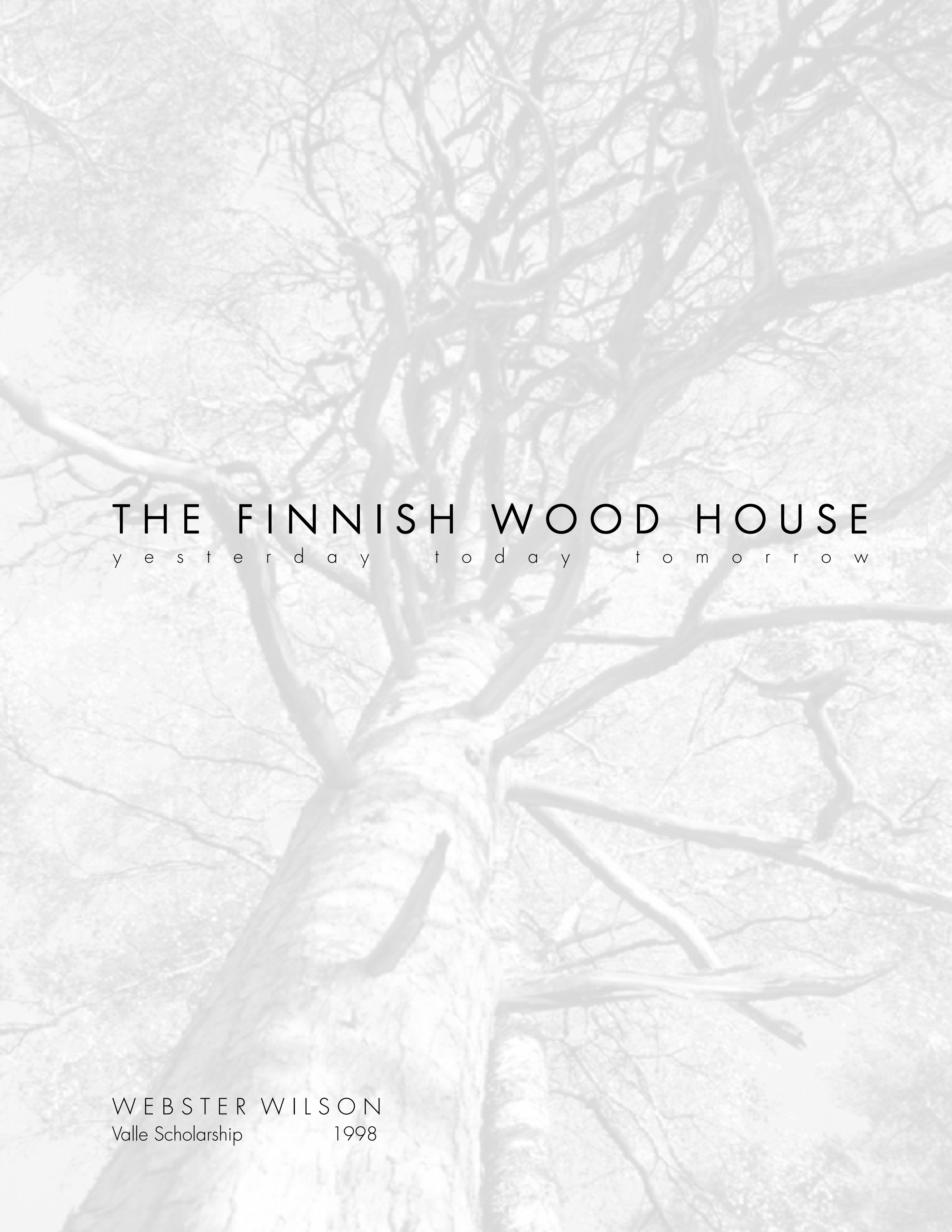

THE FINNISH WOOD HOUSE

yesterday today tomorrow

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Valle Scholarship 1998

webster wilson

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acknowledgements

Only if we are capable of dwelling, only then can we build.

Martin Heidegger[1]

The research conducted for this document took place from September, 1998 through November, 1998, with the help of Professor Phil Jacobson, at the University of Washington and Professor Tuomo Siitonen and Pekka Heikenen, at the Helsinki University of Technology. It was made possible with a generous donation from the Valle Scholarship at the University of Washington, to which I am very grateful for the opportunity. In addition, I would like to thank all the architects, engineers, and researchers in Finland who gave me their time and answered my many questions.

The research was intended to further my knowledge of wood construction and housing issues that will inform my Masters Thesis at the University of Washington and greatly benefit my career as a practicing residential architect in the Northwest region of the United States. Although the models and conclusions presented here can certainly be compared to other timber-based regions and in particular, the Northwest, they are intended only for Finland. Finland may indeed be a good model for the Northwest, especially when comparing forestry practices and wood products, but each region has a unique set of circumstances relating to sustainability that should be addressed individually.

list of works

1. INNUKKA SAUNA COTTAGE

Seppo Häkli
Architect SAFA
Kaavinjärvi Lake
Kaavi, Finland
1993

2. ÄNGHOLM SAUNA

Juha Ilonen
Architect SAFA
Ängholm Island
Korppoo, Finland
1990

3. LAKESIDE SAUNA

Topi Tuominen
Päivi Pennanen
Architect Office
Topi Tuominen LTD
Kalvola, Finland
1994

4. TKK SAUNA

Jaakko Keppo
Woodstudio 1994-1995
Instructors:
Jan Söderland
Seppo Häkli
Hannu Hirsi
Mikkeli, Finland
1995

5. HUITUKKA SAUNA

Georg Grotenfelt
Architect SAFA
Juva, Finland
1982

6. SUNDIAL HOUSE

ARRAK
Architects
Hannu Kiiskilä
Harri Hagan
Jyväskylä
1987

7. A HOUSE BY THE LAKE

Ulla Vahtera
Lasse Vahtera
Architect Office
Vahtera LTD
Juva, Finland
1994

8. SILVA HOUSE

Architect Office 6 B
Pekka Heikkinen
Architect SAFA
Ylöjärvi, Finland
1996

9. ARARAT CABIN

Georg Grotenfelt
Architect SAFA
Juva, Finland
1986

10. KUTTERITIE 2 HOUSING

ARRAK
Architects
Esko Rautiola
Four Units
Helsinki, Finland
1993

the finnish wood house

When the arboreal plant is growing, it is called in Finnish puu (tree) - when it is sawed into planks, it is called puu (timber) - when it is processed into a final product, it is again called puu (wood).

Markku Kosonen[2]


Wood house in Porvoo, Finland

The wooden house in Finland has been an integral part of Finnish history and is embedded proudly in the Finn's national psyche. Every tourist brochure or book on Finnish landscape photography will feature a handsome and aging wood house resting on a lakeshore or molded into a forest scene. The Finnish forests, themselves, are a large part of the national economy and is the place for relaxation and repose for many of today's urban dwellers. The tree, itself, could be considered a national symbol, with mythological, even spiritual associations. Yet, today, the Finnish wood house seems almost a remnant from a bygone era; a museum piece for tourists to photograph and for Finns to reminisce about the old Finland. The richness, the craft, the connection with nature that these old buildings embody, has largely been replaced in the modern world with cold and sterile materials and prefabricated anonymous architecture.

I will trace the evolution of the wood house in Finland and attempt to comprehensively analyze the contemporary situation with the hope of presenting a better future model. The study will include a description of the prefabricated housing sector and then a series of architect designed case studies that will encompass a variety of housing types. This is intended to show that individually designed solutions can be competitive with their prefabricated counterparts if the spaces and housing functions are carried out efficiently and without luxury, the materials are wood and construction methods are simple, and designs are more subtle and relate more to vernacular traditions. The prefabricated house is just the mere biproduct of larger, global issues of excessive capitalism and over-consumption that result in the destruction of nature and man's increasing distance from it. Today's house, as Georg Grotenfelt remarks: "sees nature as an encumbrance whose influence must be minimized, an opponent who must be relieved of his weapons."[3] If some of the contemporary trends can be mitigated, the overall result would be a more meaningful architecture for people, grounded in site and region, and 'ecological' in terms of materials and overall energy use. The argument can be seen as a product of two major sub-themes. The first will be to illustrate the need and feasibility of an 'ecological' wood house. The second will be a plea and strategies for architects to reform their practices and take the lead in the losing battle for the market share of single-family houses. The two themes intertwine themselves and lead to the same result of a more meaningful and sensitive architecture. The works have been selected and reviewed with these intentions in mind and are thus, in my view, persuasive and eloquent examples of modest wood constructions that can reach a broad audience. They are limited to the following areas: isolated cabin/saunas in natural settings, single-family homes either used as vacation villas or on a permanent basis, and a cluster of unattached single-family homes. The projects are all current, and for the most part, built within the past ten years. This was important as part of my analysis was to meet the individual architects and discuss the design and construction process they went through to complete the project.


Hand hewn log wall of Seppo Hakli's Innukka Sauna Cottage, Kaavi, Finland

TKK Sauna, Mikkeli, Finland


VACATION CABIN / SAUNA

The Finns are known for their modest wood retreats usually situated on one of their many lakes. The summer villas typically are under 1000 S.F., and include a separate sauna and outhouse. They are used primarily in the summer months. This summer villa as a genre became popular in the 1920s and 30s and later as a prefabricated testing ground in the 1960s, but has its roots in the National Romantic period at the turn of the century and earlier still in the agrarian societies of medieval Finland. The sauna has been a tradition in Finland for centuries, and as a building type, it consists of one stove and raised wood benches facing each other. This is typically a dark space and the adjacent dressing and washing room is more open. There is often a sitting or sleeping room nearby, as well, for guests or other use. The 'model' in this case, is one which uses local materials and timber, low energy products and processes, and is appropriate in size and function for summer or other impermanent use. Examples will include specifics of formal design, construction, and siting.

SINGLE-FAMILY HOME

The 1940's wartime need and the 1960's dream of prefabricated industrialized wood housing met housing needs in Finland, but nearly eliminated the architect from a 'design' process with an individual client and a unique site. Housing shortages were accommodated in the 70s and 80s with concrete and brick apartment blocks, despite the efforts of Aalto and others with more flexible standardized wood systems. In today's increasingly urban and fragmented society, there is hardly any connection with nature, nor a dwelling place of rejuvenation, inspiration, and one that brings to us a sense of, as Grotenfelt points out, "well being." Today's prefabricated housing industry dominates housing and results are banal. An architect designed home can be a viable alternative and wood should be the building material. The examples selected are modest, yet innovative, site-sensitive and promote interaction with nature and light. A house has the opportunity to open to the south and use sunlight as heat during the cold seasons. This was the primitive model and contemporary architects should take advantage of better glass technology to incorporate passive solar techniques into their housing designs.

SINGLE-FAMILY HOME GROUP

It would be unreasonable to propose that all our housing needs, especially in urban areas can be solved with single-family houses, but perhaps with information-based technologies and the possibilities of 'cyber' commuting and networking, smaller communities and cities of single-family dwelling will be more viable in the future. "The building form of the future consists of loose villages that respect environmental values in the midst of nature, and low single-family houses made of wood," remarks Eero Paloheimo.[4] The issues in this 'model' are how the architect maintains privacy, while taking advantage of shared facilities, designs efficient, yet pleasant spatial layouts, and creates higher density with minimal impact on landscape. There are, of course, many possibilities in semi-attached housing and multi-story housing, but the scope of this research has been limited to single-family dwelling. The example of grouped housing selected is Arrak's Helsingin Kutteritie 2, family housing of four single-family homes in a cluster.

the evolution of the wood house in finland

Finnish life in the old days meant living in communion with the forest. The forest was the Finn's world; it was there that he cleared land to farm and caught game, and from it he took the raw materials for his buildings and implements. The whole of life was wood: buildings and means of transport, tools and traps, furniture and children's toys. Naturally, then, skill at handling wood was one test of man's estate.

Juhani Pallasmaa[5]

The earliest known form of timber shelter in Finland is known by its original users in Lapland as the *kota*. Remains have dated from the ninth century, but it was probably introduced by tribes from the east even earlier. It consisted of a circle of vertical posts leaning inward to form a cone and was covered with animal skins. This evolved into a rectangular hut by the tenth century which was made out of log sides and had a low gable birch-bark roof and central fireplace and smoke-hole. This entered Finland via Russia, but was widely used in southern Europe for many centuries and had its origin in Greece. The timber megaron type house of Greece, constituting the starting point for the early Greek Doric temples, was in use 2500 years ago when the Mediterranean area was still forested.[6]

Log house in Niemela, open air museum, Saurasaari Island, Helsinki

Gradually the rectangular hut became more sophisticated as German and Swedish techniques were imported into Finland in the twelfth century. This horizontal, closed-log house, with weathertight hewn walls and joined corners was made possible with special tools brought from Sweden and Germany and these new techniques slowly spread into the interior of Finland. These medieval log houses were built on stone bases, were insulated with moss and earth underneath, and were just tall enough to allow fire smoke to collect in a layer above a seated person. The dimensions were determined by the logs, themselves, which were often cut and carved in the forest and allowed to dry for up to two years, then brought to a site for assembly.[7] These log houses could also be disassembled and rebuilt elsewhere. The log building practise became more refined and higher quality in the period of the Enlightenment as double floors were added to prevent rotting, limed gravel and sawdust gave better insulation, and birch-bark was replaced by sawn planks for roofing. Glass windows were added in the 18th century, as were vertical siding painted with red ochre distemper (to imitate European brick), and more efficient fire places.[8]

Many of these single cell log dwellings evolved into building complexes for farming societies. These agrarian groupings varied from region to region and had different stylistic influences. For example, the eastern Karelian grouping of Niemelä, consisted of free organic clusters, often with individual farmsteads and support structures all housed under one roof.[9] The Finnish wooden town emerged out of a combination of agrarian and urban communities where trading and crafts coexisted with farming and animal husbandry.[10] The Finnish town was a classically based grid plan that developed out of the Renaissance. The single and double storey log houses were lined along a street and had wood fences and outbuildings, forming a yard complex.

