

The Orientation of Ancient Monuments in Sweden

A Critique of Archaeoastronomy and an Alternative Interpretation

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The results of three archaeoastronomical studies of Scandinavian ancient monuments are discussed and dismissed as unconvincing. The necessity of a broader approach to the problem of orientation is emphasised. The mean orientations of several groups of ancient monuments in Sweden are presented. It is suggested that graves, as well as other ancient monuments, are roughly oriented according to the four cardinal points, although the conception of the cardinal points was not the same as it is now. Two different ancient conceptions are suggested, the B- and C-systems. Possible social and religious background and astronomical principles are discussed.

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Already in the prosperous childhood of Swedish archaeology it was well known that several different groups of ancient monuments were not randomly oriented but clustered in certain directions. However, despite this knowledge no serious attempts have been made to get an overall picture of the phenomenon, although as part of more general studies of separate grave groups the subject has been touched upon in interesting ways (e.g. Malmer 1962; Janzon 1974).

In those cases where more intensive studies have focused on orientation, they have mainly been directed toward narrow archaeoastronomical interpretations of separate monuments or separate groups of monuments. The orientation of ancient monuments is at risk of being reduced to a question of local observational technicalities.

The aim of this paper is partly to briefly criticise traditional archaeoastronomy, partly to capture the broader aspects of orientation traditions in Swedish prehistory. A sample of mean orientations of several groups of ancient monuments - though far from complete - gives the opportunity to put forward a more comprehensive interpretation, which is possible to confirm, develop or reject. I am deliberately avoiding archaeoastronomy outside Sweden as the subject is so vast that it is impossible to include in a paper of this character. Foreign studies could of course be a source of inspiration, although it should be kept in mind that not every grave mound is a Newgrange. An introduction to archaeoastronomy and early astronomy around the world is presented in the book *Astronomy before the Telescope* (Walker *et al.* 1996).

The orientation of ancient monuments in Sweden probably does not mirror constantly changing preferences for different celestial phenomena, but instead basic conceptions of the cosmos. It is a question of structuring the surroundings in meaningful directions and according to conceptions of the cardinal points, from the homestead out to the mythical borders of the world. Different traditions have existed in different regions, but also side by side in one and the same region.

THE PROBLEM OF MEASURING ORIENTATION

A frequent problem in the study of orientation is the quality of data. There is room for differences between separate researchers' data even when they are measuring the same group of relatively distinct monuments. One example is the Scanian passage graves, which have been the subjects of two independent

measure series. Differences of several degrees were not uncommon (Lindström 1993). It is also obvious that measures divisible by five or ten are over-represented, even though a precision of one degree is claimed (Blomqvist 1989). Apparently the measures have been unconsciously rounded off according to the modern compass. With this I am not suggesting that these measures are not valuable - on the contrary they are among the best we've got and can hope for - but I want to underline that even these measures have limitations, more than archaeoastronomers are sometimes aware of. Even a simple measure of orientation has its share of subjectivity.

Regrettably the main part of published orientation measures is of poorer accuracy. Rounding off the orientations is mostly done towards cardinal points (N, E, S, W), thereafter towards intercardinal points (NE, SE, SW, NW) and finally towards the points in-



Fig. 1. A boulder with grinding grooves, Burgsvik, Gotland 1992. Photo: Ulrika Bergmark.

between (NNE, ENE, ESE, etc.). This means that a grave oriented towards SSW is more often at risk of being attributed to S than SW, if the correct orientation is not noted. In the same manner a grave orientation between SSW and SW more often is attributed to SW than SSW. The mean orientation of a group of graves is therefore at risk of being systematically displaced.

A problem of a different kind is the importance of not giving the same weight to all monuments when calculating the mean orientation of a group of monuments. Instead, the mean for every separate locality ought to be calculated, and then the mean of the means. This is because it is obvious that local topographical conditions can influence, for example, the graves in a separate cemetery. If a cemetery has an unproportionally large number of graves, there is a risk that the topographical conditions at this one cemetery will unduly influence the mean of all ceme-

teries. If the purpose is to identify orientations with celestial background, all graves within sight of each other should be counted as one separate cemetery. There is an obvious possibility that they have been oriented after each other, and that only the first grave built has a more direct connection with celestial phenomena.

The passages of passage graves have a narrower orientation distribution than the chamber; therefore the passage seems to be the bearer of meaning, not the chamber. In the same way the constant direction of the face but the shifting direction of the head in Battle Axe graves, points to the fact that the direction of the face is the main bearer of meaning. In other cases it could of course be more difficult to tell what is the meaningful direction, even though it nonetheless is possible to conclude that a group of monuments is consciously oriented.



Fig. 2. Passage grave with the chamber in the background and the passage in front. From Kongl. Vitterhets Historie och Antiquitets Akademiens månadsblad 1873.

