

# Inspiring Futures

## European Timber Architecture for the 21st Century

Oliver Lowenstein and Juliet Bidgood





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The Centre for Contemporary Art and the Natural World is an innovative organisation which uses the Arts to explore new understandings of our place within Nature.

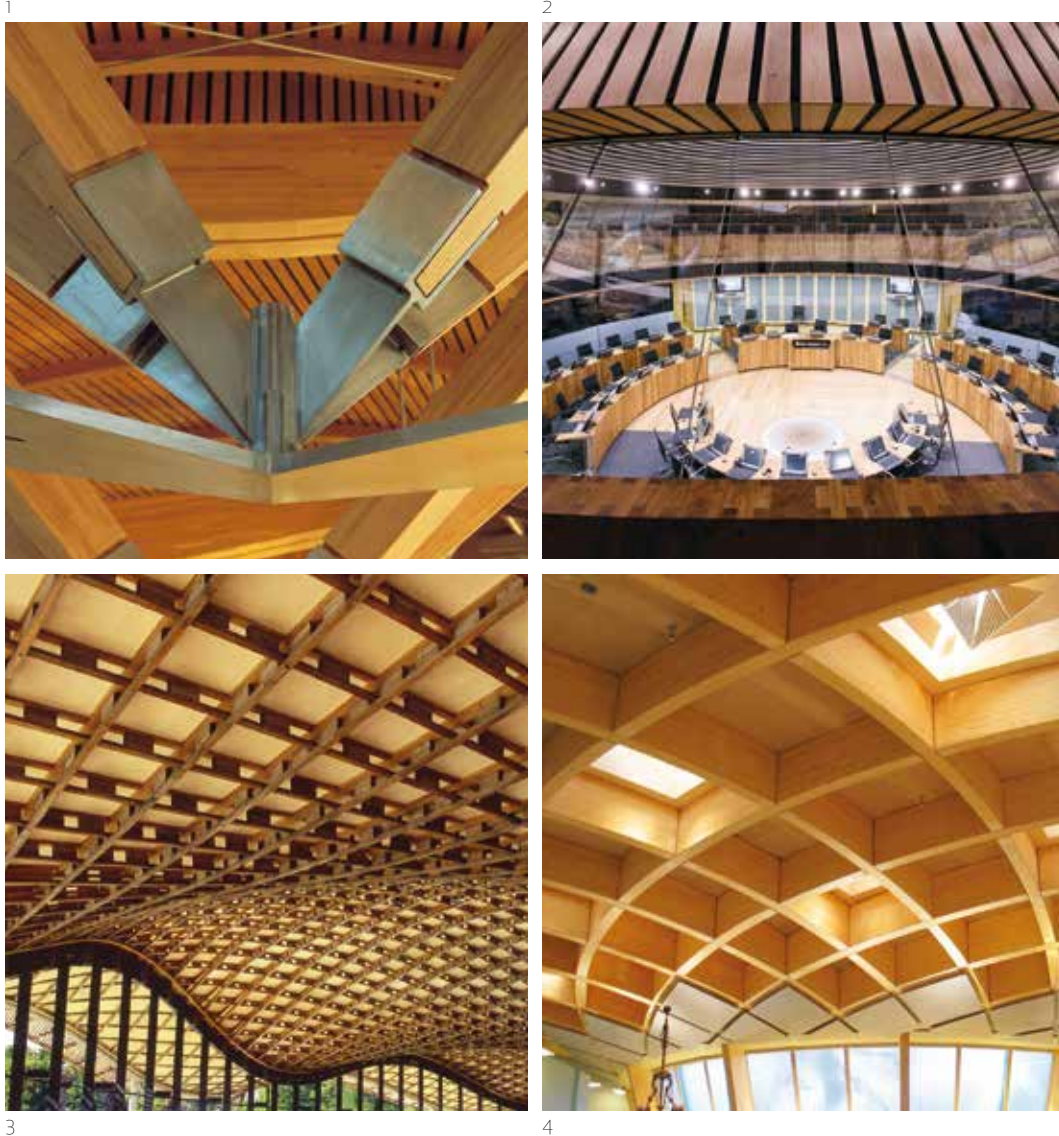
CCANW opened a **Project Space** in 2006 in Haldon Forest Park near Exeter, the first phase of an exciting, long-term partnership with the Forestry Commission. The Project Space is the base for an integrated artistic and educational programme which covers all art forms and takes place there, in the forest and other locations and includes exhibitions, residencies, projects, workshops, live events and talks. CCANW welcomed 30,000 visitors/participants to its Project Space in its first year with many others engaging with other events in the forest.

In May 2007 it launched *Wood Culture*, an ambitious year-long festival celebrating the beauty, usefulness and sustainability of wood in contemporary architecture and design. The programme comprises of a series of exhibitions, events and activities designed to demonstrate how timber growing, new technologies, and the use of wood in construction and as fuel can provide considerable environmental benefits, particularly in helping to reduce global warming.

*Inspiring Futures*, one of four exhibitions organised during the year, features our selection of twelve of the most inspiring examples of the use of timber in contemporary European architecture and is intended to encourage a greater use of timber in UK construction, particularly that which can be regionally sourced.

We are especially grateful for the cooperation of all the architectural parties concerned, our panel of selectors, the research team, to Oliver Lowenstein and Juliet Bidgood for their texts and to South West Woodland Renaissance and Arts Council England who substantially funded the programme.

- 1 Scottish Parliament, Edinburgh – 2005 (detail). Architects: Enric Miralles, EMBT/RMJM. Image: © Keith Hunter
- 2 Welsh Assembly, Cardiff – 2005. Architects: Richard Rogers Partnership. Image: Redshift Photography
- 3 The Savill Building, Windsor – 2006. Glenn Howells Architects. Image: The Royal Landscape/Crown Estates
- 4 The Core, Eden Project, Cornwall – 2005. Grimshaw Architects



## This Once and Future Material: Europe's emerging 21st Century Timber Architecture Culture

Oliver Lowenstein, July 2007

Over the past few years Britain has witnessed the arrival of a number of spectacular contemporary timber architectural projects. The two buildings housing the UK's newly devolved political institutions are outstanding timber set-pieces by International practices; the **Scottish Parliament** by the Spanish architect Enric Miralles' practice in collaboration with Edinburgh's RMJM, and the **Welsh Assembly** by the Richard Rogers Partnership. In southern England, Glenn Howells Architects has used local oak and larch from Windsor Great Park to create the **Savill Building's** remarkable 'gridshell' canopy, winning accolades and the 2006 Wood Award for this, the Crown Estates' first foray into contemporary architecture. And in Cornwall, the follow-up to the Eden Project's biomes – underlining their panache for jaw-dropping engineering splendours – is **The Core** by Grimshaw Architects (2005), an education centre providing the West Country with its very own *wood culture* highlight.

These are but four examples marking a cultural shift quietly gathering momentum over the last ten years throughout the British architectural, engineering and wider building culture. The fact that three of these buildings are at the heart of British power underlines how timber, as a creative and practical material, has become accepted again after over a half century out in the architectural cold. And these buildings are only the tip of the iceberg. Today, timber is again being used both structurally and for cladding, for joinery and within interiors, in ways which just ten years earlier would have been hard to imagine. Wood is also being used together with other materials – for instance, glass and steel – to ensure the best and most appropriate performance of each building material. In towns and cities up and down the country, many of the new generation of schools, for example, are being decked out in wood, as part of the Government's massive *Building Schools for the Future* programme<sup>1</sup>. Higher Education, another investment area for public sector building, contains further examples of wood integrated into the architectural template<sup>2</sup>. In the National Health Service, smaller healthcare buildings are also embracing wood as a credible 'healthy' and healing material. North of the border, in Dundee, the Maggie's Centres

<sup>1</sup> There are numerous and proliferating examples of timber being used across the school building sector. One of the earliest Academy schools, Mossbourne in N London by Richard Rogers Partnership, used timber prolifically in a wet wood system. Another paradigmatic example is Kingsmead primary school in Cheshire by WhiteDesign.

