

Viking Age architecture in space and time

Die Architektur der Wikinger in Raum und Zeit

Architecture des Vikings dans l'espace et dans le temps

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As long as we remain in the archaeological realm, we cannot speak of architecture but of the projection of this architecture onto the two-dimensional plane. In other words we discuss ground plans of houses and their forms. There is one house form that is indeed special for this time period and this is the boat-shaped longhouse (fig. 1), a house with smooth convex outer walls and it is this type of houses this contribution will concentrate on

The Space Aspect

Before we go further into details of this special house form, I intend to make a little excursion into the ethnographic realm. Ethnographic research has documented a very close connection between a specific cultural unit and their house form. As long as these cultures existed in their own right, they have held on their house forms (*Rapoport 1969*).

This strong connection is underlined by some examples where a cultural unit was forced to leave its homestead, either by some kind of natural catastrophe or invasion of enemies, what ever. In some cases these people were moving far away before they settled in a new country again. What is interesting is, that they re-established their house form even when neither the climate, nor the access to suitable building material would favour it (*Rapoport, op. cit.*).

When the house form modifies, it reflects changes inside the culture. When a house form disappears, the specific cultural identity is dead. This development, as noted in ethnographic research, we actually observe in the course of the Viking Age period, when we examine the Norse settlements in the North Atlantic Area and in Central Europe (*fig. 2*).

On the North Atlantic isles these house remains belong to the legacy of the first settlers, in the Dutch area they can be characterized more as an alien impact in an already existing older housing landscape. In some cases the original boat-shape already is distorted, thus reflecting the loss of the cultural identity that created this form. From an ethnographic point-of-view this means that the culture, in this case the Viking culture, had died.

This overview clearly shows the wide geographical distribution of the boat-shaped house. At the end of the Viking era this house form disappeared from the record and is replaced by minor rectangular houses that made the basis of our historic architecture.

The Christianization of the pagan culture set an end to this house form but where is the beginning?

The Time Aspect

In the Early Iron Age we find traces of a different architecture. These traces show longhouses of a more rectangular layout (*fig. 3*). There are indications of a curvature in the outer walls but they are mostly found as a narrowing of the house near the gable ends.

In this housing landscape of the Early Iron Age there are in fact some "aliens", houses that clearly show a degree of convexity that was not normal in that time period. These houses look like Viking Age houses but they have a much older dating (*fig. 4*). They can be characterized as precursors or forerunners of a time yet to come.

These early examples of the Viking Age architecture come from the central Southern Scandinavian area. If these houses refer to the cultural identity of the Vikings, then we might trace the origins of this culture back to the Early Iron Age. Interesting in this connection is that, according to recent research, the Odin cult may already have existed in the Migration period (*Hedeager 1999*). If this is true, then at least parts of the Viking mythology as the basis of the cultural identity of the Vikings were in place in the Early Iron Age and the emergence of the boat-shaped house in this epoch gets a meaning.

House Form And National Identity

Houses with curved lines are unfamiliar to people raised in Northern or Central Europe. In relation to house construction we automatically think in rectangular terms. But curves and arches were definitely one of the main expressions of the architecture of Nordic prehistory.

When attempting to reconstruct prehistoric buildings, researchers normally are thinking in a pre-determined direction. In my opinion they take the historic material as a starting point and develop their ideas of form and construction backward in time (*Komber 2001*). This method is understandable and natural, because it is always desirable to identify in the prehistoric material as many known elements of

a national heritage as possible. The more remote the epoch to which these familiar elements belong the better, since this underscores a long history and tradition of an ethnic group and strengthens its cultural identity.

But, in this method of approach there lies a danger. We are prejudiced by historical ballast, and our minds are not open for the peculiarities inherent in the prehistoric building material. We often nationalise our prehistoric cultural remains to a greater degree than the archaeological material actually permits. This insight might lead us into a conflict of identity when we enter ancient periods and maybe we have to accept that our own cultural sphere does not reach as far back in time as we would wish.

My thesis is that the boat-shaped form is not limited to the two-dimensional plane, but that these ground plans are projections of a boat-shaped architecture that entailed the buildings as a whole.

The Ethnographic Approach

If we examine the houses of different pre-industrial cultures from all over the world, we notice that it is exactly this building principle with curved roofs and houses we find as a common factor (*fig. 5*).

The advantages of this building principle have been ascertained and utilised all over the world. The curvature of the roofs opens up for a considerable reduction of the dimensions of the material in use. Dependent on the degree of curvature the savings can amount to 50-60 % in comparison to straight material.

We simply have difficulties in dealing with these curves in our reconstructions; we try to make them angular. There have been made several reconstructions of houses on the boat-shaped basis, most of them in an angular way by using exclusively straight timber. In my opinion these attempts distort the original idea of these houses.

In regards to the ethnographic house material which shows all these curves and arches, we should set a question mark as to whether it is really correct to press our angular conception of the world onto houses with curved layouts.

The Geometrical Approach

By closer examination of Viking Age houses, we see that not only the walls, but all other longitudinal structures such as the rows of roof-bearing posts and eventually rows of outer posts follow curved lines (*fig. 6*).

The degree of curvature increases with the distance from the central axis of the house. Considerations from an engineering point-of-view ascertain that these curved lines on the ground plan entail a curvature of the inner roof-bearing frame. That means that this roof-bearing frame is convex in the vertical plane, highest in the central part of the house and lowering towards the gables.

Consider a three-aisled building with a convex wall-line. When we lay straight beams from this curved wall

over the section-wise straight purlins, then we get concave ridge-sections (*fig. 7: 1-3*). The stronger the convexity of the wall, the more concave the ridge-sections will be. In any case, the ridge will get a rather jagged appearance and the roof-sections will follow this feature. To avoid this dragon-tail look in favour of a smooth convex ridgeline, we have to bend the rafters (*Komber 1999*). The actual reconstruction of the Merovingian longhouse in Borg, Lofoten Islands, clearly shows that use of straight rafters in convex houses entail the mentioned effect (*fig. 7: 4*).

The Historical Approach

There are historical documents supporting this theory (*fig. 8*).

Several houses from the famous Bayeux-tapestry clearly show roofs with a double curvature (*fig. 8: 5-6*). Then we have the so-called "hogbacks" (*fig. 8: 1*), gravestones from England, representing Late Iron Age houses. Seen as house-models, the hogbacks very clearly show double curved roofs. A third example is a shrine from Pomerania (*fig. 8: 4*), decorated in Mammen-style, which has been interpreted as a model of an authentic house of that time. The roof has a domed structure and the roof ridge has a strong curvature, which in the gables nearly extends to the top of the outer walls. Furthermore, houses with curved roofs are pictured on a coin from Björkö (*fig. 8: 2*) and the Oseberg-tapestry (*fig. 8: 3*).

These different approaches show that there is a high probability for roof-constructions on the basis of double curved shells being a characteristic of the boat-shaped Viking Age houses. These examples fit with the engineering considerations made on the basis of the archaeological data.

The Buttress Theory

Fig. 9 shows one of the houses of the Fyrkat fortress in Denmark, clearly depicting rows of so-called outer posts. According to the archaeological evidence these outer posts show an inclination towards the house. The distance between the two rows of posts lies at about 1-1.2 meters. The angle of obliquity is rather high, about 70 ° or even more. These slanting outer posts have been interpreted as buttresses meeting the house at the top of the walls and thus stabilising it in transverse direction.

The angle of obliquity of the outer posts was measured to be in the range between 64 ° and 79 °. The wall height as a function of the obliquity of the buttresses becomes very sensitive at high angles. At 70 ° the wall reaches up to about 3 meters, at 75 ° up to 4 meters and at 80 ° up to 6 meters. In the actual reconstruction of the Fyrkat house the height of the wall was set to 3 meters (*fig. 10: 1-3*).

The stabilising effect of these buttresses gets lesser the steeper they are. If there really was a need to counteract the forces from the roof, why did the builders place these buttresses so near to the walls?

Outer buttresses were also found along the entry porches in the Fyrkat-house (cf. *fig. 9*). In view of the rather limited size of these porches the interpretation of these posts as buttresses becomes very questionable.

There exists another interpretation of these outer posts, i.e. the lower ends of the rafters going down to the ground, creating thereby a triangular frame as the bearing unit of the house that is statically stable in the transverse direction. The first outcast of the Fyrkat reconstruction is done in this way (*fig. 10: 4-5*).

But in the actual reconstruction of the hall (*fig. 10: 1-3*), this view was abandoned in favour of the buttress theory. If we nevertheless should interpret these buttresses as the lower ends of straight rafters, the ridge height of the Fyrkat house would amount to 15-18 meters. This solution leads itself ad absurdum, the enormous roof areas would take effect as sails and the house would be gone with the wind under the first hurricane. If we accept the outer postholes as traces of the rafters, then these rafters must have been bent.

Traces of outer posts are also found in the houses from the Viking Age settlement in Dorestad in the Netherlands (*fig. 11: 1-3*).

