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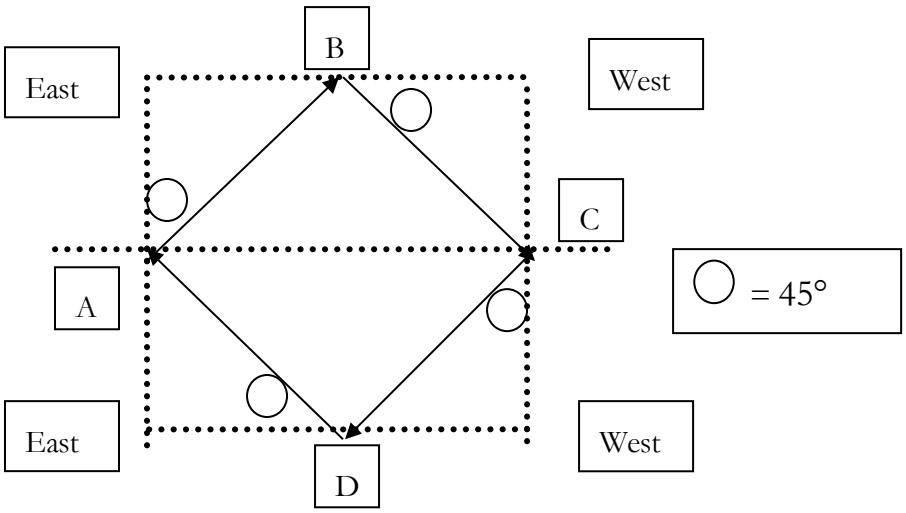
1.) Scheme and variants of the Quattinera method



Schematic drawing of the Quattinera method

If you start at one of the four points of the quadrangle an equally long march below 45° to the east-west direction - determined by the sun or the polar star - you reach your starting point again after three turning points below 45°. The author refers to this type of exploration with the new nomenclature 'Quattinera method', Quattinera = shortening of lat. quatt(uor it)inera = four ways .

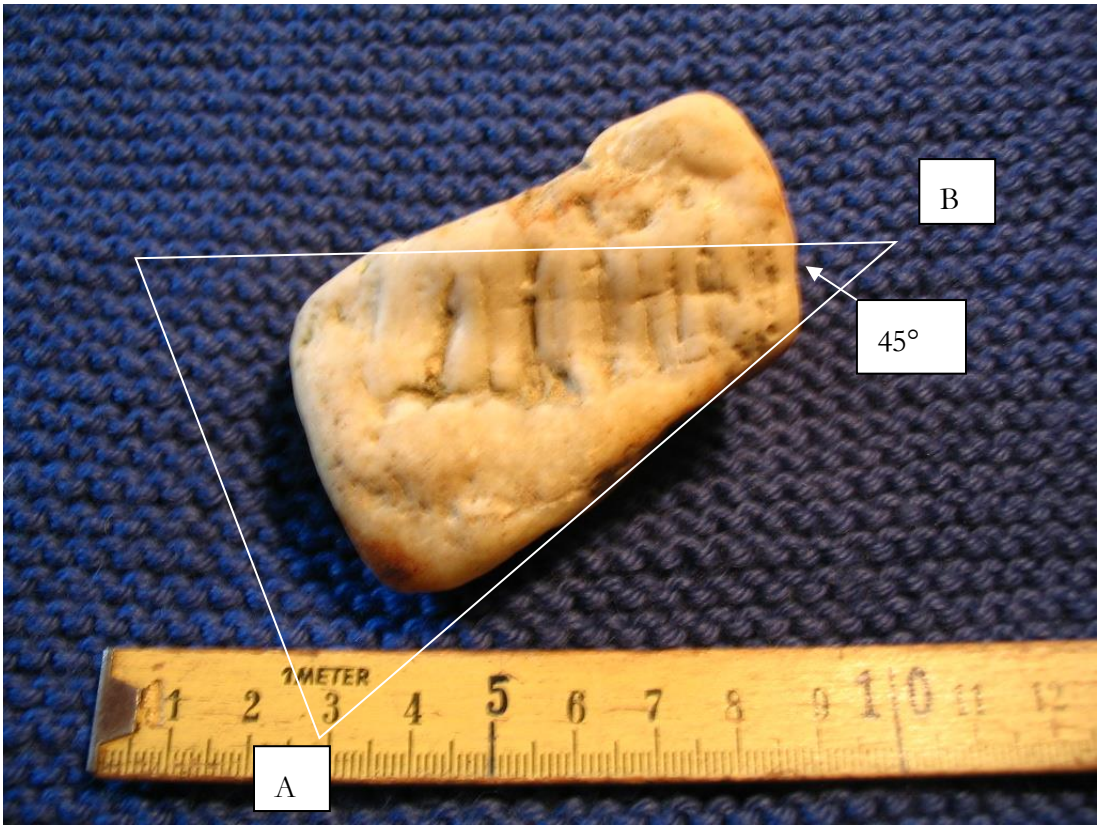
In the Stone Age, wherever one stayed, one was in an area of uniform primeval vegetation (primeval forest, primeval prairie, primordial tundra). This simple exploration method is particularly suitable in areas with little distinctive evidence in the landscape. It only really comes into play if you choose the vector width so large that you only hike the route in one day (march length in each direction about 5 km) or on four days (march length in each direction about 15 km).

Of course, it was not always necessary to walk around the entire square. The simplest variant is A-B-A. The route combination A-B-C-B-A and many others are also possible. They came into question, for example, when topographical obstacles stood in the way. The abbreviation C-A is problematic in that the

march distance as a hypotenuse of a right-angled triangle according to the Pythagorean Theorem is larger than the legs of a right triangle of the standard application. On the other hand, the direction of the march then runs exactly on the east-west direction, which is easy for the Paleolithic people to determine. The march path C-A without the measure of the fixed march vector could perhaps be chosen after all because it led back to the area of the well-known starting point (residential place, resting place).

The Quattinera method is a closed bussola polygon course. It does not receive its orientation from the Earth's magnetic field (compass) or the Earth's rotation (gyro compass) but from the sun's shadow according to the principle that also underlies the equatorial sundial. This consists in the representation of the Earth's axis and the equator according to the geographical latitude of a place. The direction is determined by aligning with the parallelism of shadows of a shadow giver in parallel to the earth's axis. The recording surface, which is to be held perpendicular to the shadow giver and parallel to the equator, is oriented to the south (not directly to the sun!) and moved back and forth and tilted until the shadows fall parallel.
While the recording surface in the classical equatorial solar clocks is circular, in the case of the stone (age) bussolas it represents a flat surface with gutters to capture the parallel shadows. On the sundial of Grömitz in Ostholstein this is described by the Latin saying "Lucem demonstrat umbra" (the shadow clarifies the light).
Because this method repeatedly must determine the basis of the east-west direction and carry out a reorientation, errors cancel each other out, and the error propagation is low overall.