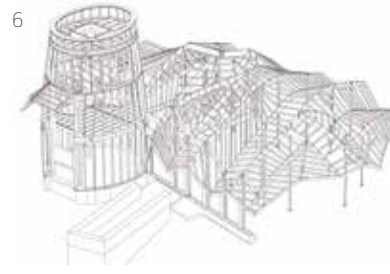
<sup>2</sup> Again Higher Education provides many examples. A couple which have received attention are the new wing of South Bank University and Cambridge University's new Faculty of Education building both by Building Design Partnership.

cancer care charity began its series of signature buildings with Frank Gehry's first UK project. Gehry chose to design his building in wood, mixing sophisticated computer design with the ancient craft of carpentry. Despite the external spiky angularity of **Maggie's**, the softening warmth of wood inside conveys reassurance in a way no industrial material can. In the housing sector, too, more and more buildings are popping up, dovetailing with the search for sustainable building techniques. As well as an increase in the use of softwood timber-frames in mass-market housing, individual houses are appearing all over the country, demonstrating the strengths of what some are coming to call *contemporary timberbuild*. Across up-market and middle-market developments, timber, generally in the guise of cladding, is the material of choice. Often this is presentational and a species of greenwash, providing a skin-deep aura of sustainable sensitivity, but it proves the point; wood, these days, is *cool*.

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That this timber sea-change is reaching a tipping point of sorts, is acknowledged across the wider British architectural world. Whereas ten years ago a reader would have been hard pushed to find more than a couple or so timber building projects profiled in the architectural press during the course of a year, magazines today are brimming with them. Indeed, it can seem as if architects are falling over themselves to pledge commitment to this once and future material. There is also another side to the equation, Britain's – and especially England's – local wood industry remains in crisis; one indicator being the disappearance of local sawmills, with very few remaining. Yet, in terms of building culture, a complete turnaround has occurred. The story of how this has come about has been very much driven by the rising necessity to integrate sustainability into the building mix. But, within the story of emerging and accelerating sustainability concerns, there is also another crucial element; the convergence of three relatively separate and distinctive factors which have enabled a distinctively 21st Century timberbuild architecture and culture to emerge.

The first part of this story is that of the re-emergence of a community who found making rather than designing buildings as compelling as it was rewarding: the craft of carpentry. The resurgence of carpentry in this country has been played out against its near extinction in the 1960s. Building carpentry, alongside so many other craft skills, was, to a significant degree, brought back from its knees by that part of the Sixties generation who sought a closer relationship with nature, to living and working more in tune with older traditions and were committed to relearning wood-building skills. From a handful of carpentry companies in the Seventies, the decades since have seen their number increase rapidly.

A second strand to the story is the all too contemporary and all-pervasive influence of computers, applied in engineering to modelling and what is called 'form finding'. If today's generations stand on the shoulders of centuries of extraordinary timber engineering, the digital age has transformed certain



7 Mannheim Multihalle, Germany – 1975. Architect: Frei Otto. Image: Atelier Frei Otto Warmbronn

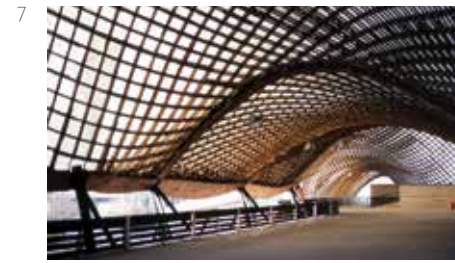
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8 Downland Gridshell, Weald and Downland Museum, Sussex – 2002. Edward Cullinan Architects. Image: courtesy of Weald and Downland Museum

predictive exercises, which previously required considerable mathematical brainpower and knowledge of physics, into a relatively short series of clicks of the mouse. In less than three decades the computer's application to ensure that designs are fit for purpose has revolutionised the reach of timber engineering; and this is only early days. What was impossible prior to digitalisation has become accessible, with CAD, computer-aided design, in architectural offices processing the kinds of number-crunching previously the preserve of those with uncommon mathematical abilities.

The last of the three influences has been a slower revolution, and one set against the backdrop of both global de-forestation and the industrialisation of forestry; the 20th Century's emergence of engineered and manipulated timbers. Glue laminated timber technology, developed as major industries mainly in the Nordic countries, have enabled comparatively low quality softwoods to be remade into strong, pre-fabricated beams and columns to be ordered in customised form by architectural and engineering clients. Spans, hitherto impossible without the longest tree trunks, have made feasible both large open-roof spaces and multi-storey timber buildings which, until recently, were considered beyond the pale of health and safety. In addition, a portfolio of engineered products for cladding, as well as important structural components, have resulted from decades of diligent research into the chemical and physical properties of wood. Increasingly, these 'wonderwoods' are today being used as credible, sustainable and competitive alternatives to steel beams, concrete or brick. In the UK's temperate climate, where hardwoods are just as present as softwoods, a smaller low quality 'wastewood' revolution, this time using hardwood thinnings, has also taken its infant steps, with low grade chestnut, ash and oak woods all part of a niche sector in the making.

Without computers, without engineered timber and without carpentry, the beautiful gridshell structures with which some UK architects have specialised – first at Edward Cullinan Architects' poetic **Weald and Downland Museum's**



gridshell (2002) and, in the last year, Glenn Howell's Savill Building – would have been fiendishly complicated to design. Not impossible though; gridshells in their modern incarnation go back to the remarkable work of their German creator, the master engineer Frei Otto. Otto's 1975, pre-computer age, **Mannheim Multihalle** was the first modern gridshell<sup>3</sup>. On that totemic building, engineered by human calculation, breakages of the long laths from which the gridshell lattice was constructed ran into the thousands! For that reason alone, for over a quarter century the consensus was that the Multihalle was a one-off. In contrast, during the construction of Cullinan's gridshell in the West Sussex countryside, there were a mere 53 breakages! Four years later at Windsor Great Park, breakages at the Savill shell structure were down to a handful. Thus the power of the computer!

What all this only hints at is that, despite such beautiful and engaging structures as these two gridshells, the Parliament and Assembly buildings and Gehry's elegiac Scottish composition along with the growth of the wider resurgent wood culture, this UK activity is only a small part in any larger picture of Europe's wider timberbuild culture. Indeed, it has been Britain which has often been perceived as somewhat parochial and behind the times by some in the strongholds of continental timber culture.



3 The Weald and Downland Museum gridshell has been extensively documented, although a good textual source is Edward Cullinan Architects' *Ends, Middles Beginnings* monograph, Black Dog Publishers, 2005. For an overview of the early British gridshells of which Weald and Downland was central, see *Gridshelter Futures*, by Oliver Lowenstein on Fourth Door's web-magazine site, [www.unstructured.co.uk](http://www.unstructured.co.uk) 2. For an overview of the Savill Building see *This is not Bling, nor even Duchy Original*, by Jay Merrick in the *Architectural Journal*, 06.07.06. The most thorough, if dated, documentation of the Mannheim Multihalle gridshell is in one of the series of monographs published by Otto's Institute of Lightweight Structures (ILS) – *IL13*, in 1978.