In the Dorestad material the assumed outer buttresses become more accentuated than the wall itself. There are houses where the wall posts are reduced to tiny sticks pointing to a mere light wall without any static function at all, or they are even absent at the excavation level.

This development clearly shows that the total weight of the roof rested on the outer posts. According to a Dutch interpretation, the outer posts in the Dorestad material were slanting inward and they have obviously in pairs borne the roof (*Waterbolk 1994*).

There seem to be some disagreements among the Dutch researchers according to the interpretation of these outer posts. The actual excavation stratum was very thin in consequence of deep ploughing and the traces were in several house remains difficult to interpret unequivocally. According to the alternative opinion the outer posts were vertical and thus serving as the actual wall (*van Es - Verwers 1995*). But, there remains the fact that there is a clear evidence for slanting outer posts in the boat-shaped houses in Dorestad (*fig. 12*).

And, if the wall had moved outward to the place of the outer posts, why did the door not follow? The door remains in place where it always had been, as a remnant of a wall that is no longer existent.

The reluctance to accept the possibility that there may have been slanting outer posts without a wall to support lies in the fact that we come up in a weird situation. What are the buttresses supporting if there is no wall to support? This image would call the whole buttress theory in question. Of course, we could model a transverse section of the house in the same way as we did with the Fyrkat house. We could interpret the outer posts as the lower ends of straight rafters and we will end up with the same roof height of 15-18 meters. As far as I know has this been done in a model of one

of the Dorestad houses.

This solution is too far-fetched to be taken seriously. No architect with her or his common sense intact would ever suggest building such nonsense. The conclusion is that the rafters of these buildings with a high degree of probability must have been bent. All other attempts end easily up in constructive convulsions.

Thus we may consider the possibility that in the boat-shaped Dorestad houses, the roof-bearing system consisted of pairs of curved rafters. As simple as it is, this construction is an ingenious strike to create a very stable, low weight system, easily spanning over 10 meters without needing any inner support. In this view the boat-shaped houses don't fit into the Dutch architectural history that exclusively consisted of a rectangular building tradition. In my opinion, the boat-shaped houses represent an alien impact that came from the North with the expansion of the Viking culture and this house form prevailed as long as there were people living there who felt the need to preserve their own cultural identity.

The Fireplaces

It is almost impossible to find enough trees in nature having exactly that degree of bend that would make them suitable to be used as rafters in these double curved roof constructions. The rafters have to be formed artificially over open fire. This process of warm bending takes only a few hours and makes the rafters completely tensionless. There is in fact archaeological evidence for this process having been in use in the actual time period. In several settlements there have been found fireplaces with a length of 9-12 meters. I want to stress the fact that these fireplaces were undivided, single units. Other researchers have already stressed the possibility that these fireplaces could have been used to form certain building elements (*Björhem - Säfvestad 1993*).

Conclusions

The evidence is in my opinion convincing enough to assume that the boat-shaped house type of the Viking Age architecture was constructed with curved rafters. It seems that the boat-shaped ground plan together with a double curved roof shell that completed this shape, has been the essential house form of that time and of that culture. It emerged in the central Scandinavian area in the course of the Early Iron Age and it was essential for the cultural identity of those people and they re-established this house form wherever they settled.

Fig. 13 shows reconstructions of different Viking Age houses on the basis of curved rafters (cf. *fig. 13: 1-8*). These reconstructions undoubtedly break with the traditional understanding of the form of prehistoric houses in this part of the world. But, when we go back in time the cultural expressions change and so does the architecture.

References

- Albrethsen, S. E. 1982:*
Tråk af den norrøne gårds udvikling på Grønland. In: *Myhre, B. - Stoklund, B. - Gjørder, P. (eds.): Vestnordisk byggeskikk gjennom to tusen år. AmS- skrifter 7: 269-287. Arkeologisk museum i Stavanger.*
- Bjørhem, N. - Säfvestad, U. 1993:*
Fosie IV. Bebyggelsen under bronst- och järnålder. Malmöfynd 6. Malmö Museer.
- Capelle, T. 1969:*
"Schiffsförmige" Hausgrundrisse in frühgeschichtlicher Zeit. In: *Frühmittelalterliche Studien, 3. Band: 244-256.*
- Carlte, L. 1992:*
Brogård - ett bronst- och järnålderskomplex i södra Halland. Dess kronologi och struktur. Hallands läns museers skriftserie nr. 6.
- Christensen, T. 1991:*
Lejre - syn og sagn. Roskilde.
- Dahl, S. 1965:*
Vikingabústaður i Seyrvági. Fróðskaparrit. Faroe Islands.
- Drayby, B. 1999:*
Arkitektur og bygningskunst i ældre vikingetid. In: *Rasmussen, M. (ed.): Hal og højsæde i vikingetid. Technical Report No. 5. Historisk-Arkæologisk Forsøgscenter, Lejre.*
- Duly, C. 1979:*
"The Houses of Mankind." London.
- Eriksson, T. 1995:*
Boplatser och gravar på Håbolandet. Arkeologiska undersökningar för järnvägen Målarbanan. Manuscript. Riksantikvarieämbetet UV Uppsala.
- Es, W. A. van - Verwers, W. J. H. 1995:*
House Plans from Dorestad. In: *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek, jaargang 41: 173-186. Amersfoort, Netherlands.*
- Hedeager, L. 1999:*
Skygger av en annen virkelighet - Oldnordiske myter. Oslo.
- Heidinga, H. A. 1987:*
Medieval Settlement and Economy North of the Lower Rhine. *Cingula 9, Universiteit van Amsterdam.*
- Hvass, S. 1979:*
Die völkerwanderungszeitliche Siedlung Vorbasse, Mitteljütland. In: *Acta Archaeologica 49: 61-111.*
- Hvass, S. 1981:*
Vorbasse. The Viking Age Settlement at Vorbasse, Central Jutland. In: *Acta Archaeologica 50: 137-172.*
- Haavaldsen, P. 1983:*
Virik, et gårdsanlegg fra eldre jernalder på Østlandet. In: *Nicolay nr. 41 (2-1983): 37-45. Universitetets Oldsaksamling, Oslo.*
- Jensen, S. 1987:*
Hvidings vikinger. In: *Skalk 1987, 1: 3-8.*
- Jørgensen, L. 1998:*
En storgård fra vikingetid ved Tissø, Sjælland - en foreløpig presentasjon. In: *Larsson, L. - Hårdh, B. (eds.): Centrala platser - centrala frågor. Samhällsstrukturen under järnåldern. Lund.*
- Komber, J. 1996:*
Avaldsnesprosjektet Rekonstruksjon av vikingtidshus. *Frå haug ok heiðni. Nr. 2. Arkeologisk museum i Stavanger.*
- Komber, J. 1999:*
Utvikling av langhus med buete vegger. In: *Rasmussen, M. (ed.): Hal og højsæde i vikingetid. Technical Report No. 5. Historisk-Arkæologisk Forsøgscenter, Lejre.*
- Komber, J. 2001:*
New Aspects of the Development of Houses from the Mesolithic to the Viking Period in Northern Europe. In: *Brandt, J. R. - Karlsson, L. (eds.): From Huts to Houses - Transformations of Ancient Societies. Skrifter utgivna av svenska instituttet i Rom, 4°, LVI. Stockholm.*
- Løken, T. 1982:*
"Report of Excavation Forsandmoen 1982" Museum of Archaeology. Stavanger.
- Løken, T. 1988:*
Bygg fra fortiden. Forsand i Rogaland, bebyggelsessentrum gjennom 2000 år. AmS-småskrifter 7. Arkeologisk museum i Stavanger.
- Myhre, B. - Stoklund, B. - Gjørder, P. (eds.) 1982:*
Vestnordisk byggeskikk gjennom to tusen år. AmS- skrifter 7. Arkeologisk museum i Stavanger.
- Nørlund, P. 1948:*
Trelleborg. Nordiske Fortidsminder IV, hft. I. Copenhagen.
- Nørlund, P. - Stenberger, M. 1934:*
Brattahlíð. Medd. om Grønland 88, hft. 1, Copenhagen.
- Petersen, J. 1933:*
Gamle gårdsanlegg i Rogaland. Inst. for saml. kulturforskning. Serie B, XXIII. Oslo.
- Rapoport, A. 1969:*
House Form and Culture. Foundations of Cultural Geography Series. Englewood Cliffs. N.J.
- Rasmussen, M. (ed.) 1999:*
Hal og højsæde i vikingetiden. Technical Report No. 5. Historisk-Arkæologisk Forsøgscenter, Lejre.
- Roberts, H. - Vésteinsson, O. 2001:*
Personal information. Fornleifastofnun Íslands. Reykjavík.
- Schmidt, H. 1977:*
Bebyggelsen. In: *Fyrkat - en jysk vikingeborg. Nordiske Fortidsminder, serie B - in quarto. Bind 3. Copenhagen.*
- Schmidt, H. 1994:*
Building Customs in Viking Age Denmark. København.
- Small, A. 1967:*
Excavations at Underhoull, Unst, Shetland. In: *Proc. Soc. Antiquaries Scot. 98: 225-248.*
- Stenton, F. (ed.) 1957:*
The Bayeux Tapestry. London.
- Thornbjerg, S. Aa. 1997:*
Fra gubbernes verden. In: *Skalk 1997, 3: 6-10.*
- Thorsteinsson, A. 1982:*
Fåråske huskonstruktioner fra vikingetid til 1800-årene. In: *Myhre, B. - Stoklund, B. - Gjørder, P. (eds.): Vestnordisk byggeskikk gjennom to tusen år. AmS- skrifter 7: 149-161. Arkeologisk museum i Stavanger.*
- Verwers, W. J. H. 2001:*
Personal information.
- Waterbolk, H. T. 1994:*
The Origin of the Lejre House Type. In: *Kongehallen fra Lejre - et rekonstruktionsprojekt. Teknisk rapport nr. 1. Historisk-Arkæologisk Forsøgscenter, Lejre, Denmark.*
- Winkelmann, W. 1954:*
Eine westfälische Siedlung des 8. Jahrhunderts bei Warendorf, Kr. Warendorf. Germania 32.
- Wranning, P. 1996:*
Ett vikingatida trelleborgshus i Ösarp. Arkeologiska rapporter från Hallands läns museer 1996, 6.