EXAMPLES OF ARCHAEO- ASTRONOMICAL STUDIES

The studies of the orientation of ancient monuments have mainly been directed toward separate groups of monuments or even separate monuments, and have resulted in quite advanced interpretations. The great Iron Age mounds at Old Uppsala, the graves of the Viking Age town of Birka in the Mälars Valley, and the huge ship-setting *Ales stenar* in Scania are among the monuments that have been interpreted by archaeoastronomers (Henriksson 1988; Randsborg & Nybo 1986; Roslund 1987. For other examples and partly out-dated critique see Lindström 1990). It is not unusual to find short discussions of possible celestial phenomena behind the orientation of graves and other monuments in different papers, from unpublished seminar papers to dissertations.

In this paper it is only possible to discuss three studies. One example of a far-reaching study is the interpretation of so-called grinding grooves (Sw. *slipskårar*) on the island of Gotland. Grinding grooves are oblong depressions with a length of a few decimetres clustered in smaller and larger groups in the surface of the bedrock or boulders (fig. 1). The number of known grooves on Gotland amounts to more than 3000, distributed among more than 900 localities. They are the result of grinding activities, but the exact background and their dating is unclear. It has been proposed that the grooves have been made in the direction of the ascent or descent of the full moon at the winter solstice, or when it has passed Antares or Spica within 24 hours. Each of these phenomena occur with intervals of ca. 19 years, and this activity is supposed to have been going on from ca. 3300 BC to the end of the third millennium BC

(Henriksson 1983, 1985).

The interpretation has found its way into the Swedish national encyclopaedia, *Nationalencyklopedin*, as an established truth, but it must be underlined that it has obvious flaws and in all probability is incorrect. It is obviously unrealistic; the grooves are probably from the late Iron Age and the statistical proof is also faulty (Lindström 1991, 1996 unpublished), which is more obvious now that parts of the sources have been published (Gannholm 1993).

Of greater interest are a couple of studies of passage graves, ca. 140 in Västergötland in western Sweden and ca. 40 in Scania in southern Sweden and Zealand in eastern Denmark (figs. 2, 3 & 4). It is of course clear that these passage graves have an obvious ritual background, and the passages are distinctly oriented towards ESE in a rough normal distribution, with most of the passages concentrated towards the centre and occasionally up to ca. 45° from the mean orientation. The archaeoastronomical interpretations have departed from irregularities in the distributions. It is assumed that the passage graves in Västergötland have been directed toward the solar ascent in the beginning of February in several cases, and in most other cases at other important days. In some cases the orientation to the full moon or some solar eclipse could have been important, as well as bright stars (Henriksson 1989). The passage graves of Scania and Zealand are proposed to be directed towards the major and minor standstills of the moon and towards the moon when it rises in the east (Hårdh & Roslund 1991).*

Several major objections can be raised against these interpretations. For this separate group of graves, constructed during a relatively short period of time in a restricted

*) The direction of the ascent of the moon furthest to the south during the lunar cycle varies slowly within a period of ca. 19 years. The limits of this variation are the major and minor standstills in the case mentioned above.

area, Henriksson proposes a wealth of orientation principles. The analysis of Hårdh and Roslund is clearly more down-to-earth, but it results anyhow in three additional principles. It is surprising that the orientation for a single type of grave should be so complicated. The irregularities in the distribution which have been said to be interesting and been given interpretations, are totally different between the graves in Västergötland and Scania-Zealand. It has been disregarded that these irregularities could very well be the result of pure chance. If a large number of graves are oriented approximately in one direction, without requirement of precision, there will normally be some unpredictable irregularities in the distribution, just as in reality. This is also the likely reason why the distributions of Västergötland and Scania-Zealand have different irregularities but identical means - ESE in both groups.

If each separate grave was directed towards a locally observed celestial phenomenon, the local topographical horizon would have displaced the direction of ascent with different amounts at different graves. The total distribution of grave orientations ought to be larger than if the horizon were

level at all places. A hill standing in the way would, for example, displace the sun's ascent towards the south. When the orientations of the graves in Västergötland were recalculated with regard to the form of the horizon at each separate grave, the result was that the distribution did *not* become narrower. Even when mountains were standing in the way, the passage graves were oriented approximately towards ESE (Blomqvist 1989; Henriksson 1989). The reasonable and important conclusion - which was not drawn in the above-mentioned papers - is that the grave builders only approximately oriented their passage graves in a given direction, independent of the local topographical horizon.

