

Late Neolithic flint transport in The Netherlands

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Between 1959 and 1964 a Late Neolithic settlement was excavated at Vlaardingen (Van Regteren Altena et al. 1962/63). The culture was named after its findspot 'the Vlaardingen Culture'. It is dated around 2300 BC. Since, like the settlement at Aartswoud (see below), it is situated near the coast, it must be reckoned as secondary coastal-neolithic. The settlement lay in a freshwater tidal area on the bank of a wooded creek. Apart from many other finds large quantities of flint were discovered. Not the amount of flint but the number of large unused pieces of flint is important for this account. If you look at the area excavated the number of pieces of flint found is not so great. For example, if we look at cutting 16, 2 to 3 pieces of flint were found per square metre (98 artefacts and 402 flakes in an area of 219 square metres), and in cutting 11, 3 to 4 pieces of flint per square metre (76 artefacts and 569 flakes in an area of 152 square metres.) In contrast to the settlement at Aartswoud that in Vlaardingen was excavated using only the spade.

The large pieces of flint in Vlaardingen can be divided into broken artefacts (of polished axes), core pieces and cortex pieces. The large number of pieces with cortex refutes an earlier theory that only completed or nearly completed tools were traded (Clark 1965, p. 244). This theory presumably arose because many flint finds were either single finds or grave finds. It was the custom to lay tools in the grave with the deceased so that he could use them in the hereafter. It appeared from investigation of settlements that much unprocessed flint was also traded. In the settlement tools were made from this raw material. This can be seen for example in the cortex-scrapers. This unprocessed flint could have been obtained through trade, but could also have been col-

lected. Thus settlements can be divided according to their topographic situation into two groups: 1) settlements where flint was found in the catchment area and 2) settlements which had to get flint from outside their catchment area.

Since 1972 a settlement, of a slightly later date in the Late Neolithic Period, has been excavated at Aartswoud (Van Iterson Scholten 1977). The site at Aartswoud consists of a sequence of the Beaker Cultures - The Protruding Foot Beaker and the Bell Beaker Culture. The settlement lay on a mud-flat near a large bay, in treeless surroundings. On both sides of the settlement was a creek. C-14 datings are not yet available, but the subsoil on which this settlement was built was formed in the Calais IV A2 phase. This phase is dated between 2350 and 2150 BC (Ente et al. 1975, p. 12). The pottery consists mostly of Protruding Foot Beaker type 1d and All Over Ornamented type 2IIb, which dates it between 2200 and 2000 BC. (Lanting et al. 1973, p. 52-53). Here too large amounts of flint were found. Differing excavation techniques, with the spade or wet-sieving of all the excavated soil, gave differences in the number of pieces found.

In 1972 31 square metres in trench 1 were dug entirely with the spade, which produced 25 artefacts and 112 flakes. This is an average of 4-5 pieces of flint per square metre. In 1977 47 square metres of trenches 3 and 5 were entirely excavated and then wet-sieved, which gave 187 artefacts and 2260 flakes. This is 52 pieces of flint per square metre.

This seems a great many but the culture layer in Aartswoud is much thicker than that in Vlaardingen. In Aartswoud too, many large pieces of unused flint were uncovered, mainly core and cortex pieces. When large imported tools broke, they were nearly always completely reused to make smaller ones. This can possibly be ascribed to the fact that large imported tools were made of a better quality flint. From the large number of cortex-flakes it is clear that in Aartswoud too unprocessed flint was imported. (In cutting 4, for example, 328 of the 717 pieces of flint had cortex; this is about 45%). That raw flint was made into tools on the site

is evident from a find in cutting 3 (F29:106), consisting of 6 scrapers and 3 flakes, which when fitted together clearly came from two pieces of raw flint.

From the investigation of the settlements at Vlaardingen and Aartswoud it seems that large tools were imported, probably through trade, and that small tools were made in the settlement itself out of imported unused flint and broken large tools. The import of large flint tools at Aartswoud has not yet been proved directly. There are some pieces of indirect evidence in the shape of a number of flakes with polished surfaces which would have come from large flint axes. Certainly small artefacts were imported on a narrow scale at Aartswoud. These include blades of Grand Pressigny flint, and a very unusual white flint arrowhead (E34:34), which does not belong to the normal assortment of Bell Beaker arrowheads.

When we look at the large pieces of unused flint in Aartswoud and Vlaardingen the question remains of why these pieces were not used. Of course calamities such as flood or war can be given as the reason why these large pieces of flint were lost. The fact that the occupation of the settlement was of a lasting nature makes it seem likely that flint was quite easy to get hold of. Because of this it was possible to be careless with the stocks. Flint does not appear naturally in the catchment area of Vlaardingen and Aartswoud. The question is then: where did the flint come from and how were large quantities of it transported?

In order to determine the source of the flint the investigator of settlements has a useful method to aid him. It is well known that it is extremely difficult to discover the source of flint from its external characteristics. However large amounts of natural stone are also found in settlements. This natural stone was used to make tools (querns and upper stones, polishing stones, hammer stones) and as material for tempering pottery. This natural stone is not indigenous in the coastal area, it is imported. It may be assumed that flint was imported at the same time from the same traders. It is much easier to determine the source of stone than of flint. From an investigation of the natural stone in Vlaardingen it seems that it was chiefly imported from the middle reaches of the Rhine and the Meuse. The black and grey flint found in large quantities at Vlaardingen point to the same region of origin, the flint mines in the basin of the River Meuse. The flint found at Aartswoud is much more heterogeneous. Besides the black and grey flint a lot of multi-coloured flint has been found. The determination of the stone at Aartswoud (determination dr. J. SEVINK) points to Scandinavian origin. Where is the nearest deposit of this sort of stone? In the former Saalien inland ice regions: north, east and central Netherlands. Apart from granites and gneisses well-preserved flint is also to be found here in the boulderclay and multi-coloured flint on the surface. This surface flint is often of lesser quality due to weathering. Possibly this lesser quality is the reason for the larger unused flakes of this sort of flint found at Aartswoud.

