€ 18,00

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A collaboration programme for the preservation of the traditional Karelian timber architecture

Wooden Architecture in Karelia

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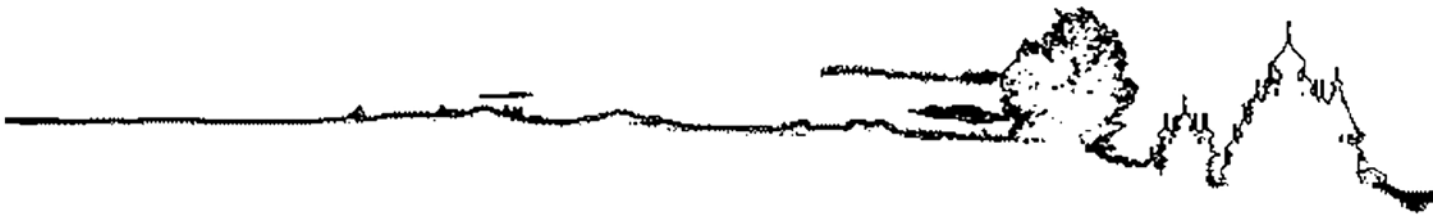

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This book is printed with the contribution of "Centro Restauri Piacenti" and "G.E.A.L. Conservazione Lapidei Legno"

The scientific committee thanks for the contributions given by the Municipality of Lastra a Signa,
The Association Villa Caruso, Tuscany Promotion and the Municipality of Montepulciano
and Massa Martana for the activities connected to the seminar

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www.edifir.it

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Picture lithography, layout and printing
Pacini Editore Industrie Grafiche – Ospedaletto (Pisa)

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ISBN 978-88-7970-326-0

I° International Conference and Seminar

Wooden Architecture in Karelia

A collaboration programme for the preservation of the traditional Karelian timber architecture

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The Karelian wooden architecture is recognized as an object of great peculiarity and interest on an international scale. The study days are addressed to the universities and the institutions involved into the project and they set the promotion of research activities launched in this country as a target. The aim of the operation is to encourage the relations, not only the cultural ones, between Italy, Finland, Ukraine, and Karelia bringing into contact operators of this field through a threading of meetings of which the present represents one of the first opportunities.

The gained scientific experiences about topics liked to the recovery, the rehabilitation and the improvement of historical centres, with intensive activities of research and analyse, produced a know-how which is highly valuable at the present moment; especially for the use of specific applications of the new technologies, for the monitoring and for the data-management useful for the restoration, the urban planning and management in sensitive areas, like urban centres of historical and environmental interest. In particular the Karelian territory is configured as a dense area of elements which need a high attention in order to crease the value of the territory itself and its anthropic activities.

This conference will contribute and explore the topic about contributing to the value of this territory beside providing a documentary support which is able to describe the activities carried out until the present days, also into the architectural and environmental research.

The contributions, presented by the researchers of the participant countries, are related to the following themes:

- Stories and reports about Karelia;
- Tourism resource between Eastern countries;
- Protection and analyse of the lived systems in Karelia;
- Timber architecture in Karelia;
- Experiences of other European Countries.

The volume collects the records of proceedings presented during the study days, which took place at Villa Bellosguardo Caruso in the municipality of Lastra a Signa near Florence and establishes the starting basis for the development of an international cooperation programme regarding the analysis and valorization of the wooden architecture.

Stefano Bertocci
Sandro Parrinello

Stefano Bertocci

Was born in Florence on April 29th 1957. After completing his education in his native city, he remained in Florence where he graduated in Architecture in 1984. He took part in the Italian architectural survey projects at Petra, Jordan, and has also conducted the field trips of the Archaeological Specialisation. He directed the project "The Architectural Survey of the Perimeter Walls at Iasos in Caria" (Turkey) and the project "Filing the Old Town Centre of Montepulciano". He is a qualified associate professor at the University of Florence in the Architectural Planning Department, and teaches Architectural Survey.