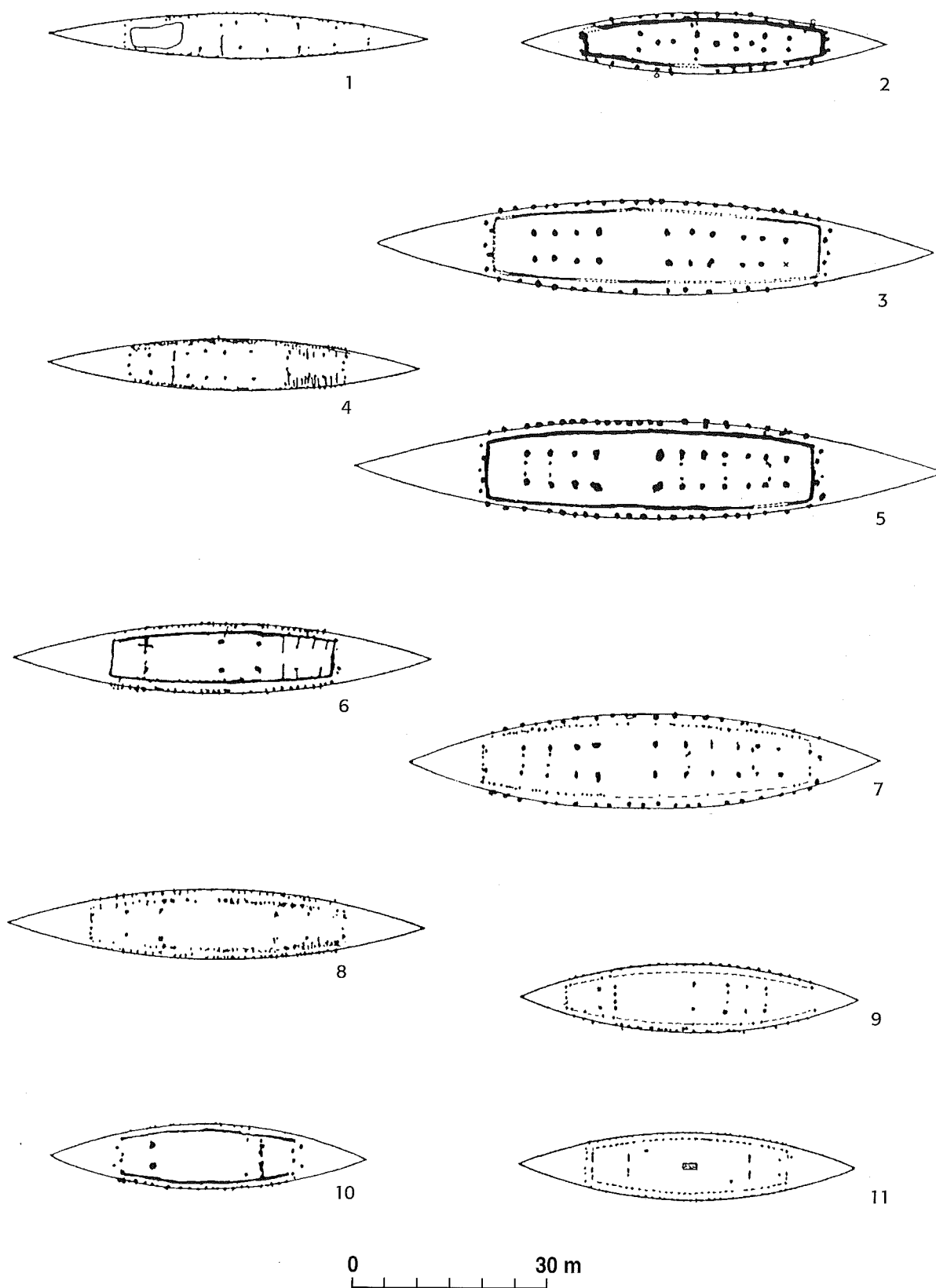


Fig. 1. Boat-shaped Viking age houses: **1** - Omgård house A II b. After Nielsen 1981; **2** - Toftegård house 3. After Thornbjerg 1997; **3** - Gamle Lejre house III. After Christensen 1991; **4** - Vorbasse house CCXXIII. After Hvass 1981; **5** - Gamle Lejre house IV ab. After Christensen 1991; **6** - Gamle Hviding. After Jensen 1987; **7** - Gamle Lejre house IV c. After Christensen 1991; **8** - Omgård house A XXXVIII. After Nielsen 1981; **9** - Toftegård house 4. After Thornbjerg 1997; **10** - Omgård house A XLVI. After Nielsen 1981; **11** - Trelleborg fortress, northeastern square. After Nørlund 1948.