With the Quattinera method, the cardinal directions in the terrain can also be marked at any time of the day. So, you don't have to wait for the culmination of the sun at noon.



Find W214S in east-west direction with 45° angle

The stone serves as an indicator of the east-west direction and an exploration direction inclined by 45°.
It then points exactly in the east-west direction when it is held at the respective location under the inclination of the latitude to the ground, and a shadow giver - held with the same inclination to the ground - casts parallel shadows on the scale of the stone. Behind this is the principle that is still used today in the equatorial sundial.

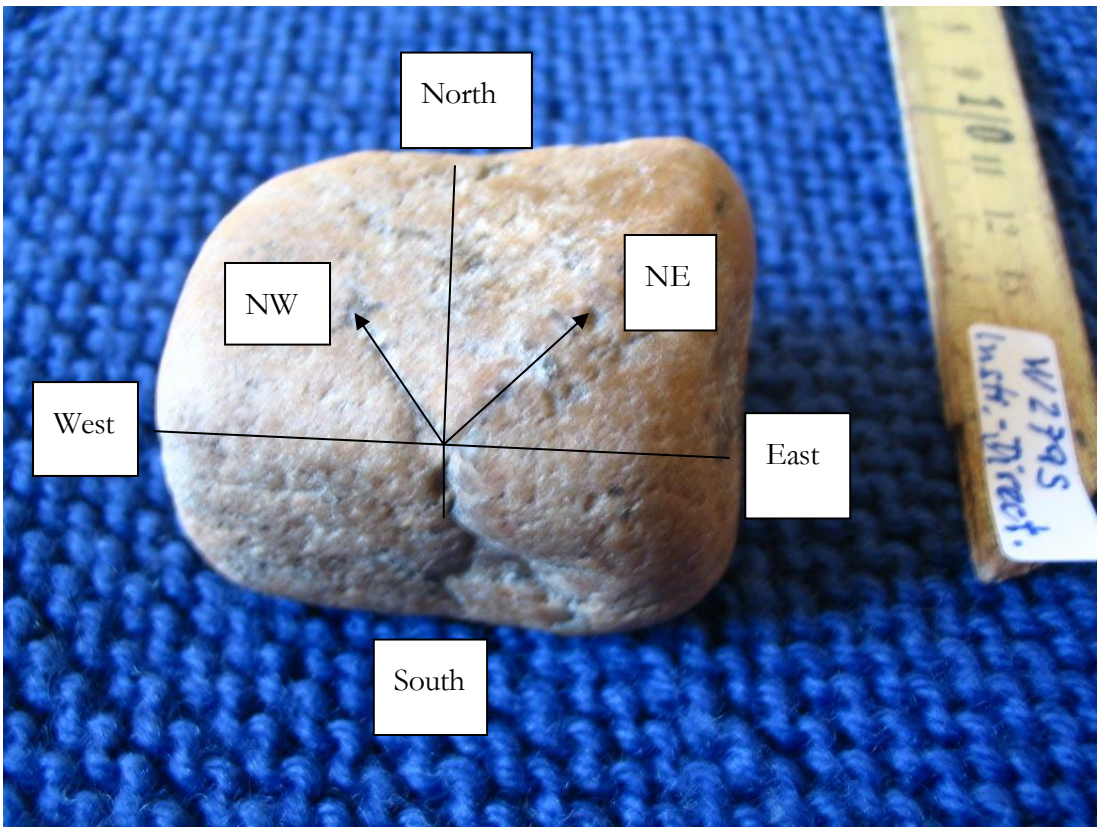
The stone is notched in several places, so it can be conveniently pinched between the fingertips and the thumb for observation.
If it is aligned, you put an index finger in it and aim for a target in the terrain that is exactly to the east or west. On this basis, a target in the exploration direction of 45° can then be targeted in the 2nd step.
By rotating the lower edge to the target determined in the preliminary action, the finger then lies below 45° to the base AB and points in the direction of exploration.
This angle seems to have been the preferred direction of the Paleolithic people.
It is also not excluded that the Paleolithic people used the 45° angle for navigation at sea.

Find E271 with side for determining the east-west direction

Find E271 with 45° angle

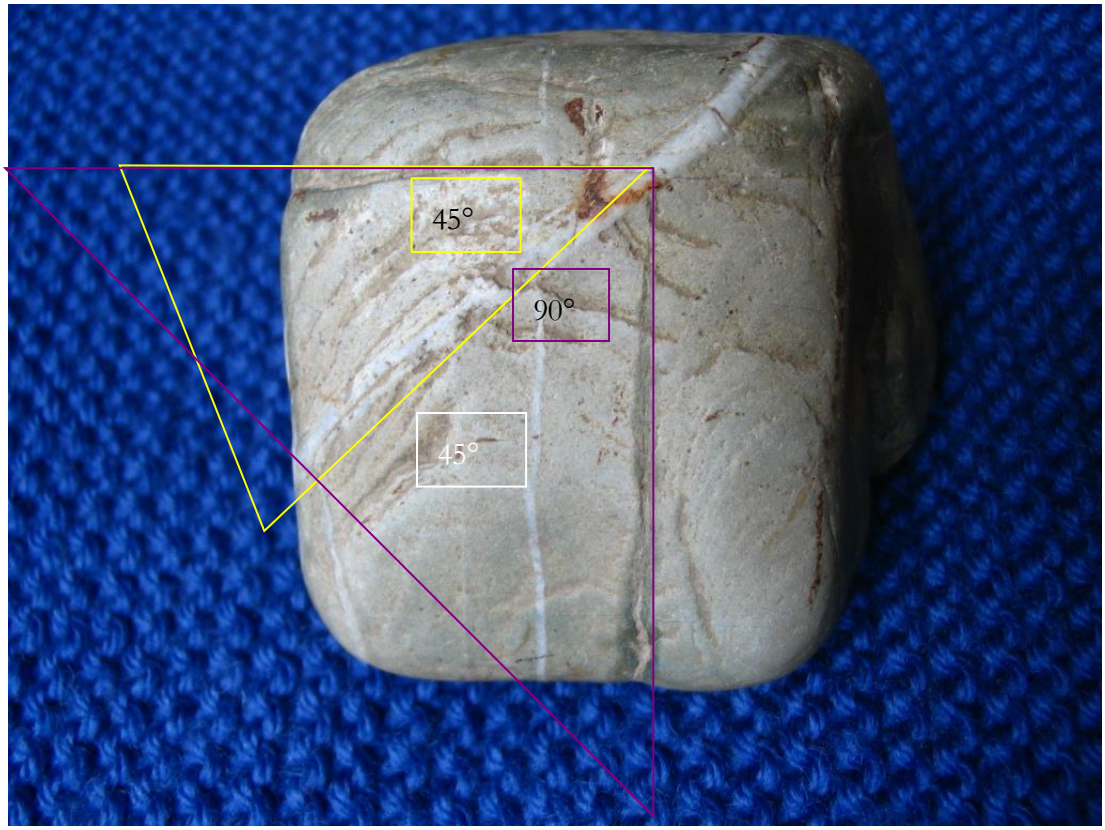
The stone has the shape of a ship and serves as a directional meter. After determining the east-west direction, this stone could be used to target a 45° angle in the terrain for navigation on the sea and for orientation on land.