Many of the characteristics of the re-emergence of wood in contemporary British architecture can be found, played out in similar fashion and to greater or lesser extent, across most of Western Europe. At the end of World War II wood was generally presumed to be a material of the past, demoted to the sidelines by the rise of industrial materials; bywords for urban modernism and the developed world's industrial future: steel, concrete, brick and – in recent decades – glass, aluminium and a range of composite materials. For the Modernist mainstream, wood, until just a few years ago, was perceived as traditional and regional, almost an affront to the forward thrust of the internationalist, industrialised architectural culture. As Christian Affentrager writes in the introduction of his book *New Wood Architecture in Scandinavia*, for the professional architectural world, as much as the industry in general, wood evoked rejection<sup>4</sup>. In the UK, the high priests of Britain's post-Sixties architecture – Foster, Rogers, Grimshaw and Hopkins – embraced a hi-tech aesthetic which celebrated the futurism of new materials. As the advantages of presenting their operations as environmentally considerate sank in, the hi-tech aesthetic quietly morphed into Ecotech. Wood began to feature in buildings but, for the high priests, the route to sustainability continued to be through modern materials, and this has been the case with many of the most successful architects since. There are exceptions, including Cullinan and the Bath-based **Feilden Clegg**, who in their early years developed a Modernist architectural language which showed close attention to, and influence of, the Arts and Crafts Movement of a century earlier<sup>5</sup>. As in Europe at the beginning of the 1970s, it was those architects who took up sustainable architecture with the most commitment, who also immersed themselves most fervently in wood architecture in this country<sup>6</sup>. Unsurprisingly, the fit between the two – sustainability and wood as a material – could not be improved on. In terms of energy used to produce the material, timber uses 190kWh per cubic metre, compared to 85000kWh for aluminium, 82000kWh for steel, and 11000kWh for plastics<sup>7</sup>. There are many other statistics and, again and again, from a 'whole life' sustainable perspective, timber performance consistently stacks up well.

4 *New Wood Architecture in Scandinavia*, Christian Affentrager, Birkhauser, 1997.

5 The building which arguably embodies most fully mid period Feilden Clegg's links to the Arts and Crafts movement is their Bedales school hall. Since then, the practice has not only become one of the most in demand of the original generation of sustainable architectural practices now named Feilden Clegg Bradley. For an account of the Arts and Crafts link see the *Architectural Journal's* practice profile, September 1998.

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6 In the UK three smaller practices which historically were involved in the early sustainable architectural movement are Architype, Simmonds and Mills, and in Scotland Gaia Architects. All used wood within their repertoire. Two, albeit very different, younger practices who have made timber a central part of their architectural languages are Gale and Snowdon and BakerBrownMacKay.

7 These figures are from the Timber Research and Development Association's (TRADA) research.

It was this small core of true believers who cottoned on to this earliest and (mission-led and low-tech in a way which was completely off the map for much of the mainstream) have been producing a continuous output of timber buildings up and down the country for over three decades.

Cullinan and Feilden Clegg and, in their turn, the disparate group of eco-architects took inspiration from the North. In Norway, Sweden and Finland they found a continuing adherence to a particular strain of Modernist architecture; restrained, expressive and, in its greatest practitioner, the Finnish architect Alvar Aalto, committed to the regional. The regional, characterised by the significance of materials and an intuitive sensibility which recognised the spirit of place, was a fundamental shift to the original internationalist and rationalist tenets of Architectural Modernism's early roots. It was Aalto who wrote that wood will no doubt maintain its position as the most important material for sensitive architectural clients.

Today, while this may be claimed as accurate, Nordic architectural culture cannot be described as all-embracing in its use of wood. Concrete brutalism is as much part of Nordic cities such as Stockholm or Helsinki as it is elsewhere. Even so, the turbo-charged Modernism and its Post Modernist offspring which have remade the fabric and skylines of modern cities across Europe is not so present within the Nordic countries. Although much of its architectural community, dazzled by the promise of new materials, may have turned its collective back on wood, the traditional connection these northern forest cultures have felt for wood has not only survived, but flourished to a degree that it remains central to building culture in the North.

If, between the 16th and 19th Centuries, early modern England threw away its major wood reserves in its need for ship-building timbers, those countries which continued to have substantial forested areas tended towards the most dynamic timberbuild cultures. It is not completely surprising, then, that

Sweden, Norway and Finland have long been associated with timberbuild, as have other great forested parts of Europe; Southern Germany, Switzerland and Austria. Although their timber is overwhelmingly softwood, these countries and regions have it in abundance and, today, they are the powerhouses of the emerging industrial timber architecture of the 21st Century. Some of these northerly countries contain vast tracts of woodland: Sweden with 20 million hectares of wooded land, Norway with 9 million and Finland with 25 million. One estimate reported that Finland contains 7 billion trees. The point that these forests have long been managed is underlined by the fact that less than 3.5% of Finland's forests remain old growth, these to be found in the far East of the country bordering Russia. In a striking statement the young Finnish architect Markku Karjalainen has argued that potentially all Finland's housing materials are grown every ten hours!<sup>8</sup>

In Europe's heartland, it is the overlapping Southern German, Austrian and Swiss region where timber architecture is most fully developed. Liberally afforested and including Germany's southern Schwarzwald, or Black Forest, it is another European timber powerhouse. Laminated wood construction first originated in the Weimar region in central Europe early in the 19th Century. The invention of German engineer, Otto Heizer – he patented his work between 1890 and 1910 – its production was licenced across parts of the continent and glue laminated timber (glulam) was propelled into the marketplace. Glulam spread rapidly, particularly northwards, and by 1920 Stockholm's central station was already covered by a glulam canopy<sup>9</sup>. Eighty years later, near to the end of the century, glulam was part of a palette of new-engineered timber products relentlessly pushed by the Nordic wood industry, as well as some smaller middle European companies. But it has only been in the last twenty-five years or so that engineered wood in contemporary timber architecture has begun to take-off.

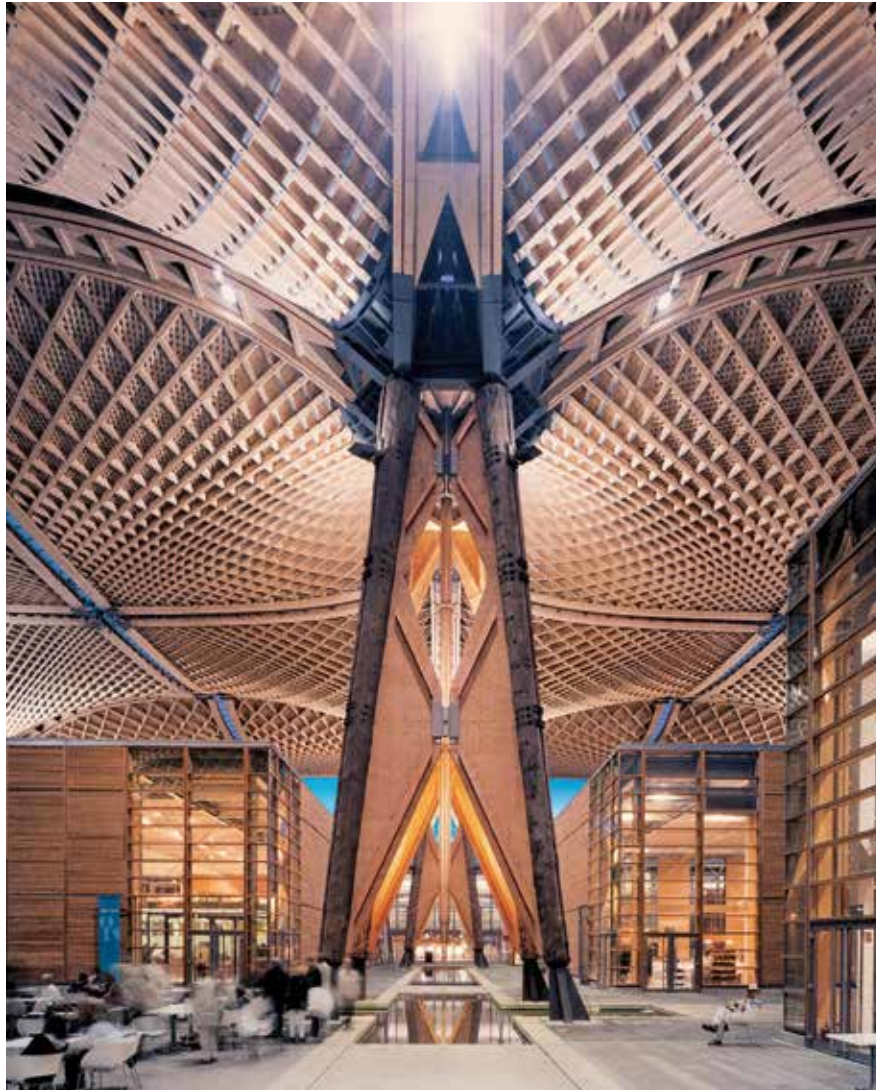
During the Nineties both Norway and Sweden experienced a mini wood architecture boom, largely triggered (in the former) by the 1994 Winter Olympics

<sup>8</sup> Personal communication.

