

Technologies for Re-Locating Buildings

Part 1: Norway

EDITOR'S NOTE: Over the past 23 years many articles have appeared in issues of STRUCTURAL MOVER containing information of specific moves. There have been few articles, however, addressing the basic history of structural moving. "The Mobile Castle" by W. Haio Zimmermann [Volume 24, Number 3, September 2006] was the first of what we hope will be many more to address the history of structural moving in general and, where possible, of specific types. This article by James Moir on the movement of structures in Norway will be followed by a second feature in the June issue on moving in the United States and a third feature in the December issue on the moving of structures in China.

Technologically, there are few barriers to moving any building, and every country can offer examples of buildings that have been moved. The spectrum of techniques employed to do this range from complete dismantling and re-erection at one extreme, to structural moving at the other. Although an obvious over-simplification, for various deep-seated cultural, economic and social reasons, the 'Old World' has tended to favour the former approach, the 'New World' the latter.

Having been awarded a Winston Churchill Memorial Trust Fellowship in 2006 to investigate these different approaches to re-locating buildings, I opted to visit three countries occupying very different points in the spectrum: Norway, USA and China. This article focuses on Norway (visited 16th-25th June 2006); subsequent articles will contrast the experiences in the USA and China.

In exploring whether the 'European' preference for dismantling buildings was favoured in Norway, it quickly became obvious that many more buildings have been moved there than in the UK. Of the 29 surviving stave churches, for example, at least five have certainly been moved from their original sites.



Gol Stave Church, in Situ (left) and re-erected at Norsk Folkemuseum (below).



It is not uncommon for buildings to have been moved several times. The Fisherman's chapel at Maihaugen was built in 1459 at Oyra in Fåberg. The Reformation sealed the fate of such private chapels, and this example was moved to the local parsonage, where it served as a storehouse. The building would undergo a further three moves, in 1896 to a private garden in Lillehammer, then in 1904 to the newly established Open Air Museum of Maihaugen, then again within the museum grounds in 1937.



Fisherman's Chapel, Maihaugen

In these examples, structures were dismantled rather than moved in one piece. The timbers were loaded onto horse-drawn wagons, occasionally sledges and later flat bed lorries. The spread of railways from the 1850s provided an alternative solution and sometimes two modes of transport were combined. The 27 buildings making up the Bjørnstad farmstead at Maihaugen were dismantled in 1910/1911: 'More than twenty horses transported the timber from Lalm to Otta, where the railway took over to bring the precious cargo to Lillehammer.'¹

But before any building is moved there has to be a force ('push') encouraging its supply on the one hand, and on the other, a force ('pull') exerting an attraction to a new site. In Norway, two apparently contradictory trends have together triggered numerous moves. On the one hand, buildings have accompanied a relatively mobile, shifting population. Vikings, it is said, moved houses from Norway to Iceland. Later, Finnish immigrants would bring their houses into Norway. Within the country itself, migrants drifted from the eastern, more mountainous side of Norway to the richer fishing areas to the west, or from rural areas into towns, often taking their buildings with them.

By JAMES MOIR

Perhaps in reaction to this shifting picture, and as a means of 'rooting' it, the search to interpret Norway's cultural identity also spawned a whole industry of moving buildings. In 1880-1881, Oscar II, King of both Norway and Sweden, began collecting buildings, five of which were relocated to his Summer Residence at Bygdøy. Norway had been part of Sweden since 1814. The buildings that made up the collection were moved both as a symbol of the Swedish royal presence in Norway, and as a symbol of accepting Norwegian traditions - at a time when Norway was aspiring to be a nation. It became so in 1905, and this was followed by an apparently seamless absorption of the Royal Collection into the Norsk Folkemuseum in 1907.²



King Oscar II's Collection in 1888, prior to being absorbed into the Norsk Folkemuseum. The scene is the same today except that the small building on the left has been moved down the hill into the re-erected Setesdal Farmstead.

The Church is that shown in Fig 1. Note also the potential for moving the building on the right as an entity.

Royal interests clearly provided an impetus to others. Anders Sandvig (1862-1950), a dentist who was also passionately interested in folk culture, moved 6 buildings to the back garden of his villa at Lillehammer. between 1894 and 1904. The collection was then moved to nearby Maihaugen and made accessible to the public.



Sandvig's collection in his garden at Lillehammer prior to being relocated to Maihaugen in 1904.

Maihaugen at Lillehammer and Norsk Folkemuseum at Oslo (two of the earliest, and largest, Open Air Museums in the world) in turn spawned many other, though smaller Open Air Museums in Norway. In 2000, Norwegian museums owned a staggering 4700 historic buildings (the majority re-erected) compared to only 2950 buildings protected *in situ* as historic structures in the country. (Compare the UK picture of 425,000 'listed' buildings, but only some 200 buildings in open air museums.)³

Oscar II's royal 'stamp' of approval elevated the moving of buildings from a functional activity to one that carried some status, with the result that many wealthy Scandinavians have assembled private collections of buildings as part of their estates; these often serve practical functions such as guest accommodation, stores, garages, playhouses for children etc. An extension of this 'collecting' habit amongst wealthier Norwegians has been to buy up

old properties in the valleys and move them up into the hills where they are resurrected as summer cabins.⁴ If they are particularly prosperous, they will have one for summer vacations and another for winter skiing. Some have taken the concept further by assembling clusters of re-located buildings as tourist 'villages'.

