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NOTE ON THE VENTIFACTS IN THE NETHERLANDS

INTRODUCTION

It has been known for a long time that in the Netherlands during the past there were circumstances which favoured the formation of ventifacts. They must have originated during periods of sand transportation by strong winds. The sand-grains had a polishing influence on the pebbles and the wind-cutting has taken place so far that distinct facets on the pebbles were developed.

Research has already been done on the distribution and frequency of ventifacts in the Netherlands. Maréchal & Maarleveld (1955) have plotted on a map the areas where they found ventifacts or expected them. They thought this would apply to all layers rich in pebbles which were lying on the surface during at least a part of the Würm. Moreover, the landscapes Het Gooi and the Northwest Veluwe are indicated as areas with a high frequency of ventifacts. Hofland (1949) mentioned that in these areas 50% and more of the pebbles showed a strong influence of wind. Faber (1960) admits the occurrence of ventifacts, but doubts the presence of them in the province of Noordbrabant.

The difference of opinion on the occurrence of ventifacts was the motive for making a study of ventifacts in the Netherlands. The investigation was directed by Prof. G. C. Maarleveld.

METHODS OF INVESTIGATION

In order to study ventifacts under unaffected conditions, exposures were looked into layers rich in pebbles and not been affected

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by cryoturbation and overmore covered by sand. Special attention was paid to the presence of a stone-pavement.

The intention was to investigate the stone-pavement for the occurrence of ventifacts. The material under it was also investigated in this respect and compared with that of the stone-pavement. The degree of polishing was determined with the help of a standard collection.

It was obvious that this method of investigation involved a great deal of uncertainty. A method for measuring the degree of polishing by means of an instrument is under investigation.

The procedure was as follows:

1. From the stone-pavement an arbitrary sample was taken, consisting of 200 pebbles larger than 2 cm.

2. At different spots an additional sample was taken from the underlying material, also of pebbles larger than 2 cm.

3. Since, in material from the stone-pavement, a connection has been found to exist between polished pebbles and ventifacts on the one hand and the size of the pebbles on the other hand (Nitz, 1965), pebbles of a size 2-5 cm and those larger than 5 cm were separately investigated.

4. The pebbles were divided into two main groups in relation to their character:

- (a) quartz, lydite, radiolarite, rounded and non-rounded flint,

- (b) sandstone, quartzitic sandstone, quartzite and the crystalline components.

5. In all groups, both the number of un-polished pebbles, polished pebbles and the number of ventifacts were determined.

OBTAINED DATA AND RESULTS

1. Polished pebbles rarely or never occur in the material underlying the stone-pavement. Therefore, there always existed a clear difference between this material and that found in the stone-pavement. Ventifacts only occur in the stone-pavement.

2. To determine the relationship between the size of the pebbles and the number of ventifacts, a sample has been taken from the stone-pavement near Huizen (location 12: fig. 2). The results are given in figure 1. When the results are compared with those of Nitz (1965), we can observe that the number of ventifacts from

the stone-pavement near Huizen is much smaller than the number found by Nitz (1965) in areas of Eastern Germany. Nitz observed 53% of ventifacts in the group of pebbles with a size of 5-12 cm; near Huizen we observed only 2% in the same size-group. From examined pebbles larger than 12 cm found in Eastern Germany, 75% turned out to be ventifacts, near Huizen this was 27%.

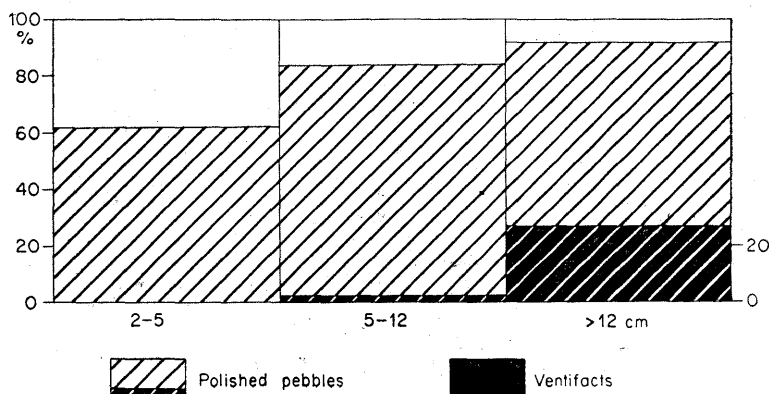


Fig. 1. Relation of pebble size to number of ventifacts and number of polished pebbles (location Huizen)

Some considerations should be borne in mind:

- (a) there may be a difference in opinion on the determination;
- (b) a smaller number of ventifacts is found at Huizen than in the area of the northwestern Veluwe.

This cannot explain, however, the great differences in results. Moreover, at Huizen only the crystalline components have been investigated, so difference in kind of material is of little importance. More investigation is necessary before making conclusions about an eventual difference in aeolian activity.

3. Very few pebbles of quartz, lydite, radiolarite, rounded and non-rounded flint appeared to be ventifacts. Considering these components in the cases where stone-pavements contained ventifacts, among 100 pebbles quartz, lydite, radiolarite, rounded and non-rounded flint larger than 5 cm, 5 ventifacts were found. The other components showed a higher percentage, namely 13%.