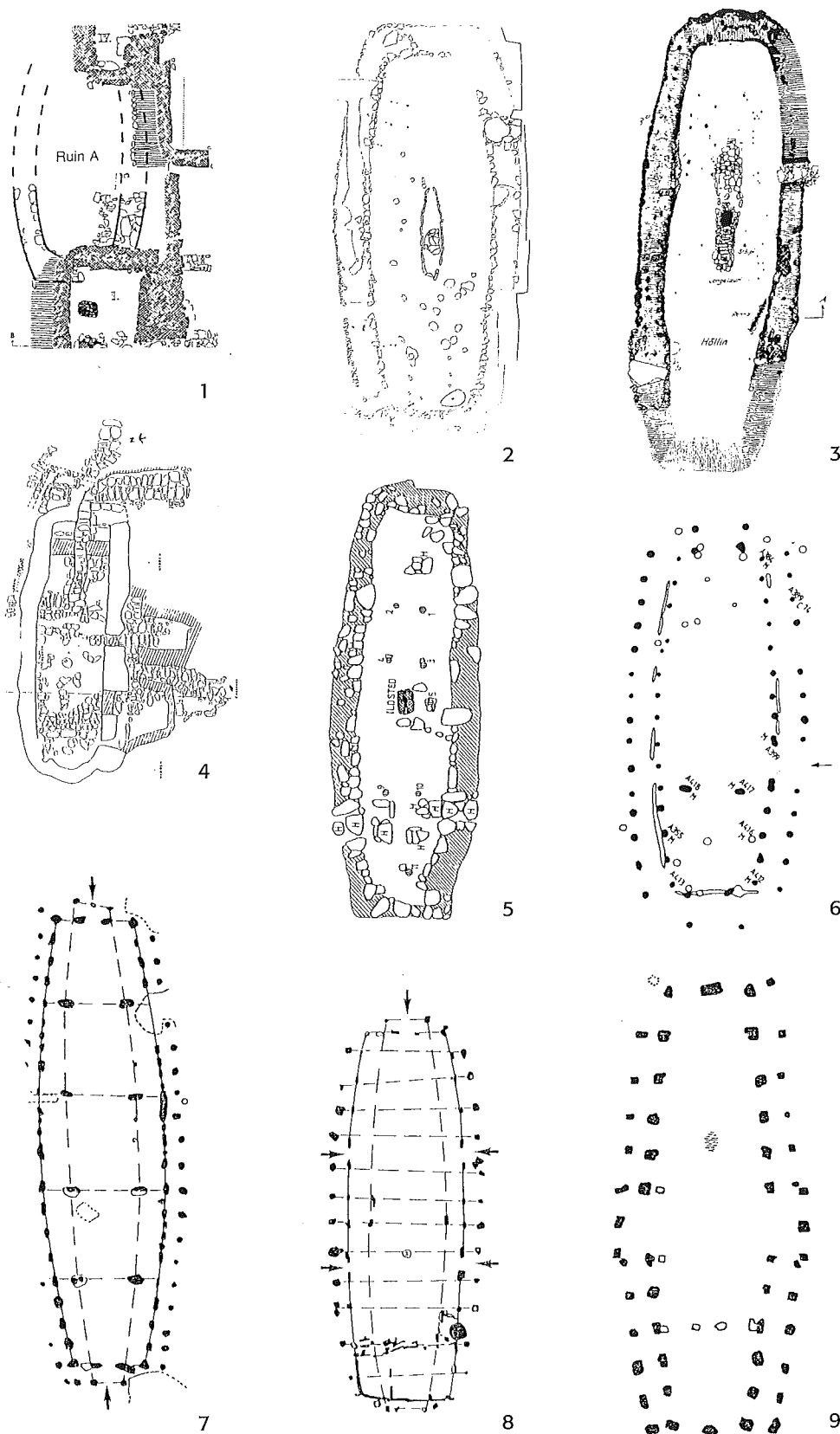


Fig. 2. Distribution of Viking age architecture in space: **1** - Brattahlíð, Greenland. Ruin group ø 29a, Ruin A. After Nørlund - Stenberger 1934; **2** - Aðalstræti 14/16, Reykjavík, Iceland. After Roberts - Vesteinsson 2001; **3** - Kvívík, Faroe Islands. After Dahl 1965; **4** - Underhoull, Unst, Shetland. After Small 1967; **5** - Oma, Rogaland, Norway. After Petersen 1933; **6** - Ösarp house 13, Halland, Sverige. After Wranning 1996; **7** - Trelleborg fortress, fore court, Denmark. After Nørlund 1948; **8** - Kootwijk house 2, Netherlands. After Heddinga 1987; **9** - Warendorf house 43, Westfalen, Germany. After Winkelmann 1954.

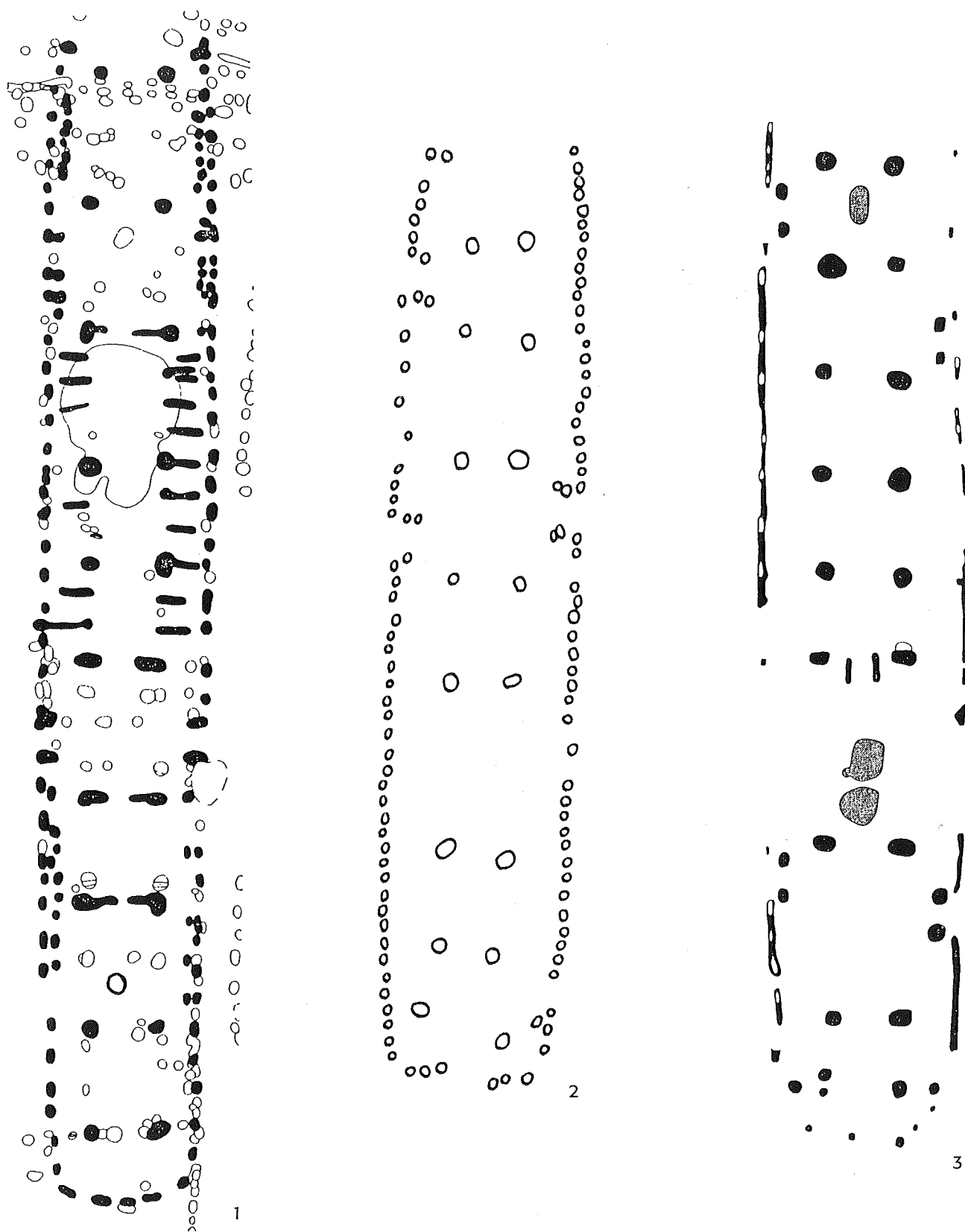


Fig. 3. Typical early iron age houses: **1** - Vorbasse house XXVI, Denmark. After Hvass 1979; **2** - Brogård house XXXII, Sweden. After Carlie 1992; **3** - Forsand house III, Norway. After Løken 1982.