With these examples it has been my intention to illuminate what I comprehend as recurrent problems in Swedish archaeoastronomy. It is possible that similar problems are haunting archaeoastronomy in other countries as well. Without further reasoning it is taken for granted that the separate monuments are more or less exactly oriented towards celestial phenomena. With such a presumption it is impossible to fail; in practice there are suitable celestial phenomena all around the horizon. The results are complica-

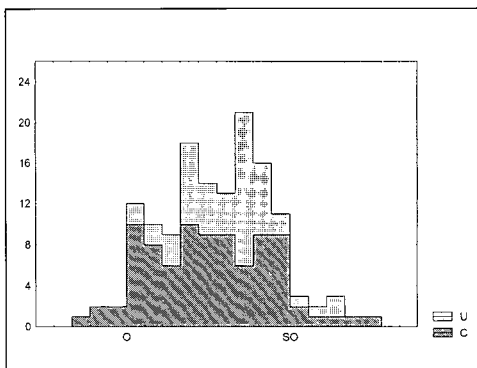


Fig. 3. The distribution of orientation among passage graves in Västergötland, divided into certain (C) and uncertain (U) orientations. Data from Blomqvist 1989.

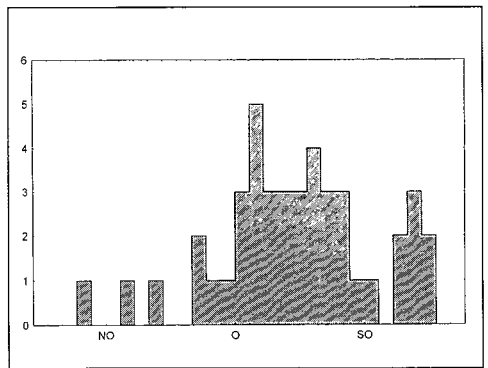


Fig. 4. The distribution of orientation among passage graves in Zealand and Scania. From Hårdh & Roslund 1991.

ted and far-fetched interpretations, where several celestial phenomena have to be included just for a single type of monument. The statistical analyses are also missing, incomplete or not seldom faulty. Of course detail studies are important, but the concentration on one separate group or even one separate monument raises the risk of losing the general outlook (Lindström 1993). Neither have the attempts to date graves to seasons and show that their orientation co-variates with the yearly variation of the direction to the sun's ascent and descent been successful (Lindström 1990).

GENERAL OUTLOOK OF ORIENTATIONS

The intensively studied orientation of passage graves clearly showed that smaller irregularities in distribution ought not to be a basis for far-reaching interpretations. Instead an assumption that the passage graves have been oriented in only one direction, but with a margin of error, seems to be closer to reality. Around this mean orientation the separate graves gather together in a normal distribution.

The mean orientation becomes the focus of interest and apparently demands a closer examination, especially as it is clearly deviating from a simple cardinal point (E in the case of the passage graves, with the mean orientation in ESE).

A compilation of mean orientations of a number of grave groups gives the opportunity to discuss more general orientation traditions (fig. 5). Also a few samples of house remains and rock pictures are discussed. It has to be underlined that the samples are incomplete and uneven, and that several means are uncertain because the samples are small and/or not accurately measured. The mean orientation of the late chamber graves (fig. 5:15) is calculated on orientations from half a dozen cemeteries, while the mean orientation of the gallery graves of Värmland and southern Småland (fig 5:4) are based on more

than 500 separate graves. The other samples lie between these extremes. Although sometimes uncertain in details, the samples do show some clear patterns which are hard to explain away.

From the island of Gotland we have got the most complete material. From ca. 2300 BC to AD 1100 there is an almost unbroken suite of graves with mean orientations of the length axis close to NNE-SSW. Only one group of graves (AD 550 - 800) deviates, with a mean orientation between N-S and NNW-SSE. It is possible that this short-lived exception is pure chance. For more than 3000 years it seems as if the same clockwise deviation from N-S has been practised.

The same tradition seems to have been practised on the island of Öland during the Iron Age until the Viking Age. In southern and western Sweden the main part of the Stone Age graves are oriented in the same way or in ESE-WNW, that is, at right angles to NNE-SSW.

In the Mälär Valley there are mostly data from the Iron Age. There is only one example of an orientation in SSW. One group is oriented in N-S, perhaps with a small deviation towards NNW-SSE, but it includes few cemeteries. All other controlled groups of graves have clearly different mean orientations from the graves of southern Sweden. These are 50-60° clockwise deviated compared with the cardinal points, that is, between NE and ENE, SE and SSE, etc. Interestingly enough, the Viking Age coffin burials (AD 800 - 1100) that are thought to be influenced by Christian traditions do not have a mean orientation in E-W, which is often claimed, but instead close to NE/ENE - SW/WSW.

Only graves have been presented in fig. 5. The only larger sample of ancient monuments of religious character besides graves are the rock carvings and rock paintings in northern Scandinavia, belonging to hunter-gatherer societies. Their mean orientation is SSW (Lind 1993).

