov Mount (height 234 m) on the same peninsula at the entrance of the Posiet Gulf, as well as Furugelma Island. In other words, in a straight line from Yanzhou port can be seen Tirol Cape, Nazimova Cape and Suslov Cape, to which the distance is twice more than that between the headlands. Therefore, even at night when the fires were burning on these headlands, the hill, and the island, they could easily lead the court to Yanzhou (Паков 2012).

Departing from Yanzhou, the ships needed to steer clear of a wide shallow area and in some places, oyster reefs, relying on the alignment of the Tyrol Cape–Nazimova Cape. Going through the narrow strait between Nazimova Cape and Cherkavskogo island, passing the East underwater sandbank, the ships had to proceed quite a distance on a strict south-east heading by compass, and with good visibility this is indicated by the alignment of the conical mountain of Big Tiger and Nazimova Cape. This landmark knowledge exists today; it is applied to all the charts and is used in sailing (Люция 1984).

The need for such directions is due to the presence at the entrance to Reid Pallada bay of Klykov reef, where previously there was only a depth of 1.8 m, and which generated high waves and breakers (Люция 1932). In case of bad

weather, as well as upon the occurrence of calm, the ships could take shelter in Pemzovaya Bay, and while anchored the crew could land on the shore, where there was a medieval fortification on the isthmus between Pemzovaya and Kalevala bays. With a favorable wind, sailing ships by noon could come close to Furugelma island. One of their stone anchors was found near the island and is being kept near our Institute. The need for ships to harbor near the island is due to the presence of long underwater rock ridges extending into the strait between the mainland and Furugelm island, which are visible in the middle in the form of Michelson Rocks. Passage for large ships is only in the vicinity of the island. Anchoring in Kalevala Bay was unsafe due to winds from the south and south-east directions, which begin just after noon and blow until the evening, creating large waves.

5. Jin period

Unfortunately, the scope of this paper does not allow full presentation of the materials in the cultural layers from the later ages of the 12th–16th centuries. One can only conclude that the Jurchen age (12–13 centuries. B.C.) is represented in the cave remains by a small dwelling with three-channel direct “Kan”, and rich archaeological material with strong Bohai, Jurchen and Koryo elements. There are some most interesting artifacts in this layer, such as the remains of a rather thick mat made of seaweed, fragments of ornamented birch bark vessel, silver plate with an image of Buddhist symbols and also bronze, iron, ceramic and porcelain relics.

The Post-Jurchen period is represented by several occupation horizons left by numerous seasonal camps of hunters, fishermen and gatherers. The last of these horizons, according to archaeological data, must be dated not earlier than XVI century A.D.

The unique conditions of the microclimate in the Grotto have promoted the preservation of numerous organic remains of the vital activities of ancient people. Intensive methods of research (including flotation and permanent washing of an archaeological layer) have allowed us to obtain a unique balanced collection of ecofacts, numbering tens of thousand of units from the small area. The study of this collection will reveal the changes in the subsistence system of the inhabitants of the Grotto in various cultural and historical epochs during more than six thousand years.

6. Fossiles found in Possiet Grotto

In the cave and the entrance to the cave numerous waste emissions were investigated, including the remains of shells, fragments of shells and limbs of crabs, sea urchins, fish and animal bones. In total, we detected more than 300,000 units. Waste emissions measured primarily in the area of the excavation in front of the cave consisted of separate (probably one-day) emissions, interspersed with lenses of fragments of bedrock crumbled from the cliff. Flotation and total flushing of the cultural layers by water pump (water separation) revealed the remains of a variety of life for the inhabitants of the cave for over two thousand years. On excavation, the cave revealed a large number of whole shells and fragments of mollusks, represented by different species.

Gastropods

In different time layers of the Possiet grotto were identified 14 species of gastropods (gastropoda), which were used as food. Many of them still live in the immediate area.

1. *Acmaea pallida* (Acme Pale).
2. *Batillaria cumingi* (batillyariya Kuminga).
3. *Cryptonatica janthostoma* (kriptonatika).
4. *Homalopoma sangarensense* (homalopoma).
5. *Turritella fortilirata* (turritella).
6. *Littorina brevicula* (periwinkle).
7. *Littorina mandshurica* (Manchurian periwinkle).
8. *Littorina squalida* (rough periwinkle).
9. *Lunatia pallid* (pale lunation).

10. *Neptunea polycostata* (neptuneya mnogorebristaya).
11. *Neptunea bulbacea* (neptuneya onion)
12. *Nucella heyseana* (nutsella Heyzeana).
13. *Tegula rustica* (tegula).
14. *Rapana venosa* (brine).

Most of the surviving fragments of whole shells bore traces of thermal treatment, and some shells were repulsed and broken off at the edge of the crown, probably in the process of extracting the meat.

Bivalves

In the cultural deposits of Possiet grotto clams (bivalvia) were found both whole and in fragments. Many of them have traces of thermal treatment, as well as traces of opening (bottom edges chipped at wings and ears). In separate bowls (most often glitsimeris) is a small round hole drilled likely to enable hanging as a decoration. Small punched holes are also found on half shells of scallops. In total, the shells of 18 species of edible bivalves were collected:

1. *Anadara broughtoni* (anadara Broughton).
2. *Anadara inaequalis* (anadara neravnostvorchataya).
3. *Area boucardi* (Arch Boukarda).
4. *Callista brevisophonata* (Callista korotkosifonnaya).
5. *Callithaca adamsi* (kalitaka Adams).
6. *Chlamys farreri* (Japanese scallop).
7. *Corbicula japonica* (Japanese korbikula).
8. *Crassostrea gigas* (Pacific oyster).
9. *Crenomytilus grayanus* (mussel Gray).
10. *Glycymeris yesoensis* (glitsimeris).
11. *Mizuhopecten yesoensis* (sea scallop).
12. *Mya arenaria* (sand shell).
13. *Panomya arctica* (Pan Arctic).
14. *Protothaca euglypta* (prototaka melkosetchataya).
15. *Ruditapes philippinarum* (Pacific Cockerel).
16. *Saxidomus purpuratus* (saxidomus magenta).
17. *Spisula sachalinensis* (Sakhalin spizula)
18. *Swiftopecten swifti* (scallop Swift).

The Gray mussel was the most common type. Besides this clam-catchers (cave dwellers) in different times actively caught scallops, glitsimeris, sand shell, corbikulas, and to a much lesser extent, oysters. Together with mollusk shells, sediment and trash, cultural layer emissions also contained the remains of barnacles (cirripedia) - barnacles (Balanuss), probably accidentally harvested with bivalves (mussels Gray or scallops) to which they were attached. At the bottom of the cave sediments at Possiet numerous skeletal plates and needles of gray and black sea urchins (*Strongylocentrotus nudus*, *intermedius*) were collected. , These now live in large numbers on the rocky shoals along the coast of Tyrol Cape.