The Palaeolithic's also used stones to determine half the right angle, on which 45° vectors were engraved and painted over by paint.



Fund W279S with 45° direction indicators

On the stone, two 45° direction indicators are engraved in the shape of an arrow and additionally marked with colour. The colour for the north-east direction is only rudimentary. At the end point of the vector, however, an engraved mark can be seen in the microscope. Below the east-west direction, a right angle is carved, which is suitable for determining the north-south direction.



V272 Target angle of the Quattinera method in an optimized position

The stone contains two natural rock veins that intersect below 45°. Thus, the 45° angle of the orientation method described here was initially given and usable.
However, paleolithic people then engraved two new lines perpendicular to each other in the stone to gain more action area and longer angular legs. The thick, diagonally running quartz vein thus forms the angle halving of a right angle. The right engraving is a parallel shift of the thin vertical aisle quartz vein. The upper second leg of the right angle also runs parallel to the lower and upper edge of the stone
The valuable thing about this stone processing is the documented intention to create a 45° angle with the largest possible observation base.

Double-carved 22.5° angle as half of the 45° angle

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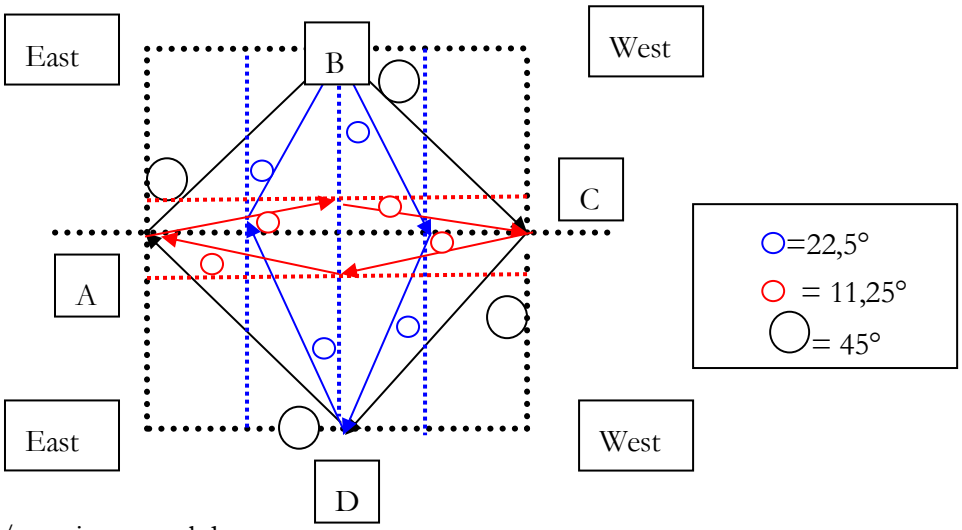
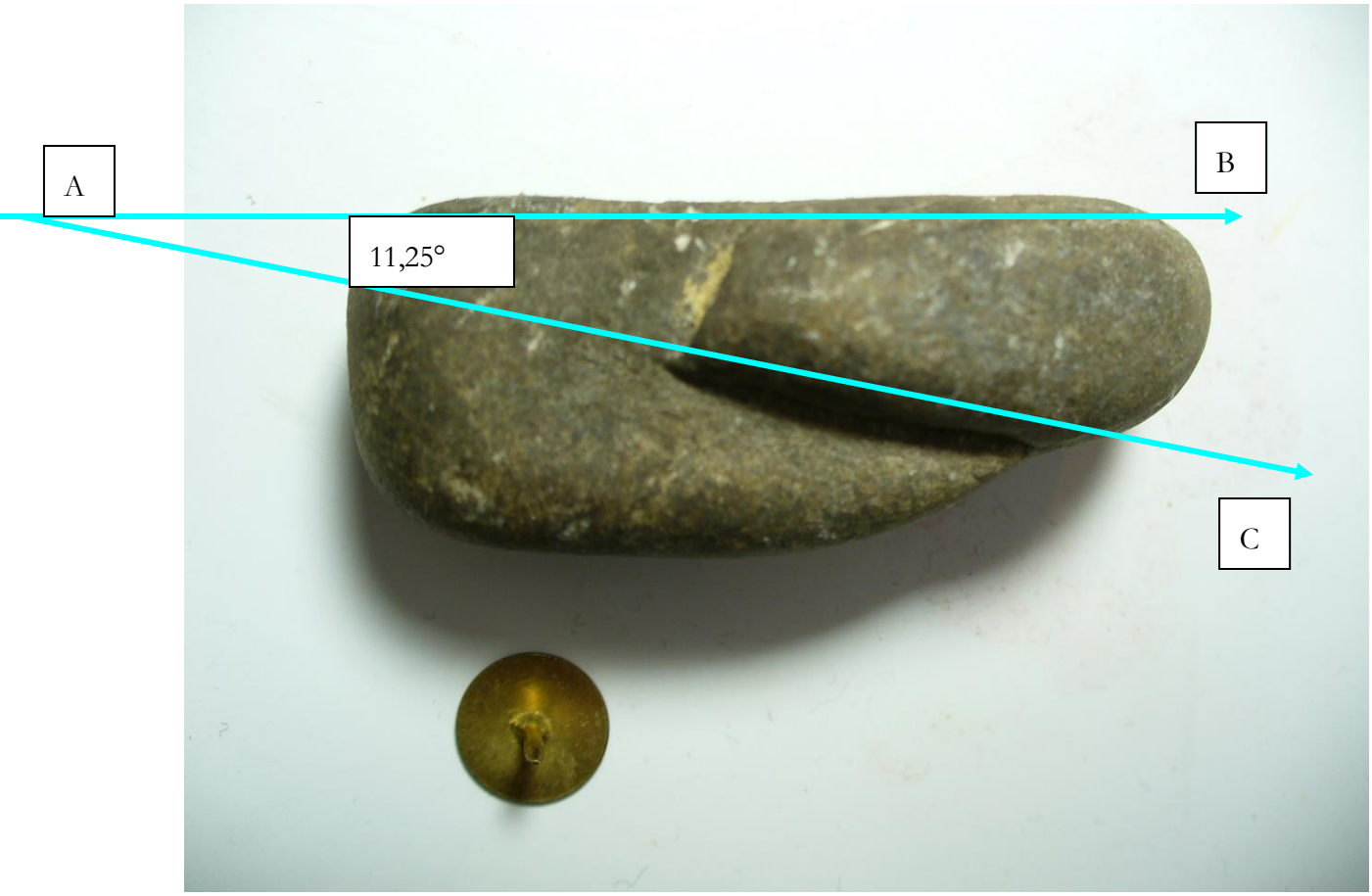
This stone-find from 03.28.2007 has the 45° angle on the left flank. In addition, its halving is carved on it.