<sup>9</sup> The origins and history of laminated wood is the subject of *Holzleimbau, Laminated Timber Construction*, Christian Muller, Birkhauser, 2000.



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which introduced a small number of large scale wood projects, the best known being the vast Hamar Olympic Hall (1992) – based around an up-turned Viking dragon boat – and the striking Lillehammer Olympic Art Museum (1994) by Snohetta, Norway's current celebrity architects.

It should be remembered that it was German engineers who developed the potential of glue laminated timbers for roofing solutions. The North Rhine Westphalia region's Berlin state office showcase may not look anything like its inventor's, the engineer Friedrich Zollinger's, original lamella (Greek for shell) of the 1920s, but the historical link in design terms is certain. It is interesting that, although a considerable section of the British architectural scene may have become besotted with gridshells, this, again, was first developed in its modern guise by Frei Otto. Indeed, it is also interesting to consider the fertile flow of influences from Hooke Park, the brave mid-Eighties experimental forest school set up by John Makepeace in the Dorset woodlands. This is the only place in Britain where Otto has, so far, completed buildings, and a direct line can be drawn from his Hooke workshed (1985) to both the Weald and Downland and Savill Building's gridshells<sup>10</sup>.

Britain isn't the only country which has learnt and then borrowed from Germanic technical know-how, and in more than one way. In the last twenty years 'massive wood' (also known as solid wood) construction has become an increasingly accepted building technique across the Nordic countries. But massive wood can be traced back to work beginning in the Seventies, with a series of bridges across Germany, Austria and Switzerland, before being applied to the broader canvas of building, from commercial through to public and housing schemes. At his I-Bois studio in Lausanne, Julius Natterer, the leading European timber engineer of his generation, has been influential, doing much to jump-start the application of massive wood in Scandinavia. If some find Natterer's style a mite bombastic, for instance the German **Hannover Expodach** of 2000<sup>11</sup>, (designed in collaboration with the country's leading environmental architect of the

<sup>10</sup> This is explored in the forthcoming *Fourth Door Review* (no 8) essay, *Back to the Future Forest*, Oliver Lowenstein, 2007.

<sup>11</sup> For a detailed overview of the German Pavilion's roof structure, see *Expodach: Roof Structure at the World Exhibition*, Natterer et al, Prestel, 1999.

11 *Sibelius Hall, Lahti, Finland – 1998. Architects: Kimmo Lintula & Hannu Tikka. Image: Voitto Niemela/Sibelius Hall*

12 *METLA Research Institute, Joensuu, Finland – 2004. SARC Architects. Image: Jussi Tiainen*

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generation, the Munich based Thomas Herzog), the engineer's influence cannot be underestimated. Through the Nineties, massive wood, as technology and technique, rapidly migrated north to the timber companies, the universities and research labs, including that of Finnish Forest Research Institute, known under the acronym of METLA. Massive wood, based on traditional log-stack structures, has now been applied to large multi-storey residential mid-rise, and is becoming common practice across the Nordic countries. More visibly, a second wave of showcase buildings has rolled out across the Nordic countries, also applying massive timber. In Sweden's second city, Gothenberg, the Universeum (2002), a science and ecology showcase by Gerd Winghard, the country's best-known architect, is an appealing amalgam of massive timber and glass façade hybrid; likewise, in Finland – a country with a surprising dearth of contemporary timberbuild icons – **Sibelius Hall** (1998), a handsome lakeside double façaded glass and wood box incorporating a concert hall auditorium.

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Built in the national composer's home-town, Lahti, Sibelius Hall has been the Finnish timber community's first real attempt at massive wood, married to the requirements of a building which would sit comfortably within the competitive gallery of international world architecture.

Since Sibelius Hall, further major works in developing massive timber to regional requirements have emerged, including the **METLA Research Institute** in Joensuu (SARC Architects, 2004). Only last year one of the country's major wood companies, Finnforest moved into its new showcase headquarters. Described as a modular office, (Pekka Helin Architects, 2006) it showcases the use of the company's products in ways and combinations that had not been tried before.

Alongside these projects there has also been a significant push to reintroduce and re-skill both the architectural and the building communities, a key part being the *Wood Town Programme*. Instigated in 2002 by the University of Oulu's architecture department, in the north of the country, architects and students began to develop wood-based design which had disappeared due to Finland's post war embrace of modern materials. Begun, in part, because of new fire regulations which allowed three storey residential buildings for the first time, the *Wood Town Programme* has spread to many mid-size towns and cities around the country; helping to familiarise the idea that timber is again a practical and contemporary material. Complementing this, there has been a variety of other projects, from bridges through to schools and sports facilities and a series of beautiful churches. Alongside the Käsämäki shingle-clad church, both the Laajasalo and St. Olaf Churches in Tyrva show how powerful a material wood is when used sensitively to convey reflection and spiritual peace. All of this has underlined the returning significance of timber to Finnish culture. Today, Finland's younger architects have willingly re-embraced timber as a material part of their building palette; and change in other parts of the building sector is also happening, if more slowly.



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In Norway, after the first resurgent flowering of mid-Nineties wooden architecture, building in wood has continued but with less of an emphasis of nurturing it as part of the national brand. The country has a long and proud history of wooden architecture, in the emblematic Stave churches recognised around the world, and in the old wooden town parts of its coastal cities and towns. Today, this has developed across the built environment. There are also many younger emerging practices using timber and massive wood. For instance, Oslo's Jensson and Skodvin, CODE and Trondheim's **Brendeland & Kristofferson** have all completed massive wood projects, while Stavanger's up-and-coming Helen and Hard practice are completing a mountain lodge as part of the city's European 2008 City of Culture *Norwegian Wood* programme<sup>12</sup>.

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That massive wood is so much an accepted part of the architectural culture demonstrates the centrality of timber to the Nordic world. Its origins in Southern Germany underline the central European regions significance to wood culture's on-going life, as does the fact that the skills associated with wood culture were never near so close to being extinguished as in Britain or Finland. This part of Germany, along with Austria and Switzerland, contains some of the most exciting contemporary wood culture across all of Europe. Alongside a number of individual buildings, it is notable how engrained timber is in significant parts of the building culture across the region. No more so than in **Vorarlberg**, a tiny county in Austria sitting at the eastern edge of Lake Constance and bordering both Germany and Switzerland. Here, over the last thirty years, a wood culture

<sup>12</sup> Considerable further information on the Norwegian timber architecture scene can be found on the Norwegian Architectural Association website: [www.arkitektur.no](http://www.arkitektur.no).





revival has taken place which is seen as an inspiration and influence across the European mainland. During the late Seventies in this well-forested and mountainous region, a small group of radical community and sustainability-minded architects fought to establish a Modern architectural idiom while working with the communities they came from, and were part of. Known as the *Vorarlberg Baukünstler* ('building artists'), many of their buildings used wood as the integral material. Vorarlbergians are known for their independence of mind and the region has maintained its craft traditions, particularly carpentry, along with a strong tradition of people building their own homes. After some initial resistance to the 'new', the 350,000-strong Vorarlberg population have accepted the new architecture so fully that today there are over 1000 new homes across building types which are contemporary in design. Of these, an astonishing 20% are from timber, over four times the average across most of Europe. A diversity of different building types are represented, even if the focus is on social housing.