In the upper layers of the cave there is still a diversity of bivalve and gastropod molluscs. However, the excavation of the Mohe layers in front of the grotto revealed a clear reduction in the species diversity of shellfish and a reduced total volume of shells. At least 12 species of edible bivalve have been found and identified The most common of these was the Gray mussel, which now resides at the entrance to the bay in the central part of Expedition bay, in the Novgorodski bay and Reid Palladas bay.

In the cultural deposits of the Bohai and Jurchen periods the most widespread type of mollusk was spizula Sakhalin, which occurs at present in clusters in shallow sea water in the Raid Palladas bay, along Nazimova Spit, Shelekhov Cape, and on the edge of Tyrol Cape. In these layers are relatively few fragments and whole shells of the scallop, which now

forms commercial concentrations in Raid Palladas bay and at the entrance to Expedition Bay and Novgorodski. It is interesting to note that during the excavations of Kraskino ancient walled town, at least 10 species of mollusk shells were found, most of which now live in the nearby bays of Possiet Gulf (Sharova *et al.* 2011: 198).

Fish

The cultural deposits of the Possiet grotto revealed a large number of bones, teeth, otoliths, and even fish scales. When washing the soil from the cultural layer sieve with a mesh of about 2 mm, we found numerous small bones of small fish (smelt, capelin, sardine), and otoliths. From this list it is clear that in different periods the cave dwellers of Possiet grotto caught at least 24 species of fish:

1. *Clupea pallasii* (Pacific herring / Nishin)
2. *Gadus macrocephalus* (Pacific cod / Madara)
3. *Gymnocanthus herzensteini* (Staghorn / Tsumagurokajika)
4. *Gymnocanthus pistilliger* (Treaded sculpin / Hagekajika)
5. *Eleginus gracilis* (Saffron cod / Komai)
6. *Limanda aspera* (Yellowfin sole / Rosuke-garei)
7. *Limanda punctatissimus* (Spinner flounder/ Ran-garei)
8. *Liopsetta pinnifasciatus* (Striped flounder / Do-garei)
9. *Liopsetta obscurus* (Dark flounder /Kuro-garei)
10. *Mugil soiuy* (Haarder / Menada)
11. *Osmerus mordax dentex* (Asian smelt / Kyuri-uo)
12. *Sardinops melanostictus* (Far cardina / Ma-Iwashi)
13. *Scomber japonicas* (Pacific mackerel / Masaba)
14. *Sebastes schlegeli* (Jacopower / Kurosoi)
15. *Sebastes taczanowskii* (White-edged rock-fish / Ezo-mebaru)
16. *Strongylura anastomella* (Psific needlefish / Datsu)
17. *Myoxocephalus brandti* (Snowy sculpin / Shimofurikajika)
18. *Myoxocephalus jaok* (Plain sculpin / Okukajika)
19. *Takifugu niphobles* (Grass puffer / Kusafugu)
20. *Takifugu xanthopterus* (Striped puffer / Shimafugu)
21. *Theragra chalcogramma* (Walleye Pollack / Suseodara)
22. *Thunnus thynnus* (Bluefin tuna / Kuromaguro)
23. *Tribolodon brandtii* (Far Eastern Dace / Maruta)
24. *Tribolodon hakonensis* (Japapanese dace / Ugui)

The main target species appear to have been 10 major species of fish—herring, tuna, mackerel, cod, flounder, saffron, haarder, rudd, dog-fish, smelt. According to the number of bones in the cave sediments of Possiet grotto, the dominant edible species were probably herring and mackerel. The bones of fish, dogs, perch and flounder were found in somewhat smaller numbers. It should be noted that dozens of bluefin tuna vertebrae were found, the bones of which were likely used as jewelry. Fragments of teeth and bone from other species of fish in the Possiet grotto come from three types of sharks (white, herring and mackerel), which are currently appear in the Possiet Gulf only in the warmer months. Thus, for the inhabitants of the Possiet grotto fishing has been important. The species composition of extracted fish indicate that there was a warmer climate during the early Iron Age and the early Middle Ages. Fishing was conducted all year round, especially during the spawning and feeding migrations. In the annual cycle of fish catches there are two maxima, one of which is confined to the summer months (June–August), the other from the end of autumn to early winter (November–January) (Vasilieva *et al.* 2011: 173). Among edible fish species were bottom and bottom-dwelling species (plaice, skate), and pelagic species (tuna, mackerel, sharks), predators and herbivores (haarder), gregarious and solitary fish. Catching these species requires a variety of special gear, hooks and tackle, lures, spears, and nets, clay and stone

sinkers, which were found in the medieval layers of the Possiet grotto.

Mammals

There are only preliminary data on the bone remains of mammals and birds. In total more than 5,000 bones of mammals and birds were detected. Most of the bones are highly fragmented. Around 2000 indeterminate fragments ranging in size from 1 to 2 cm proved to be quite similar in species composition in different layers of time: all were bones of domestic and raccoon dogs, spotted deer, wild boar, deer and several species of pinnipeds. The numerous bones of birds collected are yet to be determined, so we can only note the predominance of aquatic birds. Analysis of the occurrence of certain parts of the skeleton of roe deer showed a definite difference between the layers of the early Iron Age and medieval deposits, where the number of items made from deer antlers and red deer, of course, were much more.