Wood houses in Niemela, Helsinki

The neo-classical influence, however, would perhaps most widely felt in Finland in the nineteenth century, through the work of C.L. Engel. Though his work was predominantly public, he had an excellent grasp of wood construction and published his ideas and new innovations in articles. The Swedish roof truss came into use, as did post and beam construction. This gave much more size and arrangement flexibility, allowed larger window openings, and created a cavity for sawdust insulation. Towards the end of the century, these techniques were in wide circulation because of Swedish literature, such as Alfred Sjöström's, 'Agricultural Buildings'.[11] Also, with the invention of the frame saw, it was now possible to create complex ornamental boards, which came into use through pattern books and constituted a folk style that emerged side by side with Classicism proper.[12]

The American balloon frame was introduced to Finland, officially, in 1909, when it was published in the architectural periodical, Arkkitehti ('The Architect'). It had the advantages of faster, more economical construction, no settling time, and represented the beginning of industrial prefabrication, with the use of nails and standardized dimensions of sawn lumber. It wasn't employed in Finland, however, until the 1930s, when the insulation materials and cut-to-size windows and doors offered by the forestry industry made this type of construction both economic and suitable for Finland's climate.[13] In the interim, during the National Romantic period, the Finns were in search of a national identity and sought it in the mysticism of the Karelian wilderness, north of St. Petersburg. Many of the leading artists and architects, such as Eliel Saarinen, were inspired by folk and vernacular architecture and built their retreats in the old log styles. This was short lived because of the restrictions of log

construction and the shortages caused by World War I, but it continued into the 1920s, in the instance of the Käpylä garden town, near Helsinki, in which a system of post and beams where developed in conjunction with infill stacked logs. The predominant constructions of the 1920s, however, used sawn lumber and early panelling techniques.

In the pre-war era, while the rest of Europe was experiencing modernism in materials other than wood, Finland was still wood-based and largely agrarian. Although a Nordic version of modernism was realised in Finland in the 1930s, the forest-based monoculture of Finnish industries heavily influenced single-family housing by promoting the simplified traditional house and not open plan modernist ideals.[14] As mentioned previously, many of the innovations, such as the balloon frame, came from the U.S. and not Europe. A breakthrough came in 1937, when Alvar Aalto designed his first wooden type-planned house with the A. Ahlström company, with the intent of creating an entirely prefabricated, site-built housing product.

During the war, the AA system would be tested, as would many other prefabricated wood frame systems. The Winter War of 1939-40 and later the Continuation War would cause material and housing shortages, so wood was the accessible and logical choice for building type-planned houses and war-time barracks. The Finnish Association of Architects employed many of the leading architects to develop the type-plans for reconstruction. When peace came in 1945, Finland suffered the loss of a large section of their eastern territory to Russia and had to pay massive war reparations to the fatherland until 1952. The resulting resettlement, restructuring of the Finnish economy, and industrialisation, created a rapid need for housing, which came in the form of the prefabricated type-planned house, developed during the war. The forest industry also became mechanised and the introduction of the water-powered sawmills spurred innovations in cutting and industrialised housing products emerged. The single-family house had become a product: "It had changed from an individual design commissioned by the client for a particular site to a generalised commodity, the anonymous result of design, production and marketing mechanisms", remarks Pekka Korvenmaa.[15] These new type-planned houses of the post-war period also lacked the attention to detail and modern architectonic qualities that Aalto and others had laboured over before and during the war.

In the 1950s, attempts were made to streamline and structurally articulate the wood house, although attention was beginning to turn to brick and concrete apartment housing. New town development still created a single-family housing need, but much of the creative energy and ambition of architects was directed at the prefabricated summer villa. The influence of Mies and the International Style was localised in Finland, with again, the most accessible material, wood. New pillar-beam systems and heat insulation technology were developed to open space and create transparent walls in a time when energy was still inexpensive. It should be mentioned that, in addition to the Miesian steel and glass influence, there was also an interest in Japanese concepts of open space, rectangularity, and open and revealed wood structure.[16] These trends toward rationalisation and open structural systems coincided with the processed housing industries and the two in unison would mature into the 1960s. Motivated by the idea that architecture could act as a social catalyst, Kristian Gullichsen and Juhani Pallasmaa designed perhaps the finest of these systems: the Moduli 225 system for prefabrication in wood. Studied proportion, precision of detail and structure, and minimal gesture within a modular grid were compelling attributes in a decade devoted to rationalism.[17]

Moduli 225 proved unpopular to the general public, and in its place speculative derivatives plagued the countryside. Indeed, architecture had become a commodity, like furniture production, and the architects role in the production of housing began to dissolve into nothingness.[18] Alvar Aalto was one of first to foresee the dangers of prefabrication when he wrote, "standardisation involves industrialised violence against individual taste".[19] Aalto would instead look to folk and Japanese traditions, cubist art of the period, and even classicism in his housing and especially in his masterpiece, the Villa Mairea.[20] Although this represents a very unique work, with a high budget and exceptionally open-minded client, it still has been widely influential in Finnish housing design and will continue to be.

In the 1970s and 80s, wood housing nearly became extinct, with the exception of summer villas. Any system building was realised in concrete and housing shortages were eleviated with apartment blocks. Wood siding in houses was often replaced with brick and plastics and even sheet metal came into use, with wood used only as a detail material. Single-family houses were restricted to rural areas and most were industrially produced. "It was this situation which then ran into the energy crisis, formaldehyde emissions, the radon problem, breathing buildings, dry rot, the removal of asbestos, natural paints, fungal damage and ecological thinking about materials," remarks Panu Kaila.[21]

the contemporary state of housing in finland

Subconsciously, great things have been part of that world: rapid growth, haste, abundance, performance and achievement. It has been characterised by mirror-like surfaces, right angles, hard materials, efficiency and exactitude, rigidity, strength and explosive power. Until now, no one has dared doubt the goodness of that world…During the past few decades, this fairy-tale world has shed its Potemkin facade, and - ha! - what is revealed behind it? Clouded air, stinking rivers, all-intrusive noise and dirt, ugliness and rape, atrophied nature, vanishing landscapes, hunger and misery.

Eero Paloheimo[22]

Today in Finland, as in other industrialised nations, the mistakes of past decades have not been remedied. Our generation of architects are left to contend with massive environmental damages caused by irresponsible material use and development, not to mention the associated psychological and health factors in housing. Indeed, we are at a pivotal time in history where the bi-products of an industrialised and consumptive society could effectively be tempered if current environmental trends continue and are localised in practical and economical measures. Unfortunately, the burden of the past is still lingering all around us and the forces in power are slow in building consensus and developing a proper direction. Concrete buildings are expensive to renovate and are impossible to move or disassemble and thus cities are forced economically to use them. Even in a timber-based economy with vast timber resources, only 43% of new buildings in Finland are framed in wood, 43% are clad in wood, and 12% have wood interior finnishes, according to Puuinfo Oy's 1997 study. Although wood techniques have developed new acoustical insulation and appropriate fire prevention methods, modern fire codes, as well as noise codes, still make it easier to build in concrete. New systems in Germany and Switzerland have developed sufficient mass in timber walls and floors by nailing stacked planks together to create a composite load-bearing wall that can be insulated without a plastic moisture barrier. In Finland, as well as Denmark, only one story is permitted for public buildings of wood, when wood construction can easily permit four or five stories and new laminated products and steel plated truss systems offer a whole new range of structural applications. It was only in August of 1998, building codes allowed residential buildings over two stories to be built

Herrala House Company home model

with wood and only with expensive sprinkler systems. Within the Nordic countries themselves, there has been disagreement on the burning behaviour of wood, which has lead to more stagnation in regard to codes and permits.[23] In reality, wood's structural performance during a fire is preferable to that of steel or pre-stressed concrete. The supported structure does not abruptly break down at a given temperature and only chars on the outside for a longer period of time. There has also been special impregnation methods developed recently to increase longevity during a fire.[24] Experiments carried out by the architecture school in Oulu proved that with fire breaks and appropriate platform frame techniques, three and four storey buildings handily exceeded modern fire codes. Wood insulation companies like Vital, have proved that their wood-fibre product can withstand temperatures of 1300 degrees Celsius without combusting. Besides, most people die in fires, not from the flames, but from harmful gases, caused by the burning of unnatural materials like plastics and PVC's.

Another major contemporary problem facing the timber building industry is in developing proper insulation for wall systems, while preventing water vapor from becoming trapped inside the cavity. Many of the frame and plywood systems using artificial fibreglass insulation or mineral wool that were developed in the 1960s succeeded in thermal performance, but since the temperature differentiation was so great from inside to outside and rates that vapor pass through wood and an artificial material differ, water condensed in the cavity and wasn't properly vented, causing rotting and mold growth. Plastic moisture barriers were introduced later to prevent interior vapors from entering the wall cavities. This has also met with difficulties since artificial siding, paints, and exterior plywood layers can also trap water in the cavity. If any part of the plastic is pierced during construction, then water vapor will collect at that point and cause localized rotting. The old insulation systems of sawdust, tar paper and wood cladding allowed natural breathability, but had a mediocre thermal performance. There have been recent advancements in new natural insulation products made from wood and paper products that are blown into a cavity with water or placed in dry.[25] These and other natural products, such as flax, hemp, or wool readily allow moisture to penetrate in harmony with wood and allow the wall to breathe without decay and thereby eliminating the need for a plastic layer and venting. They also retain adequate heat by contemporary 'comfort zone' standards, but again, codes and market forces are slow in adopting these methods.

Still, there are other problems that retard wood housing; social misconceptions, for example, that wood is only a material suitable to summer cottages or that it is 'old fashioned' or not durable and modern. The high quality and elegantly detailed wood buildings that are emerging in architectural circles may help relieve some of these delusions, although this certainly hasn't effected the general building sector. In fact, only approximately 4% of single-family homes in Finland today are designed by architects. The rest are prefabricated and are 'custom' designed in a matter of hours. Of course, time is spent when designing each model product, but the overall time related to each individual client is minimal.[26] Needless to say, the results are banal: the spaces are uncompelling, details are standardised and uncreative, materials are 'off-the-shelf' low-end industry products, and of course, the building has little or nothing to do with its' site or region. Even though 89% of single-family homes are framed in wood, many receive brick facades or are built of some other structural material, like concrete blocks. 25% of all single-family home interiors are wood. Part of the problem may be that Finnish builders, architects, planners and developers have looked to America for innovations, such as the platform frame. A group came to Seattle in 1996 to study the three and four story wood platform frame that is prevalent in many apartment buildings all over the U.S. Although, Finland has adopted only the system and so far has been able to adopt it in a more ecological and permanent way, the American buildings can hardly be considered a model. They have a life-span of around 20 years, due to cavity rotting problems, associated with non-breathable envelopes and unsuitable claddings for their environment and low-grade lumber. The American car-dependant suburb house, which by the way, is now the standard for second vacation homes, is of course an even worse model. It is oversized, cheaply constructed, and attempts to emulate earlier styles, creating a vacuous statement and an aberration on the landscape. Recent attempts by American architects such as Michael Graves and Robert Stern (who is now the dean of Yale), to hatch their own trendy vision of the American prefabricated dream house only escalate this downward spiral of production, consumption, and destruction.

Instead, the Finns must look inward to a regional and forest-based solution. The Finnish forest and wood-processing industries have tried since the post-war period to compete with the concrete industry and have only now have cornered a fair share of the market, largely due to exports to Europe. Forestry, saw-mill, and lumber processing skills are high, but the building and carpentry markets are low, because most of the wood is exported and not targeted for local building. Tactics, such as giving recognition prises for excellence in wood construction or holding timber building competitions for architects, have helped promote wood, but still this needs to be pursued further. The timber industry also needs to standardise building systems and dimensions in wood to make it cheaper and easier to access costs for proposed projects. Today, concrete remains as the only standard prefabricated system, thus making it a more likely choice because contractors know how much it will cost. The state has taken some interest in wood housing in addition to private subsidies for eco-development projects. One such example is the Viiki project near Helsinki, now under construction. Though not exclusively wood, the planners of the project proved successfully that they could reduce pollution and overall consumption, use renewable resources, and meet other ecological criteria, while remaining financially competitive with similar developments. This also, has been proven in other parts of Europe. In Austria, for example, the Gärtnerhof's ecological residential area saves 50% in energy consumption and consumes two thirds less water and produces two thirds less household waste compared to a control area.[27] In addition to government support of such projects from the Technology Development Center TEKES, the Ministry of the Environment, or the Ministry of Trade and Industry, city policy could also reduce fees and charges for developers who meet given requirements. The wood multi-story apartment building and proposed wooden village, taken on by the Oulu University architecture department, as well as the wood housing fair in Mikkeli, 1998, point in a positive direction, but still are the exception and not the rule.

In summation, Europe, as elsewhere, needs to implement a continent-wide strategy to guide the development of its built environment in a particular direction and if, indeed, the 21st century is one of wood, then it also must maintain proper growth, management, and care of its forests. If paper production stays at its current level of use or is replaced largely by the byte, then the left overs from mechanical production of timber should be sufficient for paper production. It then becomes a question of how much natural forest is left and how much rotting timber is left in managed forests to maintain sufficient levels of stored terrestrial carbon necessary for a healthy global climate.[28] Likewise, present levels of carbon dioxide emissions from energy use threaten the climate and in particular the forests. Forests are highly sensitive to climate change, especially warming, and forced by a doubled carbon dioxide climate, we are facing major alterations to our forests with unknown consequences.[29] Carbon dioxide, methane, and nitrous oxide, the so-called 'greenhouse gases', have increased 30%, 100%, and 15% respectively, since the industrial revolution due to human activity. These gases are contained in the atmosphere and warm the troposphere. Global climate scenarios predict, if present population and consumption rates continue, that the earth's surface temperature will rise one degree Celsius by the year 2100, likely effecting precipitation, storm patterns and intensity of droughts. In addition to our forests, "these changes in climate could significantly affect agricultural production, water supplies, human health, and terrestrial and aquatic ecosystems."[30] Biologist Paul Ehrlich of MIT has said that in order to keep our environment in its current state, we will need to decrease the amount of material and energy needed for a product, and indeed, the house has become a product, to 1/6 of its present level within the next 50 years. The building sector alone, in Finland today, constitutes approximately 40% of total primary energy used in Finland: 22% on heating, 12% on electricity, and 6% on construction activity, products, and transportation.[31] In single-family houses, 80% of the running costs for an 80 year life-span are for space heating and hot water; the rest is distributed to manufacture and transportation of products, maintenance and tear-down and removal. On average, the production of building materials constitutes three to five percent of energy consumption for one house.[32] Water consumption, alone, for one house is also quite high: around 500 liters per day, when in the past people consumed 10 to 20 liters per day.[33]

why build with wood?

Wood is a renewable natural resource which is available cheaply and locally. Wood is easy to work, both by hand and mechanically. Wood functions simultaneously as a load-bearing and heat-insulating structure, it does not conduct cold from the outside in. It also has the capacity of storing heat, it smells good, forms a beautiful surface and creates good acoustics. And finally, by burning or rotting, wood returns to the ecosystem…But we know this already - why else should building in wood have been predominant in Finland from the distant past almost up to today?