How was the flint transported? This question is far more difficult to answer. In order to do this we have to look at 1) the geographical position of the primary and secondary regions where flint was found, 2) the geographical spread of artefacts which are easy to determine, eg. the Grand Pressigny artefacts and 3) the natural landscape, the countryside through which the flint had to be transported. Geological maps are the most useful means of determining the source. Primary source areas are the most useful means of determining the source. Primary source areas are those where flint occurs naturally and appears near or on the surface. These regions can be found by mapping the flint limestones. Since prehistoric times flint has been collected here in mines. The flint was obtained by open working or tunnelling. Secondary source regions are those where flint has been deposited after erosion and removed by water or ice. In the case of ice these are mainly the Quaternary inland ice areas. In the case of water they are the (former) coasts of marine erosion and areas where the river current decreased to such an extent that larger pebbles sedimented. Quaternary geological and geomorphological maps are here the best means for mapping out these areas. These sources were exploited by collecting flint on the surface, or by open workings in boulderclay cliffs.

Flint distribution maps such as these made to show the distribution of Krzemionki and Grand Pressigny flint (MONTAGNE, 1971, p. 141-142) show a clear distribution along the rivers. This suggests transport by water. If we look at the shortest distance between the source region and the finds, and the distribution of

finds on both sides of a watershed, transport over land also must be counted as a possibility. Transport over the sea occurred too. The flint transport from the island Bomlo, just off the coast of Norway, is well known (CLARK 1965, p. 244). In order to determine the possible transport routes in Late Neolithic times we need geological, geomorphological and paleobotanical reconstruction maps. For routes over land open areas, easy to pass wooded areas (primeval forest without undergrowth) and shallows in the watersheds (passes) were needed. For routes over water easily navigable rivers (without large rapids or waterfalls), inland waterways and lakes were necessary. Shallow seas, sea-arms and marshes (for example the marsh that lay where the IJsselmeer now is) were also very suitable for transport.

Now we know the routes we have to consider a further problem. What means of transport did Neolithic men possess? Direct proof, finds of a means of transport with its load, is nearly non-existent. There have been some finds of means of transport especially for that over water. This discussion of means of transport rests therefore partially on suppositions or indirect proof.

Means of transport can be divided into those for land and those for water. Within the category means of transport over land we can distinguish two methods: bearing and pulling. Bearing would have been done using a sack or basket on the back, or with a pole or yoke carried by one or two people (COLE 1956, p. 705). The art of making baskets or sacks from leather was already known (CLARK 1965, p. 207-231). Much more important was the sledge (CASE 1969, p. 178). The primitive sledge probably consisted of two runners with a number of cross connections to hold the load. This sledge could be used on every sort of ground that did not give too much resistance, as grass, clay, pine needles, marsh or snow (COLE 1956, p. 707). The sledge could be pulled by man or beast. The sledges found at Heinola and Kuortane are well-known (CLARK 1965, p. 296-297). Dugouts could also be used as sledges. In this way dugouts served a dual purpose: transport over both land and water.

It is possible to distinguish five types of craft for transport over water: the raft, the raft-boat, the hide boat, the bark boat and the dugout (GREENHILL 1976, p. 91-95). Rafts are probably very old, but are hardly ever found. It is possible that this is due to the method of constructing them, treetrunks were joined by a rope. When wrecked this construction readily falls apart and the components can no longer be identified. Knots had been known since Mesolithic times (CLARK 1965, p. 277), so people could easily make rafts in the Neolithic period. A disadvantage of rafts is that they lie low, and are only usable in calm water. Rafts are very suitable for transporting large loads such as furniture, cattle and stone cargoes. We can certainly assume some transport by raft at Aartswoud. In the treeless surroundings of Aartswoud many wooden houses and landing stages have been found. What was the easiest way of transporting all this wood and stone here? By raft.

According to Greenhill the raft-boat is an improved version of the raft. Raft-boats are built in Africa from bundles of reed. Hide boats consist of skins stretched over a wooden or bone frame. Large types of such vessels could transport several tons of goods besides several oarsmen (CASE 1969, p. 178). These boats were also suitable for use at sea (JOHNSTONE 1972).

The most famous prehistoric boats were dugouts. Many of these have been found (CLARK 1965, fig. 154). They were constructed by hollowing out treetrunks. Dugouts could be easily used for navigating rivers, small rapids and lakes. They were very suitable for transporting small loads, such as flint tools. The dugout on Erith Marshes contained a polished flint axe and a scraper (CLARK 1965, p. 286). By joining two or more dugouts together with a floor or supporting poles it was possible to make a sort of raft that could transport very large loads. Atkinson assumes that the large stones for Stonehenge were transported in this way (ATKINSON 1956, fig. 22A).

Finally Aartswoud and Vlaardingen, both situated in the delta area of the Meuse, Rhine and Vecht, were favourably situated to receive their raw materials by water. Due to the size of the means of transport at their disposal it was easy to keep large supplies of flint.

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