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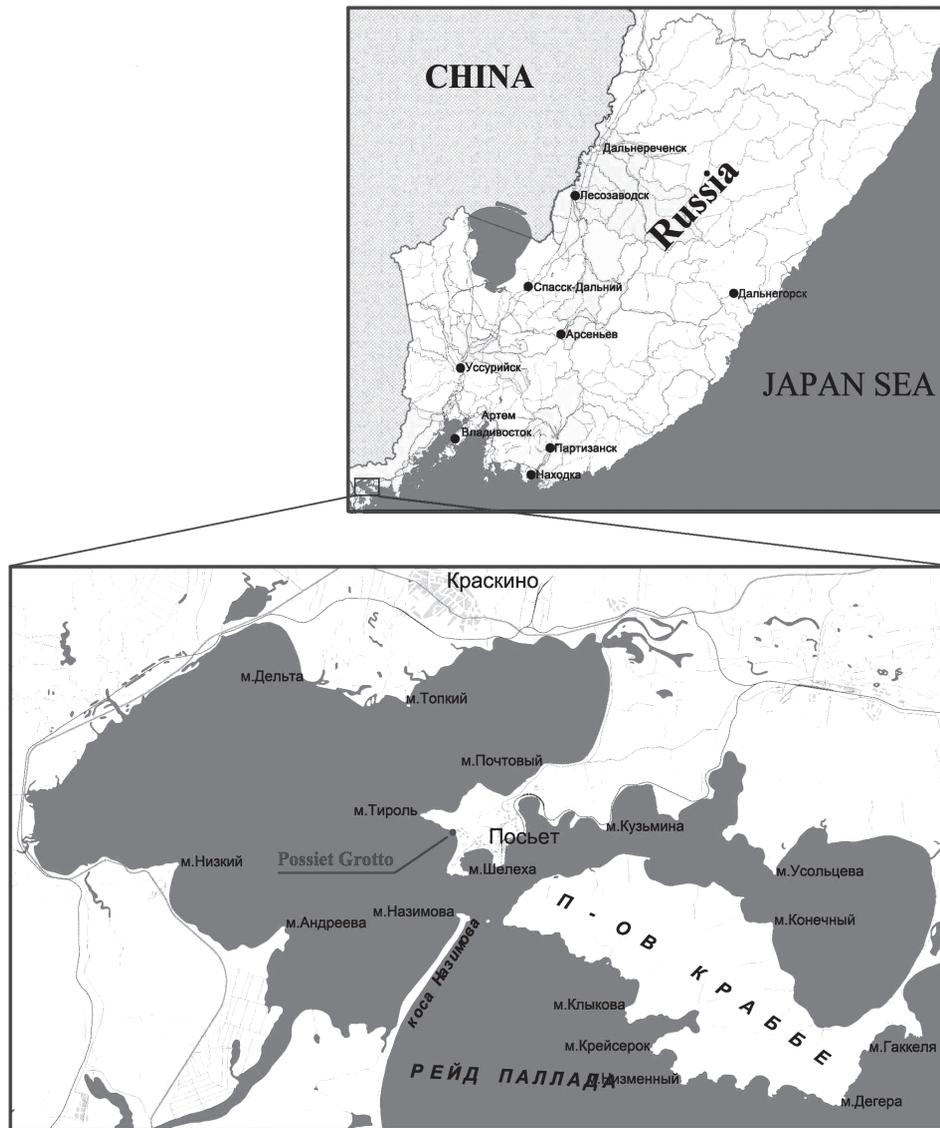


Fig 1. Location of Posiet Grotto

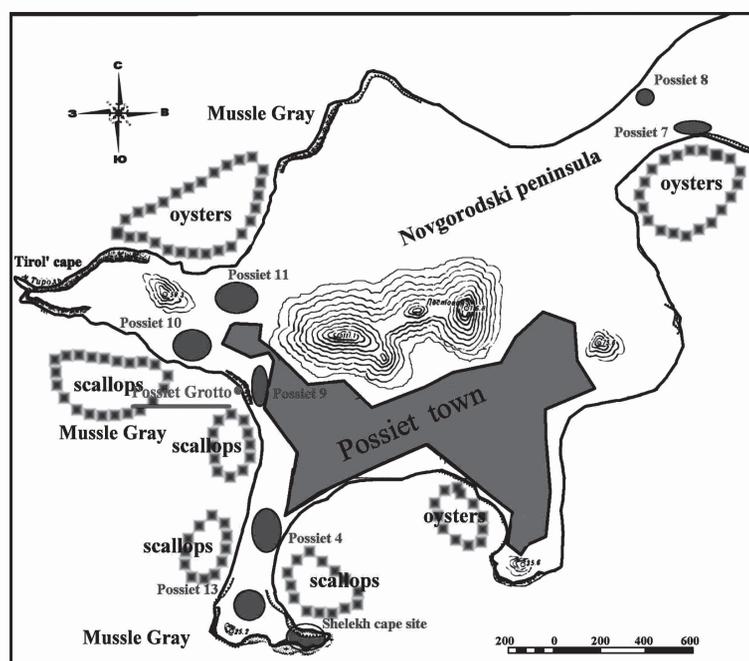


Fig.2 Location of Posiet Grotto and shell resources in Novgorodski Peninsula.

- 1. Grass**
 - 1a. grass green-gray color
 - 1b. grass green-gray with ashes
 - 1c. grass green-brown
 - 1d. Gravel with small stones
 - 1e. Gravel with fine gravel
- 2. Ashese**
 - 2a. Beige-yellow ashes
 - 2b. Beige-brown ashes
 - 2c. Dirty white ashes
 - 2d. Yellow and white ashes
 - 2e. Yellow-brown ashes
 - 2f. Ashes with stones
 - 2g. Ashes with the accumulation of pottery, bones and charcoal
 - 2h. Ashes with charcoal
 - 2i. Pinkish-beige ashes
 - 2j. Light brown ashes
 - 2k. The light gray ashes
 - 2l. Dark gray ashes with gravel and fish bone
- 3. Loam**
 - 3a. Brown loam with charcoal
 - 3b. Yellow-brown loam
 - 3c. Brownish-gray loam
 - 3d. Brownish-gray loam with scree
 - 3e. Brownish-gray loam with rocks and res
 - 3f. Brown-black loam
 - 3g. Brown loam
 - 3h. Brown loam with gravel and stones
 - 3i. Brown loam with ashes and stones
 - 3j. Brown loam with stones
 - 3k. Red loam
 - 3l. Burned brownish-red loam
 - 3m. Burned red loam
 - 3n. Burned red loam with ashes
 - 3o. Burned light brown loam
 - 3p. Burned loam
 - 3q. Burned dark brown loam
 - 3r. Light yellow loam
 - 3s. Light brown loam
 - 3t. Light brown loam with scree
 - 3u. Light brown loam with ashes
 - 3v. Light brown loam with ashes and stones
 - 3w. Light-gray loam with ashes
 - 3x. Light-gray loam with stones
 - 3y. Light-gray loam with rocks and charcoals
 - 3z. Light black loam, with fish bones and rubble
- 3aa.** Gray loam with gravel and stones
- 3bb.** Gray loam with ashes and charcoals
- 3cc.** Gray loam with stoned loam
- 3ce.** Loam with ashes
- 3ff.** Loam with stones
- 3gg.** Dark gray loam
- 3hh.** Dark-gray loam with stones
- 3ii.** Dark gray loam with gravel
- 3jj.** Dark brown loam
- 3kk.** Dark brown loam with scree
- 3ll.** Dark brown loam with ashes and stones
- 3mm.** Dark brown loam with rocks and charcoals
- 3nn.** Black loam with scree
- 3oo.** Black loam with ashes and charcoals
- 3pp.** Black loam with stones and shells
- 3qq.** Black loam with rocks and charcoals
- 3rr.** Black loam with fish bones
- 3ss.** Black loam with charcoal

conventional signs of strata (for plans and stratigraphical section)

