Scraping seal skins with mineral additives

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RETOLD project - Photogrammetric recording of a shed at the Museumsdorf Düppel in Berlin (Germany). It is important to catch all sides in great detail. Photo by Roeland Paardekooper.

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SCRAPING SEAL SKINS WITH MINERAL ADDITIVES

| Lasse van den Dikkenberg, Diederik Pomstra and Annelou van Gijn

Fig 1. Scraping the sealskin with sand. Photo by Lasse van den Dikkenberg.

In the years 2021-2025, **Leiden University** is coordinating *Putting Life into Late Neolithic Houses*. **EXARC** is one of the partners. This project is funded by the Dutch Research Council NWO (AIB.19.020). For more information see https://www.puttinglife.com

Neolithic scrapers from the Vlaardingen Culture (3400-2500 BC) display a variety of hide-working traces, amongst which traces interpreted as being the result of contact with dry hide. It has been suggested that, potentially, some of these implements were used to scrape fatty hides with mineral additives. Therefore, a series of experiments were set up to better understand the use-wear traces resulting from scraping fatty hides with mineral additives.

Introduction

Use-wear traces on flint scrapers from the Late Neolithic and the Bronze Age in the Netherlands have frequently been interpreted as being the result of scraping hides with mineral additives (Houkes *et al.*, 2017, p.187; Van Gijn, 1990, p.140; Van Gijn and Niekus, 2001, p.311). It is thought that the minerals were added to absorb fat during the scraping of hides from fur bearing animals. These animals have a fatty layer underneath their skins, and this layer is difficult to clean without the use of these additives (Van Gijn, 2010, p.79).

These traces are occasionally found but are still poorly understood. It has therefore been suggested that more experiments are needed to better understand these traces (Van Gijn and Niekus, 2001, p.311). This paper presents a series of experiments, where we scraped sealskins, using sand or clay to remove the fat. It will also present the analysis of the scrapers from Hekelingen III. It was suggested that some of these might have been used to scrape fatty hides with mineral additives. This study is part of the research project *Putting Life into Late Neolithic Houses*: Investigating domestic craft and subsistence activities through experiments and material analysis. The project aims to provide a detailed analysis of domestic life in the Late Neolithic Vlaardingen Culture (3400-2500 BC). In the project scientists collaborated closely with volunteers of the archaeological educational centre of Masamuda in Vlaardingen (The Netherlands).

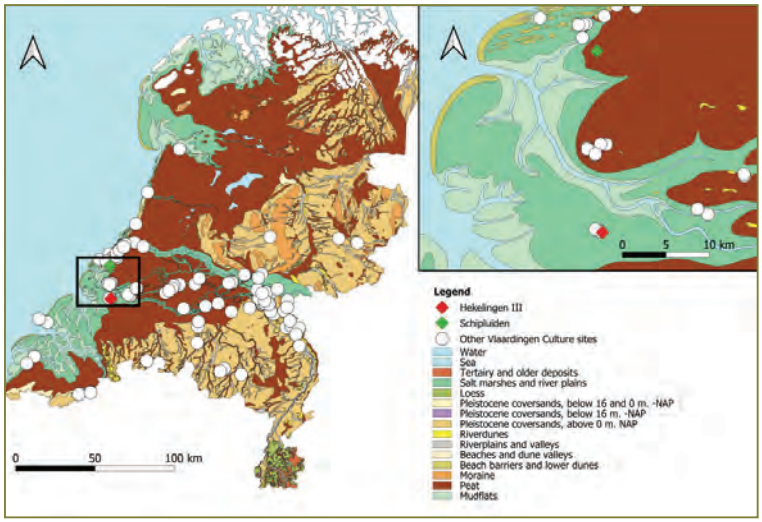

Fig 2. Location of Hekelingen III and Schipluiden plotted on the palaeographic map of the Netherlands circa 2750 BC with other Vlaardingen Culture sites illustrated in white. On the map Schipluiden appears to be plotted in the peatlands, presumably because the palaeographic environment plotted on the map is of a later date than the site itself (after: Vos, *et al.*, 2020).

Vlaardingen Culture

This study aimed to gain insight into the variability in hide-working traces on flint scrapers from the Neolithic Vlaardingen Culture (3400-2500 BC). However, the results are also applicable to the study of other periods and regions. Sites from the Vlaardingen Culture are mainly located in the wetland areas of the western Netherlands. These sites are characterised by a wide diversity in terms of subsistence strategies and their location within the landscape. It is thought that the sites in the coastal dune area are generally permanently inhabited while those on the levees consist of temporary camps (Raemaekers, 2003, p.744).