4. Polished pebbles and ventifacts frequently occur along the northwestern border of the Veluwe; this agrees with the map of

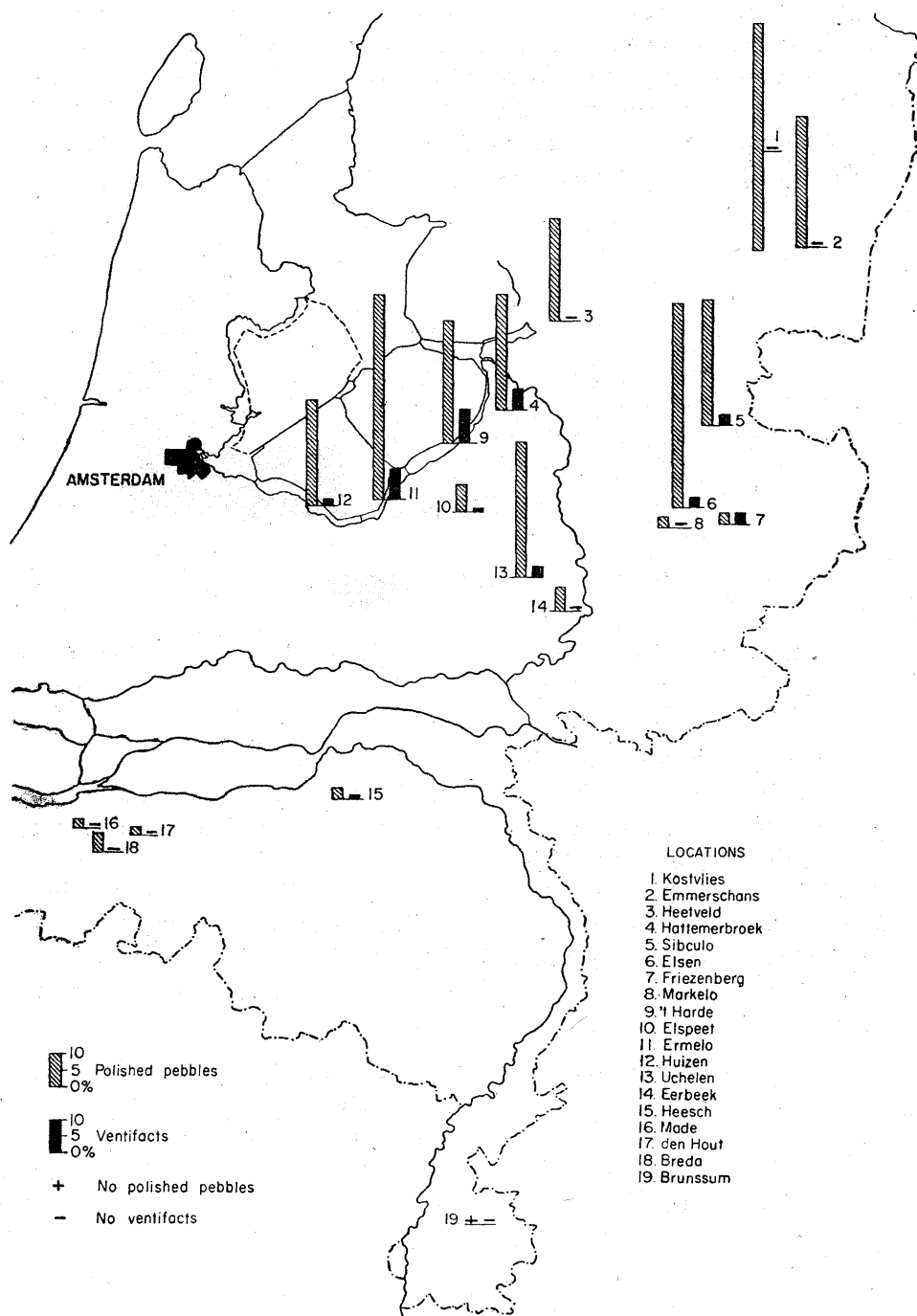


Fig. 2. Polished pebbles and ventifacts occurring in stone pavements

Maréchal & Maarleveld, with exception of the landscape Het Gooi; they indicated in the latter area also a high frequency of ventifacts. The great number of ventifacts along the northwestern fringe of the Veluwe (see locations 4, 9 and 11 in fig. 2) is probably due to a favourable position in regard to the direction of wind. Northern to north-westerly winds could have played an important part during continental climatic conditions in the Würmtime (Maarleveld & van der Schans, 1961).

5. In the Netherlands south of the great rivers, only a small number of polished pebbles and ventifacts occur. This can be due to different causes:

(a) kind of rock: In the southern part of the Netherlands quartz forms are the most important component of the pebbles. Ventifacts are found to a greater extent in the group of crystalline pebbles, which forms an important part of the stone-pavements of the North and the Middle Netherlands.

(b) character of stone-pavement: In the province of Noordbrabant stone-pavements were uncommon in the areas which were investigated. The studied stone-pavements were characterised by a more indistinct development than the pavements in the other parts of the Netherlands. This may have of influence in the number of ventifacts.

(c) grain-size of the coversand: Vierhuff (1967) pointed out recently that more ventifacts occur in stone-pavements which are lying under sand than in those which are lying under sand containing loess. It is not impossible that the character of the material transported by the wind in the area of Noordbrabant also had an influence upon the small number of ventifacts in that area.

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