Wooden architecture. Continuity of a building tradition

Timber is a construction material and belongs to a building tradition that is often neglected, but that has ancient origins and was even used before the stone constructions and has continued to develop in both directions, often opposite, but sometimes even integrated to the recent building systems.
There are wooden buildings all over the globe and these establish an extremely important heritage, especially considered through the analyse of its constructions analogies, which seems to put in evidence a deep connection that has its origin in the architectural comprehension and in the meaning of the building action.

Деревянная архитектура. Строительная традиция с преемственностью во времени

Дерево является строительным материалом и принадлежит строительной традиции, которая часто пренебрегается, но оно имеет древнее происхождение, и использовалось даже ранее каменного строительства, и его использование продолжает развиваться в обоих направлениях, часто противоположных, но иногда даже интегрируется в современные строительные системы. Существуют деревянные постройки во всем мире, которые составляют очень важное наследие, особенно с точки зрения анализа их конструкционных аналогов, что заставляет сделать вывод о глубокой связи, имеющей свое происхождение в архитектурном понимании и в значении акта зодчества.

Puuarkkitehtuuri. Rakennusperinteen jatkuvuus

Puu on rakennusmateriaali ja on osa rakennusperinnettä jota usein väheksytään, mutta sillä on muinainen alkuperä ja sitä on käytetty jo ennen kivirakentamista. Sen käyttö kehittyy kummassakin suunnassa, joskus se on ristiriitaista, mutta joskus se integroituu myös nykyaikaisiin rakennusjärjestelmiin.
Kaikkiaalla maailmalla on olemassa puurakennuksia, jotka ovat osa tärkeätä perintöä, erityisesti niiden rakenneanalogien analyysin kannalta, mistä voi tehdä johtopäätöksen syvästä yhteydestä, jonka alkuperä on rakennustoiminnan merkityksessä ja arkkitehtonisessa ymmärryksessä.

L'architettura del legno. Continuità temporale della tradizione costruttiva

Il legno è un materiale da costruzione che sembra appartenere ad una tradizione costruttiva spesso trascurata, ma che ha origini più antiche rispetto alla muratura e che ha continuato a prosperare spesso in antitesi ed a volte integrandosi con i più recenti sistemi costruttivi. Esempi di architetture lignee sono presenti in tutto il globo e costituiscono un patrimonio estremamente importante specialmente se considerato attraverso l'analisi delle analogie costruttive che sembrano evidenziare un legame profondo che ha origine nella comprensione dell'architettura e nel significato del costruire.

Wooden architecture. Continuity of a Building Tradition

Stefano Bertocci

1. Fresco's detail from Master Boemo (end of XIV sec.) in the castle of Buonconsiglio in Trento

"Solomon built the house with cedar wood from the forest of Lebanon. It was supported by four rows of cedar columns and the beams supported by these were also of cedar wood. The chambers were covered with cedar planks, and all the square doors had cedar panels. The ceilings were covered by cypress planks [...] all was of wood, there was no trace whatsoever of stone" [Bible, Kings 6,7]

Wood is a construction material which belongs to an often neglected building tradition which, along with structures in raw clay, has much older origins than masonry and which has continued to prosper, sometimes in antithesis to but more often integrated with, more recent construction systems. Wooden architecture represents an alternative building tradition which made use of a construction material often considered inferior merely because different or poorer or less durable than masonry, which has its own continuity in the course of man's history, developing poor or vernacular architecture or, as happened more often, complementing the construction systems of masonry architecture.

"Wood was almost certainly the first material to be used in architecture; with it man built his first shelters and subsequently the systems of joinery used in wooden buildings acted as models for buildings in masonry [...]. Today it is hard to believe that wooden architecture was widespread throughout the world, but even at the beginning of the XIX century, in cities like Strasbourg, Rouen and New York, the number of wooden buildings equalled those in masonry, while in Moscow, Bangkok and Beijing they exceeded them. At that time wood was still the most widely used construction material in western and northern central Europe, in North America, south-east Asia and in Japan"

Wood as a building material was widely used in relation to the geo-climatic areas of the earth and especially to the disposition of the various types of forest areas which originally extended in horizontal bands: from the boreal forest right below the polar circle to the forests of deciduous trees in the more temperate zones, as far as the tropical pluvial forests.