The site Hekelingen III, located in the western Netherlands (See Figure 2), is thought to represent a temporary camp, notably focussed on fishing and hunting (Raemaekers, 2003, p.744; Van Gijn, 1990). It was suggested that the 'dry hide' scrapers could have been used to scrape fresh hides of fur bearing animals with fat-absorbing additives (Van Gijn, 1990, p.129). If this is indeed the case, the assemblage only yields traces related to the initial stages of hide-working (cleaning of fresh hides). It could be argued that the dried hides are then subsequently taken elsewhere for further processing. The presence of specific types of hide-working traces, and therefore hide-working processes, could thus provide an indication of the duration of occupation on settlements. On temporary hunting camps we would expect only traces of scraping fresh hides, or, if fur bearing animals were hunted, we could expect traces of scraping hides with additives (Van Gijn, 1990, p.129).

Previous Studies

Experiments with scraping hides with additives are scarce. The published experiments relate to experiments where hides were scraped with ochre to dye the hides. Here isolated spots of well-developed smooth and matt polish, or a wide band of highly linked bright and matt polish, occasionally with striations, were observed on the working edges of the tools

Fig 3. Removing the blubber with flakes. Photo by Lasse van den Dikkenberg.

(Van Gijn, 1990, p.29). In other studies, the archaeological traces are characterised as a band of rough polish with small spots of bright reflective polish (Houkes, *et al.*, 2017, pp.187-9). Recent experiments, however, indicate that these isolated spots of polish also occur during the dehairing of hides (Petrogiannaki, 2022, p.49).

To better understand these traces, a new set of experiments was set up. The aim was to use mineral additives which were widely available. We chose to use sand and clay as additives. Sealskins were chosen because sealskins are notoriously fatty, therefore we expected that additives would help well with absorbing the fat during scraping.

Methods and materials

The skins were donated to the project by Zeehonden Centrum Pieterburen and they belonged to two young common seals (Phoca vitulina), who had died of natural causes. The experiments were conducted by volunteers from the archaeological open-air museum Masamuda. The sand used in the experiments was obtained from river deposits near Heveadorp. The clay was locally sourced in Vlaardingen from prehistoric river clay deposits. The sand and clay were not processed before use.

The seals were already skinned with metal tools, but before the actual scraping could take place the thick layer of blubber (fat) under the skin had to be removed first (See Figure 3). For these experiments we used five unmodified flakes, made of fine-grained Scandinavian flint. After the blubber was removed, incisions were made along the edge of the skins with another flint flake. Then, the skins were stretched on a wooden frame. The frames were laid on the ground and sprinkled with either sand or clay. Next the skins were scraped, and more additives were applied when needed (See Figure 1). For these experiments four scrapers inserted in wooden hafts with leather bindings were used.

For all tools the duration of use was noted as well, as the activity for which they were used. After use they were cleaned using detergent, water, and alcohol. The archaeological tools were cleaned in a similar manner. The use-wear traces on the experimental and archaeological scrapers were studied and photographed using a Leica DM6000 metallographic microscope.

