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PRESERVATION IN PRACTICE | SAUVEGARDE EN PRATIQUE

THE WOODEN HERITAGE
LOST TRADITIONS SURVIVING IN NORWAY

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1 PATRIMOINE EN BOIS
TRADITIONS PERDUES SURVIVANT EN NORVÈGE

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MAN'S PAST HAS BEEN divided into Stone, Bronze and Iron Ages on the basis of the raw material which was used at the time, but this system was based on surviving objects and can easily lead us to overlook the fact that wood has been the most commonly used material at all times, both for objects and for structures. Through medieval archaeology we have now been made aware of the dominating role played by wood in earlier times. In the many extensive archaeological excavations which have taken place in the historical cities of Europe north of the Alps since the Second World War, our generation has come face to face with a material culture based on wood which had become totally forgotten. Wood is more perishable than most other materials, and in the upper archaeological levels on urban sites most of the wood has rotted and disappeared. But the deeper we get in the stratigraphy and the more waterlogged the deposits, then the better the state of preservation of the wood. Down here in the wet buried deposits of the old towns, we rediscover Europe’s forgotten cultural tradition of using wood. Here we encounter the remains of wooden buildings in overwhelming numbers and with a richness of variety in form and construction which gives some indication of the extensive use which earlier house-builders made of wood.

The significant advance made by archaeologists in this area opens up new possibilities for investigating the sources of the wooden architecture of Norway. In this country ancient wooden build-

Les plus grandes des églises en bois datent d'une structure complexe et sont divisées en pièces. La haute pièce centrale a une arche de poutre droite, ou toit, et est orientée sur les quatre côtés par un vestibule. Les plus petites d'entre elles sont constituées de chapiteaux rectangulaires de remplissage, comme celles qui on trouve dans les plus petites églises en bois de déplacements.
trestle-frame construction was used for out-houses, where there was no question of taking any special care. 

There have not been any new stave-churches built since the Middle Ages. While there must at one time have been about a thousand of them, there are now no more than twenty-nine. Trestle-frame buildings on the other hand have continued to be built right up to the present century and still make up a sizeable proportion of the buildings of Western Norway.

In all the surviving stave-churches, each of the four walls was constructed as a rectangular frame, with a sill-beam along the bottom, an upright post at each end and a wall-plate across the top. Four similar frames were placed so that they formed a box, with the four sill-beams forming a sturdy rectangular ground-frame and the four wall-plates forming an equivalent horizontal frame at the top. In this way the stave-church is a cube consisting of four vertical and two horizontal rectangular frames. The wall-frames were filled with vertical planks or boards placed edge to edge, turning each wall into a solid plate. The rafters rested on the wall-plates of the side walls.

The trestle-frame building is constructed in quite a different way. The basic element here is a simple trestle consisting of two uprights and a tie-beam fixed at each end into notches in the top of the uprights. The frame is stabilized with diagonal braces across the corners. Two or more trestles are placed at a short distance from each other and joined with two parallel wall-plates which are fixed in slots in the tie-beams at the inner face of the uprights. The upright, the tie-beam and the wall-plate are so carefully and firmly locked together that the rafters can rest on the wall-plates and span the width of the building without additional support. The whole building is strengthened lengthwise by diagonal braces across the upper angle between the upright and the wall-plate.

The minimum number of trestles in a building will be two, one at each end to form the two gable walls. This is the most usual arrangement in small buildings which were erected for storing peat. Longer buildings require intermediate trestles, placed at 3–4 m intervals. A small barn may have four frames.

The external walls usually consist of a cladding of planks or boards fixed to the posts. For a wider construit et décoré avec un grand soin, tandis que la charpente en tréteaux était utilisée pour des bâtiments utilitaires où il n'était pas question d'apporter un soin particulier. Aucune église en bois debout n'a été érigée après le Moyen Age. Alors qu'à une certaine époque il devait y en avoir à peu près un millier, il n'en reste plus que 29 à présenter un aspect caractéristique des bâtiments à charpente en tréteaux, et ils constituent même une proportion non négligeable des bâtiments de la Norvège occidentale.