The Neolithic revolution, despite occurring over the space of two millenniums, must have changed the situation of the ancient forest considerably. Helbig imagined the first human settlements in the prehistoric Po valley thus: "at the time in which these villages grew up somebody with a bird's eye view of the plains around the Po valley would have seen a landscape covered mainly in forest. Within the mass of forest in many places, and especially around the water courses, he would have seen clearings in the form of lighter squares on a dark background; within each clearing a village of pile dwellings with yellow straw and mud huts and just around the village fields of cereals [...] all enclosed by the green mass of the forest".
In this process of anthropisation of the landscape fire played a fundamental role given that it also provided the potassium to fertilise the virgin earth. But as well as fire, the axe, initially made of stone and later of copper or bronze, contributed to the reduction of the primordial woodland: apart from the timber required for domestic purposes many trees were felled so as to make constructions. In the late Neolithic village of Aichbuhl in Germany, it has been seen that the number of tree trunks used to build a hut was somewhere between 150 and 190; so probably over 3,500 trees were felled to build the whole village.
In the first century BC Dionysius of Alicarnassus describes the use of trees from the forest of Sila in Calabria: "the trees of these woodlands, close to the sea and to rivers, cut at the root are transported to the nearby ports and from there supply the whole of Italy with the materials for buildings ships and houses. However the trees which grow far from the sea or rivers, are cut into pieces and transported by men on their backs, to supply oars, poles for oars, poles for military instruments and domestic vessels".
Pisa, according to Strabo, owed its importance to the abundance of construction timber which however, at that time, was generally sent to Rome to build palaces rather than used for the fleet.
Less common but not less important uses were for both structural parts and for the roofs of houses: up until the time of the Pyrrhic war [275 BC] Roman houses had roofs of beech and pine. The forest had much to offer for military applications moreover: palisades for the defence of the military camps, trunks for use as battering rams and other siege machinery, beams of every shape for passive defence and siege towers and handles for hurling weapons.
It was a common opinion among treaty writers that architecture began when primitive man built his first hut. From the hut he moved on to the temple and, gradually perfecting the formula, invented the wooden version of the Doric order, later copying it in stone.
"Roman architecture descended through the Greeks from the dawn of civilisation and had therefore made its own every natural perfection, in fact was almost a feat of nature. Supporting this theory was Vitruvius, who had taught that the Doric order was the progression of a wooden prototype and had shown that originally the columns of the temples were tree trunks, and as a result the temples were themselves a derivation of the forests".
The use of wood in building appears especially important in western Europe in the late empire too, when the forests were dense with hardwood species such as oak, ash, beech, elm, chestnut, all varieties of wood more resistant to fire and to damp than the conifers of the north.
In Germany already in 350 AD among the Goths carpenters were organised into a separate guild; Venenzio Fortunato, the bishop of Poitiers in 560 wrote of his preference for the wooden buildings in Rome to the masonry constructions "Step aside walls in square stone .I find more magnificent, really excellent works, the wooden buildings in these parts."
Venice, founded at around the time of the barbaric invasions in the sixth century on a series of islands surrounded by brackish water had a great need for long trunked trees: as well as for the same needs as the other cities in fact, up until 1100 many of its houses were made of wood; there were two main uses for timber: as the piles for the foundations of the buildings in the rather incoherent, low capacity lagoon soil and as the timber for the construction of the ships of the fleets. As regards the first use it's sufficient to consider that for every linear metre of foundation of the main or spinous walls a pile is needed, preferably of bay oak, fixed into the muddy bottom of the lagoon. It has been calculated that for the foundations alone there must be from 10-12million piles in use.
From the middle of the sixteenth century throughout western Europe the buildings made mainly in wood began to be replaced by those in stone or brick, except for those areas, such as Alpine zones, where wood was still an abundant resource.
The structural typologies used for wooden architecture can historically be divided into two main groups: structures with a weight bearing frame and structures with weight-bearing walls.
In the constructions with a frame the support of the structure is provided by the arrangement of the vertical trunks acting as point supports; in the structures with load-bearing walls in general the technique known as "block bau" is used where the walls are composed of trunks arranged horizontally one on top of another and the load is divided all along the length of the wall. In this second case the stability of the construction is entrusted mainly to the weight of the material which behaves as dry masonry does in large square blocks.
In frames however the stability of the construction depends on the correct realisation of the joints between the structural elements using various techniques among which the main ones worth mentioning are the joints using dowels and those using a slot and tongue mortice joint. In these cases the walls

