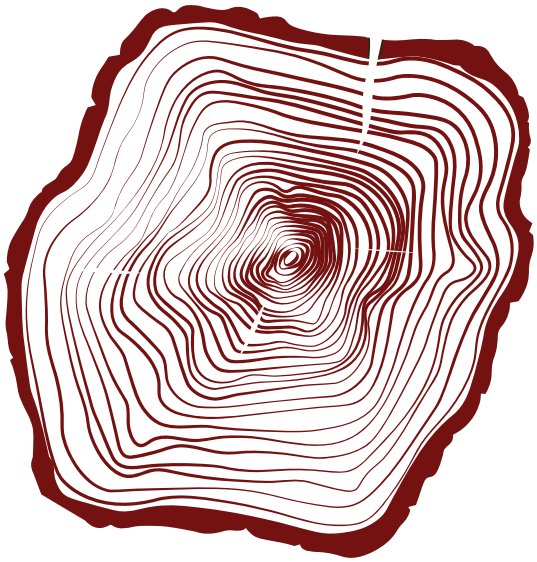

Politecnico di Torino

Department of Architecture and Design
Master Thesis in Architecture for Heritage
AY 2022-2023

Wooden Architecture in Poland: Vernacular Podhale and Zakopane Style. Comparison with Walser Architecture

Supervisor:
Prof. Tanja Marzi

Student:
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I must express my very profound gratitude to my parents and siblings for providing me with unfailing support and continuous encouragement throughout my years of study.

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Contents

Abstract

The thesis aims to analyse the wooden built heritage located in the mountain region of Podhale in Poland. These buildings are reflecting the struggles of people with severe weather conditions, and difficult land shapes but also are showing the beauty of life close to nature and sourcing from natural resources. Polish Highlanders' vernacular architecture in the Podhale region is characterised by type of construction, distinctive roofs and richness in decorations. This culture inspired, at the end of the 19th century, the Zakopane Style, which was meant to be a national style with complex design. This wooden heritage provides evidence of the skills of craftworkers and builders, the expression of the culture of a community, of its relationship with its territory and cultural diversity. In Italy, an interesting example of wooden architecture in the mountains can be found in Walser's hamlets and villages. Walser people, which were pioneers of settling in high altitudes in the Alps, developed a way of raising buildings made of stones and wood with a peculiar construction system, terraces along walls, and vertical organisation of the land. This thesis summarises the study related to Podhalan, both vernacular and Zakopane Style, and Walser architecture by exploring similarities and differences between those traditions of constructing in wood, through the analysis and comparison of case studies, building elements, construction technologies and materials, their conservation and enhancement.

Celem tej pracy magisterskiej jest pokazanie architektury drewnianej w regionach górskich Polski; Podhala i Włoch; architektura ludu Walser. W tych obiektach można znaleźć odzwierciedlenie zmagań z trudnymi warunkami atmosferycznymi i niełatwym ukształtowaniem terenu. Jednak widać w nich również inspirację pięknem przyrody i możliwości czerpania z otaczających zasobów. Architektura wernakularna Podhala, która charakteryzuje się szczególnym wykorzystaniem drewna, rozpoznawalnymi dachami i bogactwem dekoracji, była przedmiotem zainteresowania XIX-wiecznej inteligencji. Ta kultura zainspirowała Styl Zakopiański – który miał być stylem narodowym. We Włoszech ciekawą architekturę reprezentują osady i miasteczka Walserów. Walserowie, którzy byli pionierami osadnictwa na dużych wysokościach w Alpach, wypracowali sposób wznoszenia budowli z kamienia i drewna o swoistym systemie konstrukcyjnym, tarasach wzdłuż ścian i wertykalnej organizacji siedliska. Niniejsza praca stanowi podsumowanie badań związanych z architekturą Podhalańską, zarówno welnakularną i w Stylu Zakopiańskim, i Walserowską, ukazując podobieństwa i różnice między tymi tradycjami budownictwa drewnianego.