A sample of house remains from Scania

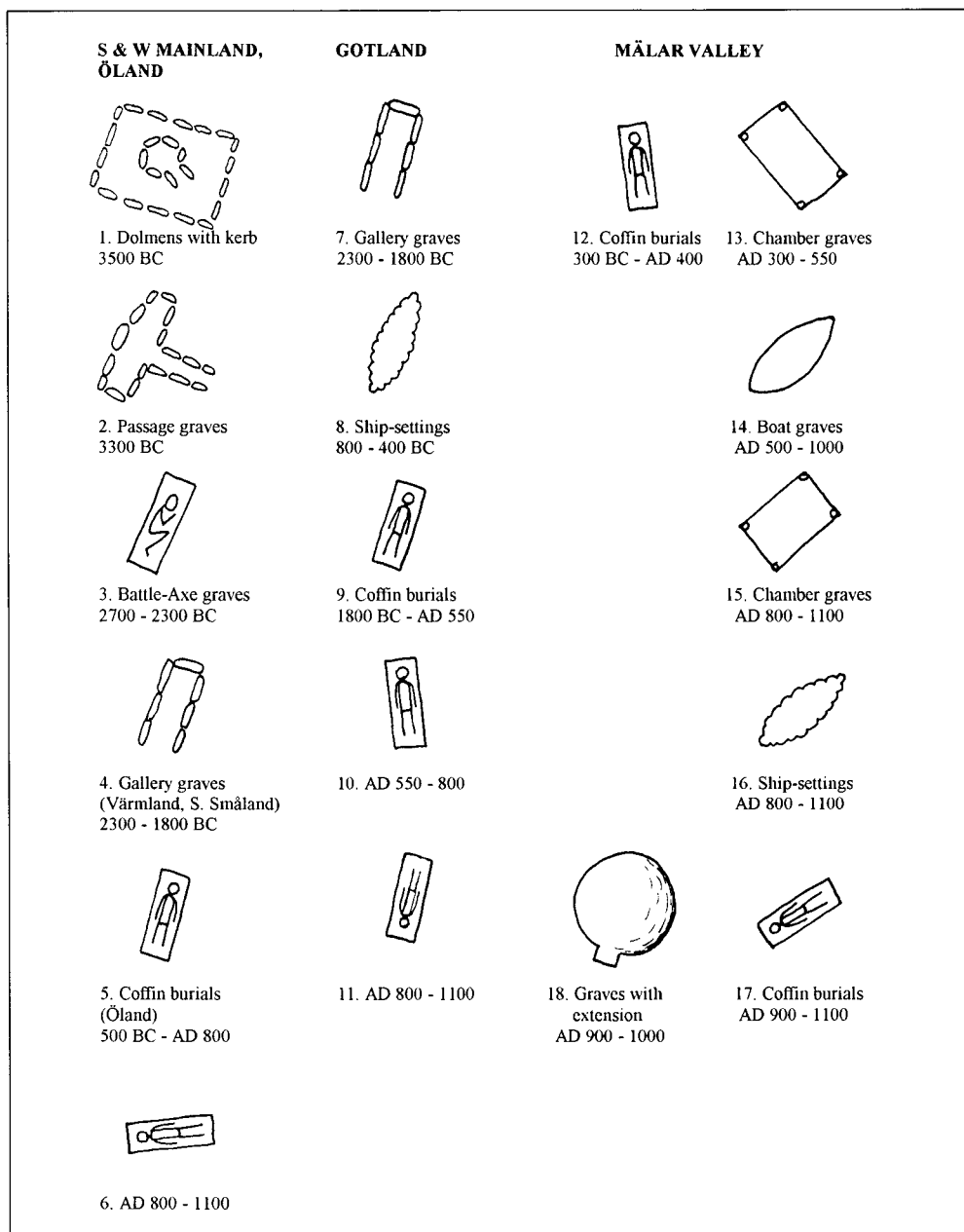


Fig. 5. Mean orientation of different grave groups in Sweden, north upwards. Data from: 1 & 2. Blomqvist 1989. 3. Malmer 1962. 4. Fristedt 1986, Ewa Ryberg, Riksantikvarieämbetet, Byrån för arkeologiska undersökningar. Kungälv, pers. com. Orientation data for 451 passage graves in the county of Kronoberg. 5 & 6. Beskow Sjöberg et al. 1987, Hagberg et al. 1991. 7. Luthander 1988. 8. Eriksson 1987. 9. Dahlberg, E. 1989, Dahlberg, I. 1990. 10. Dahlberg, E. 1989. 11. Carlsson 1988. 12. Lund 1995 and pers. com. 13. Bennett 1987. 14. Compilation from several sources by J. Lindström. 15. Gate 1995. 16. Fröberg 1971, Karlsson & Åman 1980. 17. Sample of coffin burial data from 21 cemeteries in the county of Stockholm, compiled by J. Lindström. 18. Johansson 1993.

in southern Sweden and Denmark shows that these were oriented close to ESE-WNW during the Bronze Age. During the Stone Age and the Iron Age the mean orientation was closer to E-W (Björhem & Säfvestad 1993), although with a possible small deviation towards WNW-ESE. Also house remains from the middle of the Iron Age on Gotland seem to have a similar orientation, in ESE-WNW or at right angles to this in NNE-SSW (Biörnstad 1955), but here it is necessary to undertake a more extensive survey. A small sample of house remains from southern Sweden between Scania and the Mälär Valley seems to cluster around E-W, which is also the case in the Mälär Valley, but here there is also an interesting concentration around SE/SSE - NW/NNW (Göthberg *et al.* 1995). The latter orientation is at right angles to the most common mean orientations of the graves in the Mälär Valley.