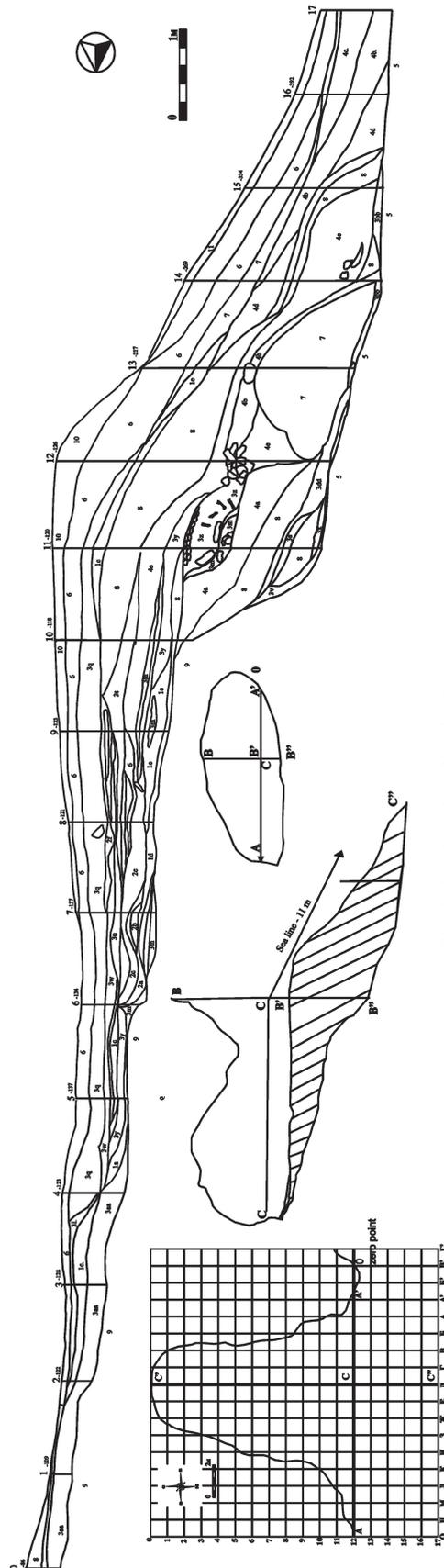


Fig. 3. Stratigraphy of Posiet Grotto

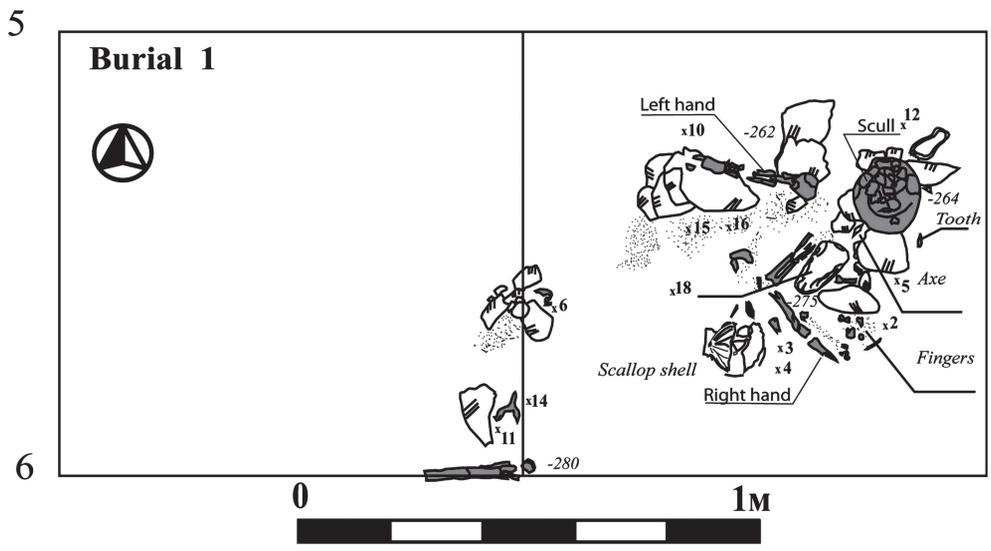
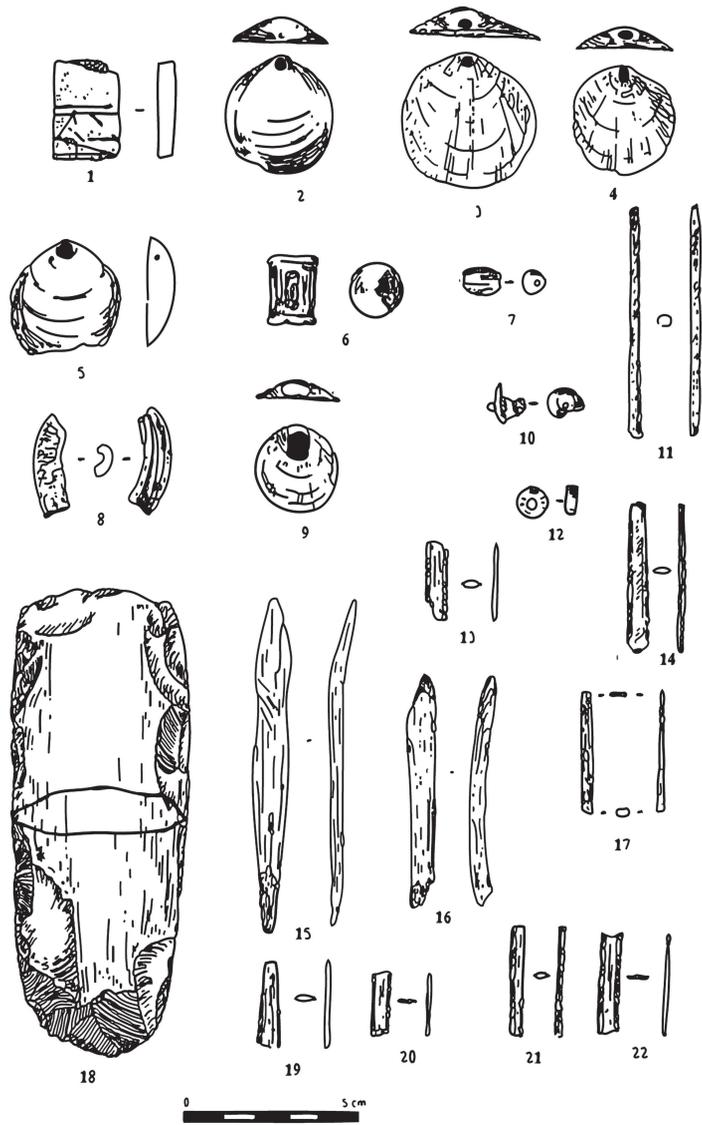


Fig.4. Yankovski burial 1: Plan and materials.