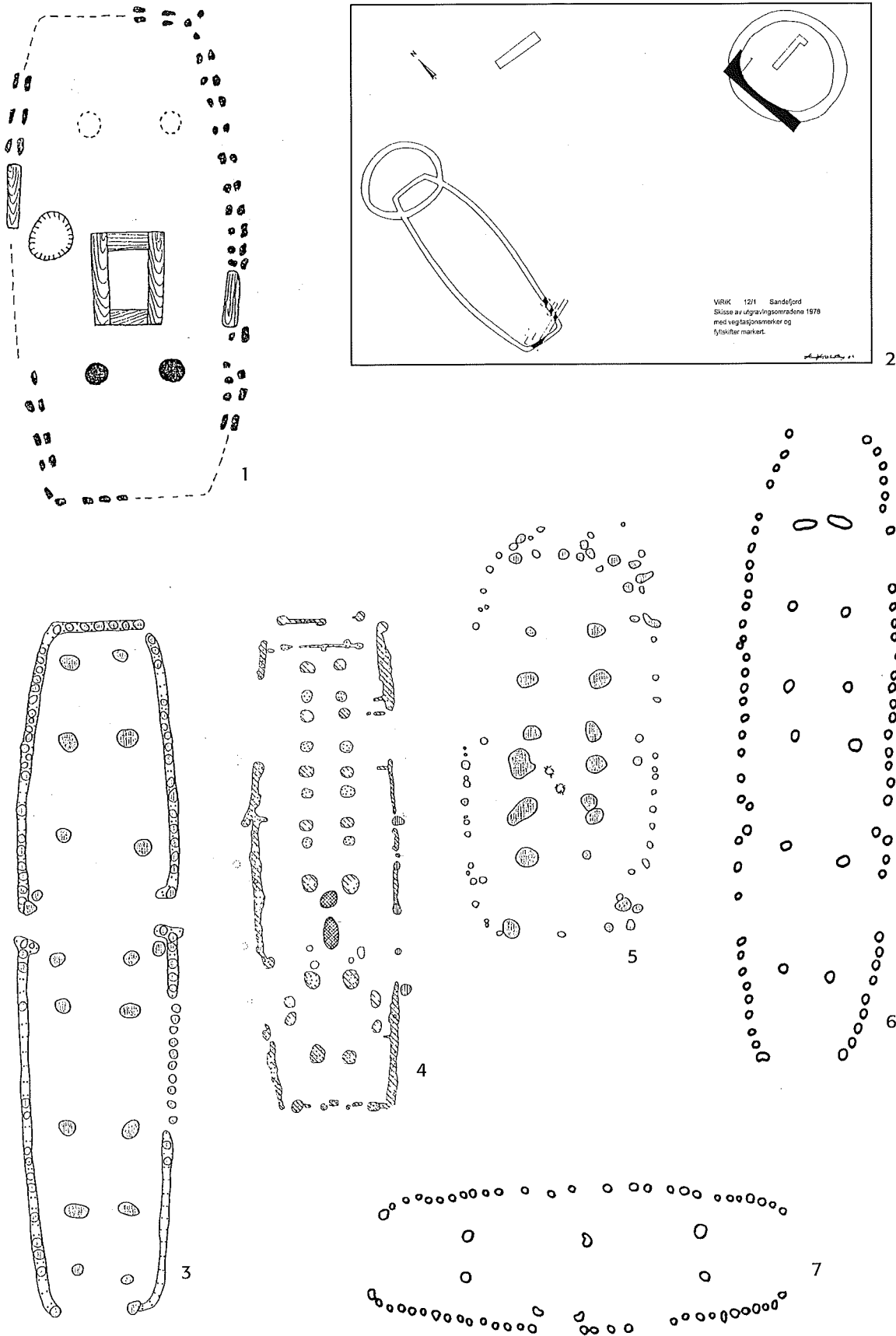


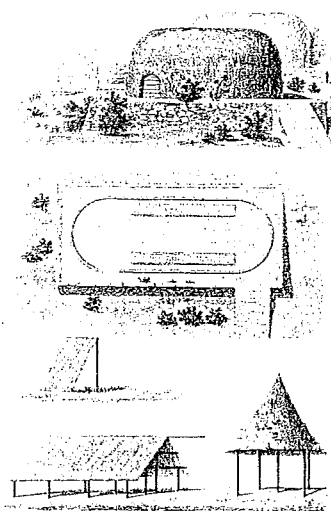
Fig. 4. Viking age architecture in the early iron age: **1** - Trælborg, Jutland, Denmark. After Capelle 1969; **2** - Virik, Vestfold, Norway. After Haavaldsen 1983; **3** - Brogård house XIV, Halland, Sweden. After Carlte 1992; **4** - Forsand house II, Rogaland, Norway. After Løken 1982; **5** - Högsta house 14, Uppland, Sweden. After Eriksson 1995; **6** - Brogård house XXXII, Halland, Sweden. After Carlte 1992; **7** - Brogård house X, Halland, Sweden. After Carlte 1992.



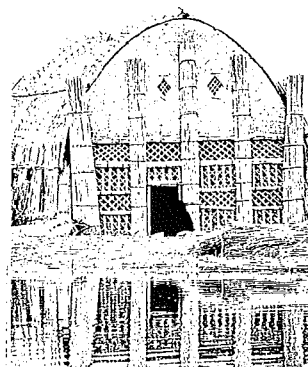
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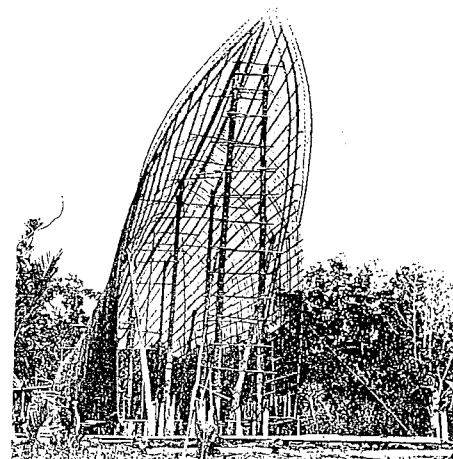
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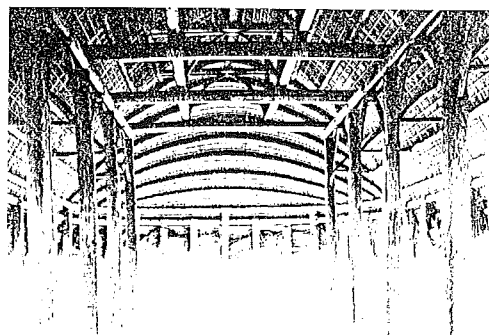
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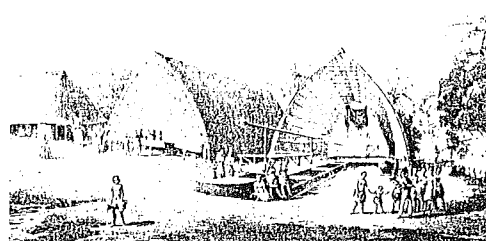
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Fig. 5. Preindustrial houses from all over the world: **1** - Village of Secotan, Virginia, North America. After Duly 1979; **2** - Amazonian village, Brazil. After Duly 1979; **3** - Buildings of Likiliki, New Ireland. After Duly 1979; **4** - Marsh Arab mudhif, Mesopotamia. After Duly 1979; **5** - Unfinished Dawi, Purari delta region, New Guinea. After Duly 1979; **6** - Longhouse from Pago Pago, Tutuila, Western Samoa. After Duly 1979; **7** - Village of Bea, Tongatapu, Tonga Islands. After Duly 1979.

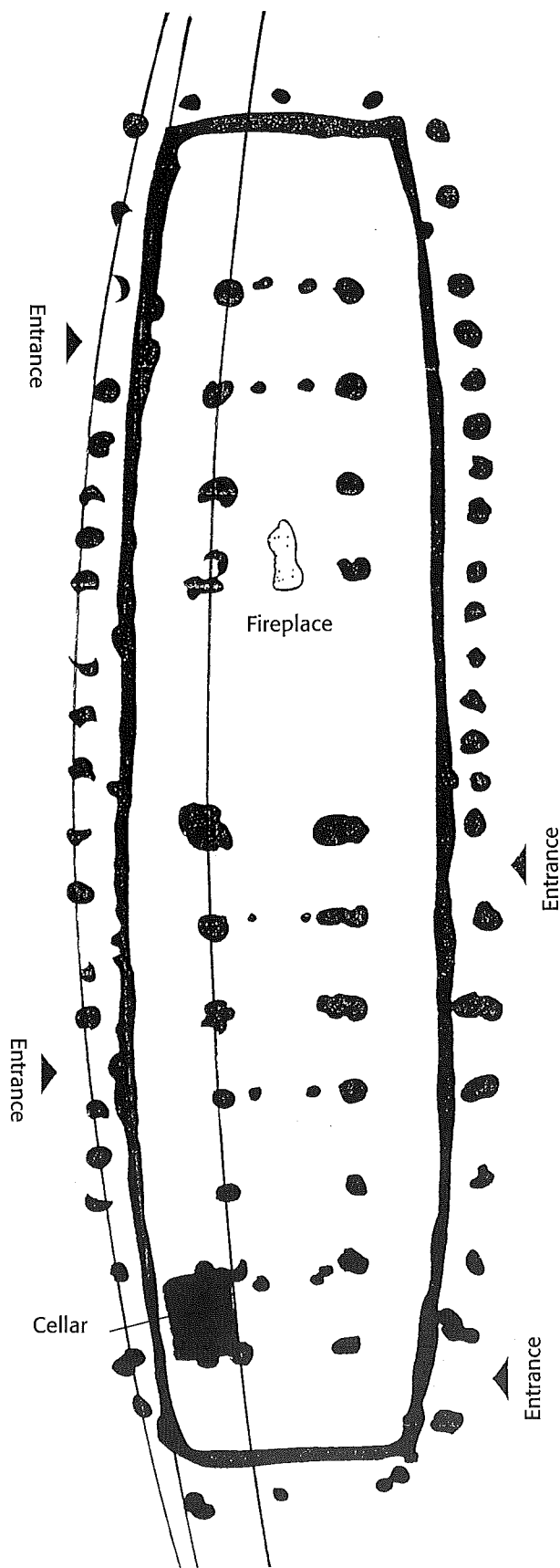
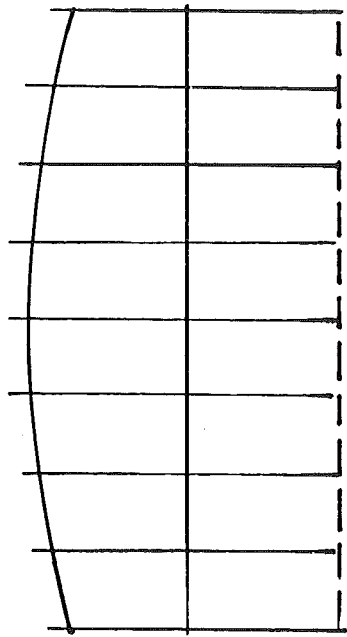
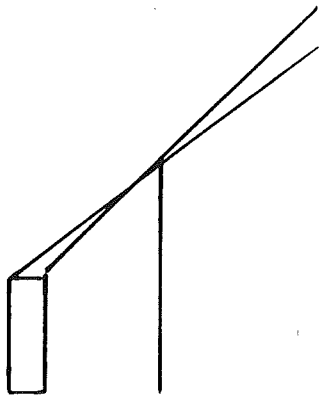


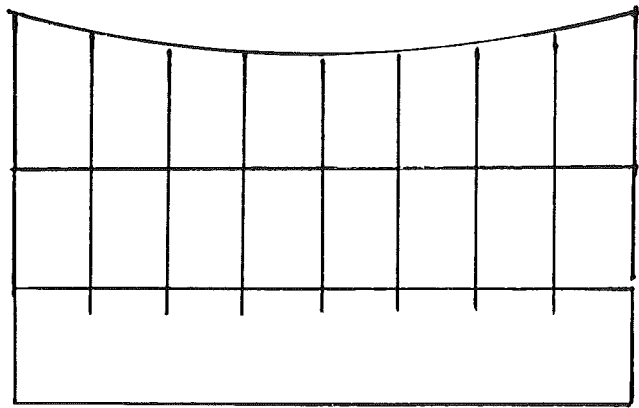
Fig. 6. Gamle Lejre house IVab. Different degree of curvature of the longitudinal elements. Ground plan after Christensen 1991, curvatures by the author.