Georg Grotenfelt[34]

Georg Grotenfelt house in Juva, Finland

Much can be said of the attributes of wood in housing design. First there is the psychological and humanistic aspects. We all experience architecture through the senses - by touching a door handle or opening a window, by hearing creaks on a floor as someone walks over it, or by smelling the musty, but pleasant scent of an attic or old barn. This evokes in us a kind of nostalgia for past experiences, a childhood memory of an old house, or perhaps a sense of happiness or an inexplicable yearning for something even deeper and more primitive. It is not by accident or merely practical considerations that people's summer cottages and saunas are made of wood. Wood reminds people of their agrarian past and the feel and smell of this tactile material evokes a state of harmony with nature, that seems to come seldomly in our increasingly urban and fragmented world of timeless man-made materials. "It may be that the experience we most miss in our new synthetic environment is the experience of time. Time is always strongly present in wood, because it speaks simultaneously of its own process of growth, wear and gradual decay, of human craft, and of an object used for generation after generation. Wood is the only material that gets more beautiful with time and use," remarks Juhani Pallasmaa.[35] Indeed, when an old wood barn or house is decaying in a field it becomes a poetic point in a landscape, whereas a concrete block only becomes an eyesore and physical nuisance.

What is even more important is that architecture effects the quality of our lives directly and subconsciously. If you live in an artificially lit concrete apartment block or a sterile and anonymous prefabricated house you become increasingly distant from nature (45% of Finns today live in flats, yet most said in surveys they would prefer to live in a wood house). Nor is your dwelling place a source of rejuvenation and shelter, of inspiration and contentment, of individuality and continuity with past generations. Although fulfilment in one's life comes from people and other sources, certainly, the physical place, our home, where we eat and sleep, live and love, can take on a dimension of meaning.

The second major virtue of wood when speaking of housing, is its practicality and economic viability. We know that it is easy to work. You can cut it, shape it, sand it, bend it, use it for structure, use it for siding, use it for finishes or furniture. The regional tree species of Finland offer an application for nearly every aspect of a building. Pine, Finland's most common tree, is known for its' durability and usability, and perhaps is ideal for structural applications. Birch is suitable for furniture and interior veneers and aspen for sauna benches because of its low conductivity of heat. There are many other familiar species, including hardwoods in Finland, which haven't been widely utilised. Wood can be mechanically dimensioned and with processing and glues and epoxy resins, you can turn it into large structural beams, plywood, chipboard, pressed tiles, and more. In short, it is probably the most practical and versatile of all building materials. With modular preparation, it can be easily erected and covered, without the drying time of concrete and steel. It also has the advantage of being readily and quickly repaired and taken down and dismantled if necessary and rebuilt elsewhere. Wood is still cheaper in the North and the construction procedure is faster than the one with brick or concrete.[36] In Austria and Germany, where wood is even more expensive than in Finland, studies have shown a 15% to 20% reduction in price with wood construction over concrete. This should be incentive for Finnish developers. In addition, if wood was utilized more for housing stock, the timber industries could provide many new jobs. The timber companies are Finnish owned and obviously a source of national pride, as opposed to concrete companies, which are owned and managed elsewhere, in particular, Sweden and Norway.

Perhaps the most compelling argument for using wood is an ecological one. If one looks at the entire life-cycle of a material and calculates the total environmental damages and natural resources used, timber is decisively an ecological material. "The process from log to completed product uses only small amounts of energy and causes very little damage to the environment. When timber grows old, it rots and the waste matter is itself of significance in the cycle of nature, it's value as a nutrient," writes Eero Paloheimo.[37] It also doesn't produce carbon dioxide, like other materials, in fact it binds it as a tree grows. When a tree is felled and turned into lumber, carbon is stored in the cells and is not emitted into the atmosphere. Construction timber, in particular, holds its carbon longer than, for example, a furniture application. Therefore, massive wood constructions have a positive effect on the global climate by reducing global warming. There is much less energy involved in transportation, production and construction, and hence less carbon dioxide released into the atmosphere. Brick, for example, needs to be heated to around 1000 degrees Celsius to harden, whereas wood, even kiln-dried, uses significantly less energy in production. Construction waste can be burned for energy and in the case of removal, a wood building can be burned, recycled, or let to decay naturally back into the ecosystem. Can you say the same for the non-renewable, mineral-based materials brick or concrete?

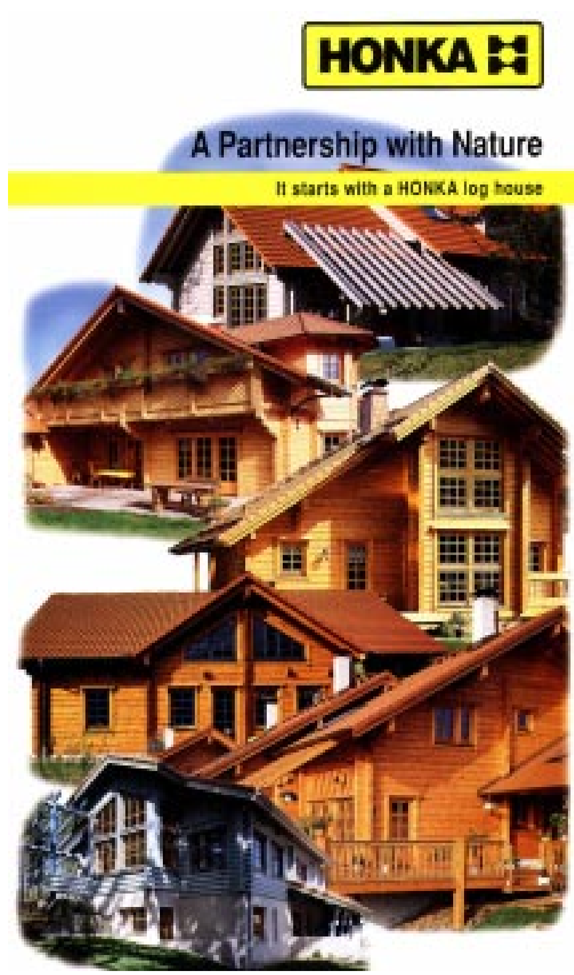
Obviously, the less you heat-dry (which constitutes 70% of energy consumption in the wood industry) and process wood, the less energy and natural resources are used. In this sense, laminated and plywood products may be less 'eco-friendly,' at least until production methods are less consumptive and all the materials used are natural. New chemical and heat treatment preservation methods also are more harmful because the products can't easily be accepted back into the natural cycle. The older surface treatments, such as tars, resins, natural oils and waxes, can again be implemented for contemporary use and wooden houses need not be pre-dried. Wood has also received the top M1 Finnish emissions rating for indoor materials. This means its non-polluting and also healthy and pleasant for human breathing. In conclusion, it should be mentioned the abundance of the resource in Finland. 70% of Finland is covered in forests. In about eight hours of forest growth, there is enough lumber for building a years worth of single-family houses in Finland.

the myth of the prefabricated dream house

4% of new single-family houses in Finland are designed by architects

Herrala House Company home model

With a staggering figure such as this, you might be lead to believe that there is some real virtue and incentive in buying a prefabricated house. These numbers are not uncommon and indeed, this seems to be a global trend, at least in industrialised nations. In Portland, Oregon, for example, in 1997, only 8% of new houses were architect designed. Are people afraid of what architects will do or do they think that they just don't need one? Surely, they can't think an anonymous prefab house is more beautiful than an individually designed home, especially if they can select an architect whose work they admire and accommodates their needs and interests. Are architects, then, far too expensive for developers or individual home-builders? Unfortunately, this seems to be the most common misconception; that an architect's fees are an unnecessary addition to housing costs and a waste of money. People would rather select a 'product', off-the-shelf, knowing exactly what they are getting and how much it costs. With aggressive advertising campaigns and savvy marketing skills, housing companies, such as Herrala and Honka reach a huge audience and export their product to Europe, the U.S., and Japan. Brochures show happy faces, environmental labels, and demonstration houses fully furnished. Herrala House Company markets their houses as, "...highly advanced in design and production methods. It is possible to take customers wishes into account in the house design to a unique degree. Individual quality of Herrala homes provide a better standard of living at reasonable prices." These blanket promises, again, are misleading and are motivated by market forces with true capitalist zeal. Yet people lick it up, like a runny ice-cream cone in mid-July.



Herrala floor plan

In many studies of the prefabricated housing sector, research scientist Mikko Viljakainen of the Tampere University of Technology, revealed that companies like Harrala and Honka budget from three to ten percent of total costs to design work, when in reality they spend approximately four hours on 'customizing' design for the individual. These companies never advertise their prices in their brochures and catalogues, but the average product cost is around 150,000 FIM ($30,000). This includes walls, windows/doors, and roof to be erected by crane on site. The client is expected to provide the foundation and any exterior and interior finish work with an average budget of 350,000 FIM ($70,000). This may seem like the easy and inexpensive part, but in reality it drives the prices up to 750,000 FIM ($150,000) to 950,000 FIM ($190,000), according to Viljakainen. Since none of these houses include closet space, built in shelves or counters, kitchen appliances, and other necessary furniture, the price gets driven up an additional 110,000 FIM ($22,000). According to a study by Johani Nummi, of VTT Building Technologies, a state and private research group, framing costs of an average single-family house, including insulation and interior finishes are 15% to 20% of total construction costs.[38] This means that Honka and others are marketing a whole house, but in reality are only giving the customer about a sixth of the total investment for a completed and liveable house.

According to a variety of sources, the average cost of a modest architect-designed house of 120 m^2 to 130 m^2 is approximately 5000 - 7000 FIM / square meter or 750,000 FIM total ($150,000) in Finland. Design costs are typically billed at around eight to ten percent of construction costs, of which the architect can expect to receive half after engineers are billed out. This ends up being a very small percentage of total costs to have a skilled professional spend weeks on a house. If the architect can design an efficient envelope and use passive and active solar energy, then comparisons of construction costs, including 10 years of running costs, would show even greater savings over a prefabricated house. VTT Building Technologies has sponsored two specific low-energy single-family houses where the heating energy consumption was lower than 40 kWh/m^2a. A prefabricated house, meeting Finnish codes, expends on average 120 kWh/m^2a. This will obviously add up, even within one year. And what about the resale value of a prefabricated house versus a well-designed and site-specific home in, for example, 20 years?

When a young family decides to buy land and build a house, it is probably the single largest investment of their lifetime. Perhaps the land is meaningful to the family or is a pleasant and scenic area. An architect can design for that family's needs and potentially contribute to that place, while taking advantage of views, slopes, access points, and solar potential, while a prefabricated house would ignore all of the above. And what if the site is unpleasant - a fractured neighbourhood, perhaps, or an old industrial zone? Will a 'cookie-cutter' house mend, revitalize, add cohesiveness to that place?

There is also the case where the family decides to bypass both architect and prefab company and try to design a house, themselves, or come up with some ideas and hand it over to a contractor to figure out and build. In studies done by Klaus Pelkonen, architect, city planner, and building inspector in Lappeenranta, a family-planned house, on average, will add 10% extra space for the same functions, than an architect-designed home.[39] The 10% means more materials and significantly more energy consumption and costs over the years. In addition, the contractor then, has total control of the quality of the product. An architect, however, can oversee construction and make sure that the details and craftsmanship are high-quality. A well-planned house with complete drawings and construction details also means that engineers fees will be lower, since they won't have waste time sifting through unprofessional work. An architect also is set up to deal with local codes, getting a building permit and can mitigate any disputes and claims during the construction process through organized pre-planning. In short, the architect serves a vital role in the entire building process. Why, then, is the architect losing status and significance in single-family housing?

what can architects do?

Like that of a good storyteller, a designer's vernacular will modulate precedent with innovation, recognition with surprise, quiet whispers with sudden shouts. Both types of narrators slyly point out secret clues or alternative meanings that hadn't before been noticed, prompting the audience to think differently about what had once seemed self-evident.

Gwendolyn Wright[40]

The design approaches of many of today's architects the world over, seem rooted in a consumer-based, fast-food, fast-paced, and image-orientated society. Architectural periodicals circulate the latest, hot commodity, and people flock to see it. Architecture has become the equivalent of a Hollywood blockbuster or a Big Mac at McDonalds. It looks and tastes good, and then afterwards you regret you ate it. It's empty and meaningless and has no lasting power. Certain architects seek formal and aesthetic ends without considering practicality, longevity, material choices, their life-cycles, and energy used in construction. They see an 'image' they like and try to stamp it down anywhere. This is often an ultra-modern version of the International Style, or else deconstructivist or a sculptural/organic form. There has also been a new interest in structural expression and so-called 'tectonics', which has only resulted in overdone detailing and a lot of unnecessary cross-bracing. In either case, there is a characteristic disdain for the vernacular and a sense that basic construction principles and inherent properties of materials were considered after a form was conceived. The architect here, can be seen, as the high-minded 'artist', not to be concerned with general building practices, only their personal vision or unique creation. On the other side, some architects have become a puppet of market forces and design the people's 'vernacular' complete with phoney details and pseudo-historic references. This is no better than the 'hyper-designer' counterpart. There needs to be a new middle-ground between the general appeal and comfort found in vernacular traditions, and the innovations and artistic value an architect can impart. Good architecture, as it always has, arises from simple, clear forms and the pure expression of materials and structure.

Many architects have also forgotten how to design on the small scale. They are regarded as elitist, expensive, and inflexible and its no wonder the average person turns to the prefabricated house.[41] The individualistic trophy house for

the wealthy client has become the stomping ground for the architect. Luxurious, personal dreams of the client are often realized, at the expense of a cohesive, well-planned quality environment for all. It is unfortunate, because creativity and rewards lie in smaller, more modest projects. This, of course, is rooted in larger socio-economic issues associated with gross excesses of wealth, but part of the problem may be in the realm of architectural marketing. Architects are learned about through word of mouth, slick brochures, and periodicals, which mostly feature large houses in spectacular sites. This type of advertising lends itself to elitist circles and hardly trickles down to the average person who wants to build a house. In fact, it conveys the message, true or false, that this is the only type of project an architect will do. Architects are also often very absorbed in current projects and are hard to get in touch with, much less set up a meeting with. Most people will, instead turn to the neighborhood contractor or a pattern book of designs for inspiration because the local architect is too busy designing for the rich.

Many of these trophy houses, and even the poor man's prefabricated version are grossly overscaled and the majority of the space is underused and not specific to any necessary housing function. This is even more disturbing in the case of second homes because the formulaic plans are not only oversized, but don't accommodate a 'vacation' lifestyle with different needs, less privacy, and more interaction with nature. People need a retreat from the city and contact with nature, not a suburban ranch house, plucked from a catalogue. There is also the responsibility to a community, landscape, and larger ecosystem. If you build a large, consumer-product house in a beautiful natural setting, you have conquered that area. No other person can enjoy it, walk through it and witness the mystic beauty of nature. In addition, you have caused drainage problems, upset wildlife patterns and habitat, destroyed flora/fauna, released large quantities of carbon dioxide into the atmosphere from your manufactured products and machine-based construction methods and you have thus contributed to global warming. If you build a modest wood house tucked back within trees, you have not only saved the area for others, but you will coexist with nature and receive a lifetime of rewards from it.

