

## CONSERVATION OF TRADITIONAL ALPINE ARCHITECTURE: CASE STUDY OF TRENINO (PART 1)

Antonio Frattari \*

### 1. Generality

Trentino's traditional architecture consists of residential buildings, productive buildings (for example water-mills, timber-mills, etc...) and service buildings for agricultural, stock and forest activities. They are in a territory having three different heights: the bottom of the valley (up to 800 metres), the medium height (800-1400 metres), and the high altitude (over 1400 metres), corresponding with a different human presence in different times of the year and also with different functions. Buildings for permanent residence and production are for the most part in the bottom of the valley or at medium height, where people presence is constant during the whole year. Buildings for service activities (agriculture, stock-rearing, wood utilisation) are used during all the year, if they are in the valley and in the medium strip. If they are in the high zones, they are used as deposit, shed and mountain dairy just in the beautiful season, not more than six months a year. Buildings in the bottom of the valley and of the medium height are related with territory according to three different aggregative models: punctiform, linear and compact. The first model, characteristic of north-Europe, is usually formed by a limited number of buildings scattered on the territory, having mainly a multifunctional destination. The second model, typical of the italic settlement typology, consist of italic houses aggregated in a line or in a courtyard. The third settlement typology, the compact one, is obtained by joining court buildings. In this way, the inside open spaces permitted best open-air working conditions, even in the bad season, and had the function of thermic fly-wheel in the energetic balance of the building.

A more composite aggregation is the urban one, classifiable in simple or complex. The simple urban aggregations are formed by buildings joined together just in a line or just in a circle or simply scattered on the territory; The complex urban aggregations, instead, are made up of some simple aggregations and have a bigger complexity. The typical building typologies of the traditional architecture are connected with the described settlement models. Inside the punctiform settlement we can find two typologies with residential destination at many levels. In the isolated buildings are often concentrated more functions. For example, in the "maso" we can find residence and productive functions joined in a multi-floor building, an alternative is that these activities are developed in two different volumes, shared by a court for the open-air working. Inside the linear and courtyard settlement we can frequently see the italic

pluri-functional building typology, where residence and production are organically integrated. These buildings have two or more floors with a ground floor used as deposit or shed, and upper floors for living purposes, barn and granary. The production buildings, dedicated to utilisation of particular local resources, were often outside the villages and constituted the first industrial systems. They were water-mills and timber-mills, or factories and spinning-mills, situated near rivers and canals that flow around villages. The buildings connected with agricultural, stock and forest activities have functional, structural and sometimes formal characters that are different according to the height in which they are collocated. At the bottom of the valley or at medium height they are often mono-functional, and are situated near the houses. Sometimes houses and production buildings are integrated, from a constructive point of view. When buildings contain several functions they have two or more floors, with the shed at the ground floor, and the barn/deposit at the first level. The production buildings in high mountains are similar from a functional point of view, and sometimes they have also spaces for temporary residence and production of dairy-products. The buildings connected with agricultural, stock and forest activities in high mountains are isolated in the territory, and sometimes they form a kind of sparse aggregation in which every building is surrounded by a big ground.

### 2. Constructive characteristics

The main character of Trentino's architecture is the wide use of wood and stone as building materials. The complex orography of the region influences deeply the use of building materials and the following employed building techniques, which show deep differences from one valley to others depending on the height and if they are open, it means accessible from two "entrances", or closed, which face a mountain.