This makes the exploration shown in blue possible.
The finds W2712S , W2713S and V272 also show outlines of the angle 11.25°.
This makes exploration registered in red possible.
These exploration variants open the inner space, which has not been explored by the 45° method, and lead back to the starting point in 4 marches.





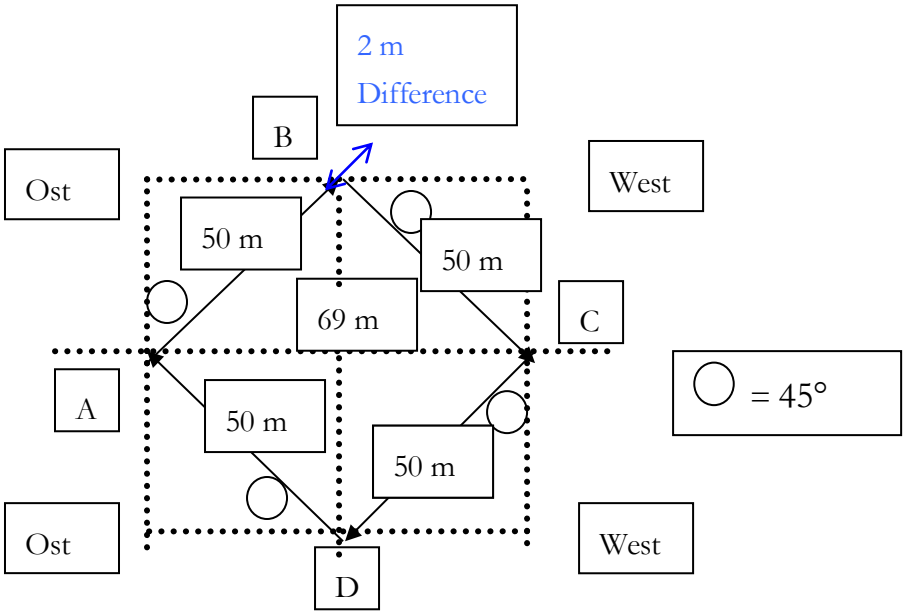
Stone with 11.25° angle

The index finger can be applied to the AC line and a target can be targeted.

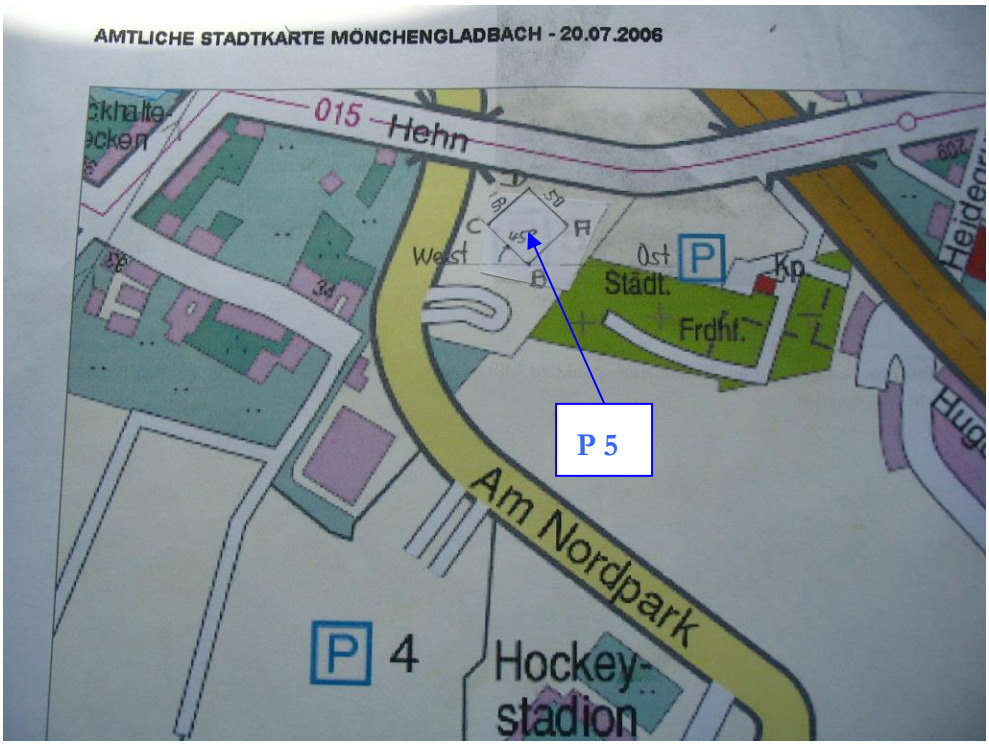
In turn, the line AB (thumb) can be directed at this target. The direction AC is then at an angle of 22.5° to the starting point.

With such a stone, angles to the right (8-fold joining together) could be created arbitrarily. This also allows the coding of a polygonal directions. A possible example of orientation in the Alps, where this stone was found:
The Etruscans (900 – 100 BC) divided the world into 16 sub-areas. In each of these sectors they saw the seat of a deity.
The subdivisions of the right angle into 8 partial angles marked in the Paleolithic orientation stones already reach the degree of division that occurs in the rumbling system of the medieval Portolan maps. Portolan maps have been handed down since the end of the 13th century for a period of 400 years.
As the Paleolithic finds suggest, the traditional culture of mankind has roots that extend far into prehistory. The steps of tradition remain hidden if the veil is not sometimes drawn from them.