HOW TO CORNER MORE OF THE MARKET FOR SINGLE-FAMILY HOUSING

It is obvious that architects need to restructure their practices, focusing directly on single-family housing, and market themselves aggressively and more broadly. Architects often complain of having no work, but this is because they are waiting for the dream client with a high budget, open-mind and a beautiful piece of land. Since designing a house like this can be very time-consuming, architects need to spend less time fussing over details and craft pieces and come up with simple, quick solutions and turn out more projects for more people. CAD programs, as well, are becoming simpler and more 'user-friendly', which in the future should expedite the design process. SAFA, the association of Finnish architects, currently has a 'no-advertising' unwritten rule. Architects are listed only by name in phone books. Architect advertising needs to be more generally circulated in newspapers and the media. Architect portfolios should be made available to people in less 'exclusive' places, such as lumber yards or hardware stores.[42] The Building Information Institute in Helsinki would also be an ideal place for people to leaf through portfolios (Honka, Herrala, and others have prominent displays here). Results of modest, well-designed 'eco-houses' should be spread to show the economic and quality-of-life benefits that more people can aspire to.

DRAW SOLUTIONS FROM THE PHYSICAL ATTRIBUTES OF THE SITE

Each site has a unique set of circumstances. Wildlife patterns, wind and light conditions, certain trees and rocks, all present an opportunity, not a detriment to the architect. Thus, a detailed study of climate, microclimate, ecosystem, geology, and other unique conditions should be undertaken. Likewise, the architect must spend time at the site to see the patterns of light, to find the best places to sit, and generally determine the nuances of the place before reaching a conclusion of the building form, major spaces and openings. This should be carried out with minimal effect on the landscape and placement of the building form should accommodate natural features, such as a prominent tree, as this will in the end, enhance the architecture, not detract from it. Open to the south, whenever there is a southern exposure. Of course, if there are existing man-made features already on the site, such as an old barn, the new structure should be placed in harmony with the old and cleared land and old roads should be taken advantage of and re-used to lessen the overall impact on the site. Additions and renovations are a separate discussion, but let it be said that this should be one dimension of single-family practices and will certainly be an important element in an ecological future.

LOOK TO THE LOCAL AND REGIONAL TRADITIONS

This does not mean you should emulate historical styles. But old building techniques can be used in new ways. They give major clues to local microclimates and appropriate architectural devices, construction details and solutions. With wood, especially, old joinery and assemblies evolved over centuries, and indeed, many old structures have lasted for hundreds of years and we can certainly learn from them now. The simple forms and the economy of construction in the wood buildings of yesteryear also offer us a dignity and purity worthy of emulation. And perhaps, too, the simple rectangle is still the most spatially and materially efficient form in building. Innovations should be made within the boundaries of tradition, as tradition connects us to the past, and we can provide a window to the future.

USE WOOD TO ITS FULL ADVANTAGE

Wood building requires some discipline and knowledge. Properties of various tree species, such as moisture content, heat conduction, and resistance to decay all need to be known so appropriate applications can be made. Construction techniques must be studied, evaluated, and tested in order to promote longevity. Old methods rediscovered and new ones yet to be discovered will assure a future of innovation and creativity. Also the versatility of the material should be exploited as wood can be used freely for architectural expression. Yet, certain fundamentals, such as proper eaves and a tight roof ensure durability. Wood structures need to breath freely and allow water to evaporate. Therefore, there should be careful consideration of joinery exposed to weather, cladding systems, and ample air circulation around rafters and foundations. For example, if you raise the house above ground and use column footings and wood beams, this allows the floor structure to breath freely. If rafters extend to the exterior and are openly vented, this will insure longevity. The importance of wood-based or natural insulation, such as Ecovilla or Vital products, cannot be emphasized more. This allows moisture to pass through at approximately the same rate as through wood in the cladding, for example, or any wood soft board used as a wind shield. The wall cavity will behave as one entity as water evaporates out. The inner moisture barrier should be a breathable surface, but around five times as dense as the rest of the cavity. This can be in the form of plywood or a wrapping fabric with a tongue and groove interior finish. Wet zones of the house, such as bathrooms, sauna and laundry area should be situated in a block or stacked vertically, so moisture is contained and exhausted from one area and not spread to dry areas of the house. Any wood preservatives can be natural: exterior surface treatments include boiled and pressed linseed oils, distemper oxide paints (rye or wheat pigments), and clear tar brushed on or impregnated. If the lumber has sufficient density and resins, such as in the heartwood of quality pine, it can be left untreated. Natural interior treatments include linseed oils and beeswax or carnauba wax. The careful consideration of natural interior finishes is very important to insure clean emissions and healthy breathing.

CLOSER TIES TO BUILDING

It is the architect's responsibility to know exactly what is being built and how. This means a thorough understanding of construction practices and materials to insure a high-quality and lasting structure. The architect, builder and engineer should ideally collaborate as a team and not distance themselves from each other. The architect needs to spend more time on site or perhaps, the best case scenario is when the architect is the builder, the so-called 'design-builder', who knows every step of the entire process. An important attribute of wood construction is the fact that a wood building can be easily maintained and repaired in its lifetime. Thus the architect should educate the client on the basic principles of their house's construction and knowledge on how to fix and maintain it themselves.

DESIGN ENERGY EFFICIENTLY

Have good thermal insulation around the whole envelope, avoiding cold bridges, and air leaks. Avoid penetrations of the envelope by electric or telephone wires, which can be run along partition walls or on the interior side of the envelope. Reduce the number of construction components: for example, the windows can be fixed directly to the frame, and eliminate unnecessary construction phases. Careful planning of the amount and sizing of lumber will reduce waste wood and energy. Joining of elements, in a composite beam, for example, should be pre-planned to avoid waste. Electric functions, such as dish washers and washer/dryers should be considered in terms of efficiency. Composting toilets reduce energy and have use as fertilizer. Household waste, compost and minimizing water consumption should be considered

in the design, not as something the client deals with. Efficient, high temperature fireplaces will not only heat better, they will also reduce the amount of carbon dioxide and carbon oxides that are released into the atmosphere. They can also heat hot water tanks for domestic hot water supplies and space heating. The house, as well, can be considered in terms of heat zones, warm for living, semi-warm for sleeping, and cold for storage. Why heat the entire envelope, including storage spaces, to a uniform temperature when a variety of temperatures can be pleasant, practical, and save energy? Other alternative energy sources, such as hearth-heating (seen in Project 7) should be considered. Perhaps the most important renewable energy source of the future is solar power. Passive solar techniques alone if implemented correctly in some climates, can save more than 60% of space heating over the course of a year. Active solar panels are rapidly becoming more efficient and accessible and can be used almost in any climate. Switzerland right now is the world leader. The Rannanpelto House, in Suomusjärvi proves the viability of solar power in Finland. This VTT sponsored project, completed in 1997, uses 13.2 square meters of panels and in conjunction with wood burning, required no outside energy. Architect Bruno Erat's own house in Helsinki uses active solar panels and wet and cold zone planning to reduce outside energy consumption by two-thirds.

DISCIPLINE IN SIZE AND COSTS

Efficiency of spatial planning and arrangement of functions should be carried out with minimal floor area. Listen to the client's exact needs to avoid anything extraneous. Haphazard and multishaped layouts increase expense and decrease usability, as more circulation is necessary, more energy is used to heat corners and cold walls, and there is more foundation work. Simple forms and flexible open plans that can accommodate future change should be implemented. Vacation homes, in particular, should be largely open and emphasis should be placed equally on external rooms. Sheltered outdoor areas with wood trellises, wind screens and decks should encourage people to sit and enjoy the outdoors, without being uncomfortable. Storage and even circulation can be outside the insulated envelope, with one large insulated area for cooking, living and dining and private sleeping areas. A bathroom can be separate and external with a composting toilet. By using wood in a simple and direct way and repeating similar details and components, the architect can save the budget for areas of architectural delight. By using materials from the site or at least locally, such as the timber and local stone, and low energy methods of cutting and connecting, this will eventually lead to savings. If most of the processing takes place at the site, with less emphasis on refined finishes, as in the case with rough sawn boards for siding and structure, this of course will save energy and money.

1. INNUKKA SAUNA COTTAGE

Seppo Häkli
Architect SAFA

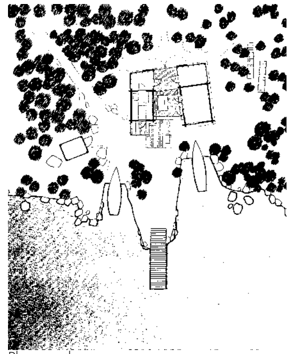
331 S.F.
Kaavinjärvi Lake
Kaavi, Finland
1993

This building, located on Innukka Island on Kaavinjärvi Lake in central Finland, represents a continued feasability and renewel of century old wood building techniques by today's architects. Seppo Häkli designed and built the structure for his parents who live on the island as a summer retreat and sauna on the site of an old smoke sauna that had burned down. Häkli intended to revive the dying craft of hand-hewn log building. He enlisted the help of a local carpenter, Heikki Räsänen, who was also interested in reviving the craft, partly as a tribute to his father, who had been a great local builder in the traditional style. Häkli worked with the carpenter during construction and the carpenter had input in the design process. Many of the decisions and non-fussy details were worked out on-site during construction.

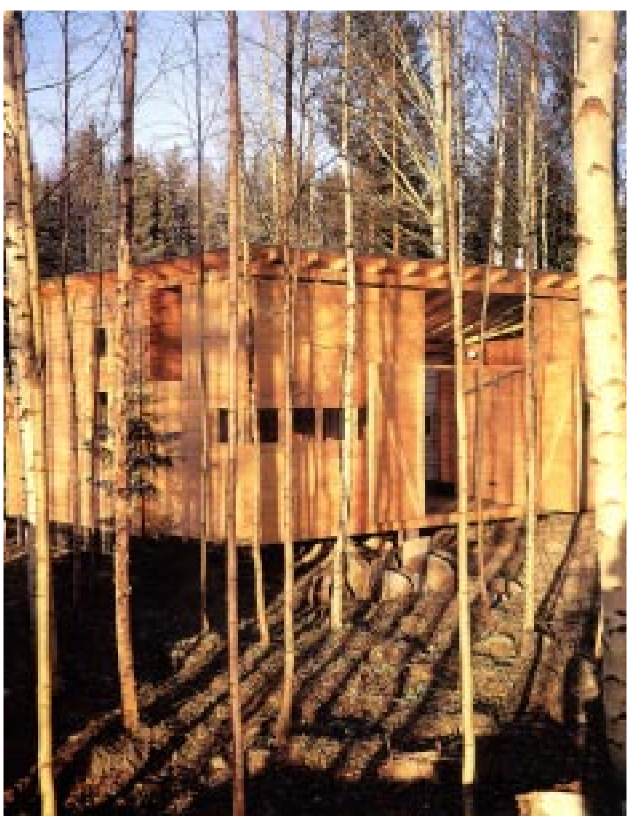
The building form consists of two pavilions situated on the coastline with a courtyard in the middle opening to the views and the sun. The log frames enclose the insulated rooms of the sauna and the living room. A framed uninsulated room extends off the back of each of these rooms to become the dressing room for the sauna and an open storage area for the living room and kitchen. A roof extends over this back wing and the patio which can be closed off on the island side with two large wood-boarded doors. The large door openings and patio were designed to accommodate Häkli's handicapped father and facilitate his movement around the building and to the lake shore.

Construction began in February 1993 with the felling of local pine from the land. The hand-hewing was carried out with barking knives, in addition to barking and channel axes. Cross-lapped corner joints were made with a chain saw. The log work was done nearby the building site before the logs began to emit resin. After the soil was free from frost, the foundations were poured using aerated concrete for foundation walls and an insulated basement slab. The first log was attached to the concrete wall using steel fasteners.

Then each consecutive log was stacked with tar-impregnated hemp filling the void. The walls were treated by axe cuts on the interior and exterior surface and the full 15 cm width of the log acts as insulation and heat retainer. The logs were left untreated and will develop a naturally preserving grey patina over time. The corner joints on the lower half are traditional overlapped log joints whereas the upper portion is connected with dove-tailed cross-lapped short corner joints, as Häkli wanted to show both traditions used in the area. The roof and back wing are framed and board finished. The roof, framed 60 cm o.c. by rafters with a tongue and groove deck, rests on a beam that sits above the back part on a threaded steel rod with bolts. Because the wood studs will shrink and swell, every summer the bolts must be adjusted accordingly. Glass rests in the recess of the groove of the siding in the open-air section of the living room. Because of the island location, any materials not taken from the site were brought in by boat. The building was completed in time for mid-summer. Although the techniques involved are time and labor intensive, the result is a beautiful, long-lasting, and low-energy example of wood construction, rooted in tradition and realized with modern elegance.


Plan, north up


South elevation

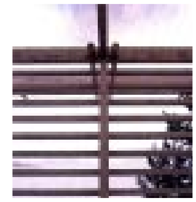


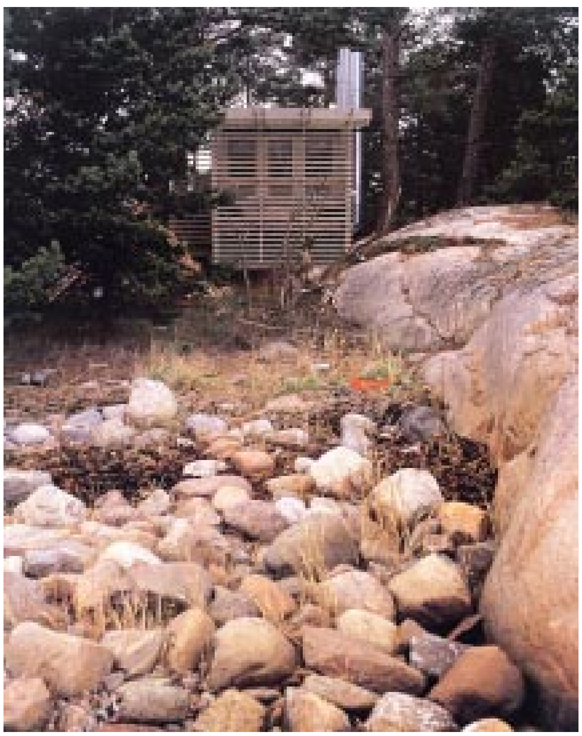
light framed wood shed on north side

2. ÄNGHOLM SAUNA

Juha Ilonen
Architect SAFA

214 S.F.
Ängholm Island
Korppoo, Finland
1990

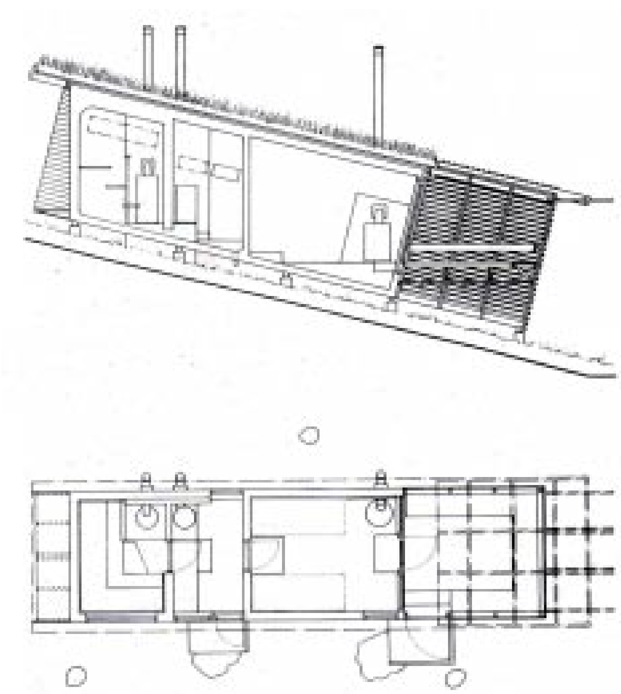




This modern interpretation of the traditional sauna building sits almost like a boat that has been pulled up to the shoreline. The site on an island south west of Turku in a vast archipelago represented a challenge to the architect, Juha Ilonen. He had a difficult time getting the design accepted by the municipal authorities since it didn't follow the traditional formula of small windows and gabled roof. Needless to say, the design is modern and pure in gesture, but respectful to its environment in every way and meticulous in terms of wood construction. Nestled between rocks and pine trees, some 164 feet from the shoreline, the only visible part is the front wood lattice. The building is sloped at 13 degrees and follows the angle of the shoreline. The turf roof and grey wood siding borrowed from the adjacent rock, complete the building's natural disguise. Even the rear elevation, was designed to hold wood, creating a 'wood-pile' finish.