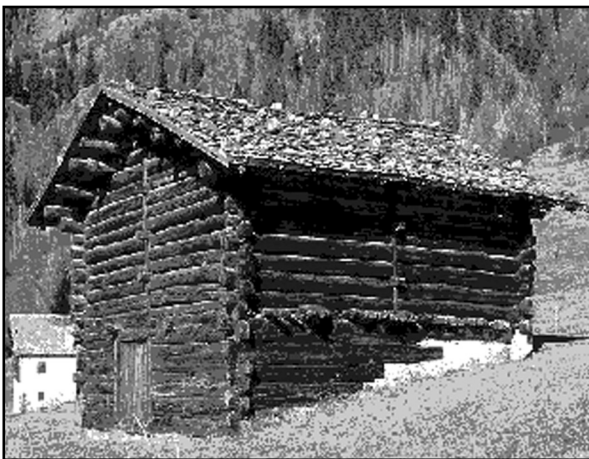
In the lower valleys, which generally are open, mixed stone-masonry is the most diffused building material, while wood has a complementary role as used in the realisation of flooring and roofing. In the middle high valley, wood is still employed as a secondary material, even if used for staircases and the framework of the outer walls (fig.1) in the upper part of the buildings, borrowing the constructive techniques from the framed building of the transalpine countries. In these valleys, moreover, wood is widely used to realise the whole building, if it is



1. Example of the use of wood in the outer walls.



4. Example a building with the first level in masonry and the second level in wood



2. Example of a building entirely in wood.



5. Building in framed system on the first floor.



3. Buildings in log system.



6. The different constructive solution for the wooden barns in Trentino.

a service building. The dwelling is generally in masonry with wooden floors and upper elevation in wood too. In the upper closed valleys, there are mostly buildings entirely in wood (fig.2), with one or two levels; in other way they have a masonry first level and a wooden upper level. They are barns or cowsheds with annexed hay loft at first floor. They are isolated or they form rural settlements. From a constructive standpoint if they are in wood they are in log system. When they are mixed the upper level is in log system (fig.3) or framed system (fig.4) with different constructive solutions (figg.5-6).

### 3. Functional and constructive rehabilitation

The typological and constructive study of Trentino's traditional architecture and the analysis of the actual conservation state have shown that the main part of this building heritage has had different interventions during the years, from the ordinary maintenance, to the restoration, to the refurbishment, with the consequence of formal and constructive changes. Actually the context is changing for the evolution of the activities and of the territorial resources' utilisation. Consequently the need of houses and service buildings is also changing, and this fact has brought to some recovery interventions, not always correct from a historical-traditional and a typological-functional-constructive point of view. One of the most common interventions in Trentino is the re-utilisation of service buildings for living purposes, so that barns and deposits have been transformed in houses by the introduction of big modifications, in the plant and in the front view. This re-utilisation has been followed not only by a new inner space distribution, but also by the introduction of new functional spaces, like bath-rooms or technical volumes, with consequent radical changes in the original establishment of the buildings.

These modifications of the typological establishment are often joined with constructive ones, derived, in refurbishment phase, by an incoherent utilisation of the alternative materials and technologies to the traditional ones.

### 4. Strategies for conservation

The Laboratory of Building Design (LBD) of the University of Trento has elaborated a strategy to promote the safeguard and the conservation of Trentino's building heritage. The strategy can be synthesised in four points:

- a. Increasing the knowledge of functional and constructive typologies, typical of Trentino's vernacular architecture, so that people can understand his particularities and try to preserve the most important elements, that characterise the buildings.
- b. Studying sustainable architectonic solutions for the functional re-conversion that don't change radically the form, to avoid a big environmental impact. This purpose can be obtained, for example, through regulations that give importance more to the inner spaces' life than to

codex studied for other environmental contexts, like the urban one. To put these architectonic solutions into practice it is necessary to develop some well defined experimental rehabilitation projects, based on alternative energy forms, on solar orientations, etc.

- c. Studying solutions that help designers, architects, executors, masons and carpenters to avoid to alter buildings' essence through practical rules that don't give rigid results, but illustrate the traditional building praxis.
- d. Forming professionals, architects and bricklayers able to understand the building philosophy and the worth of the object that needs to be recovered, for a refurbishment that respects building values.