More recently, the two somewhat contradictory strands of migrant populations and open air museums have become interwoven on an intercontinental level. The Norwegian Emigrant Museum at Hamar for example includes the well-travelled Borderud house. Peder Borderud emigrated from Norway in 1870 and built a house in Red River Valley in Dakota Territory. When his son took over the farm and built a new house in 1899, the old house was moved to the Perhus farm near Kindred, where it served as a dwelling house for many years. Later, the Sons of Norway Lodge in Kindred assumed possession of the house; it was moved once again and now served as their clubhouse and also as a small pioneer museum. After the lodge was dissolved, the building stood abandoned until the Norsemen's Federation took the initiative in 1955 to move it to the Norwegian Folk Museum in Oslo, where it remained until 1973, when it was removed yet again to Hamar. The building has thus occupied 5 different sites, and has travelled over 4,000 miles. Other buildings shipped from the USA to Norway include the Brampton Lutheran Church in North Dakota, donated to the Western Norway Emigration Centre in 1995. Twelve volunteers went to the States, where they were joined by eight American craftsmen. Within six days the church was dismantled, packed, and removed to Norway.⁵ The Valdres Folkemuseum at Fagernes also moved a pioneer log house from Decorah, Iowa, USA, to Valdres in 2004/5.



The Inauguration of the Decorah House at Valdres

It has not all been one-way traffic: 'in the 1970s an old house from Valdres was dismantled, shipped and rebuilt at the Vesterheim Norwegian American Museum in Decorah'.⁶ Such exchanges provide Norwegians and Norwegian-Americans with an opportunity to learn about their shared past.⁷ One might also question whether America's current primacy in re-locating buildings stems partly from deep-rooted Scandinavian traditions transposed by migrants to the New World.

It would appear then that Norwegians prefer to move buildings by dismantling and re-erecting them. Even as late as 1994, when the Winter Olympics arrived in Lillehammer, 'villages' were established at four different sites in and around the town. Some of the buildings were intended to be permanent but other temporary buildings were constructed exactly like the permanent buildings, the only difference being that foundations were made so that they could be easily dismantled. 35 cabins at Sørliia; 250 at Jorekstad; 124 two-storey houses and a service centre at Vormstuen and 25 two-storey houses at Storhove 1 were all were sold and moved after the Games; some were re-erected as student dormitories. Dismantling began in March 1994; by the autumn of 1995, all agricultural areas on which temporary Olympic structures had been built had been returned to their original state.

At first sight, the strong cultural preference for dismantling seems simple to understand. The majority of buildings in Norway are constructed of timber. Stave construction (essentially post-and-beam); post and horizontal plank (extremely rare in Norway); timber framing (found mostly in larger villages and cities) are all encountered but by far the most common form is referred to as lafting – horizontal logs let into each other lengthwise and cross-jointed in the corners. Norwegian buildings are almost all of this type, and essentially only simple square or rectangular boxes can be created employing this method. These boxes may be quite small, sometimes as little as 2 sq.m. Horizontal logs are basically stacked one on top of the other and so it is relatively easy for two people to lift one log at a time without affecting the rest of the construction.



Tractor with loader used for dismantling

Log building techniques were, however, much more sophisticated than this summary might suggest: a log in one plane has to sit with its pair to accommodate the natural taper of the trees. The relationship between each log to the one below is also dictated by the use of the *meddrag*, a curved, double-edged knife used to trace the contours of one log onto the one below, allowing the carpenter to hew the log to a perfect fit. The relationship of logs in one plane to another is also controlled to ensure a tight fit at the corner notches, while the pairing process has to continue round all four sides of the box to maintain a level course.



Trøndelag Farmstead, Norsk Folkemuseum. Notice the taper of the logs on the granary in the foreground. The turf-roofed farmhouse in the background was moved in one piece to its present site in 2001. It was first situated on the left side of the farm courtyard, where the yellow gable is just visible. (See Fig.17).

So, although, it is relatively simple to deconstruct the building, it is virtually impossible to reconstruct the building if the sequence of logs in any plane has been disturbed. Thus, in many older Norwegian buildings, in addition to any initial assembly marks, several further phases of markings on each

Kjell Marius Mathisen of Maihaugen Museum indicating the numbering systems on K25, a re-erected mill building. Three series using dots and Roman numerals were visible. The high sequence suggested this structure was the re-used upper portion of a former two-storey building.



log will often be decipherable. These indicate clearly that the building has at some stage been dismantled and re-erected, the markings being essential reference points for ensuring the building could be re-assembled correctly. At least three different marking systems might occur side by side.

In this light, wholesale moving of buildings would no doubt have offered a quicker, easier solution. Norway's poor transport network, difficult terrain and lack of heavy machinery are often cited as barriers preventing this approach. But it may also be that structural moving was in fact practised more widely; the evidence is simply more elusive. The many types of relatively small agricultural building found on the typical Norwegian farm (see e.g. Figs. 3 & 18), look purpose-made to be moved on sledges or skis – there would of course be no physical evidence....

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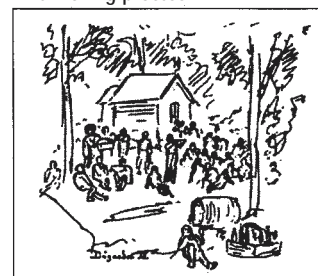
The volunteers lift the house.



The moving process.



Taking a break.



The new site.

Sketches made in 1878 of the Move of Grieg's Retreat