Dans toutes les églises en bois debout qui subsistent, chacune des quatre paroisses fait une partie d'un cadre rectangulaire, avec une sablière basse, un poteau vertical à chaque extrémité et une sablière haute au sommet. Ces cadres assemblés forment un cube supporté au sol par les quatre poutres basses et stabilisé au sommet par les quatre poutres hautes. En d'autres termes, l'église en bois debout est constituée de quatre cadres rectangulaires verticaux et de deux horizontaux. Les parois étaient remplies de planches ou de planches posées bord à bord, constituant ainsi une solide palissade. Les chevrons reposaient sur les sablières hautes des murs gouttereaux.

La construction à charpente en tréteaux est bien différente. L'élément de base est ici un simple tréteau composé de deux montants et d'un tirant fixé à chaque extrémité dans des encoches au sommet des montants. Cette charpente est stabilisée de manière dédiée, en se reportant à la face intérieure des montants. Le montant, le tirant et la sablière sont si soigneusement assemblés que les chevrons peuvent enjamber la largeur de l'édifice sans support additionnel. L'édifice entier est renforcé dans sa longueur par des entrecroisées en diagonale entre le montant et la sablière haute.

Le nombre minimum de tréteaux dans un édifice sera de deux, un à chaque extrémité pour former les deux pignons. C'est la disposition la plus courante dans les petits édifices qui servent à emmagasiner la tourbe. Les bâtiments plus longs nécessitent des tréteaux intermédiaires, placés à 3–4 m d'intervalles. Une petite grange peut avoir quatre cadres.

Les parois extérieures sont habituellement composées d'un revêtement de planches fixées...
building the walls will be erected outside the line of posts and the rafters will then project beyond the wall-plate and continue to the top of the wall, which will then consist of a light screen with no bearing function at all. It may be of various kinds of material, such as wood, sods, earth or stone. A wide building thus has a main aisle between the two rows of posts and a narrower side aisle between the posts and the outer walls, all covered by a pitched roof.

The surviving post-built structures thus show two well-developed and mutually separate methods of building, using two different construction principles. The walls of the stave-church serve both to limit the room and to bear the roof, but in the trestle-frame building it is the free-standing trestles which support the roof, while the lightly constructed walls are exclusively room-limiting and can in theory be raised anywhere independently of the bearing framework.

If we turn to archaeology in the hope of ascertaining whether these two types of buildings have existed elsewhere in Europe, we will not automatically get a positive answer. This is due to the fact that the information which archaeology provides is not complete enough to give a total picture of the original building. Usually only the post-holes survive. Sometimes the lower parts of the posts and walls survive, but there is usually no information about the upper parts of the walls and the roof, so that essential details are missing. The archaeological material is nevertheless sufficient to show that the foundations of the surviving Norwegian post-built structures and wooden buildings elsewhere in Europe have features in common. There can be absolutely no doubt that Norwegian post-built structures are related to similar structures all over Europe. While these have practically all disappeared elsewhere, special conditions in Norway have meant that some of them have survived here.

A characteristic feature of many of the wooden buildings which have been excavated is that they have had posts in pairs giving two parallel rows of posts along the length of the house. This is characteristic of a group of buildings whose prototype is the prehistoric long-house which appears to have been common over a large area of Europe north of the Alps. When the posts are in pairs, it can be assumed they formed a transverse bearing construction.

A post standing in a hole in the ground can tolerate lateral pressure, which a post standing on a sill-beam or on a stone ground-wall cannot do without additional support. It is difficult to decide whether these buildings have been constructed with trestles of the type we know from surviving Norwegian trestle-frame buildings or were of a form related to the European timber-frame house, but the method of construction shows that the builders were working with a system for distributing the thrust.