Functionally, the building was designed as the sauna and guest bedroom for the main summer house, located further inland. The sauna is located on the upside of the slope with raised wood benches. Next, is a small changing and washing room with another stove to warm water for washing. Since there is no running water on the island, fresh water must be brought in by boat to be used in the sauna and sea water is used for washing. The next room can be used as a small bedroom for two beds, or as a sitting room with a fireplace. Circulation is central and terminates in an outdoor room facing the sea surrounded by the wood lattice and PVC transparent roof. The lattice was designed for wind and sun protection and to shield the glare of the glass from the shoreline. Although the building floors are level the siding and lattice work follow the slope of the building. This becomes most apparent in the exterior room.

The foundation is concrete pillars anchored in the rock, with wood beams running across the short dimension. The primary floor runs according to the slope and of course, forming a base for the horizontal floors, framed in afterwards. The insulated wall structure is framed with a tongue and groove interior finish and a painted grey exterior lap siding. The roof is again, framed across the short side with a breathing cavity located between the rafters and the turf roof above. The turf roof is treated like a flat roof, with a rubber layer, gravel layer and then the turf and grass. Water drains down the slope and drains to a gutter before reaching the trellis. Where the rafters penetrate the exterior, a small board nailed to the end extends to accomodate the extra height created by the turf and moulding board. In every detail, Ilonen demonstrates how an architect within the modernist canon can use wood both enduringly and to expressive ends.



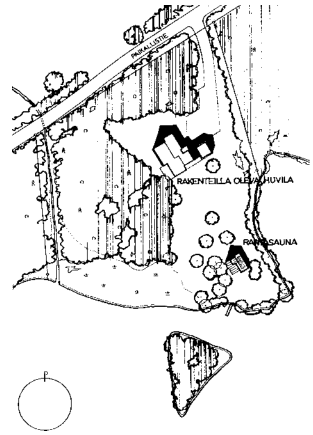
Plan (north left) and section

North elevation

3. LAKESIDE SAUNA

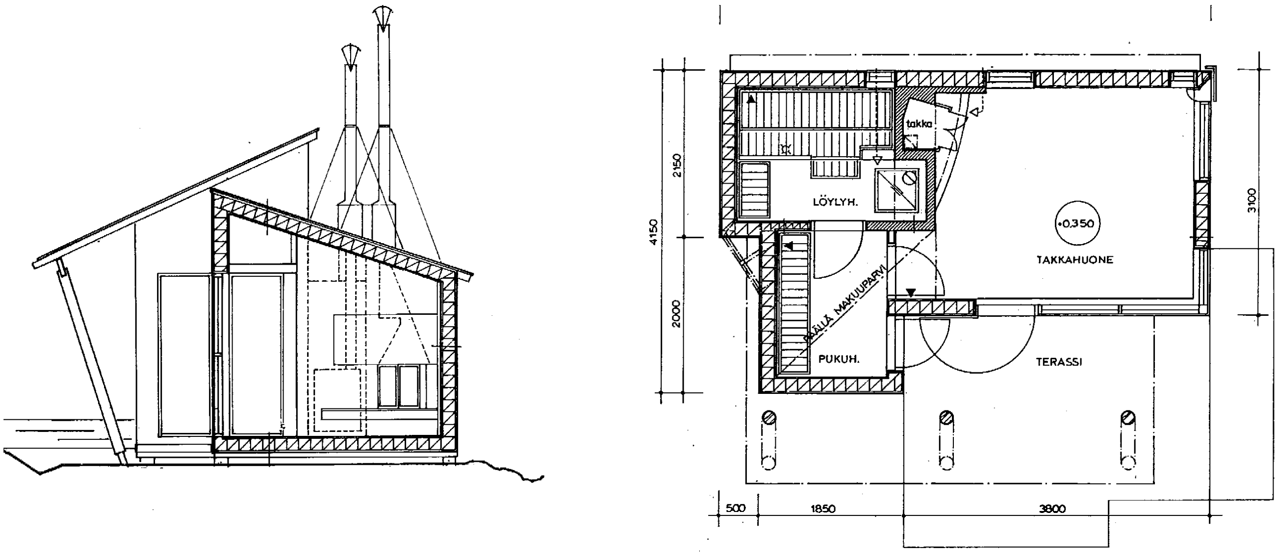
Topi Tuominen
Päivi Pennanen
Architect Office
Topi Tuominen LTD

214 S.F.
Kalvola, Finland
1994

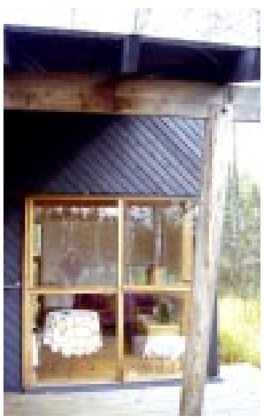


This small cabin sauna was designed to accommodate a family of four until the main summer house is completed. Situated on a cape of land which extends southwards into a lake in a remote area of south-central Finland, the building attests to the spatial and formal possiblities of a small wood structure. The main house is being built farther inland with two other small out-buildings, one for storage and a small outhouse with a composting toilet. The building sits comfortably in its surroundings and great care has been taken to leave the surrounding trees and bushes in their natural state. The building has been either stained grey or left untreated to help harmonize with nature. Even the decks step and terrace with the land, and are notched around rock formations.

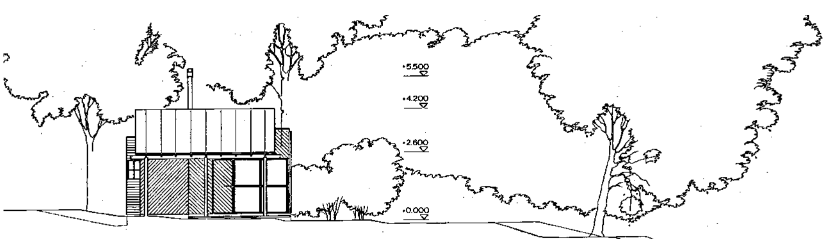
The program consists of a steam sauna room, a dressing and washing room, a loft for sleeping and a living room with a fireplace. The spaces are cleverly and compactly arranged, with one roof slope housing the living room and washing room, while the other shelters the sauna, extending out over the exterior deck. The building is light framed and insulated. The exterior surface is tongue and groove board panelling angled and horizontal, while the interior is plasterboard. Both the ceiling and floors are made of knotless pine and the sauna benches are made of aspen. The fireplace is masonry and plastered, with its front surface made of a painted steel panel and chimney of acid-proof steel. The tile revetment in front of the fireplace is burnt brick and in the humid rooms of green clinker. The roof is felt-covered and the rafters extending over the deck are carried by a beam, which in turn is supported by three round wood columns. This connection is a simple notch in the column where the beam sits and a one bolt connection. Both the beam and columns have been left untreated and have patinated a natural grey creating a poetic transition from building to forest.



Plan (north left) and section



South elevation



West elevation

4. TKK SAUNA

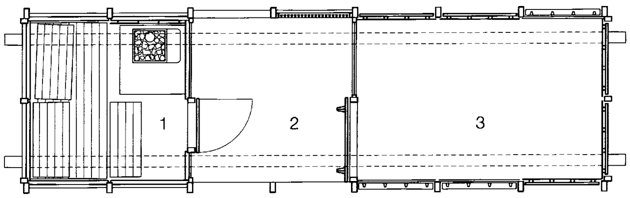
Jaakko Keppo
Woodstudio 1994-1995
Instructors:
Jan Söderland
Seppo Häkli
Hannu Hirsi

214 S.F.
Mikkeli, Finland
1995

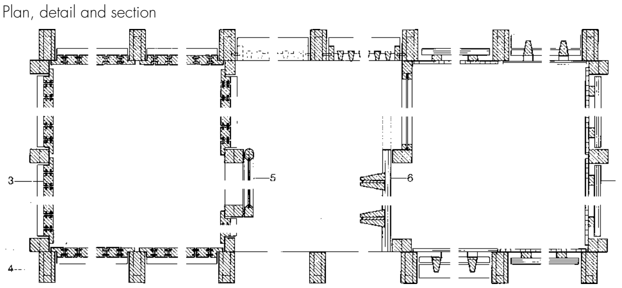
This sauna was the outcome of a student competition at the Helsinki University of Technology in 1994. The criteria for the competition was durability, ecological quality and suitability for industrial prefabrication in an uninsulated sauna designed for summer use. Jaakko Keppo won the competition and became the student design leader for the year-long project, although each student was assigned a separate area to work on. After the building was completed, it was put up for auction and purchased by an artist for his summer house near Mikkeli. Here, on a site next to a lake, the sauna was transported and rebuilt by the students. The project was designed to be easily transported and assembled, and thus was predominately lightweight Lapland pine to be assembled or disassembled as a kit of parts. Every connection is a natural wood joint without nails or screws, and the only steel used at all is to attach the major gluelam beams to the concrete footings.

The building program consists of a sauna, an outdoor terrace, and a sitting or sleeping room all unified under one gently sloping roof. The building is arranged in regular bays defined by the laminated pine frames. These were laminated in three pieces to facilitate the connections of the four sides of each frame. Each connection is slotted and held by four dowels. These rigid frames sit on two large gluelams which have also been precut, laminated, and connected in the middle to form one long beam. The frames achieve lateral bracing by the rigid panelling system fixed on the interior surfaces of the walls, roof, and floor. Beams running the long ways are also co-ordinated into the laminated system and thus rest within the frame and are fixed with wood dowels. Additional cross-beams are held, again, by long wood dowels and define the enclosed areas and entrances, above which is all single-pain glass fixed with simple pine frames. The floor is tongue and groove glue-bonded pine in the interior areas and larch slat floor in the outdoor/ indoor area. The wall system consists of a birch plywood

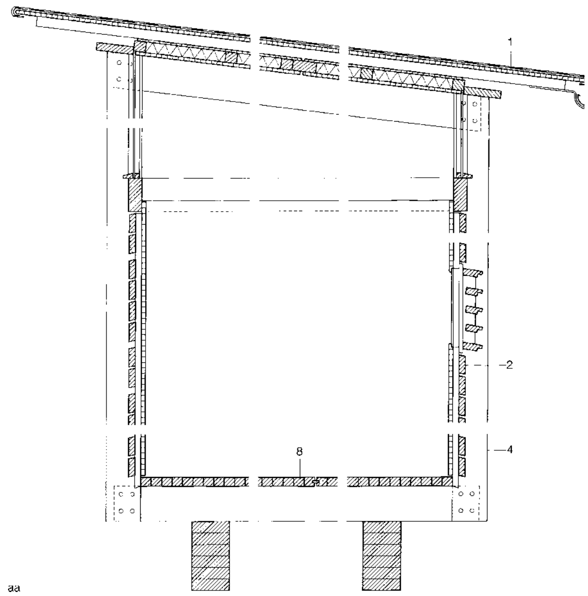
interior treated with wax and attached with dowels, vertical battens, and twice grooved exterior aspen boards. They are bevelled for water drainage and grooved to achieve stability from shrinkage and swelling. The roof system consists of a plywood and pine batten insulated panel, on top of which, are small pine rafters, plywood and bituminous sheet roofing. A gutter was added later along the front. The six foundation footings rest a meter and a half down below the frost line and are capped with precast elements which protrude over the ground level. A bed of insulation and aerated concrete gravel was prepared under the entire structure. Although the building may not be synonomous with the site where it sits, it displays artfully many new innovations in wood construction and the possibility of an ecological prefabrication.



