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Reviewed Article:

# The Process of Making Schist Axes of Paja Ul De$^{ʔ}$ŋ – “The People of Big Water”

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Paja Ul De$^{ʔ}$ŋ [padʒaulʹdeʔŋ] “The People of Big Water” is a conventional and compact name given to Neolithic inhabitants of the territories of Saint Petersburg and the Leningrad region in their hypothetical reconstructed language (it is possible to state that these people spoke a language that was very close to Yeniseian languages). Paja Ul De$^{ʔ}$ŋ made axes/adzes mainly of schist, a process that takes approximately a day of continuous work. If a stone is of oval shape and is relatively soft, an axe can be made in two or three hours. However, the harder

the stone the stronger the axe. A heavier axe made of a harder stone with a wedge profile is more convenient for cutting a tree than a lighter axe with parallel sides made of relatively soft stone.

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## Introduction

Paja Ul Deʔŋ [padʒaul'deʔŋ] "The People of Big Water" is a conventional and compact name given to Neolithic people who lived on the coasts of Lake Ladoga and the Littorina Sea in their hypothetical reconstructed language. It is possible to state that these people spoke a language that was a cross between the Yeniseian family and the West Caucasian and Hattic languages (for more details see: Akulov, 2020a; 2020b). While his is arguably an invention of an ethnicity (much like the Minoan culture can be seen as an invention of an ethnicity), we must be able to name a culture/society using a convenient and compact designation in order to speak about it. (See Figure 1)

In historical science it is generally supposed that it is possible to speak about ethnic groups only from modern times, and that it is allegedly incorrect to speak about ethnic groups in relation to prehistoric times. However, in the Neolithic period languages of modern type were already utilised that were direct ancestors of current languages/groups/families, so it is possible to say that different ethnic groups (i.e.: groups speaking different languages and living in different territories) can be identified and defined in the Neolithic period.

This paper focuses on the reconstruction of the manufacturing process of a typical Paja Ul Deʔŋ stone axe.

## Stone Axes and Adzes of Paja Ul Deʔŋ

Many Neolithic sites have been discovered in the territories of Saint Petersburg and the Leningrad region. In this paper I am going to focus my attention on stone axes and adzes from these sites which are located directly on the territory of Saint Petersburg and its immediate vicinity. (For more information about stone axes and adzes found in Neolithic sites from the region, see: Akulov, 2019.)

### Adzes from the site of Okhta 1

The site of Okhta 1 (its location can be seen in Figure 2) was discovered in 2008 by an expedition of the Institute of the History of Material Culture of Russian Academy of Science in

Saint Petersburg (Gusentsova and Sorokin, 2011, p.421). Neolithic layers of the site date from the 5th millennium BCE – to the beginning of the 4th millennium BC (Gusentsova and Sorokin, 2011, p.422). The site of Okhta 1 is not a settlement as in the Neolithic era it was a shallow bay of the Littorina sea (Nikitin, 2010, p.163), and it was used by Neolithic people as a place for fishing (Bazarova, et al., 2010, pp.173-174). Stone tools found in the site were made of materials such as flint, quartz, schist, and sandstone (Gusentsova and Sorokin, 2011, p.429).

About 20 adzes/chisels/axes have been found at the site, all of which have been made of schist (Gusentsova and Sorokin, 2011, p.430). All adzes/axes from Okhta 1 are trapezoidal/rectangular in form, and their average length is approximately 10 – 12 cm, while their width is approximately 3 – 5 cm (See Figure 3).

## Axes and adzes from the site of Tarkhovka

The site of Tarkhovka was discovered by G.P. Sosnovskii and M. Ya. Rudinskii in 1916, who later returned to explore the site (in 1917 – 1929) with B. F. Zemlyakov, A. A. Spitsyn, V. V. Fedorov, A. V. Shmidt, and P. P. Efimenko (Gurina, 1961, p.422). The site was dated to c.1500 BCE (Gurina, 1961, p.64), placing it in the late phase of the Neolithic period. Four relatively small adze-like tools made of schist (see Figure 4) have been found at the site of Tarkhovka, two of which are fragmented (samples 3 and 4; See Figure 4). All have been badly polished up (Gurina, 1961, p.424). An additional chisel-like tool (See Figure 5) with a rectangular cross-section was also recovered from this site (Gurina, 1961, p.424).

According to the classification elaborated upon by Semenov (1957, pp.157-164), stone axes usually have symmetrical working ends (See Figure 6) which often have a reduction on only one side, and the strokes received from the work are located at an angle to the blade (Gurina, 1961, p.338). Unlike axes, adzes have an asymmetric end (See Figure 6), a relatively equal degree of reduction of the blade, and traces of work in the form of small strokes that are perpendicular to the edge of the blade (Gurina, 1961, p.340).

Adzes also differ from axes in the way they are attached to the handle: the sharp edge of an axe is parallel to the line of the handle (See Figure 7), while the sharp edge of an adze is perpendicular to the line of the handle (See Figure 8).

## Axes and adzes from the site of Hepojarvi

The site of Hepojarvi was excavated by I. V. Vereschagina in 1978. The settlement was active from 5314 cal BC to 2342 cal BC. Over 2.5 thousand stone items were found on the site, most of which (1855 items) are flakes and small fragments (Vereschagina, 2003, p.149).

At the site a well-polished adze made of schist (See Figure 9) was found. This adze has an almost rectangular shape and triangular cross-section (Vereschagina, 2003, p.149). Five axes

were also found, four of which are made of schist. An example of this axe type is shown in Figure 10 and has a triangular outline and a strongly worked blade. The remaining axes made of schist are just fragments (Vereschagina, 2003, p.149). Only one axe of rectangular form was made of granite (See Figure 11) with thorough grinding of blade and sides (Vereschagina, 2003, p.149).

Thus, we can see that the overwhelming majority (30 items of 31) of the above considered axes and adzes in this area in this period were made of schist.