2.) Application of Quattinera method on P5 Stadium Borussia Gladbach



Method sketch with concrete dimensions of the experiment



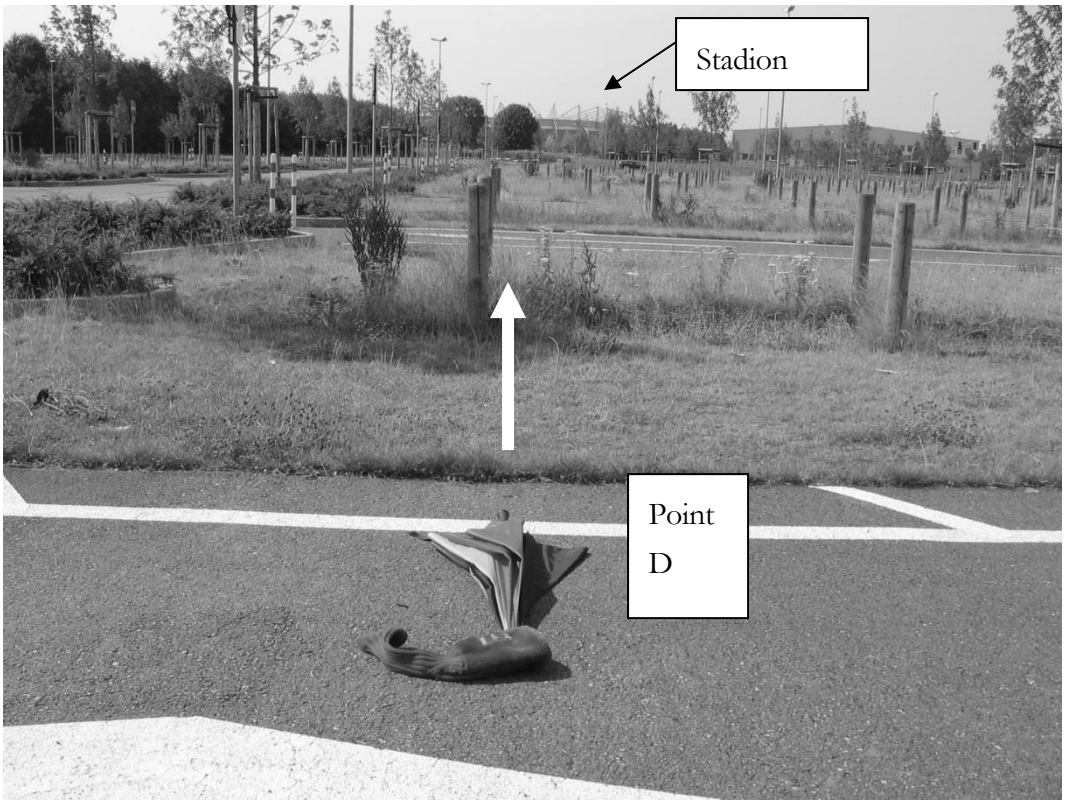
Location of the experiment with enlarged representation of the square in the city map of Mönchengladbach

The application example of the Quattinera method was carried out on 07.20.2006 in bright summer weather between 11:00 and 11:30 in the morning. The 50-metre-long routes were walked with an approximate length of several metres.

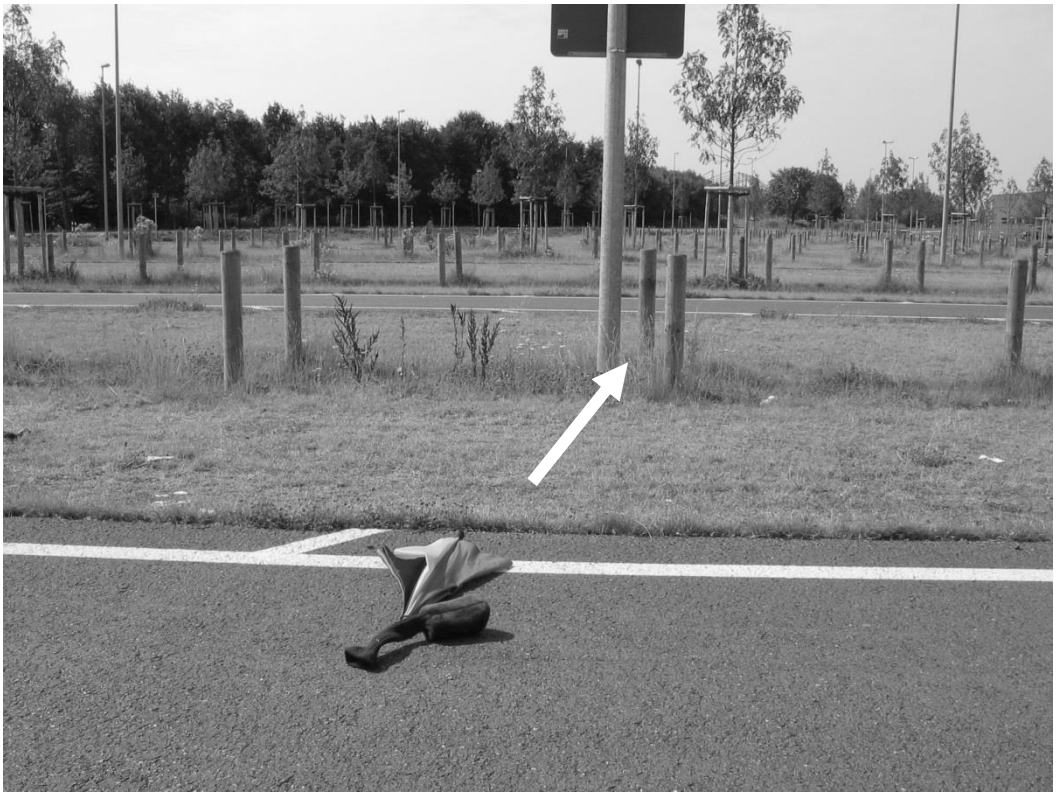
Situation at car park 5 at the Borussia Mönchengladbach stadium, which is in the Nordpark. The photo illustrates the confusion at the empty parking lot at Nordpark.
The club head caps originating from golf were used to mark the vertices.

The utensils were the stone 'East-West Indicator', registration number W214S, and a toothpick as a shadow giver. The picture shows the point B
The exploration was started at point B in a north-west direction towards point C.

He led after 50 steps in a W214S extracted from the stone 45° direction to point C.