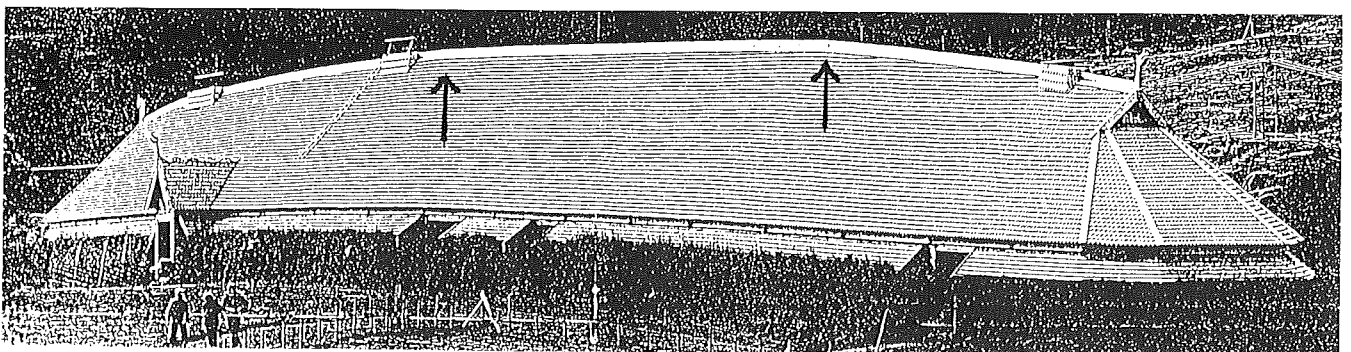
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Fig. 7. Geometric implications by use of straight rafters: **1** - Section between two roof-bearing posts. Straight purlin, convex wall. Seen from above; **2** - Same section, seen in the longitudinal direction. Straight rafters end in different heights; **3** - Same section, seen in the transverse direction. The section of the ridge gets concave; **4** - Viking museum Borg, Lofoten. Use of straight rafters prevents a smooth ridgeline. Photo by Boarch arkitekter as, Bodø, Norway. Arrows added by the author.

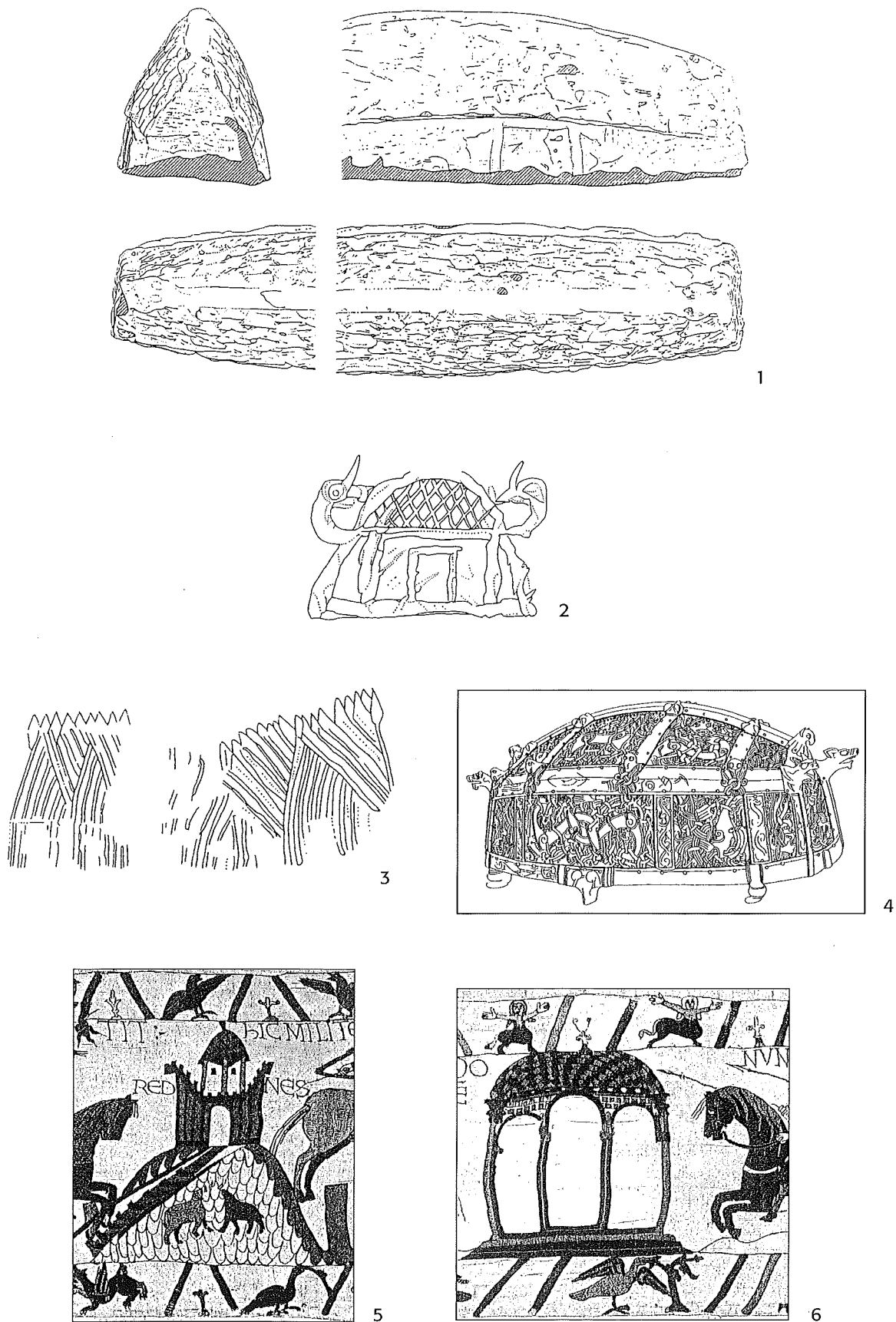


Fig. 8. Historical items depicting convex roof constructions: **1** - Hogback from Crosscanonby, Cumberland, England (after Schmidt 1994); **2** - Picture of a house on a coin from Birka, Sweden (after Schmidt 1994); **3** - Curved rafters on the Oseberg tapestry, Norway (after Schmidt 1994); **4** - Cordula shrine, Cammin, Pomerania, Poland (after Komber 1996); **5** - Picture of a house on the Bayeux tapestry, France (after Komber 1996); **6** - Picture of a house on the Bayeux tapestry, France (after Komber 1996).