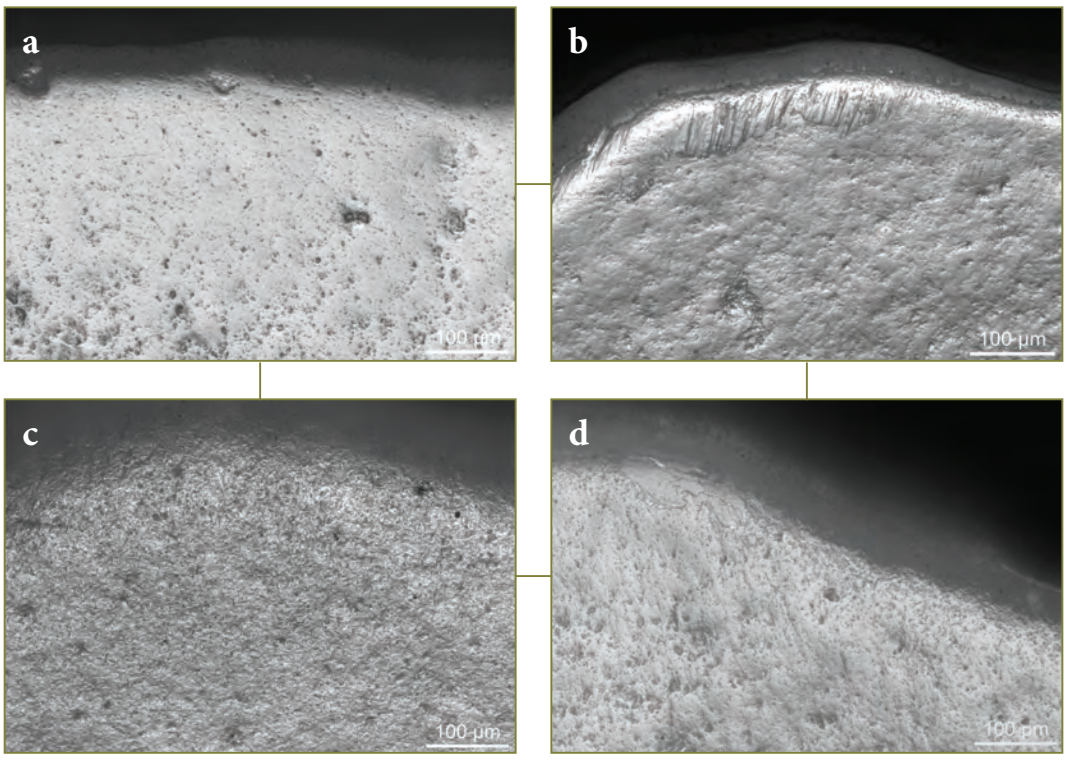

Fig 4. (a)Highly linked band of smooth and matt polish, more rough and matt near the edge of scraper 2262 used to scrape hide with clay; (b) Highly linked band of smooth and matt polish with perpendicular striations on scraper 2253 used to scrape hide with sand; (c) Highly linked band of rough and matt polish scraper 2259 used to scrape hide with sand; (d) Highly linked band of smooth and matt polish, more rough near the edge with clear transverse directionality on scraper 2254 used to scrape hide with clay. Images by Lasse van den Dikkenberg.

Experiment number	Duration of use	Polish	Directionality
2252	152 minutes	Band of rough and greasy polish	No clear directionality
2256	142 minutes	Thin band of rough & greasy polish gradually fading, meat/fresh hide like	Diagonal directionality
2257	142 minutes	Thin band of rough & greasy polish gradually fading, meat/fresh hide like	Diagonal directionality
2258	152 minutes	Weakly developed rough & greasy	No clear directionality

Table 1. Blubber cutting experimental flakes, duration, polish, and directionality descriptions.

Use-wear Traces on the Unmodified Flakes

Despite the duration of use (more than two hours per experiment), the use-wear traces resulting from removing the blubber were limited. The use-wear traces on the experimental flakes can be characterised as a vague band of rough and greasy polish along the edge (See Table 1).

Occasionally, some diagonal directionality was noted which hinted at a cutting motion. In general, the polish looked like the polish that is attributed to cutting soft animal materials. This hide-processing stage thus does not create characteristic use-wear traces. Archaeologically, the traces would either be classified as meat cutting polish, fresh hide cutting polish, or the traces would simply be missed because this very weakly developed polish can easily be overlooked.

Microscopic handling traces were not found on the unmodified flakes. However, it was noted that, due to the interaction with the grease, the chalk cortex on the flakes largely dissolved during the cutting of the blubber. Archaeologically, this will be difficult to take into account.

Another flake was used to cut holes in the hides, after the blubber was removed (EXP 2261). The experimental tool was used only for twenty minutes. Only a weakly developed band of rough and greasy polish could be observed. It is unlikely that such traces would be identified correctly on archaeological artefacts.

Use-wear Traces on the Scrapers

Two scrapers were used on a seal skin with sand as an additive, the other two were used to scrape the skins with clay (See Table 2). All four scrapers displayed a wide zone with macroscopically visible gloss along the edge. This macroscopic gloss was previously also identified on an experiment by Van Gijn in which a fresh deerskin was scraped with ochre (Van Gijn, 1994, pp.181-183).

The edges of all scrapers were heavily rounded (See Figure 4). The polish could be characterised as either a smooth and matt or a rough and matt highly linked band of polish, often as a combination of both. Experiment 2253 also displayed zones with clear perpendicular striations.