La tesi si propone di analizzare il patrimonio costruito di legno situato nella regione montuosa di Podhale in Polonia. Questi edifici riflettono le difficoltà delle popolazioni locali nell'affrontare climi avversi e territori impervi, ma mostrano anche la bellezza della vita a contatto con natura e del necessario approvvigionamento dalle risorse naturali locali. L'architettura vernacolare della regione di Podhale è caratterizzata da particolari tecniche costruttive, dai tetti caratteristici e dalla ricchezza delle decorazioni. Questa cultura ispirò, alla fine del XIX secolo, lo stile Zakopane, che divenne uno stile artistico e architettonico dal design complesso. Questo patrimonio ligneo testimonia le capacità di artigiani e costruttori,

espressione della cultura di una comunità, del suo rapporto con il territorio e delle diversità culturali. In Italia un interessante esempio di architettura lignea in montagna si trova negli insediamenti Walser. Pionieri dell'insediamento in alta quota sulle Alpi, i Walser, svilupparono un particolare sistema costruttivo per edificare edifici in pietra e legno, terrazzamenti e organizzazione verticale del terreno. La tesi riassume lo studio relativo all'architettura montana di Podhale, sia vernacolare che Zakopane, e all'architettura Walser esplorando somiglianze e differenze tra le tradizioni costruttive in legno, attraverso l'analisi e il confronto di casi studio, tecnologie e materiali costruttivi, la loro conservazione e valorizzazione.

Introduction

Methodology

This work aimed to present the immense diversity of using timber structures in different situations, with diverse abilities to process and as a vessel of culture that is an inseparable part of human life. The choice of Polish wood architecture in Podhale region and Italian Walser architecture in the western Alps was based on several reasons: both building traditions have risen in the European mountainous regions that were close to borderlines; the use of wood in those places was perfected over the centuries, and is distinctive for the region; those wooden architecture both in Poland and Italy are recognisable for their uniqueness.

This thesis is structured in a non-linear way, presenting the background of the places such as historic overview, environment, changes over the time, and the analysis of construction materials and building technologies. A specific part of the thesis presents examples from other related areas that might widen the perspective on described issues. Both cases – Podhale architecture and Walser architecture – are structured in analogous ways in order to present the same aspects of those topics.

The section dedicated to Podhale architecture is starting with showing an analysing of the history and environment of the place. Then it focuses on the vernacular architecture and evolution of the Zakopane Style, which was meant to be a National Style. Those chapters are followed by presenting the present state of conservation and examples of restorations. Similarly structured is the section dedicated to Walser architecture that shows the situation in which those structures have risen and how they are being used nowadays.

The thesis is based on bibliographic research and especially on several on-site inspections carried out both in Poland, in the Podhale region, and Italy. On-site visits allowed to collect in 2023 the photo-documentation that inserted into this thesis is marked by author's name Z.Miłek. The thesis specifically focus on differences in local building materials, traditional construction methods and woodworking techniques, along with an analysis of the different building elements such as base, walls, roof, openings (windows and doors), decorative elements. The analysis on the state of conservation and typical decay follows

it. A special section investigates shows examples of protection tools and conservation and enhancement guidance.

A final part of the work is dedicated to a glossary (in Polish/ English/Italian)which explains specific terms and vocabulary associated with woodworking, carpentry and local dialects.

I Overview on wooden architecture in Poland

Throughout the ages of human settlement in the regions of central-eastern Europe the dominant majority of structures were risen in wood. Naturally, the main reason was that timber was easy to source in covered by forest land. Additionally, the relatively not rapid industrialisation process did not cause the extinction of carpentry traditions of building. Most regions developed their own style of building in wood and passed down traditions from generation to generation. At the beginning of the 20th century, the vast majority of buildings were started to be constructed in materials perceived as more fire resistant, primarily because of law requirements, such as adobe, clay bricks, and stones (Ruszczyk 2014). The roof covers were often ceramics tiles than thatched roofs and wood shingles.

Along with those relatively rapid changes in the way of rising buildings, which in wood was developed and perfected over centuries, the traditions of carpenters, the architectural identity of regions, and the practice began to fade. At the same time, more and more researchers were interested in studying traditional arts and folklore and saw it as the source of identity. Unfortunately, the 20th century brought two devastating wars that immensely affected the built environment. After the IIWW, the preferred way of rebuilding was using materials other than wood. Moreover, the wooden buildings that distinguished the regions and continued the traditions were not perceived by the communist party that ruled till 1989 as the best place to live because they emphasised autonomy and were rooted in culture. Those factors caused the progressive extinction effect of traditional timber architecture (Ruszczyk 2014). To prevent it, most of the historical timber structures are nowadays protected by law and are a subject of study and interest of local communities that want to cultivate their traditions. They are perceived as a vessel of the culture and identity of regions. Popular enhancing heritage policies are open-air museums, called *skansen*, that show the traditional way of life and the places were people lived. They are organised in the preserved villages or/and in the places where the houses from particular region were transported and re-established in order to show folk culture. In wooden architecture, both characteristic for Poland inventions, carpentry connections and traces of foreign influences could be found.