DISCUSSION

The data presented has draw-backs and problematic lacunae, but it is large enough to be the starting point for a discussion of the principles behind the orientation of ancient monuments. These principles are of course partly of an archaeoastronomical nature, since a tradition of orientation with some geographical distribution before the era of the compass in one way or another must have some sort of connection with celestial phenomena. But this is just a small part of the setting. The orientation is not only a question of observational technicalities. It is the result of man's world view, man's intersectioning of the world into cardinal points and meaningful directions and the use of this knowledge in social and religious contexts. The interpretation of the traditions of orientation is therefore not only a matter of identifying celestial phenomena, but also explaining ancient

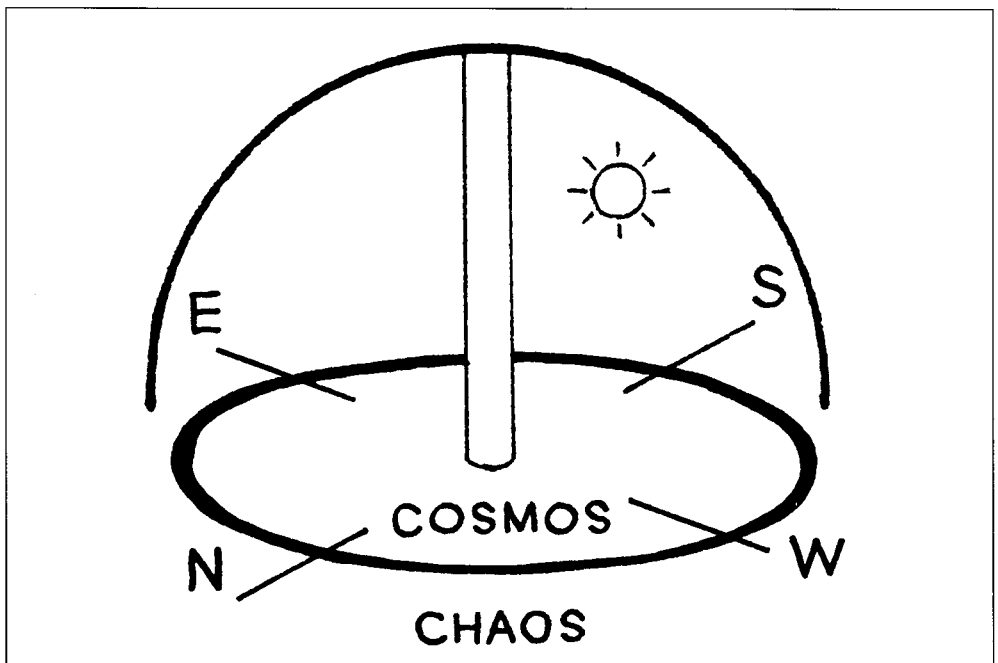


Fig. 6. Common features in archaic cosmologies, including the Scandinavian world view. A flat earth, a vaulted heaven in motion, the axis mundi and the four cardinal points. Lindström 1995.

man's systems of orientation and their connection with religious beliefs and different spheres of society.

OTHER CONCEPTIONS OF THE CARDINAL POINTS?

A short summary of traditions of orientation among people all over the world shows some common details (fig. 6). An important part of world views is the cardinal points, to which different mythological conceptions are tied. The Scandinavian mythology is no exception. In N are placed, for example, giants and the cold land, in E giants, in S the land of heat and the dark wood. The heavens are carried by four dwarfs named after the cardinal points. The direction to the land of the dead is of course of special interest; the *Hel* is placed in N. All over the world, with relatively few exceptions, the land of the dead is in the direction of one of the four cardinal points N, E, S or W.

To judge from the very meagre information in the literature of religious science it seems as if E and W are the practical directions when the land of the dead is placed in the direction of the ascending or descending sun. Therefore, the direction of the grave is not dependent on the time of the year, and the connections with the celestial phenomena are more indirect, via the cardinal points (Eliade 1959; Holmberg 1922-23; James 1986; Lindström 1994, 1995; Ucko 1969). In a similar way we say today, all year round, that the sun rises in E, even though the direction in reality varies from NE to SE.

Although it is possible to find exceptions, the main rule seems to have been to direct monuments toward the cardinal points. It therefore comes as a surprise that a lot of the Swedish groups of ancient monuments have mean orientations clearly deviating from these cardinal points.

There are at least two kinds of solutions to this problem. The traditional archaeoastronomical way would be to look for suitable celestial phenomena for each separate

monument, resulting in a confusing multitude of phenomena even for each single group of monuments, not to mention for all kinds of monuments put together. Another approach would be to look for a solution that is as simple and general as possible, although it is clear that the deviations rule out a too simple interpretation.