Plan, detail and section



Interior view of sleeping cabin



5. HUITUKKA SAUNA

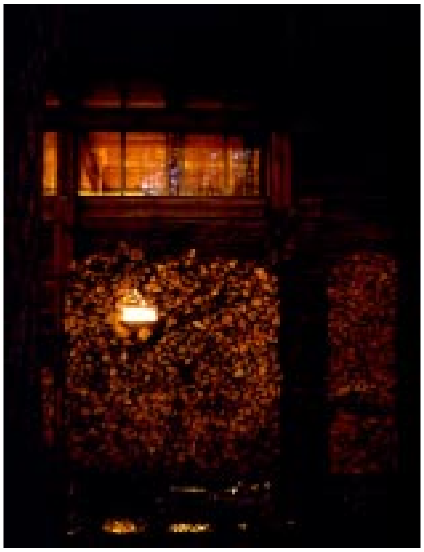
Georg Grotenfelt
Architect SAFA

Juva, Finland
1982

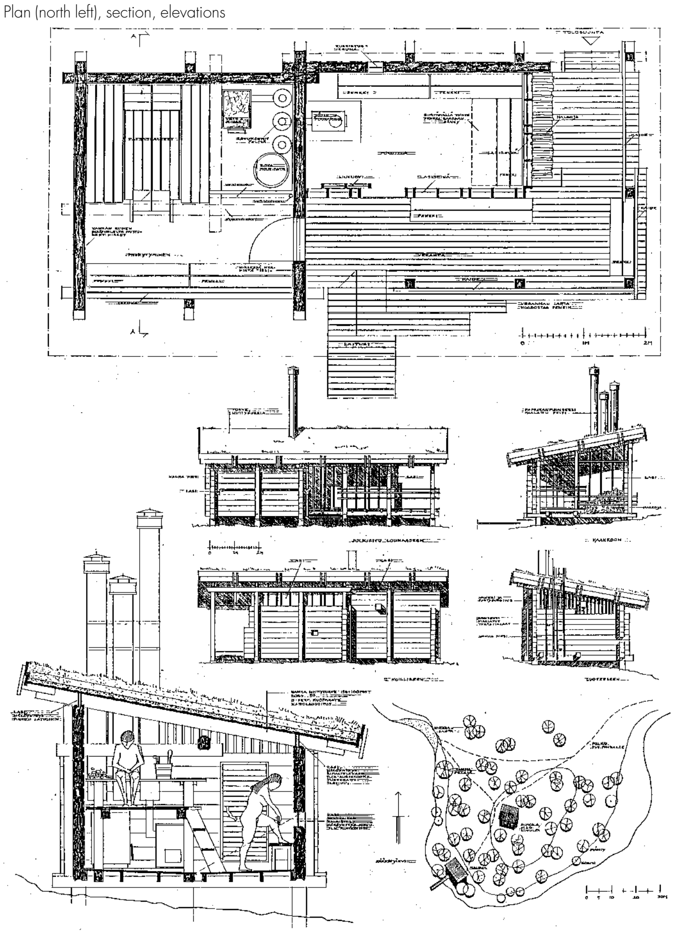
This lakeside sauna in the beautiful Savo landscape of eastern Finland combines century old building elements and modern construction principles in a harmonious union, that is characteristic of much of Georg Grotenfelt's work. He believes that architecture should be rooted in past traditions and modern architects should proceed with respect and humility.

For this sauna he designed for his family near a turn-of-the-century summer cottage, he used old logs from a nearby drying barn, that were compressed and blackened with smoke. The logs were stacked in the traditional way to form the sauna and the back wall of the dressing room. Small openings were made in the log construction, but the sauna, to Grotenfelt, is a dark and primitive place for cleaning the body and soul. Accordingly, it is designed in the old tradition of eastern Finland, with raised benches facing each other adjacent to a wood stove. The dressing room is a light and open space, using a modern frame construction and glass, with simple pine frames, infilled around the heavy timber roof. This room also has a wood stove and benches for sitting and changing. From here, one can enter the sauna or go out to the covered porch and proceed to the dock. The building is situated directly on the lake shore, so one can immediately leap into the lake after a sauna.

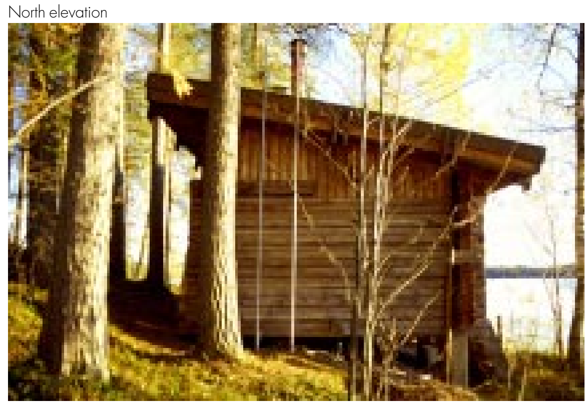
The building is supported on concrete piles and elevated above the ground. The floor timbers span the concrete and floor joists are then fixed above. The floor of the sauna drains to the center. The stacked logs form load-bearing sides to the sauna and are replaced by a post and beam structure over the porch and dressing room. The roof consists of heavy timber rafters, tongue and groove underbelly, and sod and grass above. The stove pipes are painted red to punctuate the landscape and the otherwise natural construction.



Plan (north left), section, elevations



North elevation

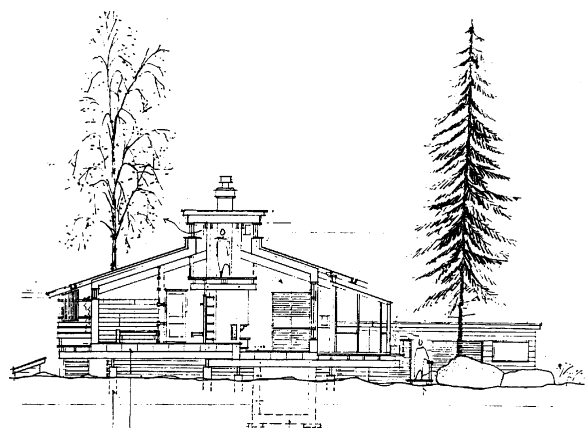


6. SUNDIAL HOUSE

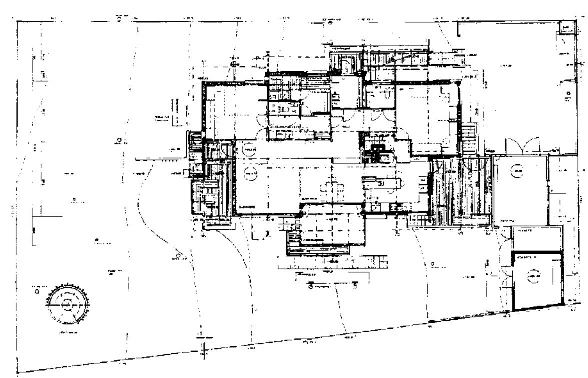
ARRAK
Architects
Hannu Kiiskilä
Harri Hagan

Jyväskylä
1987

The firm of Arrak was founded in 1976 by students of Tampere Technical University, during the time of the 1970s energy crisis and the abundance of massive concrete constructions. The team decided to base their architectural and construction designs on the use of wood: "Despite the wide use of wood, we thought that wood was generally underrated, and partly neglected, as an independent building material. In addition to the many good qualities of wood - domesticity, saving of energy and gravel ridges, repairability and healthiness, structural and cultural properties, natural dimensions - wood seemed to offer freedom in architectural expression. Furthermore, using wood correctly and with techniques that promote longevity still offers sufficient challenge and new things to learn."[43]



Plan and section



The Sundial House was commissioned in 1985 for a housing fair in the Kuokkolo area, just outside Jyväskylä. The purpose of the housing exhibition was to experiment in passive solar techniques and develop foundation solutions, industrial wood construction techniques, gluelam structures and floor structures. An additional goal for Arrak was to find lasting and weatherproof solutions for the wooden structure. The simple, one-floor, open-floor plan was designed to capture the daily movement of the sun as it passes from east to west. Thus, a variety of different sun rooms constructed of glass and sheltered wood terraces have been incorporated throughout the otherwise simple plan. The exception to the compact, well-functioning design, is an area of architectural delight, in the form of a second floor walkway, or lantern feature, that allows people an alternative experience of the space and clerestory light to filter into the main space.

The building sits on a southern slope facing a park, and has been lifted above the earth by concrete pillars and large gluelam beams. This ventilates the beams and also opens the underside of the house for storage and an earth cellar. The gluelams extend out from the house to form the supports for the decks. The earth cellar is also protected by a wood trellis that wraps the underside of the house and is hung from the first floor joists and the gluelams. The wall construction is meticulously ventilated, with tongue and groove siding and insulation layer separated by vertical battens and openly vented. The siding is carried up to the eave and the roof rafters penetrate out to the exterior. The major structure holding the main roof, as well as the lantern roof, however, are a series of gluelaminated post and beams, exposed on the interior. The roof, itself, sums up ARRAK's commitment to high quality and holistic wood construction: it is a type of overlapping board system impregnated with tar. Water drains down through channels into wooden gutters lined with galvanized steel.

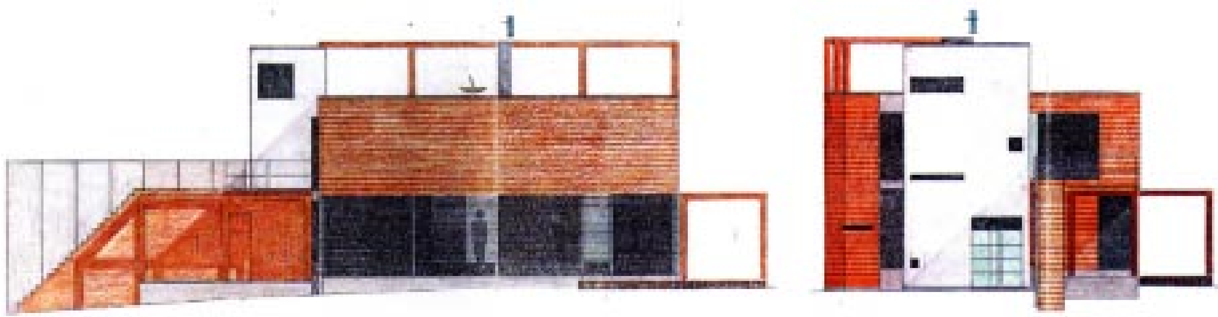

Lantern space

Northwest elevation


7. A HOUSE BY THE LAKE

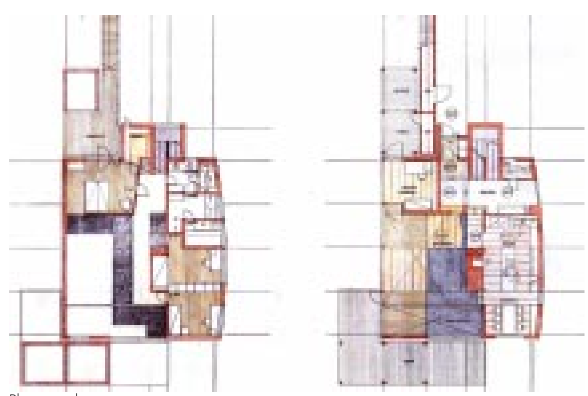
Ulla Vahtera
Lasse Vahtera
Architect Office
Vahtera LTD

Juva, Finland
1994



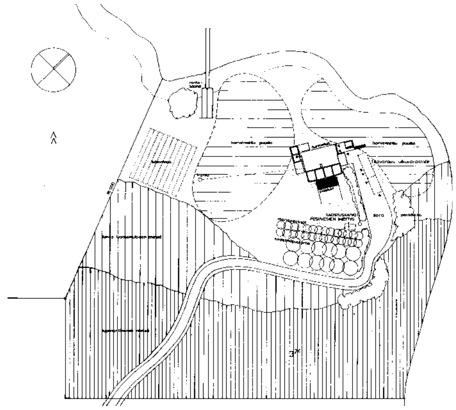
This lakeside house in eastern Finland is a manifestation of the client's interest in building ecologically. The clients, one a general contractor and the other an organic farming researcher, both wanted to live in a house compatible with a natural lifestyle and one where everyday tasks, such as composting and recycling, were easily taken care of and part of the design. Materials for the house were intended to be natural and only lightly processed, the construction and surface treatments non-poisonous, and the envelope breathable.

The house is situated on the southern shore of a lake which overlooks the main church of Juva. The architects, Ulla and Lasse Vahtera, positioned the building on a spruce covered cape to take advantage of prominent lake views in three directions and the southern exposure behind. The house gives the appearance of a wood box, with various projections and openings. It is organized on three main levels. The entrance is on the middle floor and is proximate to the circulation tower and the lavatory. Both the main lavatory and upper bedroom lavatory are stacked vertically above the compost room in the basement. All household and lavatory waste is composted and is sent directly to the compost room. The basement also houses a storage area, laundry and utility room, and a domestic entrance. The middle floor is the primary living area, with kitchen, living room, and study. The upper floor consists of three bedrooms, which are organized around the prominent double height space of the living room below. The circulation tower culminates with a small office, with access to the roof, which will be eventually become a garden terrace.

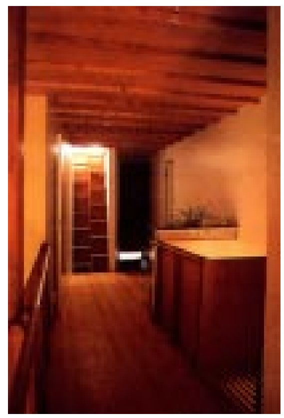


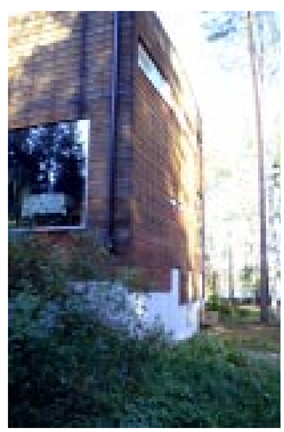
Plans, north up


East elevation



The external wall area is minimized by the near cubic form of the building. The walls are framed and insulated with recycled paper and applied to the cavities using compressed air. The external cladding is tar-covered siding, painted on clear, with the exception of the stair tower, which is finished with white stucco. The eastern side curves slightly and the western side is predominately glazed on the middle floor. Thus, the upper wall above the glass face is held by solid pine columns. This post and beam system also supports the third floor and continues outside to define the deck areas. The interior surfaces of the exterior walls are a lightly processed plywood and treated with wax. The interior partition walls and bottom floor ceilings are framed and clad in gypsum board and painted with natural pigments and milk-based paint. Flooring is mainly wide pine boarding. To support the roof, factory-made wooden web beams were cut to size at a nearby factory and supplied complete with location markings.



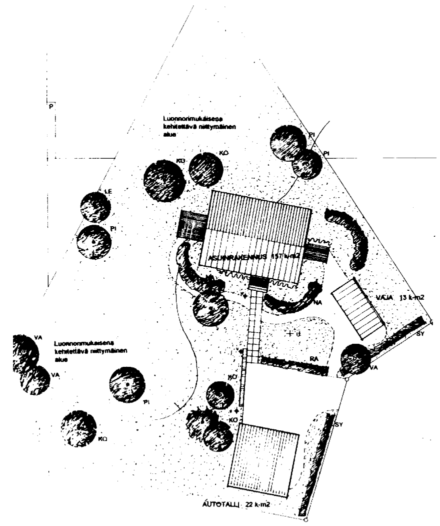


Thermal energy for floor heating is provided by a water-circulating pump, which draws from the bottom of the lake. Since the temperature of the earth temperature is warmer than the surface temperature, water circulates with a non-freezing chemical below the earth, is warmed several degrees and then returns to the surface under the floor to provide heat. A large and efficient brick fireplace is also used for space heating, as well as cooking. On the south side, there is a major glazed area which serves as a conservatory of solar heat. The sun's energy is let in and stored in the concrete and stone floor, from which hot air can be circulated throughout the house. With the initiative of the client and just a few simple design decisions, electric energy has been reduced substantially in this fine wood house.