Buildings are economic, although built to internationally recognised high standards of detailing, and include the complementary emphasis on sustainability which has made Vorarlberg a centre of the *Passive House* movement. As news of Vorarlberg has spread across Europe, architects and planners have flocked from all parts of the continent to see this cultural phenomenon for themselves<sup>13</sup>. The influence on Germany, in particular, has been pronounced with the whole architectural community discussing how the Vorarlberg paradigm might be exported and seeded across the country, which is what has happened across Germany's southern wooded regions.

In Britain, influences from middle Europe are beginning to seep through, however. In Scotland, there are moves afoot to establish a Vorarlberg of the Highlands. Meanwhile, in South London, a young funky outfit, dRMM, have been getting bucket-loads of architectural media attention for their Kingsdale School's new sports and music halls. These are the first non-residential buildings to use cross-laminated panels, a form of massive timber, which can be self supporting,

so the walls carry the whole building's load. Media attention is around the 'innovative' use of the panels, of which there are now several competing versions on the market, produced in Austria and South Western Germany where they have been popular across the continent for the best part of a decade.

With steel and other materials' prices rising because of the growth of emerging economies such as China and India, along with the ballooning push to *green* the UK building industry, this is a good time for timber architecture and building both here and in Europe. Even if what is noticed or remembered in England as somewhat isolated timber showcases, looking at the picture continent-wide, the idea of a 'pan European Timberbuild Renaissance' does not feel too far-fetched, and could be interpreted as laying the ground for the next chapter in the growth of a genuine timber culture. Just as the public debate on locally produced food has increased in volume over the last year or so, so the prospect of local, or regionally based, materials – and materials which grow again – is a debate which is there to be started. The orthodoxy is that Britain, and particularly England, contains only minimal wood and therefore will only ever give opportunities for small timber inroads into architecture. Others would like to turn the argument on its head. Consider that wood imports comprise half of Britain's balance of payments, around £9 billion a year<sup>14</sup>. From another perspective, if a continent can be called a region, sourcing timber from within these limits is surely preferable to transporting it half way around the planet: Canada, Siberia or New Zealand. It is not for nothing that some Norwegians point out that Rome is closer to Oslo than the country's Northern communes. What is surely the case is that here is a ready material, already sustainably managed, which is on tap, renews relatively quickly and could yet make a key difference to the ecological footprint of the building sector. The variety and range of the existing building types, as well as their elegance, beauty and inspiration across Europe's timber culture, can be read as eloquent testimony to this.

<sup>13</sup> see *Houses, Spaces for contemporary living and working* by Dominique Gauzin-Muller, Springer, 2004. Also for a short introduction *Spectacular Vernacular*, by Oliver Lowenstein. *Financial Times*, 26.05.07.

<sup>14</sup> This statistic was brought to my attention by the carpenter John Russell in 2001, who wrote in a footnote to his 'The decline of the local sawmill' article (FDR8 forthcoming) that, 'imported timber cost the nation £8.7 billion – almost half the balance of payments deficit. (See *Facts and Figures about Forestry in Great Britain. Teachers Pack from Wilderness Wood*, 22.4.07). Russell also refers to the UK Timber Statistics 2006, Forestry Commission/Forestry Service.

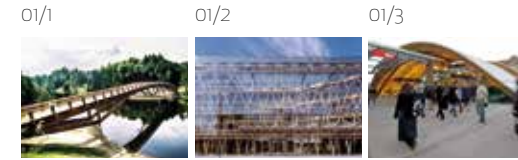
This is CCANW's selection of twelve of the most inspiring examples of contemporary European timber architecture. These projects were selected by a panel of architecture, engineering and forestry experts from a survey of recent European timber architecture.

Projects were chosen that made enlightening and inspiring use of timber and demonstrated the beauty and usefulness of this material. The projects are from Austria, Germany, Finland, Norway, Switzerland, Russia and the UK and show how the challenge of building sustainably is being met across Europe

The selection is intentionally diverse and includes buildings of different scales and with very different uses. In assembling these examples it was not CCANW's aim to identify a single style or approach to architecture but rather to capture examples of design teams taking timber to its limits in different ways. We also wished to highlight the ambition needed on the part of those who initiate building projects. Often it was both the client *and* the design team who had seized the opportunity to make these inspiring buildings.

Unsurprisingly, perhaps, many of these projects come from the most densely forested areas of Europe where building in wood and the local sourcing of timber is integral to design practice. They provide a useful benchmark for UK practice where this is yet to become commonplace.

For the exhibition we organised the projects into four groups to highlight common themes and to exemplify the different ways that they may stretch our understanding of the potential of timber. By exposing how creative, intellectual, political and regional communities develop new ideas and techniques we hope to inspire others to take up the challenge of working with this most ancient *and* modern material.



#### 01 UNEXPECTED DEPARTURES

The twelve projects begin with three major civic projects that demonstrate how timber can match steel in strength and durability. They show that the material can be used to create expressive form and retain an elegance and warmth at a large scale. They each extend the potential of the material and together they alter our expectation of when and how timber can be used.



#### 02 EVOLVING IDEAS

Three projects for timber research and processing workspaces show how central the collaboration of architect, engineer and maker is to the process of designing innovative buildings. They demonstrate the value of primary research and show how new techniques are developed and exchanged from project to project as ideas, individuals and products circulate across Europe.



#### 03 MAKING PLACES

Good designers thrive when working with ambitious individuals and organisations. These three public buildings show how a client can influence the technical and creative scope of a building. These are small-scale buildings that make important places around which communities can gather. In these projects, simple timber framed construction is being re-discovered and reinvented.



#### 04 MATERIAL TO HAND

Timber has long been understood as a readily available material, one that can be used to make buildings quickly and easily. In different ways each of these projects engage with timber as a local resource but bring to it an experimental energy. In each case knowledge about the use of timber has been shared and accumulated by a wider creative community than the author of the project.





Images © Lisbeth Michelsen

The Nordic Timber Bridge Programme has promoted the development of timber bridges in Norway, Sweden and Denmark. The purpose of the programme has been to establish timber as a material alternative to steel. In Southern Norway the Lardal Municipality owns large forests and asked the architect to design a bridge using these resources.

Bridges, like many built structures, transform places by making new connections. The west bank of this river was easily accessible from the nearby town of Riksvegen but the eastern bank was difficult to get to. This bridge aims to make the enjoyment of the river and its beautiful surroundings more readily accessible.

Because the river is a traditional venue for salmon fishing no structures are allowed in the river and the bridge is designed in a single span. Timber was chosen for the main bridge structure to suit the surrounding forested landscape.

The bridge arches as it crosses the river and is decked in timber. Large glue laminated timber beams make up the main structure and these are braced with timber and steel to make a strong structure with a light open appearance.

The midsection of the bridge was constructed on pontoons by the west bank and winched out to the river and into position. It was then lifted by cranes from each bridgehead and fixed in place.