There is a widespread stereotype that Stone Age people used flint tools. However, based on the material of the above sites we can see that Paja Ul De$^{\text{ʔ}}$ŋ did not make adzes/axes of flint. There is almost no flint in the territories of Saint Petersburg and Leningrad, and therefore, 'The People of Big Water' used the available material (different types of schist) for manufacturing adzes and axes, while flint was usually brought from afar and was used mostly for small tools (arrowheads, knife blades and alike items).

## A Reconstruction of the Process of Making a Schist Axe

It is possible to state that Paja Ul De$^{\text{ʔ}}$ŋ unlikely undertook journeys to some remote canyons to find suitable stone. It was enough for them to go to the shore of the Littorina Sea or to the shore of the ancient Ladoga Lake and to look for suitable materials there. It is possible to speak about the principle of economy of efforts, this principle exists in any culture in varying degrees; in its most generalized form, this principle can be formulated in the following way: if some acceptable result can be achieved in two ways, then the simpler way will be more likely to be chosen.

Even now it is not difficult to find a suitable stone (See Figures 12 and 13).

Initially the general contour of the future tool is formed by the technique of pecking, i.e.: the stone is tapped by another stone, unnecessary parts are beaten in order to give the schist stone a sub-rectangular shape (See Figures 14 – 18).

When the shape of the stone becomes more or less rectangular it is possible to grind off asperities and form the blade (See Figures 19 – 33).

Schist stone is very hard and so the axe had to be made in several stages, with the whole process taking approximately 35 – 40 hours. The stage of pecking took about four to hours and the rest of the time was spent grinding.

Usually making an axe of schist stone takes about a day of continuous work. If the unworked stone is already of a suitable oval shape without prominences and foreign inclusions, and if it is relatively soft, then less time can be spent in its production. It is possible to turn a stone into an axe even in two or three hours. On the other hand, the harder is the stone the

stronger is the axe: it holds the sharp edge longer, edge does not chip or break on impact, edge cuts deeper (See Figure 34).

The axe received during the above-described experiment was made of relatively hard schist and has pretty wedge profile and so it cuts a tree almost like a modern metal axe (see Pepe Mantani, 2020). This axe is a result of one of the most successful experiments. Using this axe it is possible to cut a tree of about 10 cm in diameter in 3 minutes.

During summer and autumn 2020 I made several stone axes and performed several experiments of cutting a tree with stone axes. And I can say that it is more difficult to cut a tree with a thinner axe which sides are more parallel (See Figures 35 and 37).

This thin axe with parallel sides was made of a relatively soft schist stone of almost oval shape, the stone was converted into an axe in two to three hours. This axe does not hold its sharp edge well and its sharp edge can chip. Also such axe actually doesn't cut wood, but crumples fibres of wood, turns them into a bast (See Figure 36), and cutting a tree of about 10 – 15 cm in diameter with such axe can take about 30 – 40 minutes.

## Conclusion

Thus, it is possible to summarize that a heavier axe made of a harder stone with more wedge profile is more convenient for cutting a tree than a lighter axe made of a softer stone with sides which are more parallel.

However, it is possible to say that if there was a need, an axe could be made of almost any schist stone.

And generally, the production of schist axes/adzes was a relatively simple matter for Paja Ul De$^{ʔ}$ŋ as any person having the appropriate material to hand could produce as many axes as were needed in a relatively short period of time.