A clear distinction between the scrapers used to scrape hide with clay and those used to scrape hide with sand could not be made. Both are characterised as a highly linked band of smooth and matt and/or a highly linked band of rough and matt polish, with heavy edge rounding, transverse directionality and occasionally by the presence of striations. It seems that the rougher polish, which is mostly observed directly on the edge, is caused by direct contact with the hide. The smoother polish is likely caused by contact with the additives. As a group these traces can be clearly distinguished from other hide-working processes. The extreme rounding in combination with a highly linked, extremely invasive, band of polish which is also visible macroscopically is not observed on other types of hide-working experiments (Petrogiannaki, 2022, pp.48-50; Van Gijn, 1990, pp.28-30).

Experiment number	Duration of use	Additives	Polish	Directionality
2253	58 minutes	Sand	Spread of smooth & matt polish with a more rough & matt polish along the edge combined with heavy rounding. Also with parallel striations.	Transverse directionality
2259	58 minutes	Sand	Spread of rough & matt polish gradually fading. Heavy edge rounding.	Transverse directionality
2254	48 minutes	Clay	Spread of smooth & matt polish. More rough & matt near the edge. Heavy edge rounding.	Transverse directionality
2262	48 minutes	Clay	Spread of smooth & matt polish with heavy edge rounding. Polish more rough & matt and cratered near the edge.	Transverse directionality

Table 2. Results of the experiments with scraping hides with additives.

Scrapers from Hekelingen III

The scrapers from Hekelingen III were originally studied by Van Gijn (1990). The scrapers which were interpreted as 'dry hide' scrapers were analysed again (1990, p.140). In total, 98 scrapers and three scraper/borer combination tools were analysed. Of these 52 scrapers and all scraper/borer combination tools yielded use-wear traces. The borers were used to drill shell, bone and wood. Interestingly, seven scrapes also yielded used zones related to cutting, sawing or carving bone. The majority (N=34) of used zones were related to transverse motions.

The dry hide scraping traces on the scrapers from Hekelingen III did not resemble the traces from the experiments with seal skins. The traces most closely resemble those from scraping dry or drying hides (Van Gijn, 1990, p.29: see figure 13c).

Interestingly, in one instance small, isolated spots of polish could be observed. These traces were consistent with those observed on experimental scrapers used for dehairing dry hides (Petrogiannaki, 2022, pp.48-50). This scraper was thus interpreted as having been used to dehair animal hides. Furthermore, it should be noted that hafting traces were observed on seven scrapers in the assemblage.

Discussion and Conclusion

The aim of our experiments was to allow us to better distinguish between different hide-working processes on archaeological sites. The use-wear traces on the flint scrapers were well developed after approximately fifty minutes. A macroscopically visible band of gloss developed, which microscopically could be characterised as a highly linked, invasive wide band of smooth and matt, or rough and matt, polish with a clear transverse directionality. These observations were used to reanalyse the 'dry hide' scrapers from the Late Neolithic site Hekelingen III. The aim was to test the suggestion that the dry hide scraping traces might have resulted from scraping fatty hides with additives. It could be concluded that the traces on these scrapers did not resemble those from this activity. They were akin to traces resulting from scraping dry or drying hides. It is likely that these scrapers were used to soften dry hides. In one case the traces were interpreted as traces of dehairing hides. Interestingly, the use-wear traces on a flint tool from the Middle Neolithic site of Schipluiden, located in the western Netherlands, did yield traces which were very similar to those observed on the scrapers used to scrape the seal skins with additives. The polish on this tool was distributed as a highly linked wide band along the edge of the tool (Van Gijn, *et al.*, 2006, pp.156-7). The polish could be characterised as a band of smooth and matt polish along the edge with a clearly visible transverse directionality. On the original use-wear form it is mentioned that the band of polish was visible with the naked eye. The microscopic traces are comparable to those from the sealskin scraping experiments (Figure 10). This site also yielded bones of fur bearing animals, including bones of common seals (Phoca vitulina). It seems plausible that this tool was indeed used to scrape fatty hides with clay or sand. For the Vlaardingen Culture it can be concluded that these traces have, so far, not been found. Based on these experiments, however, it is likely that they could now be recognised (if they are present) as the traces resulting from this process are distinctive and easy to recognise. ■

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