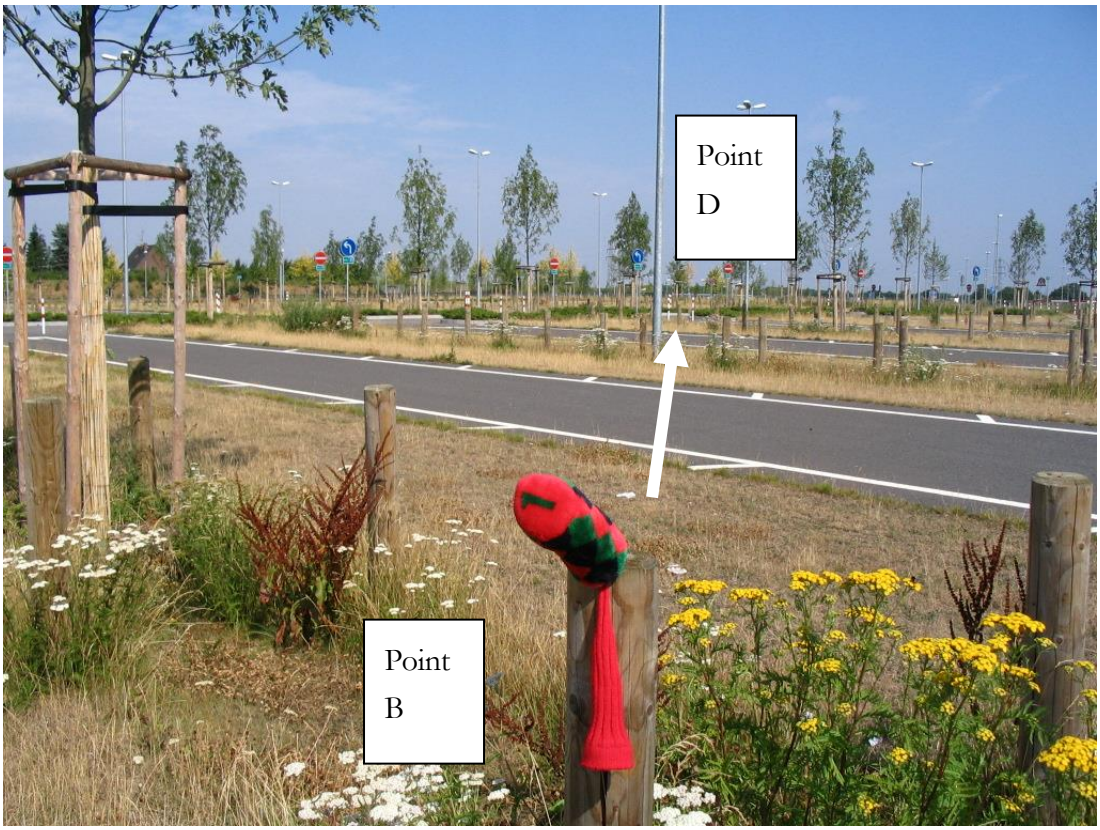


Point D with direction to C


Point A in the direction of B.

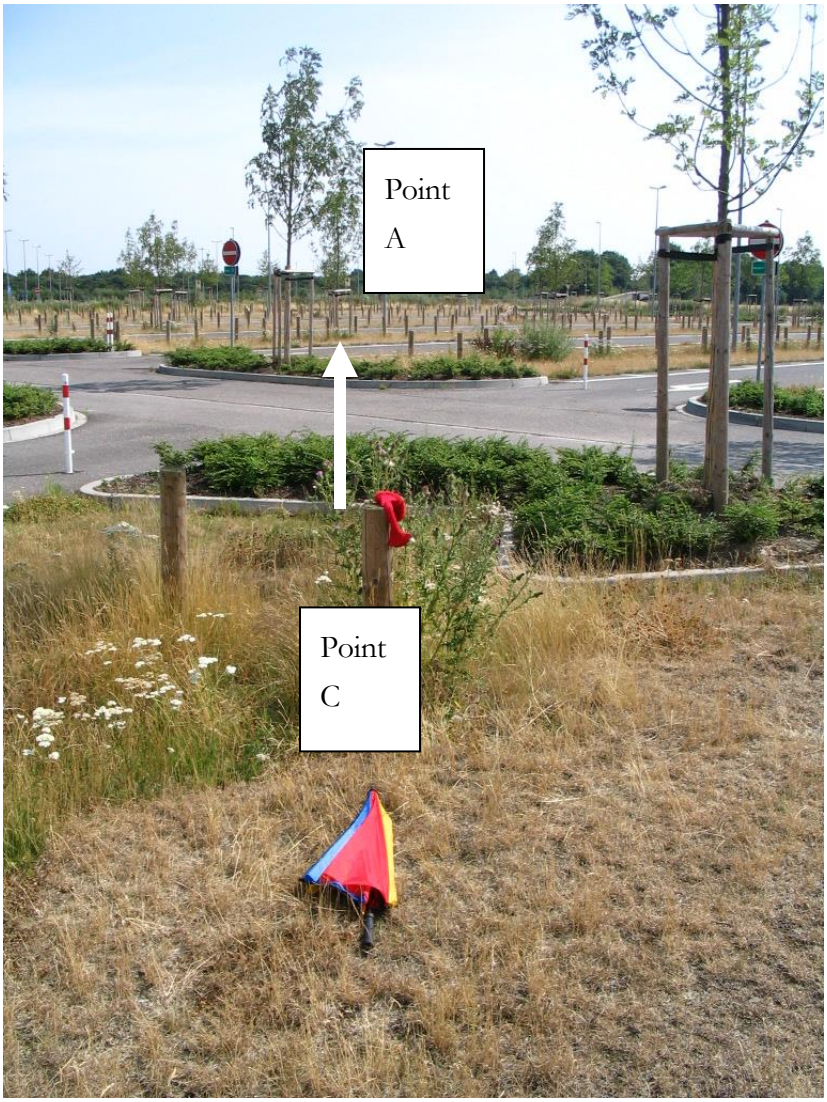
Walking the route from A to B resulted in 48 units. So, the inaccuracy of

finding the starting point was 2 step units. About this error also resulted from the diagonal D to B compared to the setpoint according to Pythagoras.



Point B with direction D.

Between these two points, the diagonal was stepped with about 69 m. The Pythagoras setpoint is 70.7 m.



Point C with umbrella in diagonal direction to A. This is the west-east direction.

It is a by-product of the Quattinera method that with its help at any time of the day when the sun shines, the 4 cardinal directions can be transmitted to the terrain.

The testing of the method and the transmission of the cardinal directions into the terrain yielded a good result overall.