Keywords axe
stone
tools

Country Russia

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## Gallery Image

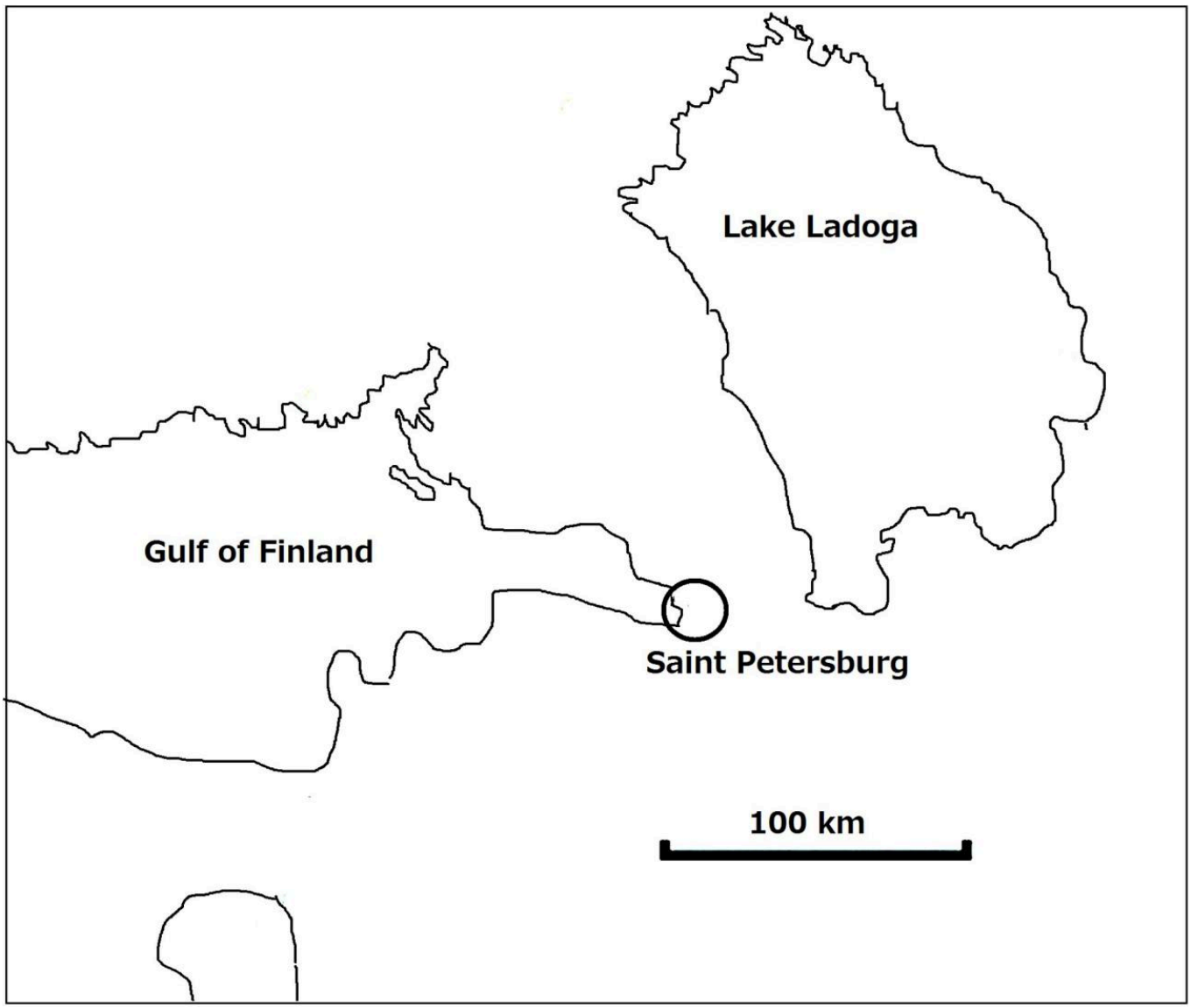


FIG 1. THE REGION WHERE PAJA UL DE?Ŋ LIVED. PICTURE DRAWN BY ALEXANDER AKULOV

FIG 2. MAP SHOWING LOCATIONS OF NEOLITHIC SITES MENTIONED IN THE TEXT. PICTURE DRAWN BY ALEXANDER AKULOV