Client: Ministry of Urbanism and Housing, Culture and Sport for North Rhine Westphalia

Architects: Petzinka Pink Technological Architektur

Engineer: Petzinka Pink Tichelmann

Timber construction: Holzbau Paul Stephan GmbH

Cost: € 29.7 million

[www.petzinka-pink.de/](http://www.petzinka-pink.de/)

[www.bund.nrw.de/index.php?mapid=206](http://www.bund.nrw.de/index.php?mapid=206)



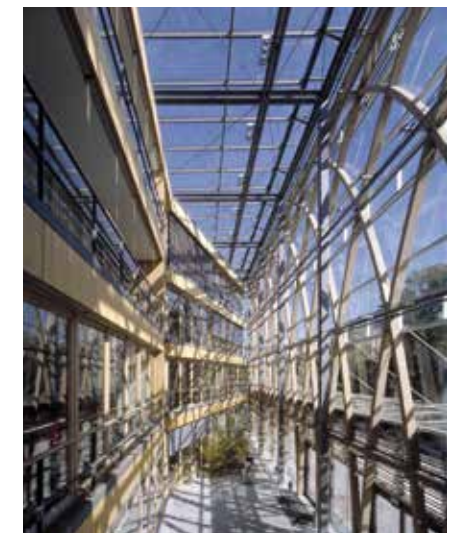
An innovative timber structure is integral to the form and identity of this building. This project, like the Welsh Assembly and Scottish Parliament, is an example of timber being used as part of the expressive vocabulary of an important civic building.

The North Rhine Westphalia region is the largest in Germany and covers the Ruhr valley, an old heavily polluted mining centre that has been the focus of progressive regeneration initiatives since the early 1990s. This building is a showcase for the region in the federal capital, Berlin, and demonstrates the region's commitment to design and energy conservation.

The building combines administrative and cultural functions housing meeting rooms, offices, a restaurant and small apartments. These spaces are arranged around a courtyard and enclosed in a double façade.

The distinctive façade uses both timber and steel. Parabolic glue laminated timber arches are used in combination with the steel portal frames that make up the main structure. The timber arches cross at closer and closer intervals towards the top of the façade.

The timber frame is on the outer skin of a double glass façade that is used to passively heat and ventilate the building. The floors of the buildings are also made in timber and formed from large 2 x 5.2m caissons or panels. The lightweight modular structure is designed to accommodate future flexibility.







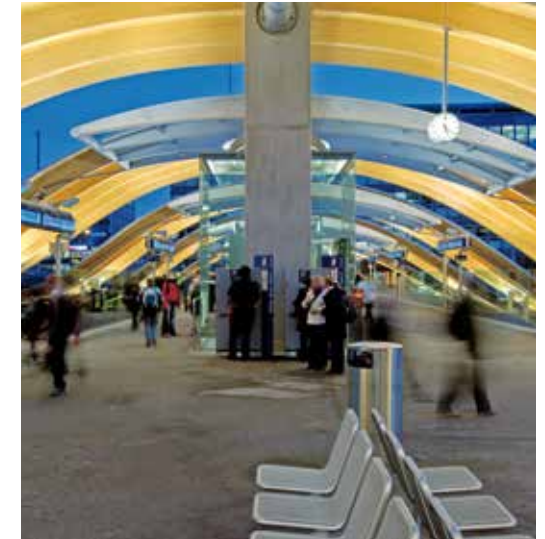
*'In the 60s, when I was born in Bern, I knew this border point of Bern as a spectacular sunset point. The accelerating Schanzenbridge was the infrastructural ribbon on which it was possible to enjoy the wideness of the west.'*  
Beat Mathys

This refurbishment of Bern's main station transforms the quality of experience of public transport. The station bridges over the railway as it loops around the centre of Bern. The shape of this structure was, in part, inspired by the seemingly elastic appearance of the railway as it travels around the city.

Known as 'the Wave' the arching roof of the station provides cover to passengers descending and ascending to and from the railway and frames views of the city.

The Wave is supported by sets of timber beams running parallel to the line of the railway tracks. The long timber beams arch up from a lower platform level to create a distinctive visual landscape in the city. The architects set out to marry new form with the traditional feel of timber. Using timber and the curved form of the roofs, the architects aimed to echo the romantic era of railway travel and reinvigorate the place of the railway in the city.

The client took a long time to decide to pursue the project, at one time pursuing two alternative options. Using digital montage and animation, Smarch were able to persuade them to build the Wave. The building had to be built very quickly and its opening signalled a new train timetable.







The building houses the artefact store and timber-framing workshop at the Weald and Downland Open Air Museum. The building's design and method of construction were unique. A very high degree of carpentry skill went into its fabrication, emulating but not imitating the traditional framed buildings at the Museum.

ECA collaborated with the engineers Buro Happold and the Green Oak Carpentry Company to develop this innovative, low energy gridshell structure. The building uses simple timber elements to form a highly sophisticated structure.

A gridshell is a structure with the shape and strength of a double-curvature shell, but made of a grid instead of a solid surface. The grid here is made of short lengths of slender timber or laths. These are bolted together to form a layered diagonal grid.

This was the world's first permanent gridshell building, made possible by decades of research and experiment with temporary structures. The idea of forming a structure in this way was initiated by Frei Otto, an architect/engineer based in Germany. His Mannheim Multihall first tested the potential of this form of structure in 1975.

The engineer Ted Happold, founder of Buro Happold, worked on the Multihall and went on to work with Cullinan to develop these principles, first at Hooke Park and then at the Weald and Downland Museum. The building advances the form and technique that has recently been developed in the UK at the Savill Building.







Client: The Finnish Forest Research Institute,  
Joensuu Forest Research Institute  
Architects: SARC Architects Ltd.  
Engineer: Insinööritoimisto Magnus Malmberg Oy  
Contractor: Rakennusliike A. Taskinen Oy  
Cost: € 16 million  
[www.sarc.fi](http://www.sarc.fi) [www.metla.fi](http://www.metla.fi)  
[www.woodfocus.fi](http://www.woodfocus.fi)

Built as a result of an invited design competition in 2002 the building was developed with the input of the client, the Finnish Forest Research Institute (METLA) and advances the techniques of using massive wood in multi storey buildings.

METLA is the biggest forest research centre in Europe. Its task is to undertake applied forestry research and one of its seven focus areas is the research of wooden materials.

*'The primary goal of the construction project was to use Finnish wood in innovative ways. Hence, wood is the main material used throughout the building, from the structural frame to the exterior cladding.'*  
Antti-Matti Siikala – SARC

The building is arranged around a courtyard that is open at one corner, the entrance to the courtyard is flanked by walls made of 100-year old reclaimed timber.