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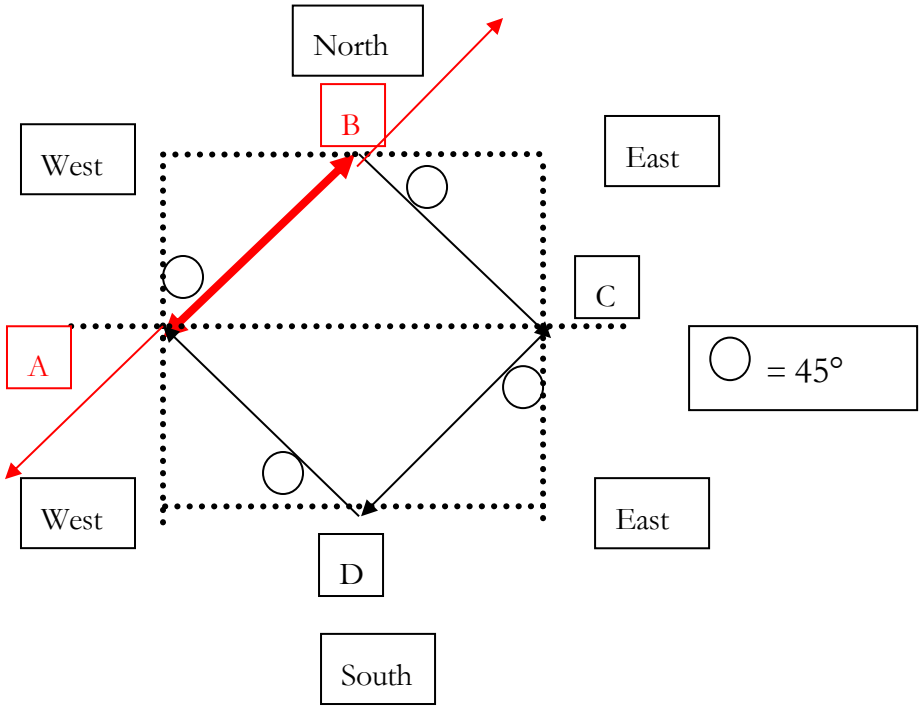
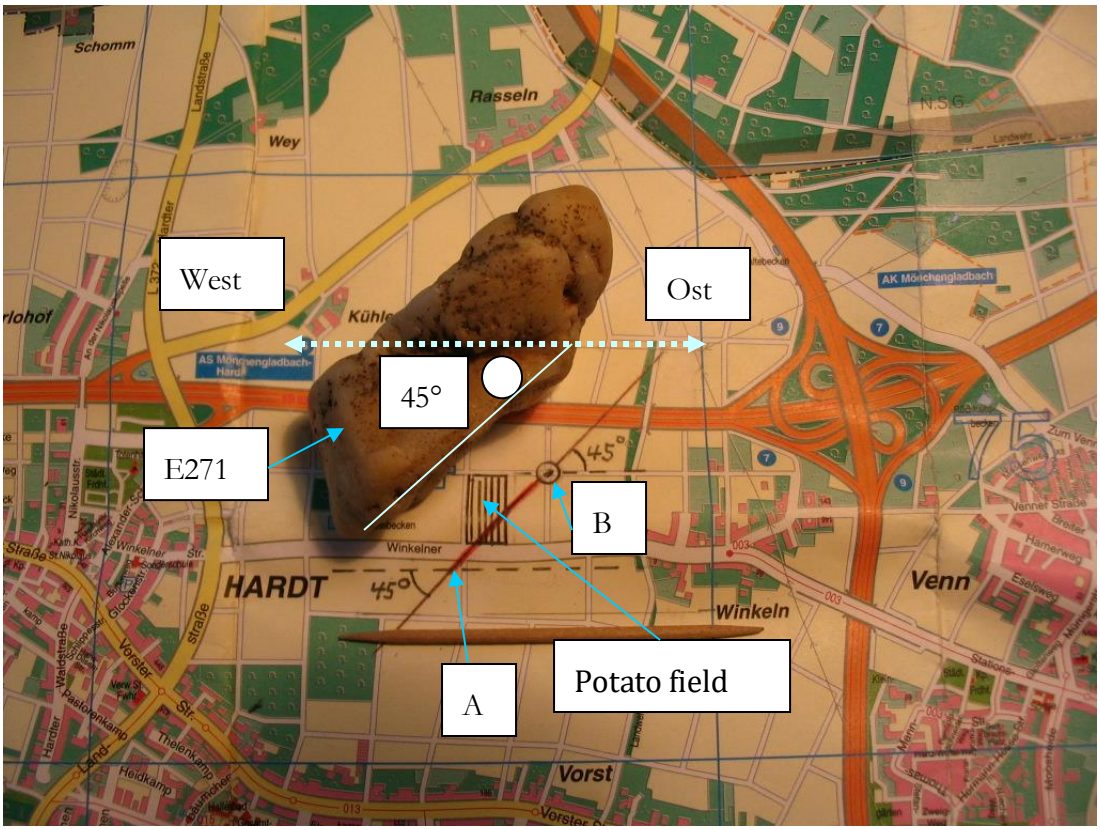
3.) Application of the Quattinera method on single section B to A



In the afternoon of 07.31.2006 the Quattinera method was applied to the movement in a single direction in cloudy to cheerful weather. It is the approx. 430 m long route A-B of the method sketch. The east and west directions are swapped compared to the method sketch.

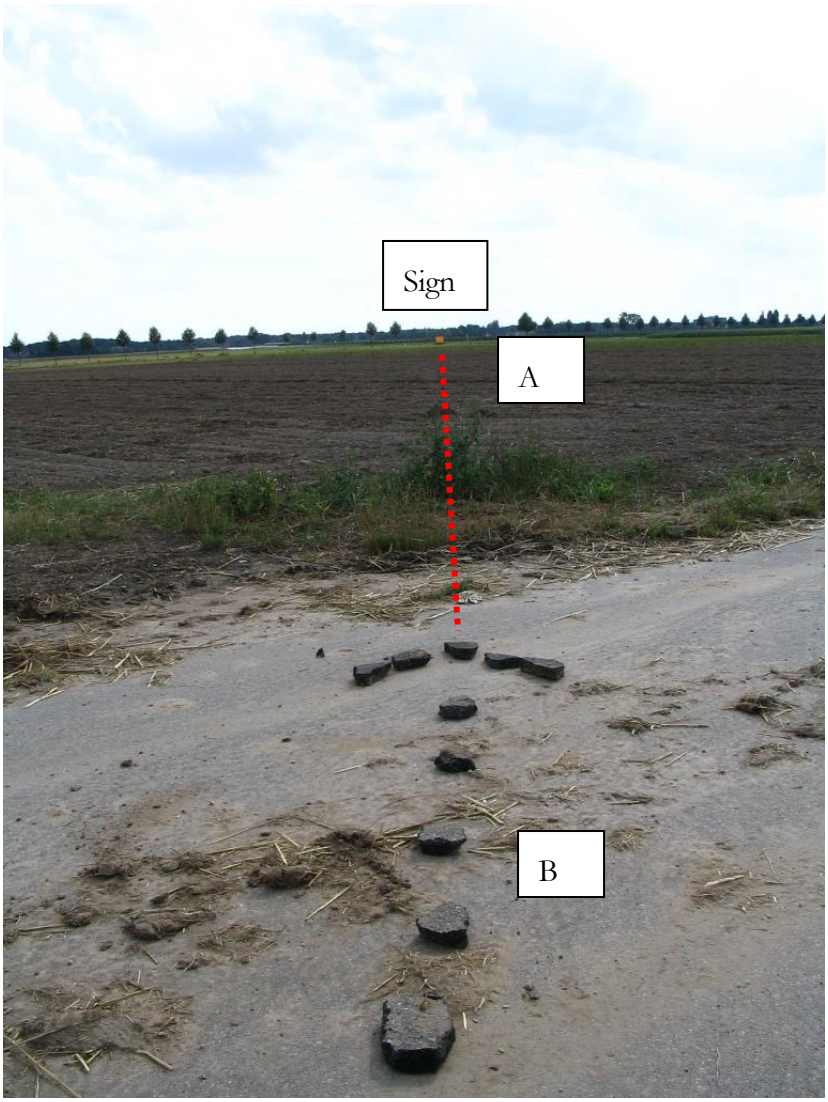
The utensils were the stone 'Winkelschiff', registration number E271, a toothpick as a shadow giver and the city map of Mönchengladbach, scale 1:20,000.