FIG 3. SCHIST ADZES FROM THE SITE OF OKHTA 1 (GUSENTSOVA AND SOROKIN, 2011, P.445)

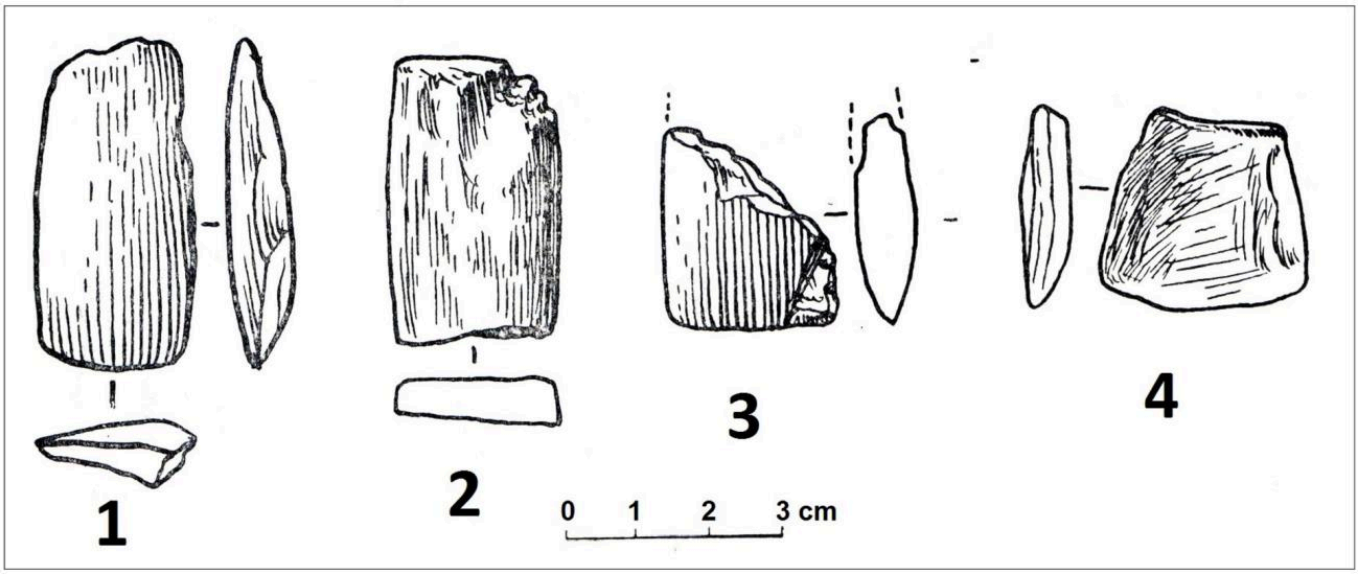


FIG 4. FOUR ADZE-LIKE SCHIST TOOLS FROM THE SITE OF TARKHOVA (GURINA, 1961, P.425)

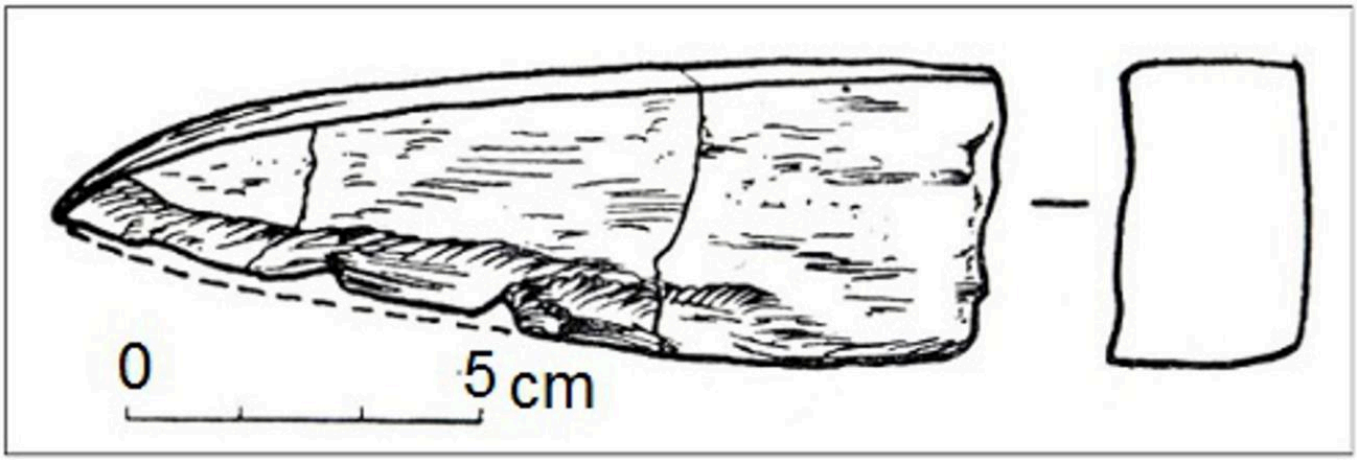


FIG 5. A CHISEL-LIKE STONE TOOL FROM THE SITE OF TARKHOVKA (GURINA, 1961, P.425)