In many cases, larger buildings of this type have had four parallel rows of posts and have thus been side-aisled. When the posts in the central aisle align with posts in the side walls, we are clearly dealing with buildings where the thrust of the roof is distributed between the two internal posts and the side walls. The physical principle of statics involved in such an arrangement must have been related to that which we know in Gothic cathedrals, where we find a structural framework in which the thrust is transferred to piers, enabling the walls between these piers to be large window openings. We also find free-standing pillars corresponding with the side-piers and interacting with them in a carefully planned construction system. It is tempting to assume that the experience which was gained from the construction of large wooden houses was of benefit to stone architecture, as the need for large roomy stone-built churches eventually arose.

Since it has occasionally been maintained that it was Norwegian stave-church builders who taught the French to build Gothic cathedrals, it should be pointed out that the wooden architecture of France already had long traditions by that time and the joiners who worked there had developed their own techniques and skills in handling this material. In the end we shall see that these traditions from the prehistoric long-houses were continued in the many medieval buildings that survive. In some monasteries huge medieval barns have survived with an internal wooden framework of great strength and solidity which divide the gable of the building. Such buildings give an idea of what these master-builders could achieve and what we have lost as a result of Europe's wooden architectural tradition falling into disuse. Compared with such buildings, the Norwegian trestle-frame constitute a construction to sustain transversal pressure. A stone or wooden beam can thus support additional weight. It is difficult to decide whether these buildings have been constructed with trestles of the type we know from surviving Norwegian trestle-frame buildings or were of a form related to the European timber-frame house, but the method of construction shows that the builders were working with a system for distributing the thrust.

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The introduction of the ground-frame, which seems to have been a Norwegian innovation, must have led to a change in the actual construction of the church. As long as the basic structure depended on transverse bearing elements, the building could be as long as one desired—and some of the prehistoric long-houses were very long. A ground-frame, however, imposed limitations on the length of the building and this may have contributed to the fact that the main room in a stave-church is not much longer than its width.

However, the architectonic development of the stave-church was not governed exclusively by structural principles and technical solutions. In the interaction between the proprietor and the builder there was also room for traditional interpretations as well as for new impulses. This development happened in a milieu where wood was the usual raw material and where builders who were familiar with its peculiar properties were required to erect larger and better buildings, as the first generation of churches—the small hundred-year-old trestle-frame buildings—were threatening to fall down. The result was the stave church which can still be seen today, a clear demonstration of power and strength in all senses of the phrase.

In the largest of the stave-churches the nave is constructed in a distinct way. It is divided into two parts—a high central room and a low pentice or aisle running around all four sides. The central room is built on piers (called "staves") standing on sill-beams and joined above with wall-plates. It is open on all four sides to the surrounding aisle, but above the roof level of the aisle, the posts form a skeleton or framework for solid walls which consist of vertical planks placed edge to edge. The outer walls of the aisle are regular frames constructed in the same way as the external walls of an ordinary small stave-church.

Seen in isolation, the central room in this type of stave-church consists of a framework constructed with pairs of posts in the same way as the first generation of wooden churches, and it can perhaps give us an impression of how they looked. In some of these churches the posts have been fashioned with cushion caps halfway up, from which decorated wooden arches spring. Features from the Romanesque stone basilica have thus been transformed into ornamental elements and incorporated into churches built of wood and with a structural system wholly determined by that material. This type of stave-church provides

des poteaux va par parier suggérant qu’il y avait des éléments structuraux transversaux associés à chaque paire de poteaux.

Les églises en bois de la première génération en Norvège furent édifiées de la même manière que les églises en bois primitives découvertes au cours des fouilles archéologiques dans d’autres pays scandinaves ou allemands en Europe. Elles ne semblent pas différer beaucoup des maisons séculières, et on peut supposer qu’elles ont évolué à partir d’une tradition européenne commune, où la maison « danubienne » avec ses paires de poteaux a joué un rôle primordial. Il semble qu’aux alentours de 1100 un nouveau type de construction ait apparu avec l’introduction de structures assemblées en cadre. Les églises construites de cette manière durant plus longtemps que le type précédent dont les poteaux étaient enfoncés dans le sol. La base des poteaux pouvait inévitablement au cours du siècle. Cela se fit en un progrès technique essentiel, car ceci impliquait que l’église était surélevée par rapport à la contrainte de la terre, qui entraînait que de tels bâtiments soient conservés depuis 800 ans.