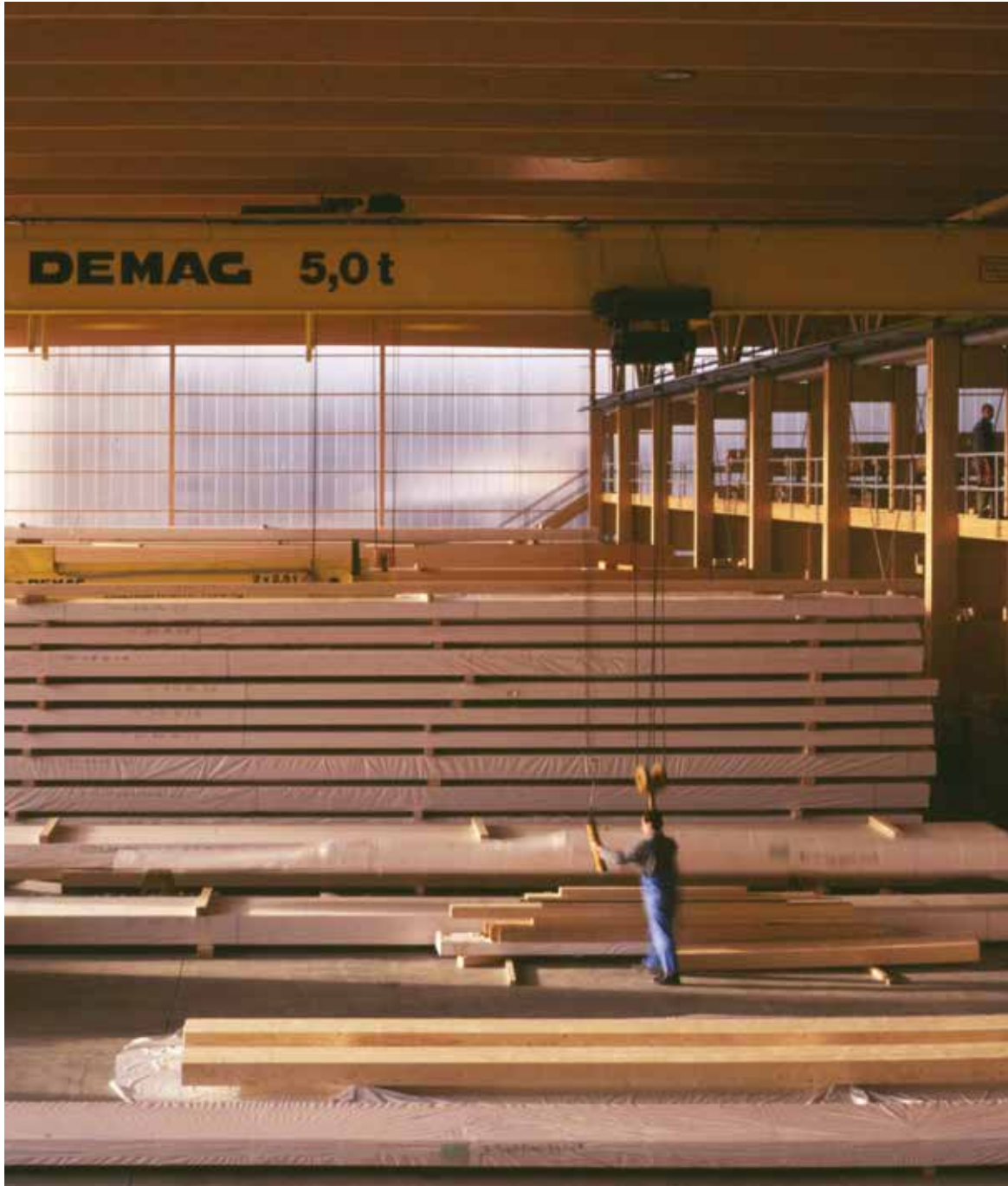
The entrance is approached diagonally across the courtyard, where a shingle-clad auditorium straddles a glass façade. Clustered glulam columns populate the entrance hall that gives access to offices above. The courtyard, the lobby and its restaurant form a meeting point for the staff of the Forest Research Institute.

The building is an essay in timber construction using simple hollow glulam floor slabs, beams and columns and more complex glulam frames to make the principal structures and using reclaimed and new cladding in Aspen and Spruce – with mature specimens of Aspen planted in the courtyard as a kind of full stop.

The design team at SARC, like those of the other Finnish projects featured here, are graduates of Helsinki University of Technology's celebrated Wood Studio.







Images © Stefan Müller-Naumann

Kaufmann Holz AG needed a simple warehouse for the storage, finishing and commissioning of glue laminated timber elements. A building with an adequate structure and simple details was to be built under enormous time pressure to a modest budget. The building was designed and built in less than five months. As a result the building is extremely functional and is of one piece with regard to materials, construction and detailing.

The building uses a simple wide span wood construction to create a two-bay hall, each bay is 22 metres wide, 76 metres long and 10.3 metres high. Glue laminated timber columns are made up of pairs of cross-braced columns, called Vierendeel trusses. The inner columns take up the load of the crane gantries and the outer columns the loads from the roof structure. The catwalk for observation and driving of the five cranes in both bays runs through the central columns. The primary structure over the individual bays is made from slender glulam beams at two metre centres.

The building is intended to convey Kaufmann Holz AG as an innovative timber construction firm and primarily uses Kaufmann products. The economy and simplicity of the structure was developed collaboratively with the engineers Merz Kaufmann who are based in Dornbirn in Austria, south of Nagler's office and this site. Merz Kaufmann are also the engineers for the housing from Vorarlberg shown later.







Images © Roland Halbe/D'Inka + Scheible Architects



Client: Commune of Pliezhausen  
Architects: D'Inka + Scheible Architects  
Engineer: Siewert, Pliezhausen  
Environmental Engineer: Gerlinger & Merkle,  
Building Physics, Schorndorf  
Timber contractor: Rieg, Schwaebisch Gmuend, Germany  
Cost: € 950,000  
[www.architekten-dinka-scheible.de](http://www.architekten-dinka-scheible.de)

The kindergarten is set in a former orchard between houses and a sports field. The building has a bold spatial organisation and simple elemental construction. The civic scale of the classrooms includes a special area of detail at the scale of the children who use the building.

*The character of the building reflects the intention of creating a world at the scale of the child, a structure surrounded by small and large spaces, some high, some low, with branches to front and rear and with niches and openings to the outside!*  
Gabriele D'Inka + Albrecht Scheible

The building is made up of apparently simple volumes that intersect to provide a variety of spaces. A long high entrance hall leads to the three main nursery rooms. These spacious well lit rooms open to outdoor balconies, to more intimate spaces and to upper games galleries.

Timber was chosen because of its local availability, its suitability for prefabrication and low embodied energy. Its use as the main construction material makes the building's construction very resource efficient. This, together with other green features, makes the building a full-size introduction to environmental conservation for the children.

The building is highly insulated and has a green roof; this creates thermal mass and reduces water run off. Solar panelling mounted on the roof heats the water and photovoltaic modules provide electricity. Rainwater is collected and used for toilet flushing and to irrigate a biotope area.







Client: Parish of Kärsämäki  
Architects: Anssi Lassila, Lassila Hirvilammi Architects  
Engineer: Jussi Tervaoja, architect, DI Oulu University,  
Department of Architecture, Wood Studio  
Contractor/cooperators: [www.paanukirkko.fi](http://www.paanukirkko.fi)  
Cost: € 840,000  
[www.lh-ark.fi](http://www.lh-ark.fi)  
[www.paanukirkko.fi](http://www.paanukirkko.fi)



A plan evolved in the parish of Kärsämäki to build a new, modern church using traditional 18th Century methods at the beautiful riverbank site where the last parish church had stood. The architect Anssi Lassila won the competition to design the church and give new form to traditional methods of construction.

*The building comprises two basic parts: a log-built 'core' and a black, tarred and shingle-clad 'cloak'. With the chosen concept I have striven to generate an atmosphere of archaic simplicity and optimal weather resistance. The space between the cloak and the church houses the vestibules, vestry and a storeroom. A person entering the church is led through a dimly lit space towards the lighter main space, lit by natural light from a lantern skylight. When the dark falls outside the space is lit by movable, candle-lit glass lanterns and tinplate lanterns carried by churchgoers. There is no fixed seating in the church and the altar is movable.*  
Anssi Lassila

The project required the craft traditions of timber buildings to be researched and developed anew. The logs for the load-bearing frame were felled from forests owned by the parish. The materials were prepared, cut and jointed using traditional tools and methods.

The aesthetic of the building and its archaic simplicity connects back to the pared-down Shaker and early northern European design celebrated by Modernist designers. In contrast to buildings that mimic historic style, this brings about the restoration of an atmosphere through the faithful exploration of the history of making buildings.