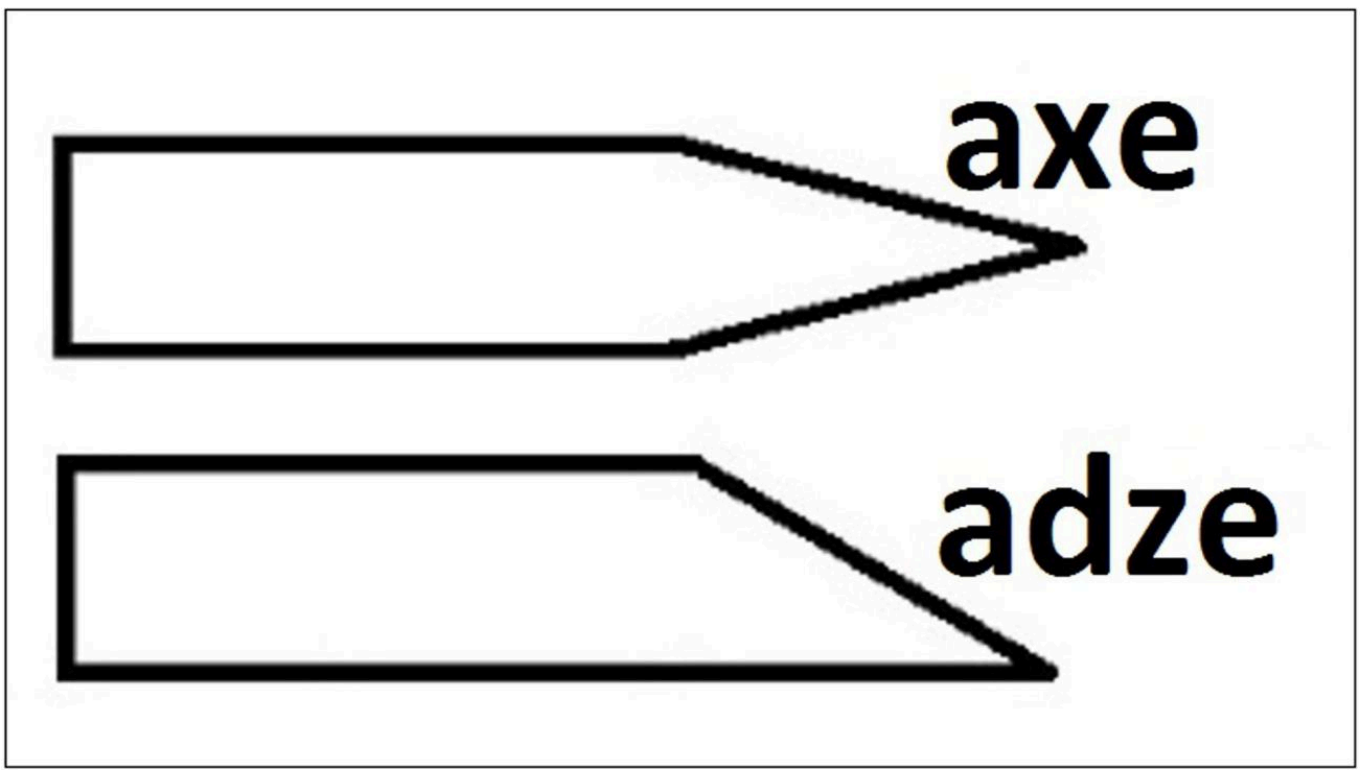


FIG 6. A SCHEME REPRESENTING THE DIFFERENCE BETWEEN AXE AND ADZE PROFILES. PICTURE DRAWN BY ALEXANDER AKULOV

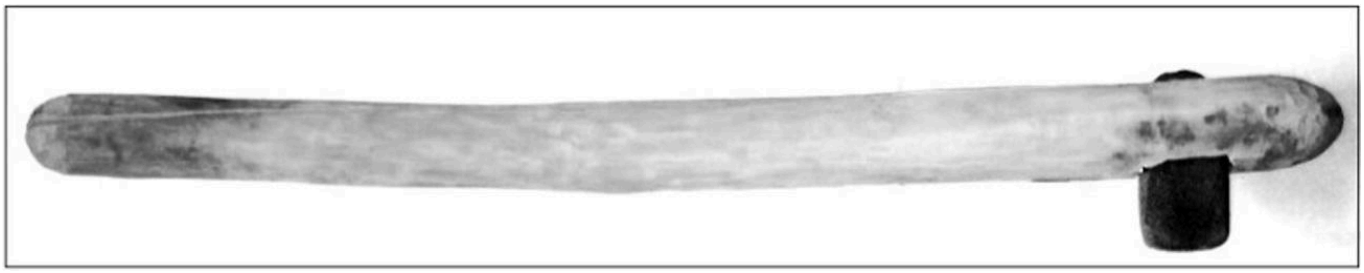

FIG 7. AN AXE INSERTED INTO A HANDLE. PHOTO BY ALEXANDER AKULOV

FIG 8. AN ADZE ATTACHED TO THE HANDLE BY A BONE COUPLING/SLEEVE. PHOTO BY ALEXANDER AKULOV

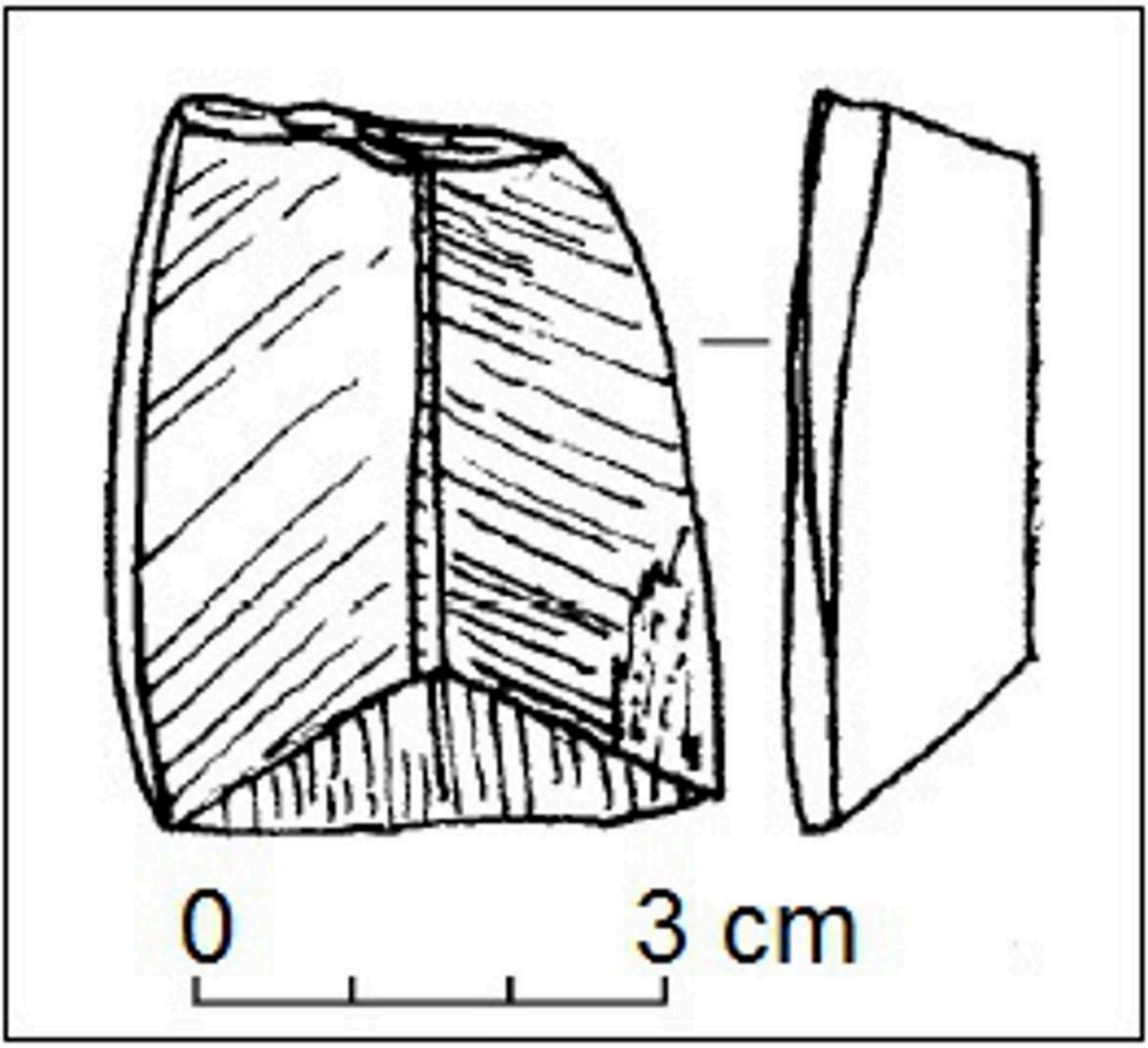

FIG 9. A SCHIST ADZE FROM THE SITE OF HEPOJARVI (VERESCHAGINA, 2003, P.150)