8. SILVA HOUSE

Architect Office 6B
Pekka Heikkinen
Architect SAFA

Ylöjärvi, Finland
1996

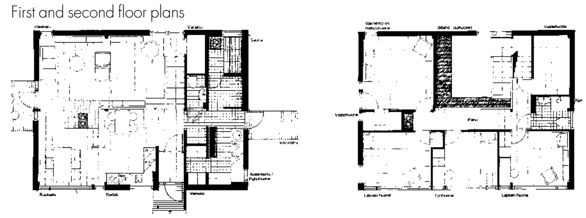


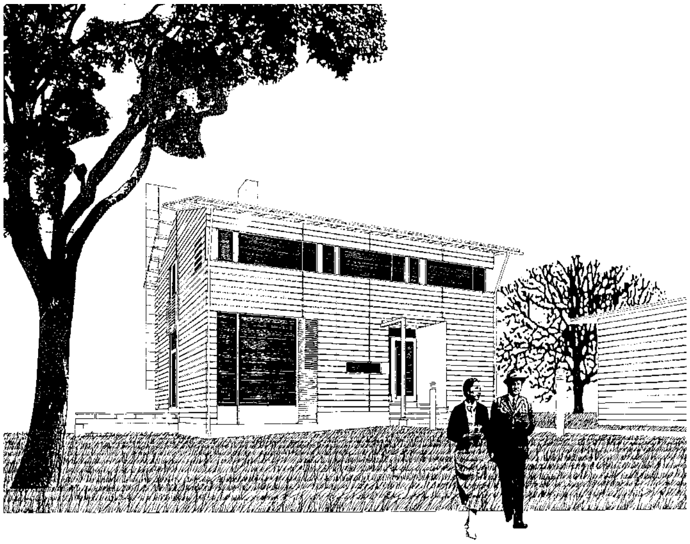
The Silva House was designed for a family of four living in Ylöjärvi and built in the spring of 1996. The house was an experimental project sponsored jointly by Puuinfo Oy (Finnish wood and timber society) and the Department of Architecture at the Helsinki University of Technology for the annual housing fair. The house is modelled after a tradition Finnish house, with a simple rectilinear plan centered around a fireplace, yet modern and innovative in many subtle ways.

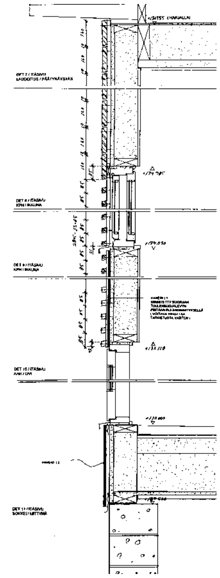
The interior spaces are divided on two levels: the main living spaces and kitchen downstairs near the fireplace and bedrooms upstairs. The glue-laminated post and beam structural system opens the space for larger windows and allows a double height atrium and a strong visible connection between upstairs and downstairs. The washing facilities have been consolidated in a 'wet' block on the eastern end to isolate moisture and facilitate plumbing.

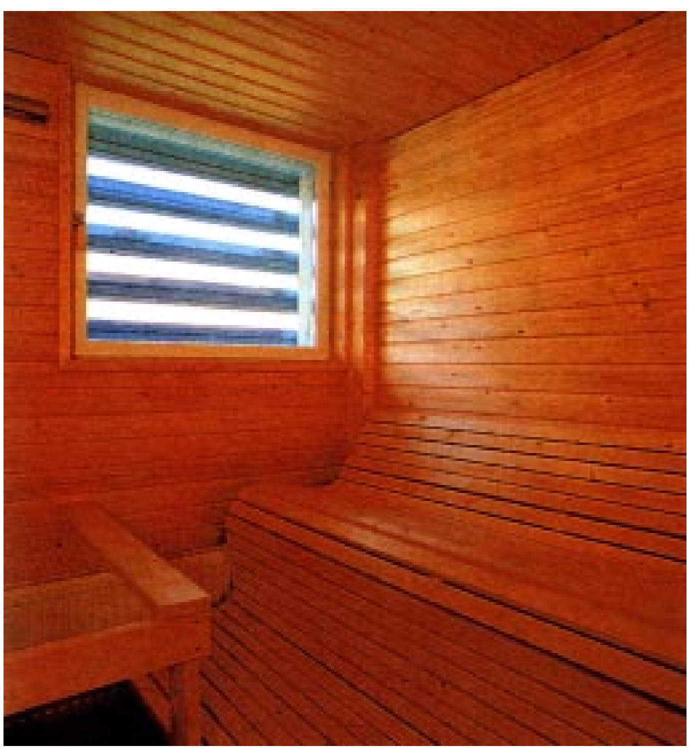
The glue-laminated frame, which is exposed on the interior, has been prefabricated, but uses only wood joint components. Almost all the interior surface materials are wood and are predominantly tongue-and-groove pine boarding treated with light brown wax. The floors makes use of the structural and aesthetic properties of plywood panels. The exterior skin is meticulously defined with tapered and spaced horizontal board siding and some areas around windows with lattice work over painted plywood. This provides a smooth backdrop for shadows on sunny days. The wall systems have been built as four individual panels to avoid on-site waste and the panels were erected with scaffolding on the site in two days, saving time and energy. Rooted in a vernacular form, but innovative in detail, construction and space, the Silva House is proof that modern architects need not be stiffled by tradition.

First and second floor plans





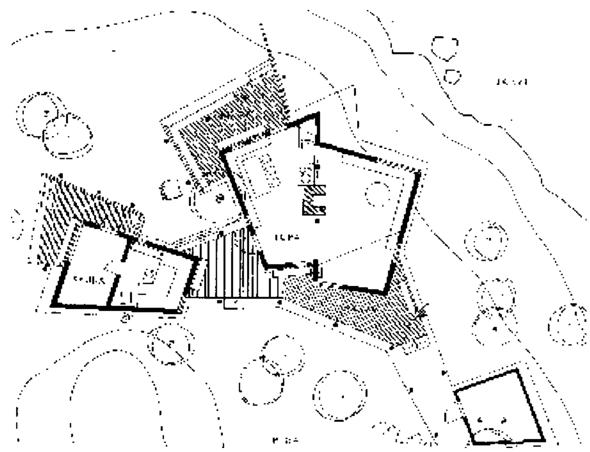




9. ARARAT CABIN

Georg Grotenfelt
Architect SAFA

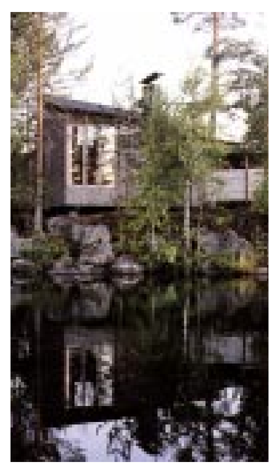
Juva, Finland
1986



This small cabin grouping was designed for a local farmers union as a summer retreat and meeting place. It is situated on a rocky and narrow peninsula jutting into a lake near Juva. For along time the union had been asking for land from the municipal authorities and were finally granted this narrow strip. They commissioned Georg Grotenfelt, a native of Juva, to design it with a very small budget. Grotenfelt worked along side volunteer carpenters to achieve this simple, yet poetic assemblage of small wood structures.

The buildings consist of a sauna, a main dining cabin, a sleeping cabin, and an outhouse. They are formally unified with an open sloping roof and decks, supported by double beams and columns. The beams are bolted through the column, which is painted bright red to accent the construction. The red columns angle at different degrees and protrude above the roof to form their own dynamic element in the landscape. The building forms shift and jog around trees and accommodate the rocky topography. The backs of each mass are angled slightly and have openings at the tops to allow light to penetrate deep into the space. Grotenfelt's windows are typically square and rough framed, with a drip edge at the top, instead of the bottom.

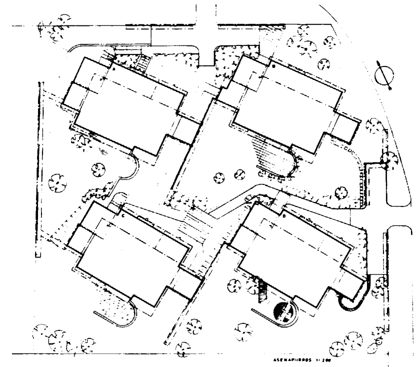
The building is raised up on wood beams, which sit on concrete footings anchored to the rock below. The wall structure is framed, insulataed and clad on the exterior with broad vertical boards stained grey. The interior is a simple pine tongue and groove finish. The roof consists of major structural rafters, with an insulated cavity, which extend slightly into the open air and are painted dark blue. On top of that are square battens, plywood, and felt roofing, which is painted under the eave in light sky-blue.



10. KUTTERITIE 2 HOUSING

ARRAK
Architects
Esko Rautiola

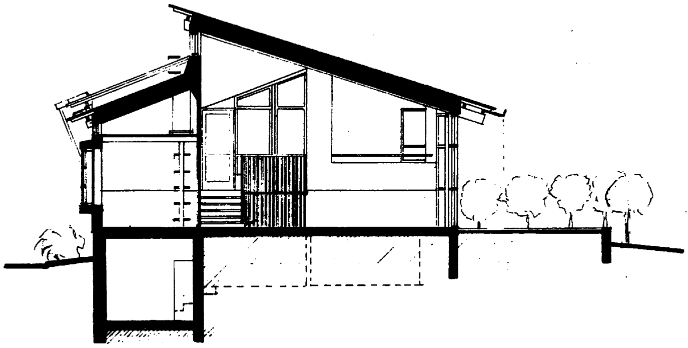
Four Units
1246.5 S.F. / Unit
Helsinki, Finland
1993



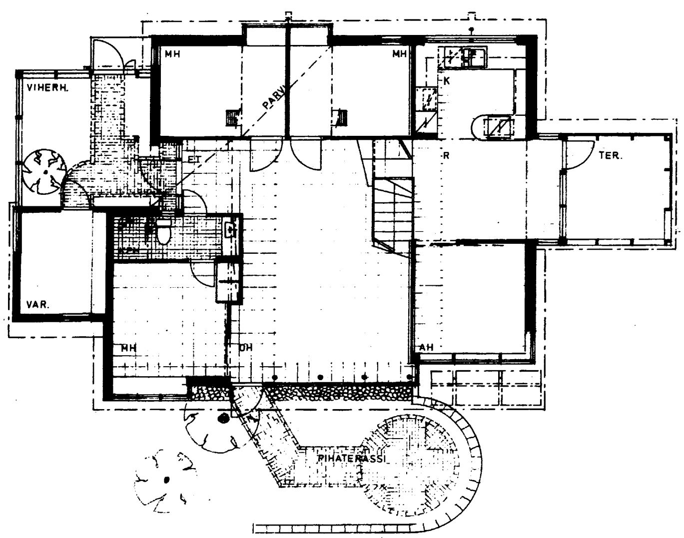
The planning for this project began in 1990, when the city of Helsinki invited families to apply for some dispersed plots of land intended for group development. This particular plot was rather small and challenging in terms of its sloping topography, but successfully accommodated four detached houses, each with their own yard and privacy. All of the houses are identical except for the interior fittings and size of the cellars, although they are painted different colors and function autonomously. The landscaping defines and gives privacy to each yard, yet harmonizes the grouping with an armature of wood trellises, pergolas, stone terraces, and walkways between the houses.

The houses fit against the slope and are split-level, with a sauna and utility room on the ground floor and the dining and one extra room above. The entrance floor contains the kitchen, bedrooms, bathroom, and living room. The entrance, itself, is an open, glazed greenhouse space. The plans are largely open and flexible, and with ample use of glass and high cathedral ceilings, the houses are well-lit and spacious.

The foundations are laid with concrete blocks and the walls framed and clad with broad horizontal spruce boards painted in the blues and greens of the coastal region. The interior finishes are largely wood or gypsum board. The roof is held partially by gluelam beams and is sloped and lit by clerestory lighting on the high end. The floors are made of concrete under thick pine planks with a ground clearance. The wood structure in the roof and interiors is articulately expressed, in a way typical of the Arrak group. The end of each houses terminates with a wood trellis sheltered deck. The budget for the project was rather low and the result is high quality, high-density housing, with all the benefits of single-family dwelling, in a location which could have been used for just one single-family house.



Plan and section of one unit



the future

We have won great advances by spending a huge proportion of the natural capital - the principal on which the world depends. But maintaining biological diversity and using it to help win a sustainable world will be impossible if inappropriate technologies are the rule, levels of consumption remain intolerably high and human population continues to grow. . . Humans use and waste almost half of all the natural products of photosynthesis on land, and 55% of the accessible fresh water. On top of that, our polluting activities have completely changed the world, including the atmosphere. Over the last 50 years, specifically, we've wasted about 25% of the world's topsoil, and lost about 20% of our agricultural lands to salinization, desertification, erosion, urban sprawl and the like. So we're feeding 3.5 billion extra people on 80% of the land we had 50 years ago. Put together all these figures and you can see that our style of living is by no means sustainable. . . If you view the human race as if it is floating down a river, then we're riding the rapids. We must put our oars in the water, take out our poles and chart a sustainable course.

Botanist Peter Raven[44]

As we near the end of this millennium, it is a natural to reflect on this past century and also to speculate about the future. While the 20th century has raised the quality of our lives, comforts and opportunities, at least in industrialized nations, we can now see in the millennial twilight, that the technological innovations and rapid industrial progress that we so enthusiastically embraced earlier in the century have lead to massive environmental damages that now ironically threaten our quality of life. Hurricanes, forest fires, el niño, la niña, and the floods that are beginning to plague the globe point to the future like ancient prophecies of doomsday. 25% of mammals, 12.5% of plants, and 10% of trees today are all threatened with extinction. In 30 years, we are expected to lose 25% of our five to seven million animal species (that's 17,000 - 35,000 a year). Scientists are just beginning to understand the intricate life-support web of biodiversity that maintains potable water, fresh air and atmospheric radiation screens. The U.N. predicts the global population to swell to nine billion in 50 years. Today's global corporate expenditures of $24 trillion is expected to quintuple in 50 years, and least-developed nations only share .3% of world trade today. While the population and economy is growing, renewable resources are treated as expendable income and are becoming more and more scarce. It's easy to imagine crisis situations, especially in undeveloped nations, where rapid urbanization and land and fresh water shortages will lead to inevitable conflict.[45]

The attitudes and values that permit the company Honka to export a pre-designed, pre-packaged Finnish polar pine log house half way across the world to Bainbridge Island, Seattle (another timber-based region) and that allow Bill Gates to build a 50 million, 40,000 square foot single-family house are sure indicators of our misguided and destructive direction. Rampant economic growth has lead to excesses in global corporate capitalism that result in environmental degradation. It seems that the opening of global markets creates situations where profit-seeking unaccountable entities replace democratic governments and social and environmental concerns are not considered. In the future, we must try to strike a balance between trade and economic interests with equally rigorous demands on social and environmental values.