A possible explanation for the deviations is that there existed conceptions of the cardinal points in ancient time that deviated from the modern conception. Besides the latter there could have existed at least two other conceptions (fig. 7). The examples of mean orientations given above are with one or two exceptions easy to sort into two groups: those which are oriented in NNE-SSW or at right angles to these in ESE-WNW, that is with a clockwise deviation of ca 10° - 20° from the cardinal points, and those with a deviation of ca 50° - 60°, close to NE/ENE - SW/WSW or SE/SSE - NW/NNW. For the sake of simplicity the two conceptions will be referred to as the B- and C-systems, while our modern conception will be named the A-system.

The notes on directions between places in the oldest geographical descriptions of the North are surprisingly often incorrect, but not by chance. In most cases the deviations are clockwise. By turning the cardinal points ca 60° clockwise, the errors disappear. Therefore it has been suggested that the old Scandinavians had a conception of the cardinal points with this deviation. This proposal has been questioned, but no satisfactory solution has been put forward (Weibull 1928; Ekblom 1938, 1960; Ellegård 1960). An acute problem has been the scarcity of written sources, but it seems now that it is possible to come further with the help of archaeological sources. Is it a coincidence that the C-system suits this proposed conception well? Interestingly enough, both the geographical descriptions and the graves of the C-system are associated with seafaring as well as high status and the Viking Age.

A different conception does not mean

that one was ignorant of the astronomically "correct" cardinal points, but only that - for unclear reasons - one has chosen deviating directions. It should also be emphasised that a precise determination of the directions of the "correct" cardinal points demands quite elaborate observations, no less demanding than for any other chosen conception. The everyday conception of the cardinal points at the farmstead (and at the cemetery!) is heavily dependent on landmarks.

From recent times it is known that dominating topographical formations influence the conception of the cardinal points. The rivers in the Swedish north were thought of as running in W-E, although NW-SE is closer to the truth. The conceived directions in the river valleys were therefore heavily deviated (Ekblom 1938).

Besides the somewhat uncertain conclusions based on written sources, there are several other reasons for the assumption that different conceptions of the cardinal points (including perhaps also the recent A-system) were in use in ancient time.

The orientation of graves and other ancient monuments has a history of many mil-

lennia in Sweden, but in contrast to the wide distribution geographically and chronologically it shows a surprisingly small variation. New samples in the future will probably complicate the picture, but the main pattern ought to remain. It is also clear that the orientation has been practised at separate farmsteads and not only was reserved for an isolated elite. Relatively simple and robust principles ought to lie behind such continuous uniformity from the Stone Age to the end of prehistory. Therefore it is natural to associate to the universal common tradition of orienting the dead approximately toward one of the four cardinal points. Compared with this, the explanations put forward by archaeoastronomers seem unrealistic and unnecessarily complicated.

When the sources are of good quality the graves belonging to a group have a characteristic normal distribution around the mean orientation. The passage graves are a good example. Most graves are situated quite close to the intended direction ESE (then looked upon as E, according to the B-system), while relatively few have larger deviations from the mean. These deviations can be explained

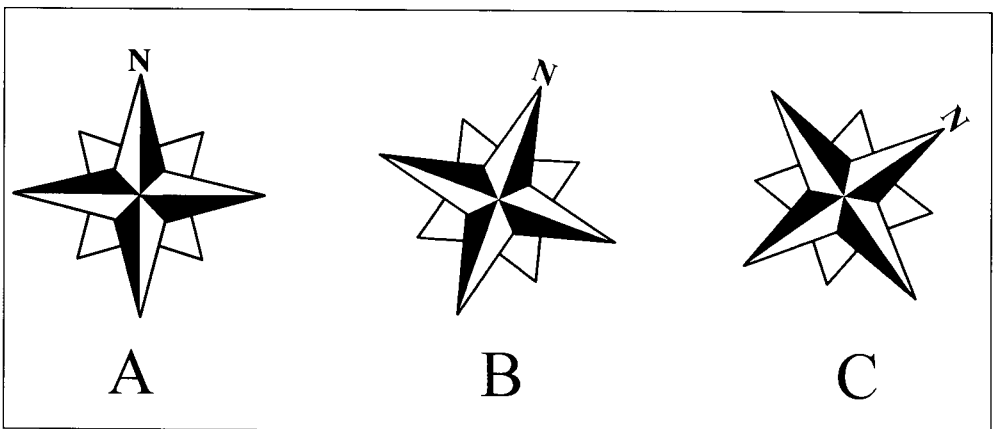


Fig. 7. Three conceptions of the cardinal points: a) the modern A-system b) the hypothetical B-system with a deviation of ca. 10-20° clockwise c) the hypothetical C-system with a deviation of ca. 50-60° clockwise.

by the assumption that the direction of a grave was only intended to be approximate, and that factors such as the local topography (at the place of the grave, not at the far horizon) may have influenced the direction. The point of interest is the fact that almost no grave deviates more than 45° from the intended direction. A larger deviation would result in the grave being directed in the sector of a neighbouring cardinal point (N or S of the B-system) instead of the intended one (E in the B-system). It almost seems to have been more important to avoid the wrong directions than to aim the grave with precision in the correct direction!