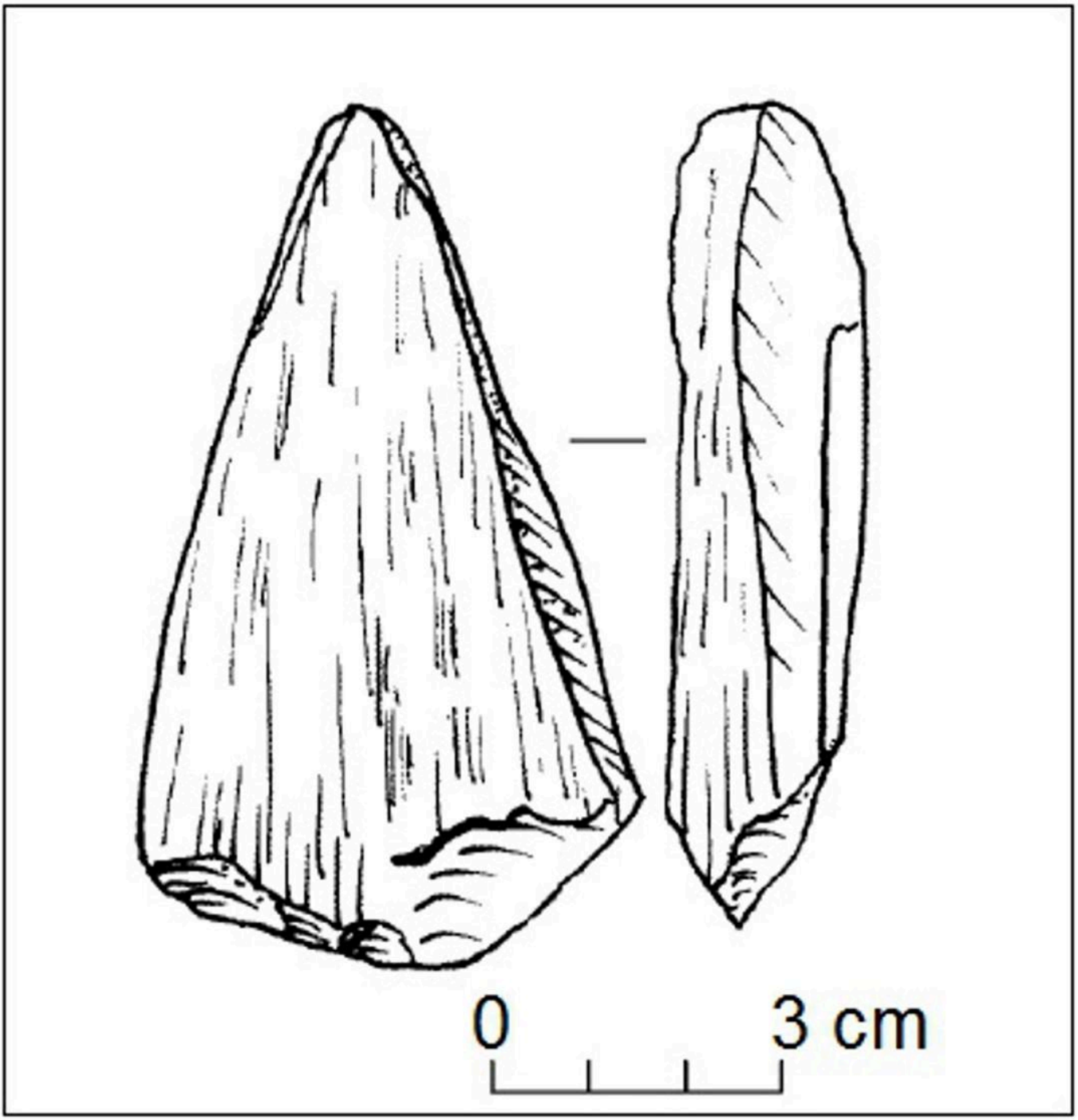


FIG 10. A SCHIST AXE FROM THE SITE OF HEPOJARVI (VERESCHAGINA, 2003, P.150)

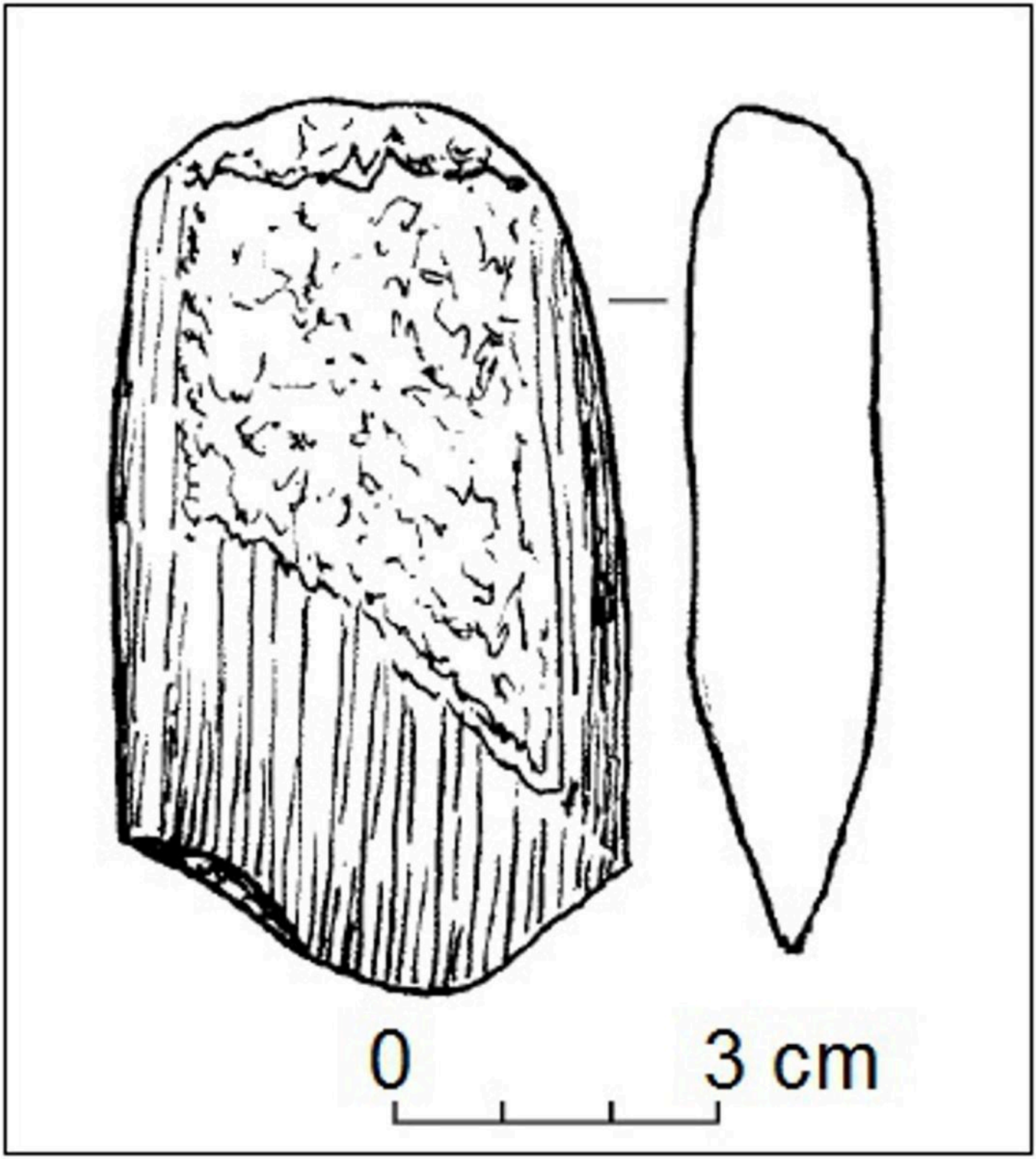


FIG 11. AN AXE MADE OF GRANITE (VERESCHAGINA, 2003, P.150)