◯ Podhale Region

Below are presented a few examples of wooden buildings from different regions of Poland to show the diversity and variety of structures and use of the same material, but in various ways.

1 "arcaded" house in Trutnowa, 1720
source: (Ruszczyk, 2014)

2 The Museum of Folk Architecture - Ethnographic Park in Olsztynek
source: https://muzeumolsztynek.pl

3 Museum of the Mazovian Countryside in Sierpc
source: https://mwmskansen.pl/

4 Manor house in Ożarów, 1757
source: (Ruszczyk, 2014)

5 Houses in Podlasie
source: https://bialowieza.travel/

6 Houses in Rakoniewice
source: (Ruszczyk, 2014)

UNESCO World Heritage Sites in Poland

As it was mentioned, in Poland could be found vast variety of wooden structures built for different purposes. 17 properties are inscribed on the UNESCO World Heritage List and three of them are specifically related to timber structures:

- Churches of Peace in Jawor and Świdnica (enlisted in 2001), (Criteria: (iii)(iv)(vi)[1]) the largest timber-framed religious buildings in Europe
- Wooden Churches of Southern Małopolska (enlisted in 2003), (Criteria: (iii)(iv)) ; six medieval, gothic churches
- Wooden Tserkvas of the Carpathian Region in Poland and Ukraine (enlisted in 2013), (Criteria: (iii)(iv)) – built of logs between 16th and 19th century,

("Poland - UNESCO World Heritage Convention" n.d.)

[1] Criteria that were fulfilled to enlist the object/property into UNESCO World Heritage List
(iii) to bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared;
(iv) to be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history;
(vi) to be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance. (The Committee considers that this criterion should preferably be used in conjunction with other criteria);
("UNESCO World Heritage Centre - The Criteria for Selection" n.d.)

Polish sites inscribed in the UNESCO World Heritage List - chosen examples

◯ Podhale Region

A Church of Peace in Świdnica, mid. XVII cent.
source: https://whc.unesco.org/

B Wooden Church in Dębno XV century
source: (Ruszczyk, 2014)

C Wooden Tserkvas in Kwiatoń, XVIII century
source: (NID.pl)

Wooden Tserkvas of the Carpathian Region in Poland and Ukraine

The newest, among mentioned three wooden, enlisted properties in the UNESCO World Heritage List are sixteen wooden Tserkvas in the Polish and Ukrainian Carpathian region. On the Polish side, these are eight Orthodox churches in: Chotyniec, Radruża, Smolnik, Turzańsk, Brunary Wyżne, Kwiatoń, Owczary and Powroźnik. Those Tserkvas (churches) are in line with eastern liturgic traditions and are reflecting the local communities' folklore that developed in insolation in this mountainous region. They are characterised by timber structure and furnishing, tripartite plans, pyramidal domes and bell towers. Nonetheless, those Ortodox churches differ in the type, because they were built by different ethnic communities: Hutsul, Halych, Lemko and Boyko. In Poland there are three types of wooden tserkvas : Halych, Lemko and Boyko.

The criteria identified and fulfilled to be included in the UNESCO WHL have been:

> *Criterion (iii): The tserkvas bear exceptional testimony to a distinct ecclesiastical building tradition, which is grounded in the mainstream traditions of the Orthodox Church interwoven with local architectural language. The structures, designs and decorative schemes are characteristic for the cultural traditions of the resident communities in the Carpathian region and illustrate a multiplicity of symbolic references and sacred meanings related to the traditions.*
>
> *Criterion (iv): The tserkvas are an outstanding example of a group of buildings in traditional log construction type which represents an important historical stage of architectural design in the Carpathian Region. Based on building traditions for Orthodox ecclesiastical purposes which were adapted in accordance with the local cultural traditions, the tserkvas, as they evolved from the 16th to the 19th centuries, reflect the sacred references of the resident communities.*

("Wooden Tserkvas of the Carpathian Region in Poland and Ukraine - UNESCO World Heritage Centre" n.d.)