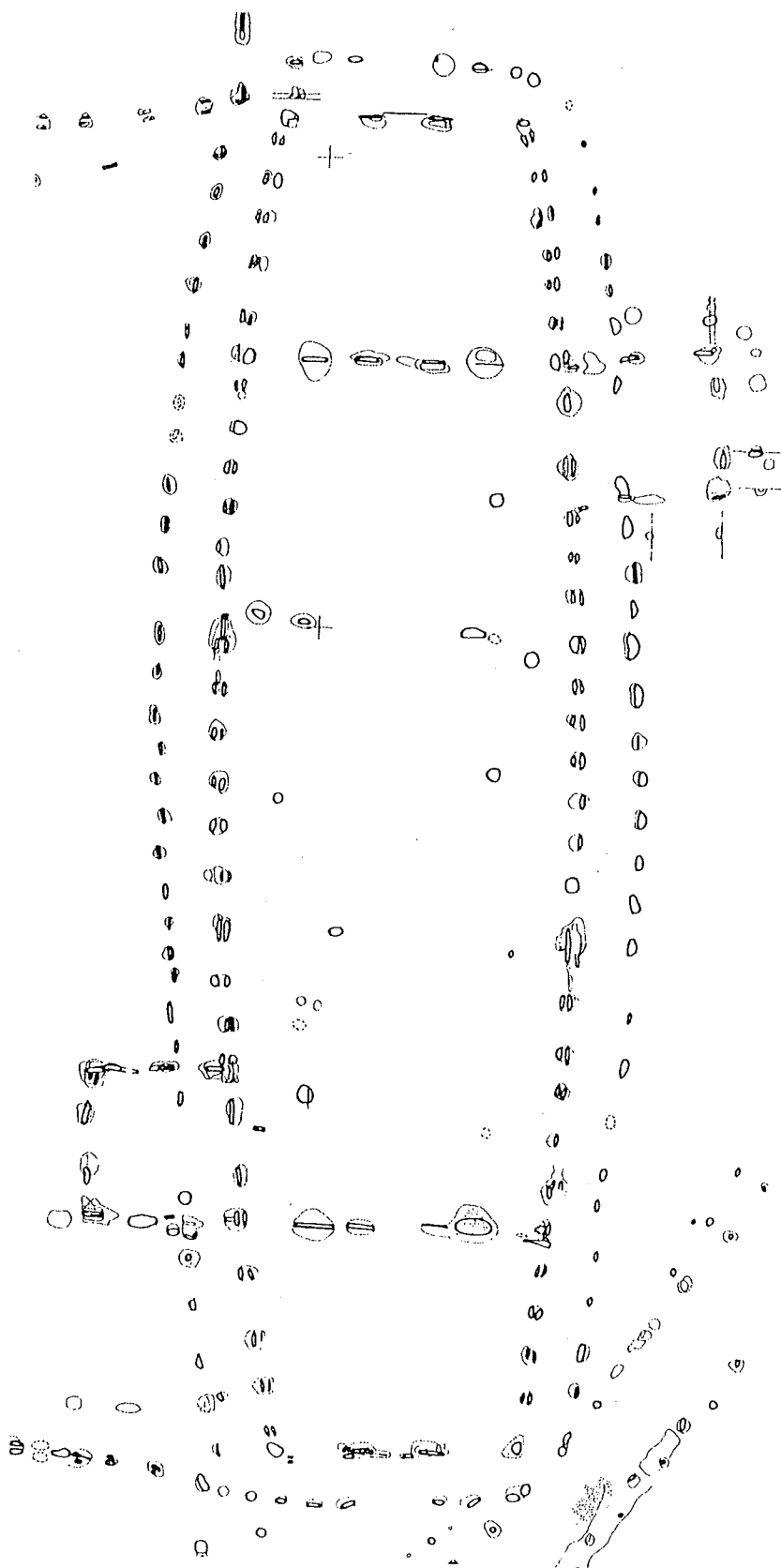


Fig. 9. Fyrkat fortress, house 1 n. After Schmidt 1977.

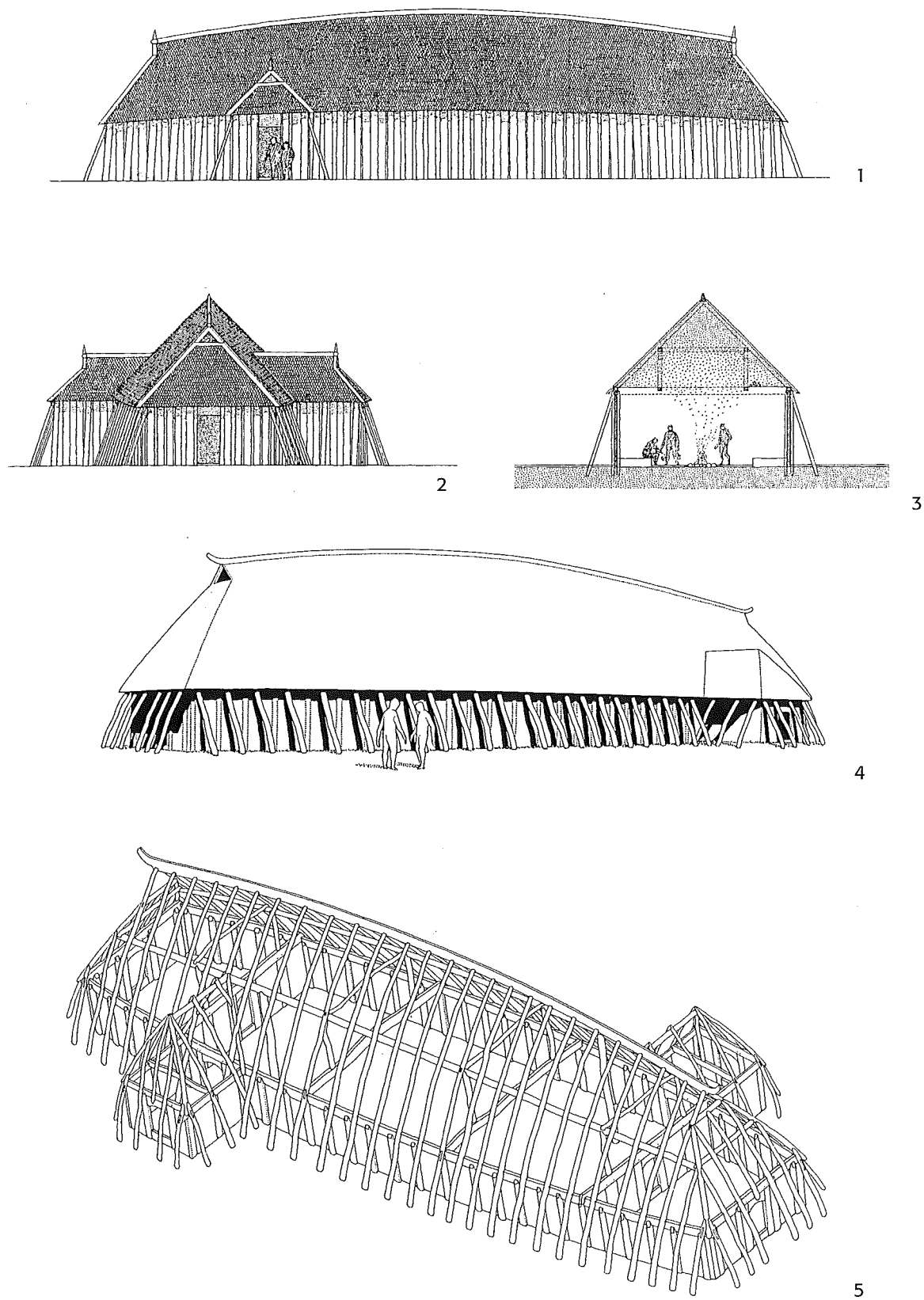


Fig. 10. Reconstruction of the fyrkat house: **1-3** - Actual reconstruction of the Fyrkat house. After Schmidt 1994; **4-5** - Original idea of reconstruction of the Fyrkat house. After Schmidt 1977.

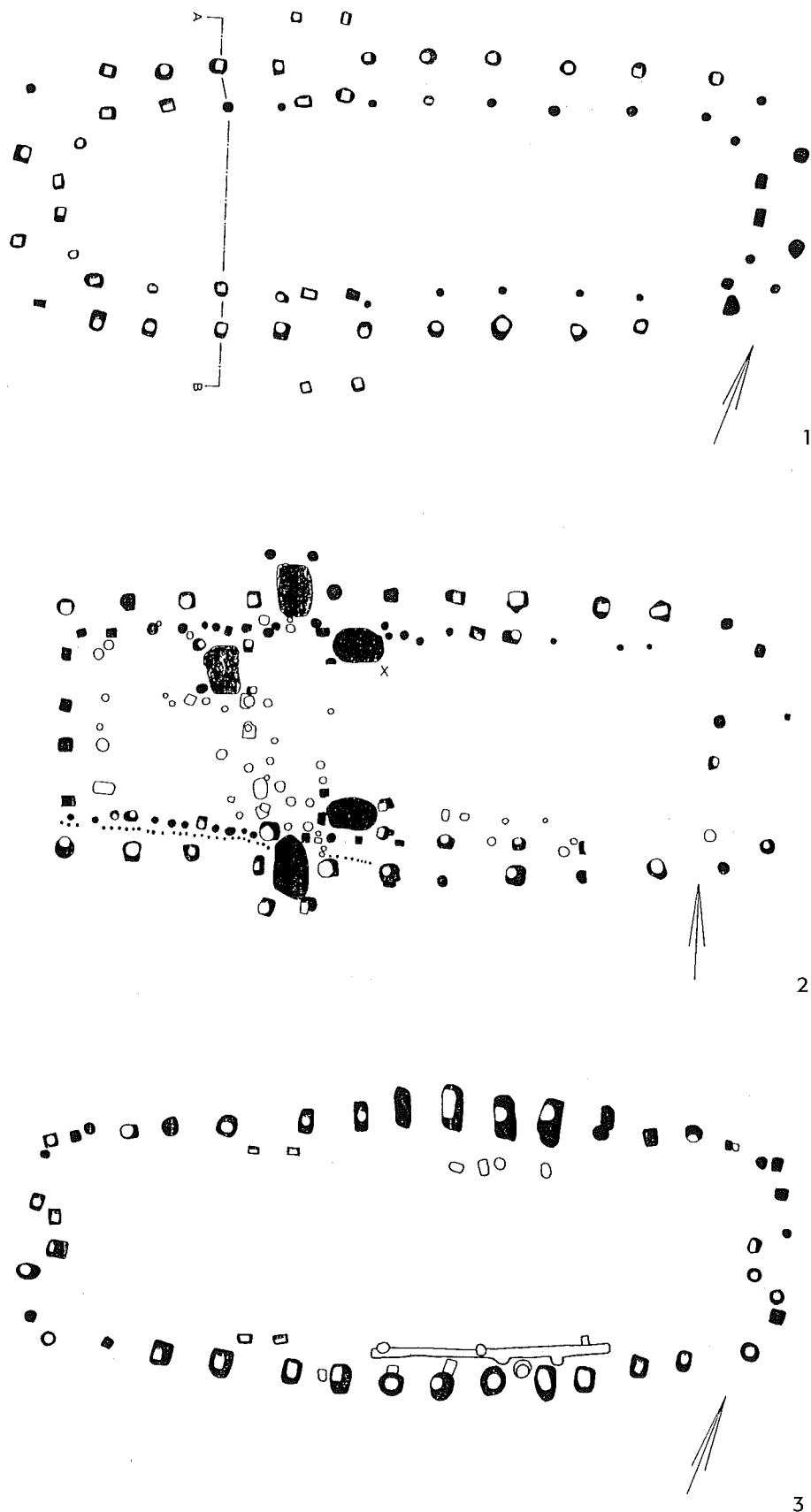


Fig. 11. Houseplans from Dorestad, Netherlands: **1** - House from Dorestad. After van Es - Verwers 1995, figure 3; **2** - House from Dorestad. After van Es - Verwers 1995, figure 5; **3** - House from Dorestad. After van Es - Verwers 1995, figure 6.