FIG 12. A SUITABLE SCHIST STONE ON THE SHORE OF LAKE LADOGA. PHOTO BY ALEXANDER AKULOV

FIG 13. A GENERAL VIEW OF THE FOUND STONE. PHOTO BY ALEXANDER AKULOV

FIG 14. INITIAL PECKING OF THE SCHIST STONE BY A GRANITE STONE. PHOTO BY ALEXANDER AKULOV

FIG 15. PECKING OF A SIDE EDGE BY A LARGE FLAT GRANITE STONE. PHOTO BY ALEXANDER AKULOV

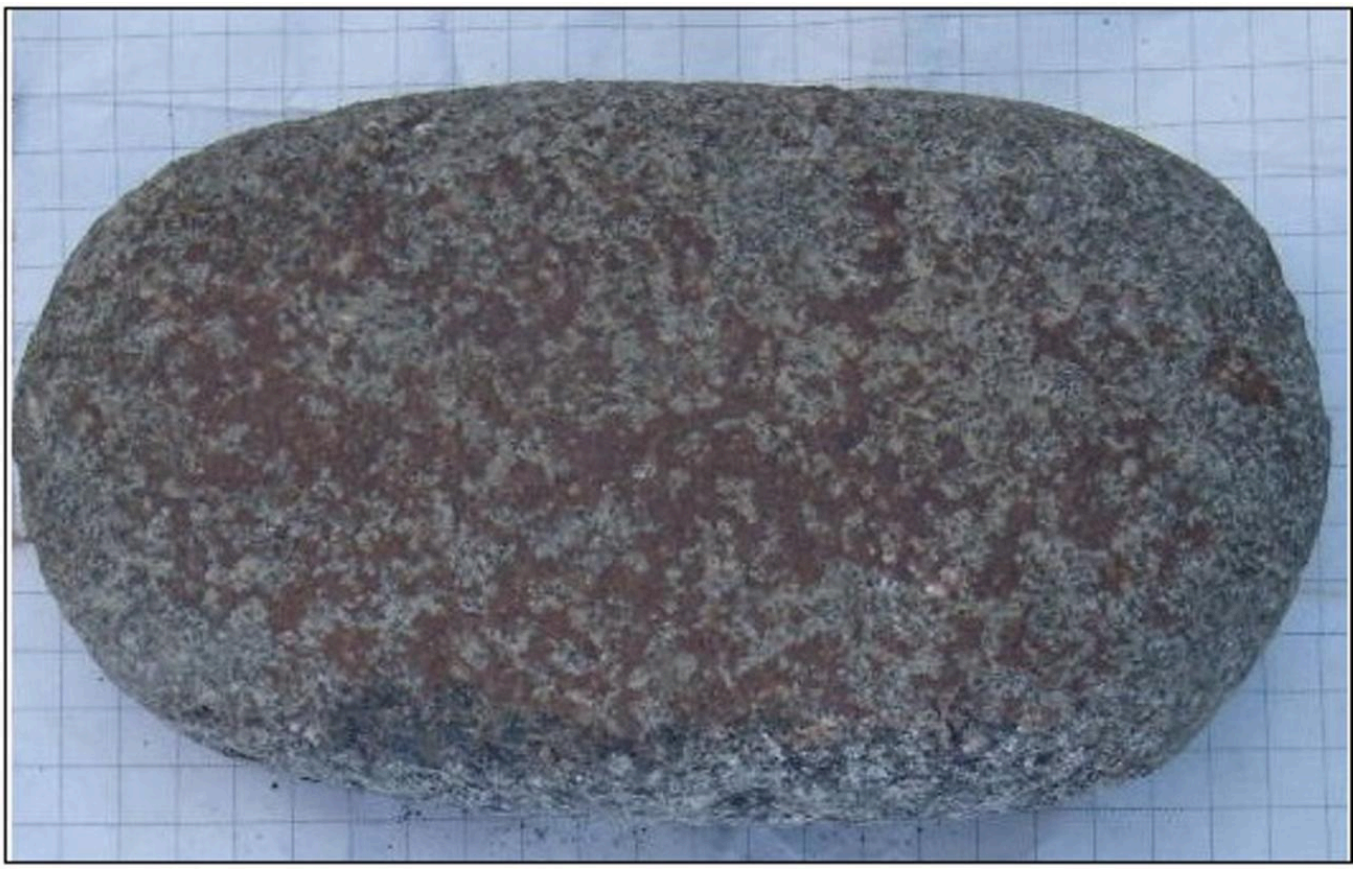

FIG 16. THE RESULT OF THE FIRST PECKING. PHOTO BY ALEXANDER AKULOV

FIG 17. PECKING OF THE FUTURE WORKING END. PHOTO BY ALEXANDER AKULOV

FIG 18. THE RESULT OF THE SECOND PECKING. PHOTO BY ALEXANDER AKULOV

FIG 19. GRINDING THE STONE WITH WET SAND. PHOTO BY ALEXANDER AKULOV

FIG 20. THE RESULT OF THE FIRST GRINDING. PHOTO BY ALEXANDER AKULOV

FIG 21. DRY GRINDING. PHOTO BY ALEXANDER AKULOV

FIG 22. A DRY GRINDING AGAIN. PHOTO BY ALEXANDER AKULOV

FIG 23. CONTINUING OF GRINDING WITH WET SAND. PHOTO BY ALEXANDER AKULOV

FIG 24. CONTINUING OF DRY GRINDING. PHOTO BY ALEXANDER AKULOV

FIG 25. GRINDING OFF PROTUBERANCE . PHOTO BY ALEXANDER AKULOV