Co-operation for a sustainable future needs to come on many different levels: from governments and inter-government organizations like the United Nations and the World Conservation Union, from the private sector (some companies like SC Johnson and Volkswagen have made voluntary efforts toward sustainability), and from regional and local authorities and of course, individuals. The role of education will be an important catalyst for change (it is disappointing that most architecture schools today don't provide mandatory courses on materials and the impacts of the building sector on the environment). Scientific knowledge with specific remedies can move the environmental movement into the mainstream to become a bipartisan concern and not just the realm of left-wing idealists. Political buzzwords, often laden with empty rhetoric, like 'sustainability' and 'environmentally-friendly' need to be defined with hard facts and implemented with clear strategies and goals.

For the building sector this means a joint effort between forest industries, product manufacturers, regional planners and city officials, architects, and builders. We, of course need to protect our remaining old growth forests and forest industries need to ensure reforestation and sensitive cutting and extraction of logs. Product manufacturers need new lines of natural building products and also reduce energy consumption in their production processes. Regional planners and cities need to increase density and infill urban areas to reduce transportation and urban sprawl, as well as plan and put caps on rural development. Architects and builders, again, need to design and build naturally and energy efficiently. Finland, in particular, due to its subartic climate and long distances between urban centers needs to concentrate on energy reduction.[46]

The case studies presented here are all indicators of a positive new direction in single-family housing in Finland. They demonstrate in different ways that sustainable wood construction can merge with quality architecture. Although they are isolated cases and far from the norm in single-family housing, they do represent, in terms of modesty and cost, models that more people could aspire and a potential for the standard and not the exception in housing.

It is possible to imagine a scenario in say, 200 years, where hydrocarbon dependence has been replaced with clean, quiet renewable energy, where mineral resources are no longer extracted and recycling and reuse provide all the materials for industrial products, where urban centers are contained and populations have stabilized, with necessary agricultural lands to provide food and necessary forests to ensure biodiversty and clean air and water, and where the house is a fully natural and self-sustained product. . . But do we need to wait for 200 years to enjoy this more pleasant world? Why not get started right now?

interview with georg grotenfelt

Architect SAFA

WW: What is your opinion on wood as a building material, in particular, as an 'ecological' building material?

GG: Yes, I am interested in the subject and have mentioned it in some of my articles. Wood is an insulating material, which retains heat, and with wood it is possible to create visible, load-bearing post and beams. This is very important for the architecture, both inside and outside. The beams can be visible and can also go from inside to outside, without any cold bridges. You can have the beams go through a wall, for example, and be supported by columns on the outside. I also designed a wooden villa, which is standing on wood pillars. There is an air space between the ground and the floor, so the landscape can naturally come underneath. The pillars come through the building and support the roof, so that's another possibility. But, in general, wood feels very 'homey' and cosy for people and it has good acoustics. It is also beautiful and it becomes a symbol of time, because when you use it, it leaves your imprint and marks. It contrasts with concrete, plastics, and other modern materials that are always brand new and don't age in a nice way. Wood does, and this is very important. It is good for single-family homes, where you don't need long spans. So, there are many advantages.

WW: The timber industry promotes many new processed forms of timber, such as gluelam beams and new chipboards. Do you think we should embrace these new technologies or use more traditional techniques?

GG: I think in small-scale projects, you should use more traditional ways of treating wood. It is more ecological because one or two strong men can handle the entire project. If you need to have longer spans, it is better to make the beam out of many small pieces of wood, rather than industrially producing something big, where you expend a lot of energy making it and then transporting it. And, you must use chemicals and glue. You can easily just use small pieces and join them together. For example, I designed a guest house with a sod roof, which is quite heavy. There were only two load-bearing beams, one in front, and one behind. So, the wall can go anywhere and also there were light glass walls and windows. These load-bearing lines had a lot of weight and the pillars are made out of four very narrow wood pillars joined together, like Alvar Aalto did in the sauna at the Villa Mairea, with bamboo and rope. Anyway, by joining four small members, it becomes even stronger than one larger one. It is understandable and useful on the building site, where you have just two people. The Japanese are very skilled in small-scale wood houses and in their treatment of rafters and sliding doors and windows. The have inherited these techniques over generations and hundreds of years, with natural joining techniques without nails.

WW: Can you describe your 'wooden eco-house' of the future that you propose in your article on natural building?

GG: It will be a natural building that will look quite new, because of the possibilities of large glass walls that will face south, with maybe a green house and plants growing. We had a course on this subject at the university, where the house is trying to protect itself from the north and from wind and everything opens toward the south, with a heavy roof, eaves, and pergolas or screens from the sun. Vines also could be used as a natural screen in the summer, and whose leaves will fall in the winter. All the ingredients are there and have been for hundreds of years, but we need to re-evaluate everything and not spend so much time worrying about new technologies.

WW: In the U.S., many people live in the city and have a second home. Many of these second homes are oversized, cheaply constructed and prefabricated, and are not even designed by architects. They are placed in beautiful landscapes, such as on the Oregon coast where I'm doing my thesis, and spoil their location with 'suburban-style' development.

GG: It's a problem, because many good architects don't go into the field of prefabricated housing. It then becomes a kind of fashion, with different 'styles', like cloths, and people try to express their personality and architecture should not be like that. Of course, there will be people who need their summer cottages, as we do in Finland, because most people have their origin in the countryside and they will want to go back there. Small wood communities is another good idea, if you can work in the countryside or commute to work. There have been some ideas in the U.S. on this subject. Frank Lloyd Wright was one, who tried to live in the country in Arizona and Talisian East in Wisconsin, surrounded by people interested in architecture and also agriculture. He also developed a type of prefabricated house called the Usonian house.

WW: Bill Mitchell is the dean of MIT, and has recently published a book about the technology/ information age of the future and its impact in society and development. With the possibilities of 'cyber-commuting' and internet business, smaller communities can be independent without being isolated, and thus use less energy and time in transportation. This is an advantage toward developing a wooden 'eco-house' community.

GG: Yes, exactly, and that's certainly for the future, but that's even possible within the next ten years.

WW: In the wall structure of this wood 'eco-house', you suggest using natural insulation techniques, such as 'celluwool' and sawdust panels, as opposed to artificial products.

GG: I think this is very important. There are a lot of new organic materials, you can also use sod from the marshes. Logs, themselves, act as insulation. I gave a lecture at Yellowstone Park several years ago on log building. There was another Finn there who had developed a system of prefabricated logs, which are used in such a way as to use the natural form of the log. Because the logs are thinner on one end, you alternate sides so it stacks evenly. The section was rectangular, with the bottom carved out with his special machine, and you can use the maximum length of each log. He had also developed a system combining post and beams, with logs as infill panels. There is always a problem of logs shrinking and sinking because of their own weight and the weight of the roof, so this combination is very good. The logs act as insulation and also store heat. We had this system in Käpyla in the 1920s in this beautiful wooded area on the way to the airport. They had a type of sawdust panel on the interior for more insulation and board and bat vertical siding on the exterior.

WW: I wonder if you could discuss your design process. When you come to a new site, for example, how do decide where and how to place a human artefact in the landscape?

GG: I think you almost feel it intuitively. The solutions should arise from the site before you even begin drawings and models. Architecture is a process and has a dimension of time. This dimension of time can only experienced by walking on the site and experiencing the approach to it. The sun on the site, the lake, the field, the wind, and all these things will factor in to how to place the building on the site. You will know it intuitively and there will be no doubt about where to place the house when you have been sensing the tensions and different possibilities of the site. When you walk the site with the client they will tell you where they like to sit, or fish, and that's the most important moment and also the most inspiring. You should have no preconceived ideas about what it should look like, because everything should come from the site. Traditionally, this was how people placed their buildings on the land. They had no architectural training, but they knew the site and had some technical skills learned from local carpenters or from their fathers. I made a film about a group of houses from Niemelä, which were taken to Saurasaari in 1909. It was the first group of houses taken to the open air museum and very much admired by Alvar Aalto.

WW: If the house is a product of the site, then should it also be constructed of materials from the site?

GG: Yes, whenever possible. I designed a house where we brought a large circular saw on to the site. We rough-sawed the boards right there and used them both on the exterior and interior. The carpenters also took the timbers from the local forest and cut them during the full moon of mid-winter.

WW: In your writings, you have mentioned some Asian philosophers and also Japanese builders that you admire.

GG: Yes, they have been very important for me. I studied Japanese building in Kyoto and looked at different farmhouses around the country. But of course also the Finnish traditional farmhouses have been influential for me. There is fantastic museum near Jyväskylä that you should visit named Keski Suomen Museo that depicts some Finnish vernacular...

interview with seppo häkli

Architect SAFA
HÄKLI
Arkkitehtitoismisto Ky

WW: How would you describe the current situation in Finland regarding single-family housing?

SH: The problem in Finland, is that people are moving to cities and we haven't built very many small houses and now people would like to live in small houses, but there is not the space in cities anymore. Building has become very expensive because of the concrete and having decent insulation and I hope small houses are a solution. Nowadays, living is so constrictive in cities.

WW: Is that why most Finnish people have vacation cabins?

SH: Yes, it is very typical that in Finland, people have a house in the city and a cottage in the country. That is one solution.

WW: So people can work in the city and then also satisfy their need for nature and have a place of repose. But, maybe another solution is to have smaller communities, but, of course, people are drawn to the city for other reasons and are not necessarily seeking a high quality of life. What do you think of other possible housing solutions, similar to what you have done with row housing?

SH: This is not a bad ecological solution in south Finland, with four units in a single-storey building, where every family has a garden, green house, and deck.

WW: What is the overall urban plan for a project like this and what are the city guidelines?

SH: The city had some ideas for this province and they asked us to draw up some sketches. Then, we came up with a land-use plan. It took about three years and there were some existing buildings, such as this shop, but the problem was that there was one guy who didn't want the project. This is a democracy in Finland and once you make a land-use plan, any neighbour can complain and block the project.

WW: But this was very modest compared to many large apartment blocks.

SH: Yes, and now when we are trying to build wood houses, it is a great pity, because many wood buildings are as big as concrete ones, and they only change is that they are made of wood. But, I think there should be something in between houses and three story apartments, with maybe six families, which would be very easy to build from wood.

WW: There has been a lot of new processed wood products, such as gluelam beams, that enable this type of construction, and new wood treatments. Do you think we should embrace these new products or go back to more vernacular construction techniques and use wild wood?

SH: There are many different ways of building. When I visited your country, I was eager to see in Seattle how simple the one, two, and three story buildings were and that you were using just one size of wood and then added more pieces when more structure was needed. I thought this was a simple and easy way to build and ecological because you don't dry and glue the wood. It's best to use wood in its' base form and not use 'designed' products. The sauna house was very ecological because we used wild timber from the nearby forest and used only are hands to build. In other constructions, we need floor beams that are 350 cm deep and many layers of material and plywood and it becomes very complicated. With concrete, it is cheaper; you only have to pour beams and a slab, and add a carpet, and you have sufficient mass. In Switzerland, they have made floors with logs, directly from the forest, and it is cheap and doesn't involve any processing.

WW: In the U.S., there is a lot of debate about the sustainability of our forestry practice. In most cases, the industry clear-cuts entire sections of forest, causing erosion and destruction of habitat. A better way is to selectively cut only certain trees and I'm not sure how it is in Finland.

SH: It's the same as your country: they clear sections, then reforest them. There are only a few large timber companies and there was a controversy recently where it was discovered that one wasn't replanting. In Finland, the large saw mills, plywood, and gluelam companies mostly export their products to Europe. Ten or fifteen years ago, we had many different types of plywood. Now, 80% is mass-produced from spruce and only a small portion from pine and it goes to Europe.

WW: In the US, we have the preconception that everything in Finland is made from wood. I was surprised when I arrived in Helsinki, that hardly anything in the city was wood.

SH: Yes, wood was pretty much finished in the 50s. During the Second World War, we had to industrialize and many people moved to the cities to work and so we had to use concrete for these large buildings. We built apartments and factories and they were very expensive to build and now we are forced to use them. Even today, building codes are very strict in regard to fire and noise and it is still easier to build with concrete. We learn some new techniques from Switzerland and your country.

WW: We use a lot of wood in the Northwest even in three storey apartment buildings. But, most are not well built and begin to deteriorate after 20 years. Problems occur when the wall cavity doesn't vent properly and the studs rot out. Perhaps, there should be a return to naturally breathing walls and use of natural insulation, but our codes are very strict and don't encourage any progress in this area.

SH: Yes, you could use massive timbers and pack it with natural insulation, and it would last 300 years and you would just need to replace the facade every 50 years. There are many new wood and paper product insulation, such as ECOVILLA, that are quite good. In the old days, we used sawdust and tar paper, but it was quite cold. Then, we had problems with water condensing in the wall cavity, because there is such a huge difference from the inside to outside wall temperature. Engineers suggested a plastic layer, but we are still not sure what is the best and how wide the cavity should be.

WW: In the Innukka Sauna building, did the solid stacked timbers act as insulation?

SH: It was only wood. I built it for my parents on the site of an old smoke sauna that had burned down. My parents asked me to build a new one in a hurry, which was about 15 feet, and we made it entirely of logs. We made two small frames from the logs we cut from the forest. They were about 15 cm thick and we used hand tools and axes to carve the surfaces. The surface was very beautiful when it was light and now it is darker. We used tar-soaked wool between the logs. First you draw a chalk line down the timber and cut down to the line so each log is straight. Then you add the material. It is a very slow process and we maybe cut three logs a day.

WW: How did you find the carpenter?

SH: His father was a very famous carpenter in the area and he was very eager to build like his father in the old way.

WW: And, how are the corners made?

SH: They are cut with a chain saw and above is a different way because I wanted to show both ways of joining. I wanted to show the local tradition of the area, by using the local logs and construction techniques. The back part is a more modern construction frame with glass recessed in the tongue and groove siding, which is uninsulated. The frame roof, spaced 60 cm o.c. on rafters with a tongue and groove deck, rests on a beam that sits above the back part on a threaded steel rod with bolts. Because the wood studs will shrink and swell, every summer I must adjusts the bolts. The sauna and living room are sealed at the roof and insulated.

WW: What is the solar orientation and was that a determinant in the design?

SH: The sun was designed to come into the courtyard. My father is handicapped, and he will spend his summers here so we needed to accommodate his wheel chair and access into the courtyard and into the building openings.

WW: What about other practicalities, such as water and going to the bathroom?

SH: We use the water directly from the lake. But there is also a spring for drinking water. We have an outhouse.

WW: How was the foundation made?

SH: It was difficult because we were so close to the water. In this part of Finland the frost line is about 150 cm, and we couldn't use any machines, since we were on an island, so we had to dig down and put insulation down and then pour aerated concrete in four layers for the walls. Then, there is a 40 cm thick basement slab. We built the frame away from the site in the winter, but we poured the concrete in the spring and then attached the first timbers with steel and bolts.

notes

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