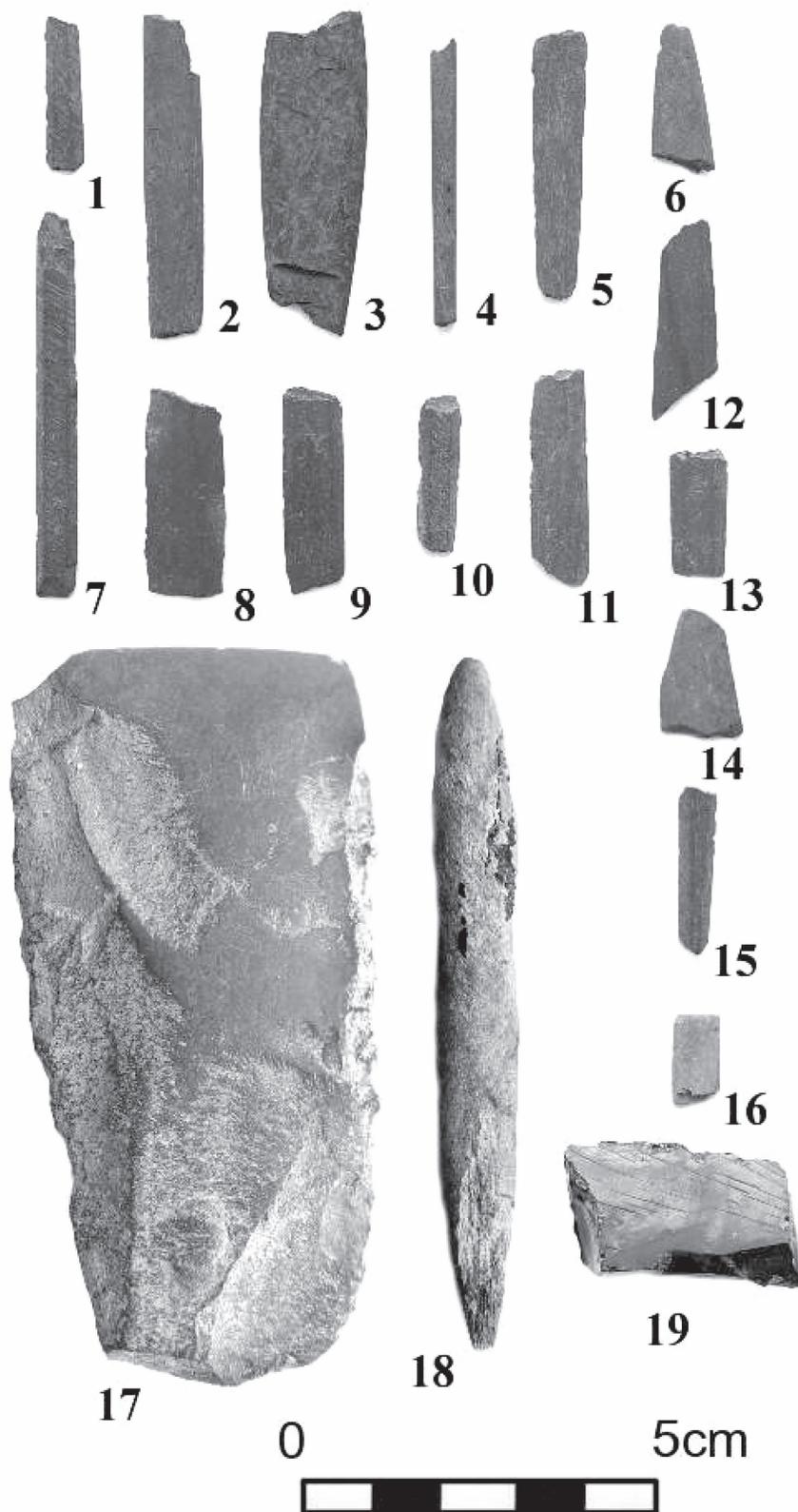


Fig.5. Yankovski burial 1: materials.

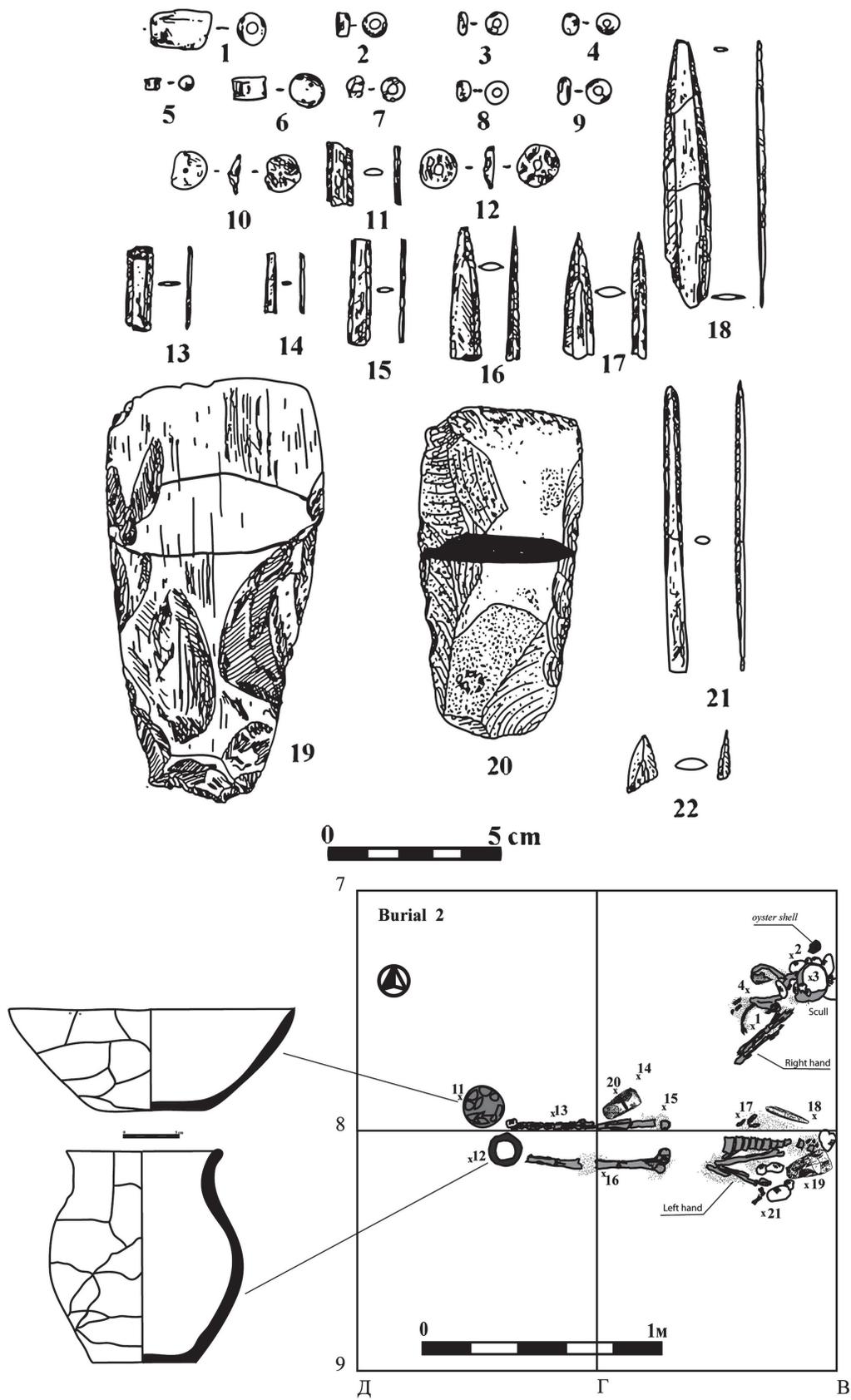


Fig. 6. Yankovski burial 2: Plan and materials.