With the assumption of different conceptions of the cardinal points, it will also be easier to explain apparent interruptions in continuity. The passages of passage graves are oriented ESE, which is also the case with the faces of the dead in the Battle Axe graves. This seems to be an unproblematic continuity. The long axis of the Battle Axe graves is NNE-SSW, the same as for the gallery graves, with openings in SSW. This seems also to be an unproblematic continuity, but at right angles to the first one! The gallery graves are also represented on Gotland, where after a time they are followed by ship-settings, "sailing" in NNE-SSW, emphasising that this is the important axis.

Separately analysed, the orientations of the passage graves and the gallery graves would have been connected with totally different celestial phenomena in ESE and SSW respectively, which by pure chance results in the same deviation from the cardinal points and with approximately the same distributions. It is easier to assume that only one separate celestial phenomenon has been the starting point, not for the orientation of the individual grave but for the conception of the cardinal points, and that one has simply chosen to change from one cardinal point to another according to one conception, the B-system, in one step from E to S. The right angles between the mean orientations of the

ancient monuments are in this way given quite a simple explanation.

Instead of arguing for complicated and far-fetched archaeoastronomical interpretations, it is possible to be content with the conclusion that ancient people oriented their graves, with low demands of exactness, in what they apprehended as N, E, S or W.

ASTRONOMICAL BACKGROUND

Of course there also has to be some kind of astronomical background to the fact that ancient monuments are clustered in certain directions. The conceptions of the cardinal points must be linked to some sort of celestial phenomenon. Locally the topographical circumstances may have played a role. In many parts of the country the topographical formations have a slight clockwise deviation compared with the cardinal points, as is the case with the great lakes and islands. However, this kind of explanation has at most local significance. An example of this is that even along the SW coast of Gotland, which runs in NNW-SSE, the graves still have a clockwise deviation.

At the moment it is impossible to identify the celestial phenomena behind the orientation of the monuments with any certainty. If the phenomenon is the direction of ascent or descent of a bright star the change in direction over millennia caused by the precession may be possible to demonstrate, but so far the sun or the moon stands out as a more probable object of orientation.

In the case of the B-system there is no clear connection with the sun, such as the summer or winter solstice. Instead we have to look for intermediate dates. Scattered information gives some clues to the time reckoning in Scandinavia before the introduction of the Christian calendar. There is evidence at the beginning of the Middle Ages for the division of the year into a summer and a winter half year starting around April 14th and October 14th respectively, as well as evidence for lunar months and week reckoning (Nilsson *et*

al. 1934). A lot of this goes back to prehistoric times, but how far is uncertain. Probably there were variations at least in details between different parts of Scandinavia and over the years. It is possible that the sun's descent at the beginning of summer in WNW, or the ascent at the beginning of winter in ESE, may have been the starting point of the B-system (Lindström 1994). Another possibility is that the starting point has been the direction toward the sun in the afternoon when the day is hottest, i.e. SSW (Lindström 1994), or in the middle of the time we are awake every day (Roslund 1994). A possible starting point for the C-system is the descent of the sun at winter solstice in SW/WSW.

It is also possible that the moon instead of the sun has been the starting point of both systems, but that demands more complicated observations. At least theoretically it is possible to come closer to the truth by precise measurements of the orientations of ancient monuments and the shape of the horizon, at different latitudes including monuments of different ages.

Finally, another possibility is that only one celestial phenomenon is behind both the B- and the C-system. The difference between the systems is ca. 45°. This is also the difference between the cardinal points and the intercardinal points, and the difference between dolmens and their kerbs (fig. 5:1).

SOCIAL AND RELIGIOUS BACKGROUND

The stability of the traditions of orientation - over at least several millennia in some cases - points to the possibility that the conceptions of orientation may have survived several shifts in material grave culture and perhaps shifts in religious beliefs. Some traditions have a far-reaching geographical distribution while others seem to be more local, and it may be possible to separate different regions. The orientation of ancient monuments may therefore be of value when it comes to distinguishing different cultural areas.

It is interesting that neither Mesolithic graves nor graves of the Pitted Ware culture - i.e. graves belonging to societies with no or just a small element of agriculture - have a clear tradition of orientation, contrary to the cultures with more distinct agricultural attributes. The graves of the earlier part of the Battle Axe culture are more exclusive and also more distinctly oriented than the more common graves of the later part (Malmer 1962). Social and economical factors seem to play an important part in these examples.