### 5. Knowledge of functional and constructive typologies

For what concern the first point of them showed above the Laboratory of Building Design of the University of Trento carried out a study of functional and constructive typologies. The study has been developed with the purpose of classify and analyse the most significant rural services buildings, that represent Trentino's traditional buildings. During the study, the region Trentino has been shared into four significant geographic ranges, with specific cultural peculiarities. Everyone of these sector contains territories with analogous climate and orography and with buildings having similar functional and constructive typologies. The study has consequently been deepened through the individuation of smaller geographic ranges: valleys and plateau. Then it has proceeded individuating and analysing 168 sample-buildings. In every geographic sector, buildings have been classified for their constructive characteristics and this permitted us to individuate three categories: wooden buildings, masonry buildings and masonry-wooden buildings. In the group of partially or completely wooden buildings it is possible to do another classification: frame system or log system buildings. In all, 168 rural service buildings have been analysed: 45 in the north-west sector, 51 in the north-east sector, 44 in the south-west sector and 28 in the south-east sector. For every building we have prepared a chart to pick up some information in the analysis phase of the study. Every chart has two parts: the first contains some general information about the whole building, the second collects a functional and constructive analysis of the building. In the first part of the chart it is possible to find information about building's localisation: geographic sector, locality, land register's town and cartographic references in different scales (1:50000, 1:10000, 1:2880), a building's picture and a scheme of building-ground relationship. In the second part of the chart it is possible to find information about: building's topographic localisation (orientation, daily average insolation, principal winds direction, ground's average inclination), original, actual and

future utilisation purposes, constructive characteristics of building's parts (basement, walls, roof), pathologic conditions, already done refurbishment interventions, and the ones hypothesised for the future. After this study, seven rural service buildings have been chosen for their formal and constructive characteristics. They can be considered as emblematic example of Trentino's rural service architecture, as expression of the conceptually similar but operatively different building ways of Trentino's people, as cultural heritage that risks to be lost due to new utilisation purposes and new building techniques. This risk can be avoided by safeguarding and conserving at least some significant examples, as the following:

1. barn built in blockbau system on a stone basement in Primiero Valley (in the locality Masi di Tognola);
2. barn built in frame system in Fassa Valley with vertical boards outer covering and long wooden shingles on the roof, typical of that valley (in the locality San Pellegrino Pass);
3. "tabià" in Fassa Valley with a masonry ground floor used as a shed, and two floors realised with blockbau technique used as a barn (in the locality Penia). This building's particularity is at the third floor, where there is a projection along all the four building's sides, covered with vertical boards;
4. "Ca' da mont", that is a barn and a shed, in Chiese Valley with a masonry ground floor and a mixed wooden framed structure, realised with posts and large boards (in the locality Planezzo);
5. "Ca' da mont", that is a barn and a shed, in Chiese Valley with a masonry ground floor and a mixed wooden framed

structure, realised with blockbau technique and with posts and large boards (in the locality Planezzo);

6. barn built in masonry with U-shape in Pinè Plateau, with the roof covered with porphyry slabs, that are typical of this geographic area's tradition (in the locality Bedollo);
7. barn-shed of Sole Valley, with U-shaped masonry and an upper structure built with the frame system.

## 7. Bibliography

- ADAC Freizeit –ATLAS "Die schönsten Freilichtmuseen in Europa", 1992
- Dematteis L., "Case contadine del Trentino", Quaderni di cultura alpina, Ivrea, Priuli e Verlucca, 1986.
- Dematteis L., "Case contadine del Sud Tirolo", Quaderni di cultura alpina, Ivrea Priuli e Verlucca, 1986.
- Suzuki M., "Holzhäuser in Europa", Office du livre, Fribourg (CH), 1979.

### \* Antonio Frattari

Professor of Building Construction and Wooden Architecture at University of Trento, Italy.

Research, publication and teaching in historical and innovative wooden architectures and wooden building constructions.

Research and project development in historical wooden building survey and preservation. Conservation projects include conservation plan for important historical buildings and traditional buildings in wood and timber. They include also reconstruction plans for conservation in open air museum of the traditional vernacular building

Member of the Wood Committee of the ICOMOS

Member ItalianUNI-Normal Committee for the development of the Italian and European regulation for the conservation of wooden buildings and structures.