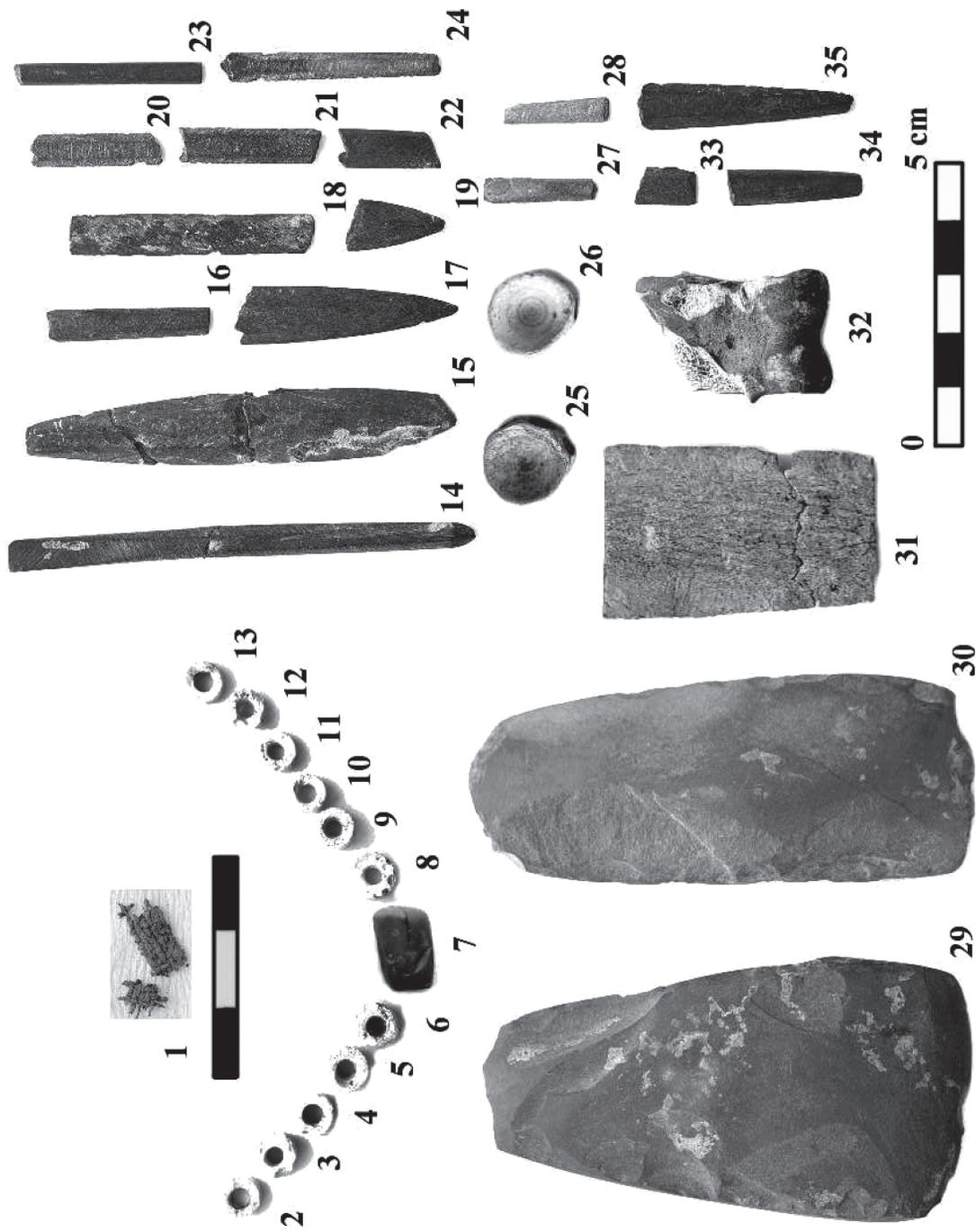


Fig.7. Yankovski burial 2: materials.