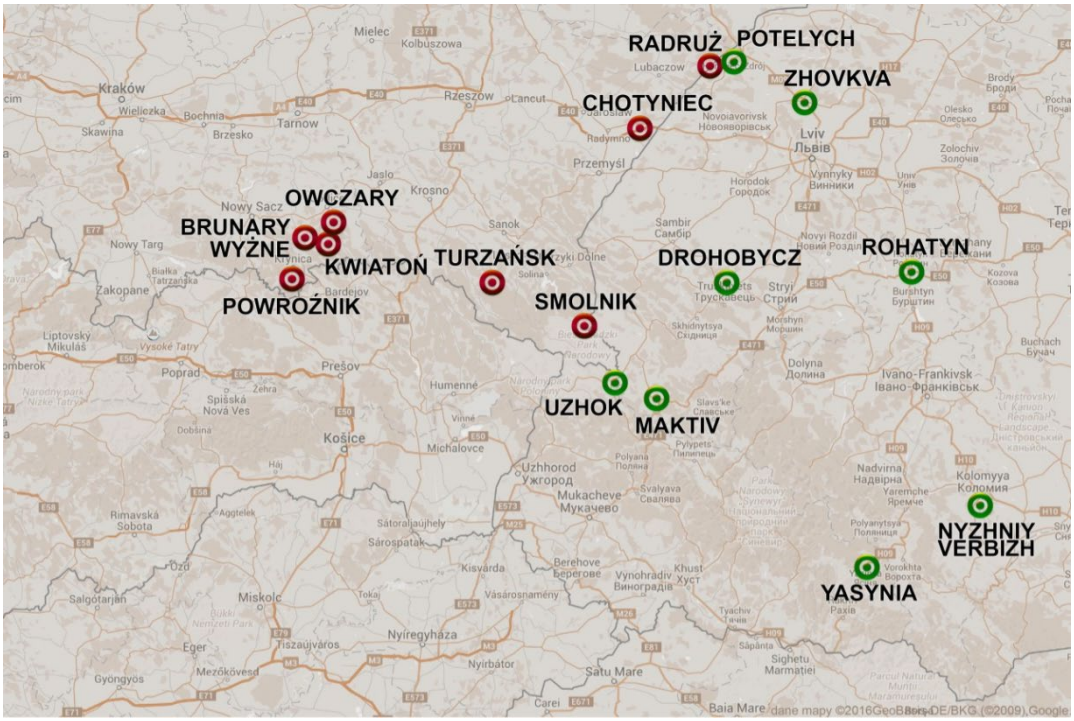


Figure 1map; red circles Tserkvas in Poland; green circles Tserkvas in Ukraine , UNESCO World Heritage Site "Wooden Tserkvas of the Carpathian Region in Poland and Ukraine" NID

The Church of the Protection of the Mother of God in Owczary; nowadays Greek Catholic church.
It was built in 1653. Represents Lemko type.

photo: NID.pl

Orthodox church of the Nativity of the Most Holy Mother of God in Chotyniec.
It was built in 1615. Represents Halych type.

photo: NID.pl

Orthodox church of St. Michael the Archangel in Smolnik; nowadays Catholic church.
It was built in 1602. Represents Boyko type.