FIG 26. CONTINUE OF DRY GRINDING. PHOTO BY ALEXANDER AKULOV

FIG 27. AN INTERMEDIATE RESULT OF GRINDING. PHOTO BY ALEXANDER AKULOV

FIG 28. GRINDING WITH WET SAND. PHOTO BY ALEXANDER AKULOV

FIG 29. GRADUALLY THE STONE RECEIVES THE DESIRABLE SHAPE. PHOTO BY ALEXANDER AKULOV

FIG 30. GRINDING WITH WET SAND. PHOTO BY ALEXANDER AKULOV

FIG 31. FINAL GRINDING WITH WET SAND. PHOTO BY ALEXANDER AKULOV

FIG 32. GENERAL VIEW OF THE RECEIVED AXE. PHOTO BY ALEXANDER AKULOV

FIG 33. WORKING EDGE/BLADE OF THE AXE. PHOTO BY ALEXANDER AKULOV

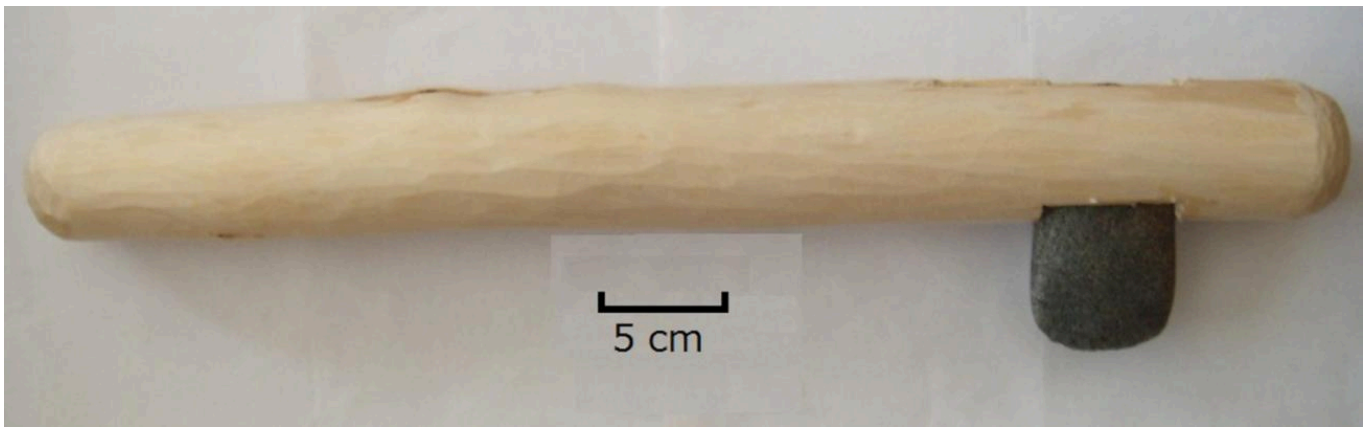


FIG 34. THE AXE INSERTED INTO A HANDLE. PHOTO BY ALEXANDER AKULOV

FIG 35. A THIN AXE WITH PARALLEL SIDES MADE OF A SOFTER SCHIST. PHOTO BY ALEXANDER AKULOV

FIG 36. THE RESULT OF CUTTING A TREE WITH A LIGHTER AXE WITH PARALLEL SIDES. PHOTO BY ALEXANDER AKULOV

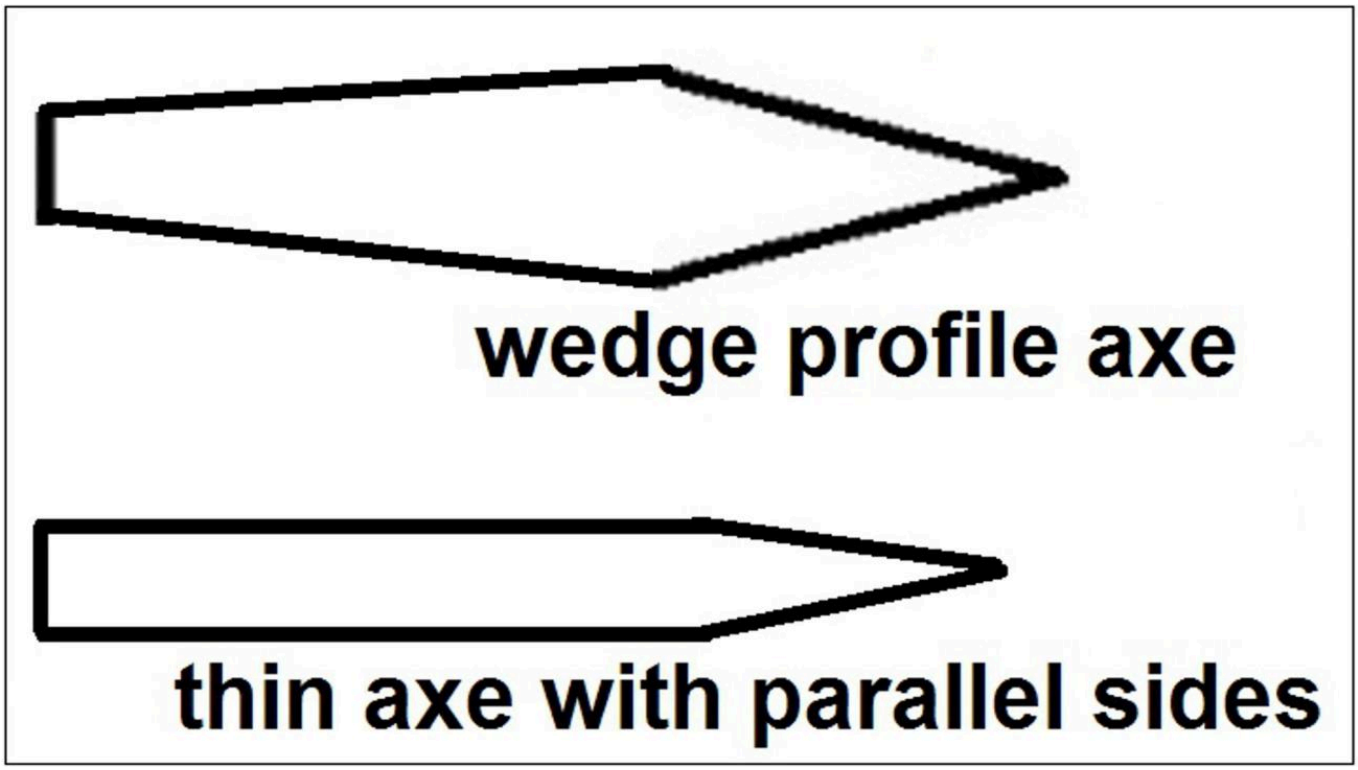


FIG 37. THE SCHEME ILLUSTRATING THE DIFFERENCE BETWEEN WEDGE PROFILE AXE AND AXE WITH PARALLEL SIDES. PICTURE DRAWN BY ALEXANDER AKULOV