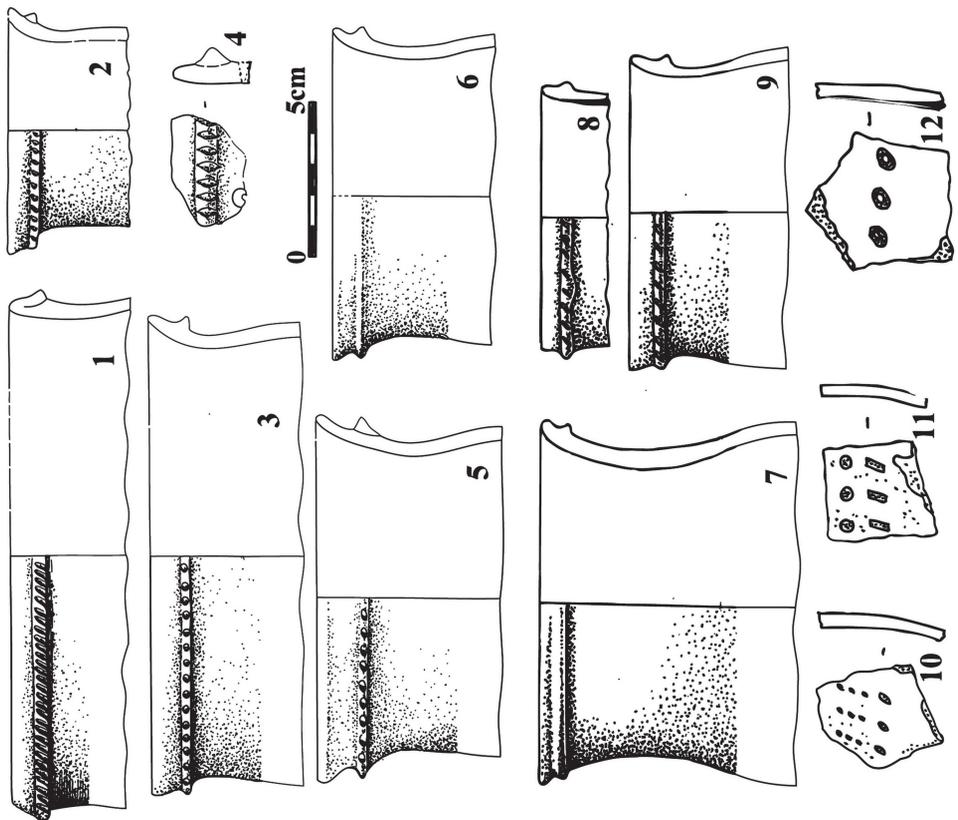
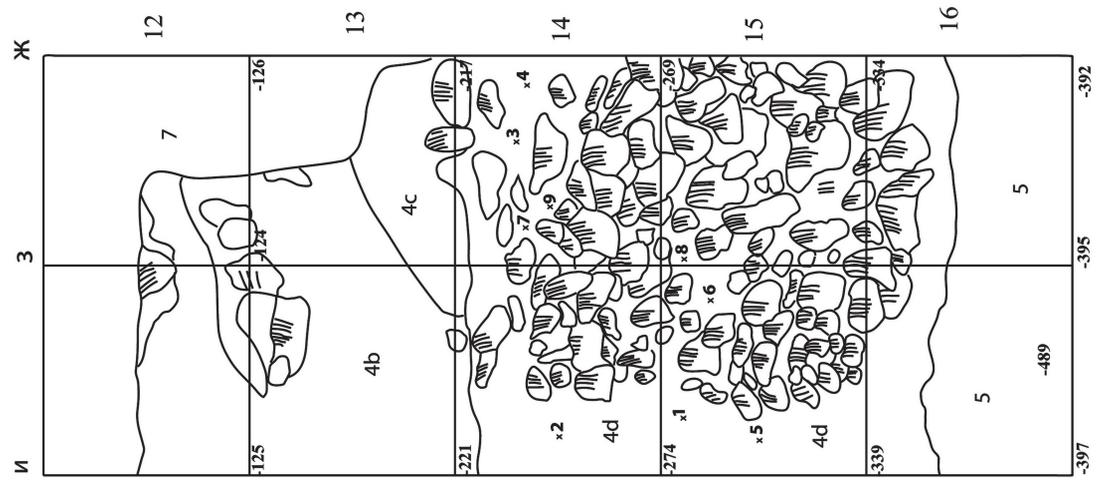


Fig.8. Paved construction and potteries of Mohe culture.