Images © courtesy of Maggie's Centres/Frank Gehry



Landscape gardener and architect, Maggie Keswick Jencks, who died of breast cancer in 1995, devised the blueprint for the first Maggie's Centre based on her own diagnosis and treatment for cancer. She wanted to create a welcoming and home-like environment for people affected by cancer to visit and use as their own, near to the hospital where cancer treatment is provided. Maggie's, Dundee was the third Centre to be built in the UK, another two have since opened and a further seven are planned in the next four years, all commissioned from architects with international reputations. It is the first UK building by Frank Gehry, a Los Angeles based architect, known widely for his design of the Guggenheim Museum in Bilbao.

The asymmetrically folded roof is based on a Dutch hat worn by a girl in a Vermeer portrait. The use of timber in the roof, doors, windows and interior gives the building a warm home-like feel. Frank Gehry made many models of the building before settling on its built form:

*'Frank was a close friend of Maggie's and this project has been close to his heart. The signature of Frank Gehry's designs are their curving walls and unusual roofing. Frank began the process of the design by working with us to arrange the building blocks of the rooms in a suitable layout. Once this was agreed he then began designing the building around them.'*

*Maggie's Centre, Dundee Building Scrapbook*

The cylindrical structure houses a library with a small sitting room above it, the rest of the building is mainly open plan with a kitchen, dining area, a large sitting room and smaller rooms for one-to-one sessions. In the large room underneath the folded roof the timber structure is exposed, the roof timbers are bent in two directions, essential for the curves in plan and section.

At the opening Gehry said 'I hope the architecture won't override the purpose of the building, but complement it and take it to a higher plane of comfort and beauty'.

Client: Maggie's Centre  
Architects: Frank O. Gehry & Associates  
Executive Architect: James F Stephen Architects  
Engineer: Ove Arup & Partners Scotland Ltd  
Timber Contractor: Cowley Timber Work  
Cost: Undisclosed  
[www.maggiescentres.org](http://www.maggiescentres.org)  
[www.cowleytimberwork.co.uk/Maggies.html](http://www.cowleytimberwork.co.uk/Maggies.html)





This project is an interesting example of how an initiative like the Wood Programme at HUT (Helsinki University of Technology) can empower design students by giving them opportunities to experiment with new technology and enable them to make work at an early and formative stage in their careers.

A student competition held in 2000 for the design of a lookout tower on Korkeasaari Island was won by the entry for a Kupla ('Bubble') by Ville Hara who was interested in developing a curvilinear organic form for the rugged natural setting.

*The Lookout Tower has a strong but light meshed shell structure built of timber strips. This allows unobstructed views in every direction, and the light, wickerwork-type tower becomes a subtle landmark for Helsinki Zoo in the seaside landscape.*  
Ville Hara

The completely organic form intended was simplified as its method of construction was developed. Its implementation required persistent testing with models in order to establish how to bend and twist the timber to the design. Once the form could be described in a CAD (computer aided design) drawing, a two-meter high, one-to-five model was built to test the construction method.

The lattice of slim battens forms the vertical supports for the two timber lookout decks and a timber-cased stair connects between each level. From the upper level views out over the city are framed by the lattice that opens to the sky. HUT students also built the complex structure.







Client: Anton Kaufmann, Reuthe  
Architects: Hermann Kaufmann Partner  
Engineer: Merz Kaufmann Partner  
Contractor: Kaufmann Holz AG  
Cost: € 1.4 million

[www.hermann-kaufmann.at](http://www.hermann-kaufmann.at)  
[www.v-a-i.at](http://www.v-a-i.at)



This is an example of a series of buildings built in Vorarlberg by architects who use local timber to make imaginative contemporary buildings. The region has a tradition of building houses from local timber. This has been developed and used on a larger scale by a group of architects based in the region. The design culture they have generated has influenced designers across Europe.

This housing uses a contemporary reinterpretation of traditional timber building techniques to create a simple, sustainable and economic building. The building stands on an open plot in a residential suburb and houses four apartments on each of the three floors with a three-storey artists studio at the southern end of the building. Each flat has a small garden area or a balcony. The upper flats are accessed by a galvanized steel stair and walkway; a ramp makes the first two levels fully accessible.

This is one of the first projects to use the principles of the Passive House developed in Germany. The aim of the Passive House is to reduce energy consumption. To achieve a very low level of energy use of 8kWh/m<sup>2</sup>/year this building has a compact plan, is highly insulated, has airtight triple glazed windows, uses solar panels to heat water and has a sophisticated heating and ventilation system.







Alexander Brodsky was a founder member of an influential group of Russian artists and architects known as Paper Architects, so called because the main outlet for their work was on paper. Having practiced as an artist in New York he returned to Russia in 2000 bringing his visionary approach to architecture. His determination to work creatively with limits has translated to a way of making buildings.

Both the Vodka Ceremony Pavilion (left) and the 95° Restaurant were built at the Klyazminskoe Resort alongside experimental houses and buildings designed by Russia's first generation of architects to practice after the collapse of the Soviet regime. The pavilion was commissioned for the ArtKlyzama 2003 art festival and is described by Brodsky as 'a simple spatial metaphor of the Russian art de vivre'.

*'This is a cultural recycling project, as already used building elements were used with all their meanings and connotations being utilised in the new structure. The major materials used are window frames salvaged from a demolition site in the centre of Moscow. These are fixed on a simple wooden frame, and painted white. Timber comes here as an universal medium of architecture and memory.'*  
Alexander Brodsky

These buildings have verve about them and, while contemporary, reclaim the history of Russian vernacular timber building.



Client: Klyazminskoe Reservoir Resort

Architects: Vodka Ceremony Pavilion: Alexander Brodsky

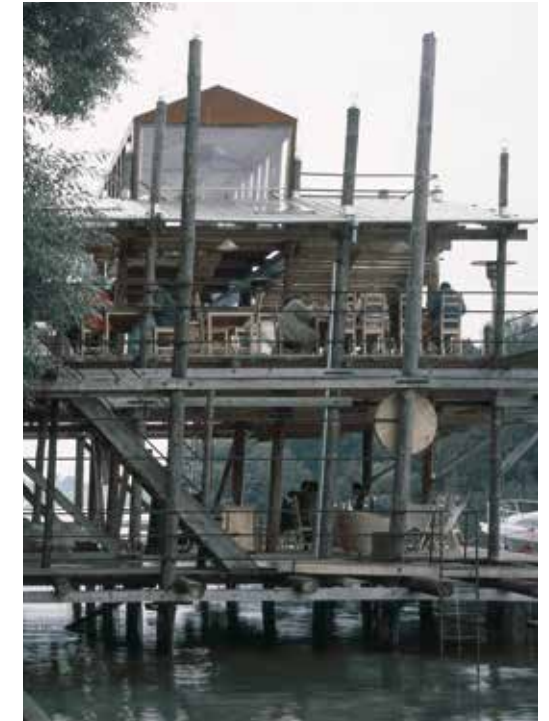
95° Restaurant : Alexander Brodsky with Oleg Ovisky

Contractor: Klyazminskoe Reservoir Resort

Cost: Vodka Ceremony Pavilion: € 500

95° Restaurant: Sum undisclosed

[www.brod.it](http://www.brod.it)





Selection panel for *Inspiring Futures*:

Juliet Bidgood, NEAT  
 Adrian Gale, Architect, CCANW trustee  
 Oliver Lowenstein, Fourth Door Research  
 Jez Ralph, South West Woodland Renaissance  
 Jane Wernick, Engineer  
 David West, Forestry Commission  
 Craig White, White Design

Researches for *Wood Culture* programme:

Juliet Bidgood and Carl Middleton of NEAT  
 Elly Deacon, Adriana Robert and Craig White  
 of White Design  
 Oliver Lowenstein of Fourth Door Research

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