The photo shows the measuring utensils and the location of the BA line around the Mönchengladbach-Hardt district and its extensions on the city map.

As starting point B, a crossroads was chosen, which could be well identified in the map. At A there happened to be a sign visible from afar. On the direction from A to the south-west, a potato field stood in the way.
This did not need to be crossed, as the target A was known by the sign. Thus– admittedly: there is hardly a lighter obstacle than a potato field – the Stone Age people are likely to have avoided obstacles as soon as they had identified a striking intermediate destination in their direction of travel.

At point B, the 45° direction determined with the help of the stone E271 to the east-west direction was marked as a double arrow by randomly found asphalt chunks.



View to the south-west from B to A.

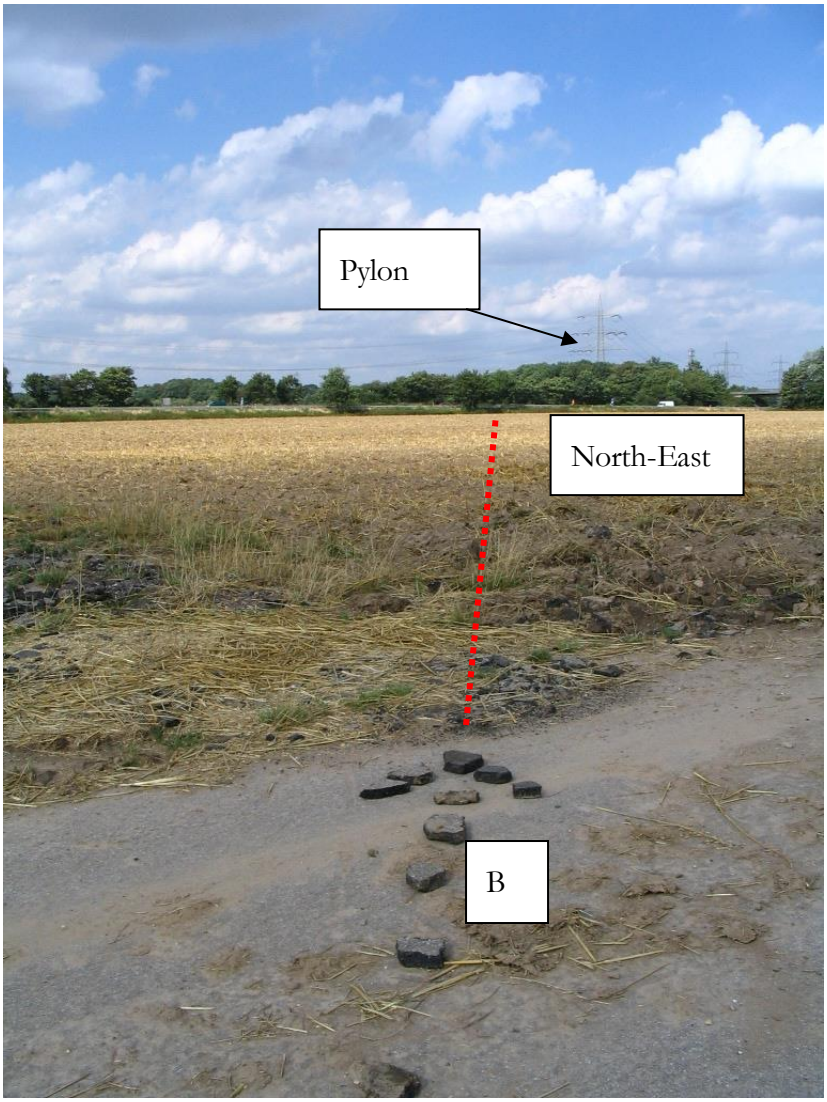
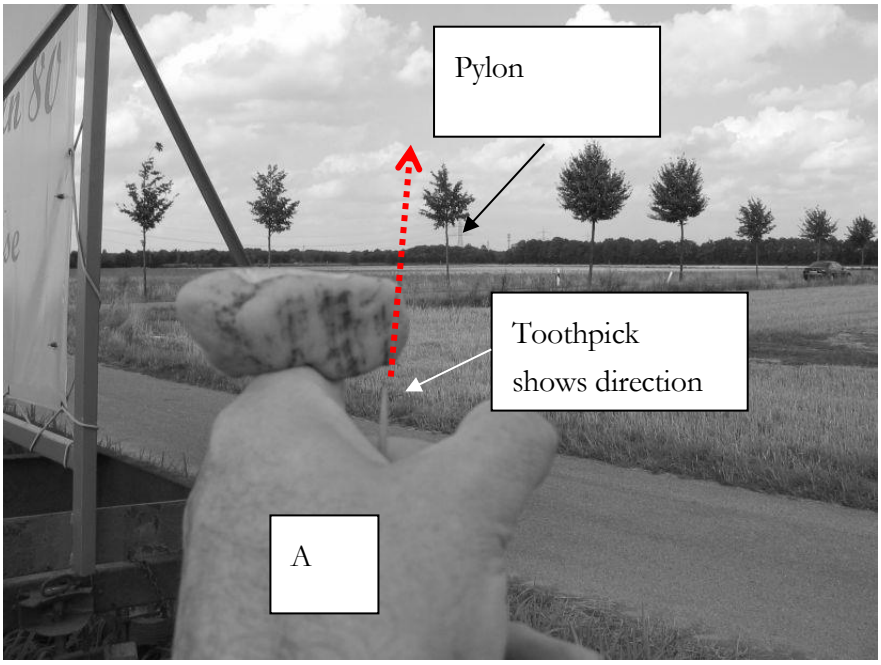


Photo from position B to the north-east. The direction goes west offset past the pylon. This later serves as a control for the retrospective from A.



View back from A to North-East (B).

As a control for the rear direction, only the line mast - offset to the west to the mast - can serve here, since there is no signal sign at the flat crossroads B. The example of the hike in one direction shows that you did not have to walk stubbornly straight ahead, and that you could check the correctness of the orientation in retrospect.