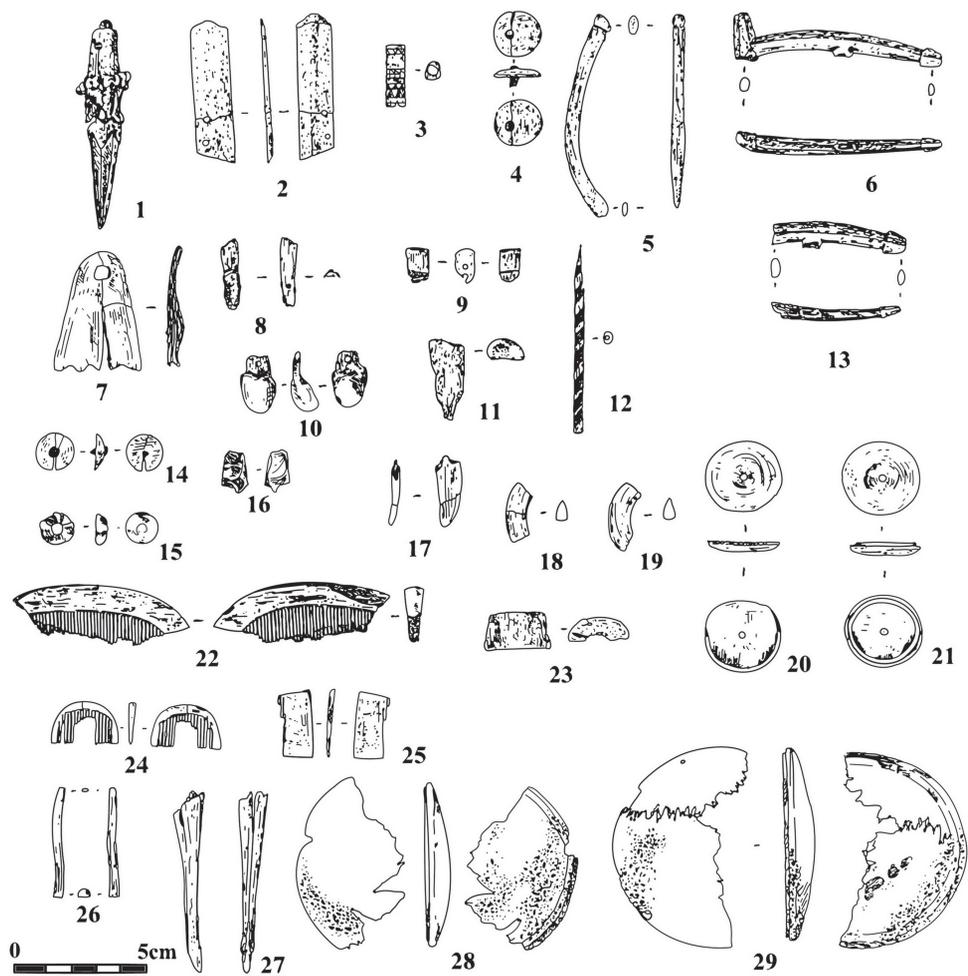


Fig.9. Living plan and artifacts of Bohai culture

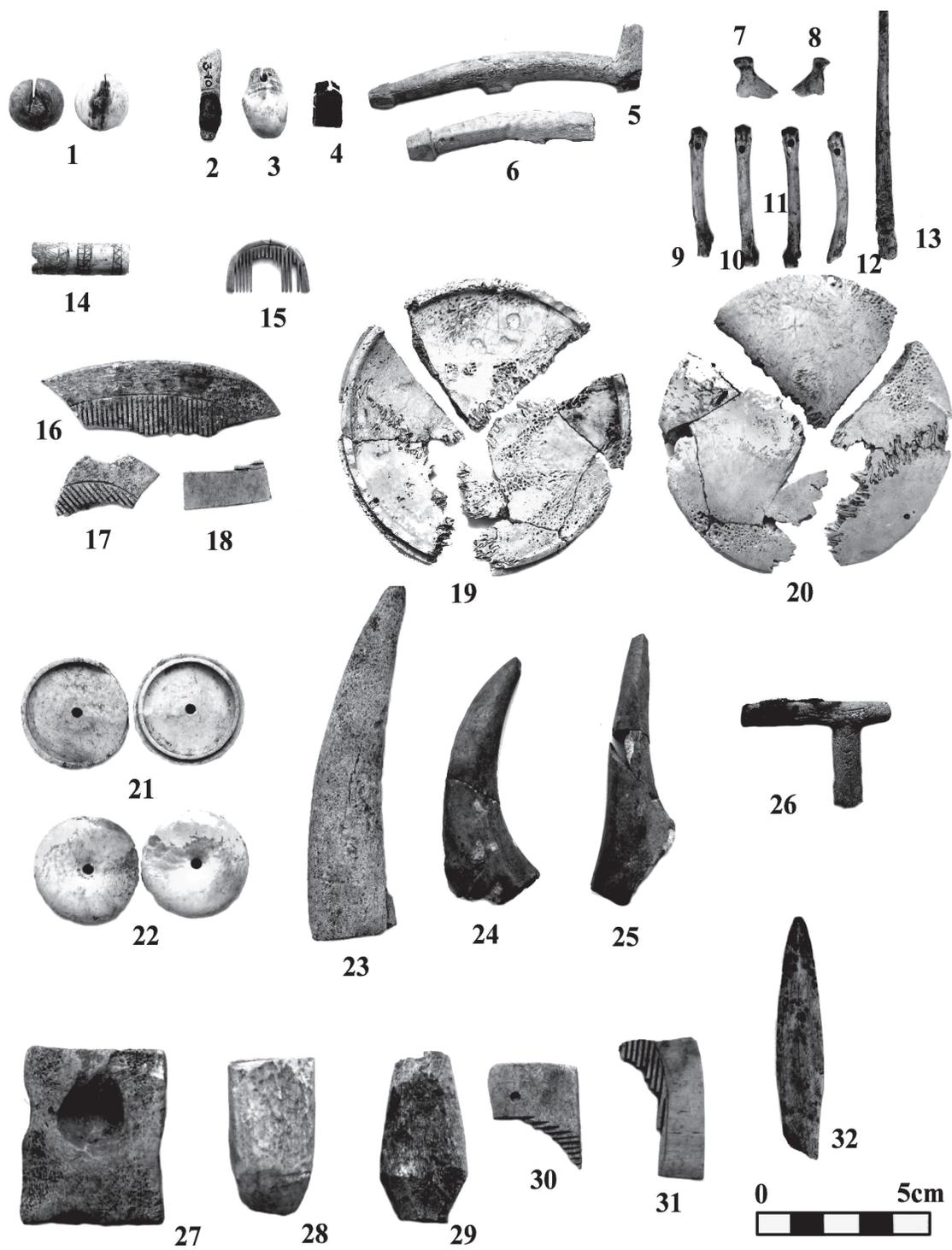


Fig.10. Artifacts of Bohai culture.

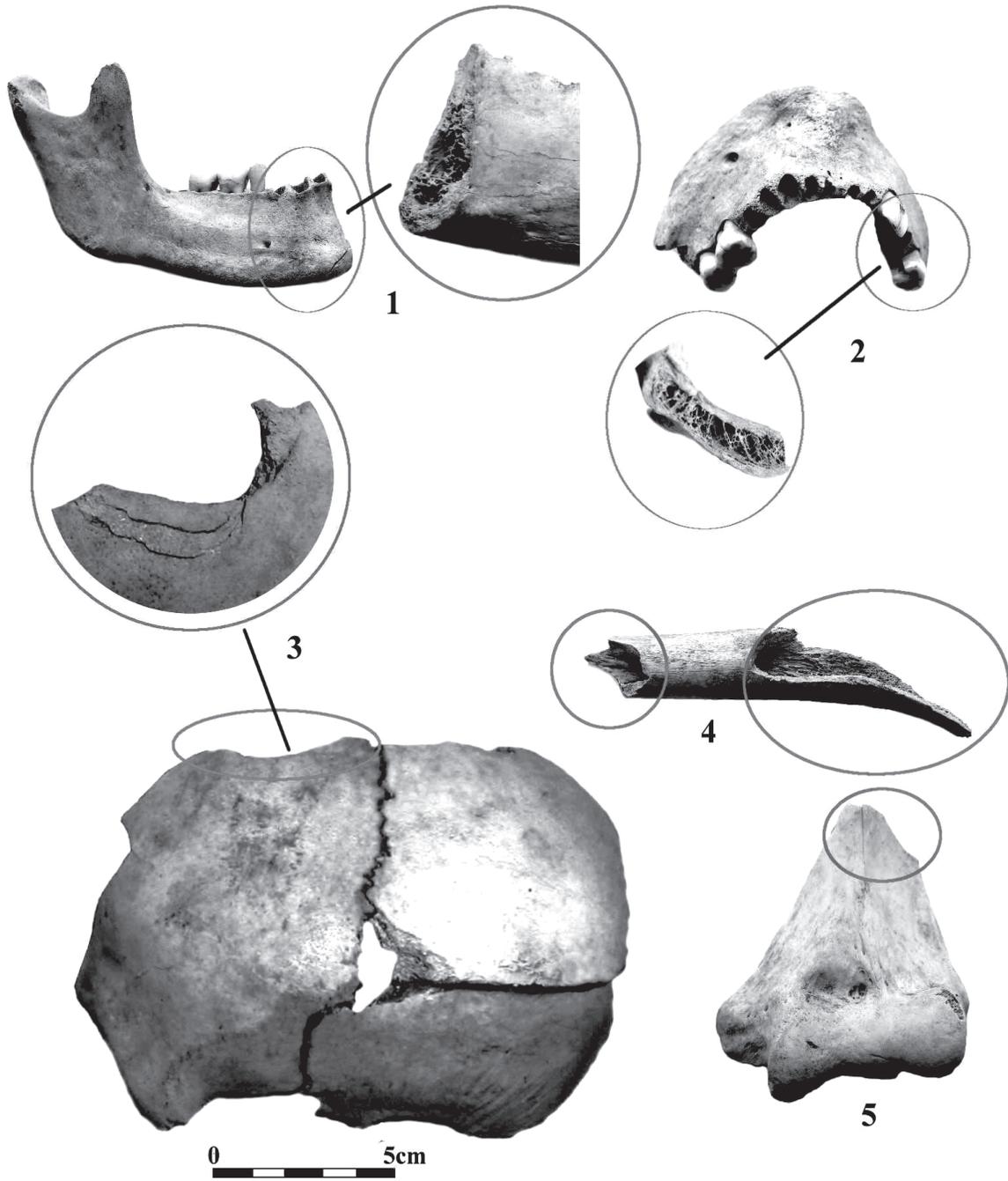


Fig.11. Human remains of Bohai culture.