are made by filling the frame with planks or half-timbers covered or connected with other materials.
This book breaks the news of the recent discovery of the oldest ligneous structure in Tuscany, in Lucca, probably built in the II century BC of a structure with blok bau type weight-bearing walls, a technique which is still widely used in the Alpine Arc and which boasts at least two millenniums of continuous use, with construction features substantially similar in northern Europe and in Karelia too, where it finds its greatest monumental expression in the ecclesiastic complex of Kizhi in the Cathedral of the Transfiguration, built by the master carpenter Nestor.
In Europe wooden architecture makes special use of the half-timber technology, already widely used in the Roman world, documented in particularly by the conspicuous remains of Pompei, and used for civil architecture on a continuous basis until the present-day. In these framed structures the infills are composed of small interwoven strips [grids] coated with a mixture of clay, straw and animal dung and covered in lime.
From the mid-sixteenth century the infill panels were gradually replaced by thick brick masonry.
Framed ligneous structures are also widespread in the Asian continent where the use of the purlin as a basic element of the load-bearing structure enabled the eastern master craftsmen to produce roofing with elaborate shapes such as the typical curved roofs which characterise most of the continent from China to Japan, among the finest examples of which is the complex of the Temple of Heaven in Beijing in China, begun in 1420 by the Ming dynasty.
It is however important to emphasise how even traditional architecture in masonry makes much use of the timber techniques for the realisation of lintels and tie beams, floors and roofing structures generally arranged in a concealed manner in the masonry, or in any case protected from the weather for greater structural longevity in damp temperate climates such as that of the mediterranean area as well as for provisional structures such as scaffolding, centres, formwork and whatever else. In this same area, the wooden architecture which completed the outside of masonry buildings was often not preserved for climatic reasons: one calls to mind the great wooden structures of bastions and access balconies which covered the medieval castles, the typical houses with projections widespread in Tuscan town centres. In Florence too there was no lack of fully fledged wooden constructions among which some of the factories used for special processes such as the machines for finishing fabrics equipped with spacious roofing for the clothes-lines, such as those to be found up until the last century on Lungarno Diaz, on the site of the present-day commodities exchange.
These brief general notes already give an idea of how wooden architecture assumes the role of protagonist in the "physical scenario" of the city and of the man-made landscape, a determining part of the cultural heritage; a scenario which, as Benevolo recalls, "has a characteristic of persistency which cuts through other events in time and which is, at this moment, an irreplaceable communication channel between past and present, as well as conditioning the future with the present. [... man's activities] makes the landscape constructed in a historic era durable, handing it down to subsequent eras and partially constraining the way of life of each generation to the choices made by the previous generation".
This awareness should characterise our age in which sudden social and economic changes endanger the physical scenario of the landscape of some areas of the planet, provoking the loss of a cultural identity through the strong detachment from the environment. " The vital necessity to correct this detachment from the environment, stronger than any "cultural" interest gives rise to the modern need to specially conserve the stone landscapes formed over the long periods of history. The equilibrium between individual and collective memory is, for the moment, entrusted to these fragile scenarios, vulnerable to modern technology but which can be conserved with the resources of the same".

2. View of the roof of the Trasfiguration church, in Kizhi