In the Mälars Valley at least a couple of traditions have co-existed, leading to interesting questions about social and religious background. From chamber graves at the end of the Early Iron Age, via boat graves, younger chamber graves and ship-settings to the simple coffin burials of the late Viking Age, there seems to be a uniform tradition of orienting the graves according to the C-system. It is evident that the graves have a connection with higher strata in society and with ship forms. Only with the late coffin burials does the tradition seem to be commonly accepted. These graves are generally looked upon as influenced by Christian tradition.

The common view that the late coffin burials are oriented in E-W obviously seems to be wrong, according to my sample of ca. 50 graves from 21 separate cemeteries. The question whether the orientation is the result of Christian influence should therefore be discussed. The orientation of the dead ought to be interpreted as S in the C-system rather than W in the A-system. This can be compared with the tradition on Gotland, where the direction of the head, which earlier in the Iron Age was N, becomes S in the B-system in the beginning of the Viking Age.

Parallel to this tradition there is at least one other tradition of orientation in the Mälars Valley. The coffin burials of the Early Iron Age, which do not have pronounced status character, are oriented roughly in N-S. Perhaps they can be connected with the B-system, but probably not to the C-system like the

contemporaneous chamber graves. The graves with extensions from the Late Iron Age are oriented according to the B-system. These graves are with few exceptions cremation burials.

A small but interesting sample of house remains indicates that a considerable part of the houses in the Mälars Valley seem to have been oriented according to the local C-system. On the other hand, this system does not seem to have been practised among the houses of southern Sweden, where the orientation seems to be closer to E-W, with some exceptions. Scanian Bronze Age houses and probably Iron Age houses on Gotland seem to be oriented according to the B-system. This seems to support the assumption that the orientation of houses was influenced by the contemporary world view and not only by climatological considerations (cf. Hodder 1995).

Whether the co-existence in an area of several orientation traditions for graves ought to be interpreted as a result of different conceptions of the land of the dead - such as the Scandinavian *Hel* and *Valhall* in the written sources - is not possible to discuss at any length, nor to what degree different orientation traditions have a different origin and were practised in different social groups. Here it is sufficient to say that these questions deserve a closer study.

CONCLUSIONS

A large part of the ancient monuments in Sweden have a non-random orientation distribution, which directly or indirectly is connected with celestial phenomena.

In those cases where it has been possible to examine advanced archaeoastronomical interpretations in detail, they have hitherto been shown to be unconvincing or incorrect. The main problem is usually the statistical foundation. Probably the separate monuments are not oriented with precision, which is a common presupposition. Instead there are several reasons for assuming that the mean

orientation of the whole group of a certain kind of ancient monuments is the bearer of meaning. The monuments have been oriented in only one direction, but with a margin of error. Around this mean orientation the separate monuments gather together in a normal distribution.

Here the opposite direction to traditional archaeoastronomical research has been tested by interpreting a large and more varied material, being aware of common traditions of orientation around the world. One problem is that the measures of certain groups of monuments are of poor quality. Often the material is very small. There are also geographical and chronological lacunae in the presented compilation of mean orientations. The advantage despite these problems is that it is possible to get an overall picture and relate separate groups of monuments to larger contexts (fig 5).

As a rule the mean orientations deviate from the four cardinal points, although there are exceptions. The largest part of the mean orientations deviates ca. 10-20° clockwise. This is most pronounced during a large part of prehistory on Gotland and at least during the younger Stone Age in southern Sweden. Another distinct group concentrated to the Mälars Valley deviates ca. 50-60° clockwise.

It is suggested that the mean orientations are cardinal points (N, E, S, W) in at least a couple of conceptions of the cardinal points, deviating from the modern conception. Several regularities and details in the distribution of the monuments' orientation are hard to explain otherwise and speak in favour of this suggestion. The mean orientations that deviate ca. 10-20° are assigned to a conception named the B-system, and those deviating ca. 50-60° to a conception named the C-system. Our modern conception is here named the A-system (fig. 7).

Several different astronomical explanations of the deviations from the modern cardinal points are discussed. One possibility is that the sun's ascent on a certain day of the year has been important, which could be

connected with the old Scandinavian time reckoning. To go further a better and larger source material is needed, which fortunately is a matter of hard work and not luck. The mean orientations' dependence on latitude ought to give some clues to a solution, but in that case also continental material must be studied.

In several cases there is continuity in the traditions of orientation over millennia from the Stone Age and beyond. There are also regional and social differences, and in the same area there are examples of at least a pair of traditions co-existing.

The presented samples indicate that not only graves but also dwelling-houses have

been oriented according to the systems, although the samples are small. While the orientation of graves foremost can be tied to conceptions of the land of the dead, the orientation of houses probably also includes other aspects of the world view.

The interpretation put forward in this paper is of course in part hypothetical, among other things because the source material is limited. Hopefully it has at least been shown that a more comprehensive analysis can reveal interesting patterns and give new perspectives on the orientation of ancient monuments.

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