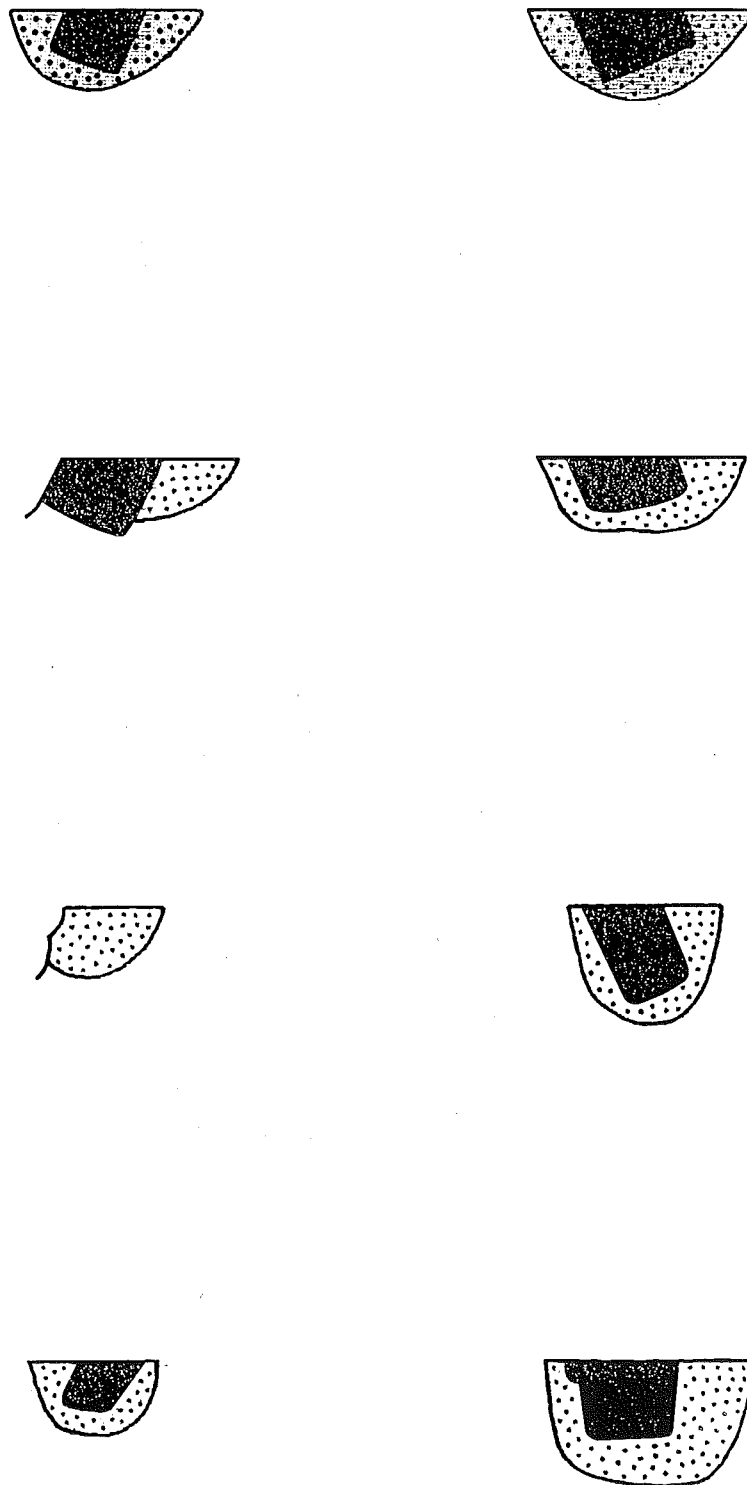


Fig. 12. Sections through opposite pairs of postholes from figure 1 - (after Verwers 2001).

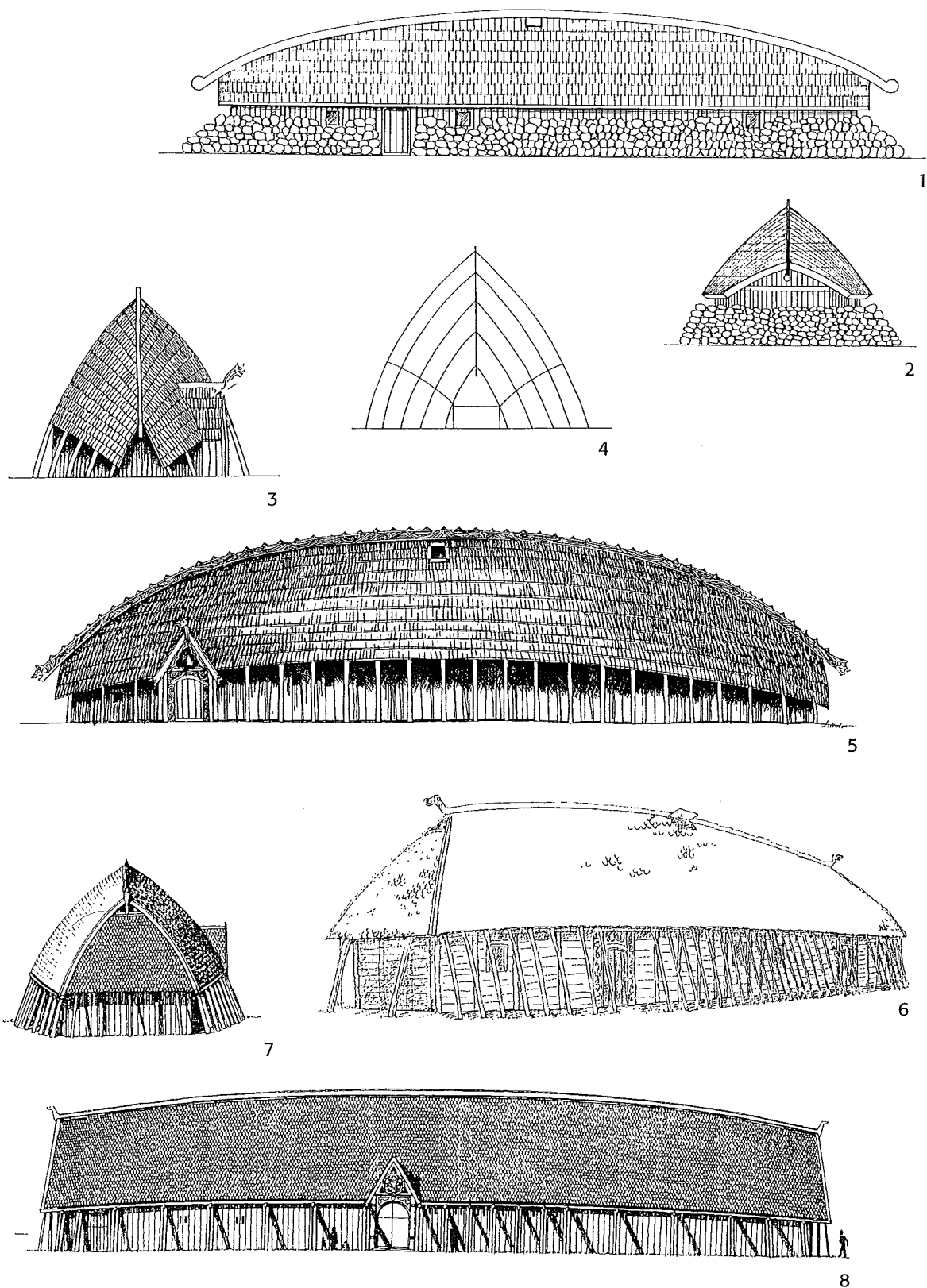


Fig. 13. Attempts of reconstruction on the basis of curved rafters: **1-2** - Viking Age farm in Avaldsnes, Norway. Developed by Jochen Komber. Based on excavations from Oma, Rogaland county, Norway (cf. Petersen 1933). **3-5** - Viking Age farm in Ale, Västra Götaland, Sweden. Developed by Jochen Komber. Based on excavations made in Tissø, Sjælland, Denmark (cf. Jørgensen 1998). **6** - Viking Age farm in Hornbore by, Sweden. Developed by Jochen Komber. Based on excavations made in Ösarp, Halland county, Sweden (cf. Wranning 1996). **7-8** - Suggested reconstruction of the Lejre hall, Denmark. Developed by Bente Drajby and Jochen Komber (1999). Based on excavations in Gamle Lejre (cf. Christensen 1991).