Ceci semble avoir été une innovation norvégienne, et a provoqué un changement dans l’apparence même de l’église. Aussi longtemps que la structure de base dépendait d’un élément de soutien transversal, le bâtiment était construit de deux étages, mais ce dernier serait un longue durée. Or un cadre de base imposait des limites à la longueur du bâtiment, et cela peut avoir contribué au fait que la nef d’une église en bois debout n’est guère plus longue que large.

Mais, l’évolution architectonique de l’église en bois debout n’était pas exclusivement gouvernée par des principes structuraux et des solutions techniques. Dans la relation réciproque qui existe entre le propriétaire et le bâtisseur, il y avait place autant pour des interprétations traditionnelles que pour des innovations. Cette évolution a eu lieu dans un milieu où le bois était le matériau de base ordinaire et où les bâtisseurs, qui connaissaient bien leurs propriétés intrinsèques, avaient à édifier des bâtiments plus vastes et de meilleure qualité, parce que les églises de la première génération – les petits bâtiments à charpente en troncs vieux d’un siècle – menaçaient de s’effondrer. Le résultat fut l’église en bois debout, telle que nous la connaissons aujourd’hui, une démonstration
LAFTED BUILDINGS ON THE MEDIEVAL FARM

RELATIVELY LITTLE INFORMATION has been passed down to us about how people lived in Norway in Old Norse times and what their buildings were like. But we do know something. Firstly, there is what we can deduce from archaeological finds; and then there is what can be read between the lines in the literary sources. Towards the end of the Middle Ages there is more information: we even have complete buildings which can give us a direct picture of people’s daily surroundings at that time. The surviving medieval buildings are all found in rural districts; the contemporary vernacular houses in the towns have all disappeared, replaced with later buildings, so that it is only beneath the surface that remains of old wooden buildings will be found there.

The earliest evidence we have of permanent farm-settlements in Norway is from the Iron Age. As long as the climate in the previous millennium remained dry with warm summers, the natural conditions for hunting and fishing were good. Grain could also be grown and

LES CONSTRUCTIONS EN RONDINS DES FERMES MÉDIÉVALES

ARNE BERG

NOUS POSSEDSIONS RELATIVEMENT peu d’informations sur la manière dont vivaient les gens en Norvège à l’époque des Vikings et sur l’aspect extérieur de leurs bâtiments. Nous savons cependant un certain nombre de choses, d’abord par l’archéologie, ensuite par les sources littéraires. Nous avons plus d’informations sur la fin du Moyen Age car il en reste assez de bâtiments entiers pour nous donner une image directe de l’entourage quotidien de la population de cette époque. Tous les bâtiments médiévaux conservés se trouvent dans les districts ruraux. Dans les villes, les habitations ont toutes disparu, et on a remplacées au cours des temps. Ce n’est que dans le sous-sol que des vestiges de constructions en bois ont subsisté.

Le témoignage le plus ancien que nous ayons d’établissements permanents date de l’Age du Fer. Aussi longtemps que le climat était resté sec avec des étés chauds, les conditions étaient favorables à la chasse et à la pêche au cours du millénaire antérieur. On pouvait aussi cultiver des céréales et élever des animaux domestiques. Le bétail pouvait brouter dehors toute l’année et il n’était pas nécessaire de stocker le fourrage pour les mois d’hiver. Il y a donc peu de chances pour qu’on ait construit des abris pour les provisions et le bétail avant l’Age du Fer. On pense que le climat s’est modifié vers 500 avant J.C., devenant plus froid et plus humide. En hiver il fallait donc garder les animaux à l’abri et récolter le fourrage en été, ce qui n’a laissé aucune trace.

Le type de constructions employées était alors, comme par la suite, la résultante de plusieurs facteurs. L’un d’eux était le climat, les autres sont