photo: NID.pl

II Podhale: mountain, forest, architecture

Environment

Geography

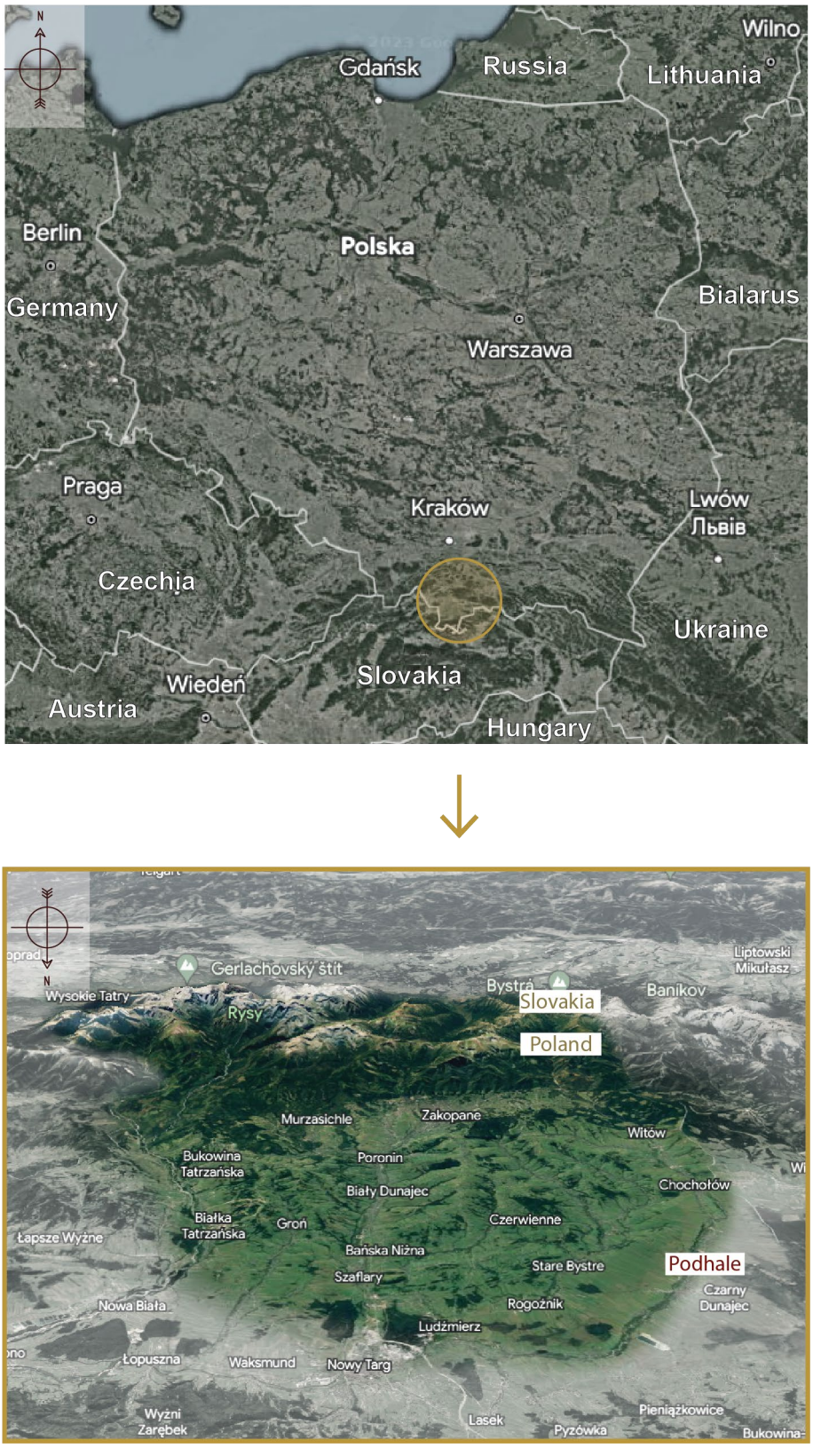


Figure 2 location of Podhale on the map of Poland source: Google Earth

The term Podhale appeared in the mid-19th century to describe the areas lying on the northern parts of the Tatra Mountain, part of Karpaty. Later the term began to describe the area located further north including Zakopane, Kościelisko, Witów, and Bukowina. At the beginning of the 20th century, Podhale was named also the vicinity of Nowy Targ (Krawczyk-Wieczorek 2010). One of the summits of Mount Rysy, which is in the border with Slovakia, is the highest point in Poland measuring 2.499m. The main rivers in the region are Black Dunajec and White Dunajec[2]. A huge part of the area is under the protection of Tatra National Park which was created in 1954, but the first forms of flora and fauna protection date back to the late 19th century.

Figure 3 Map of Podhale Spisz and Orawa;Tadeusz Zwoliński Tourist map of Podhale

[2] Black Dunajec – river Polish: Czarny Dunajec; river White Dunajec - Polish: Biały Dunajec

The soil in the region is very diversified, which means it differs in terms of types and depth. High parts of mountains are either not covered with soil at all or very shallow and poorly developed. Areas where grasses were possibly grown, called *hale*, Highlanders used for sheep grazing. In the valleys, popular types are rendzina and brown earth ("Map: Soil and Agricultural Map in Podhale" n.d.). The first one, although fertile, is difficult to cultivate due to containing rocky material. Brown earth, even though fertility is not impaired, in this region, weather conditions do not allow to achieve remarkably high crops.

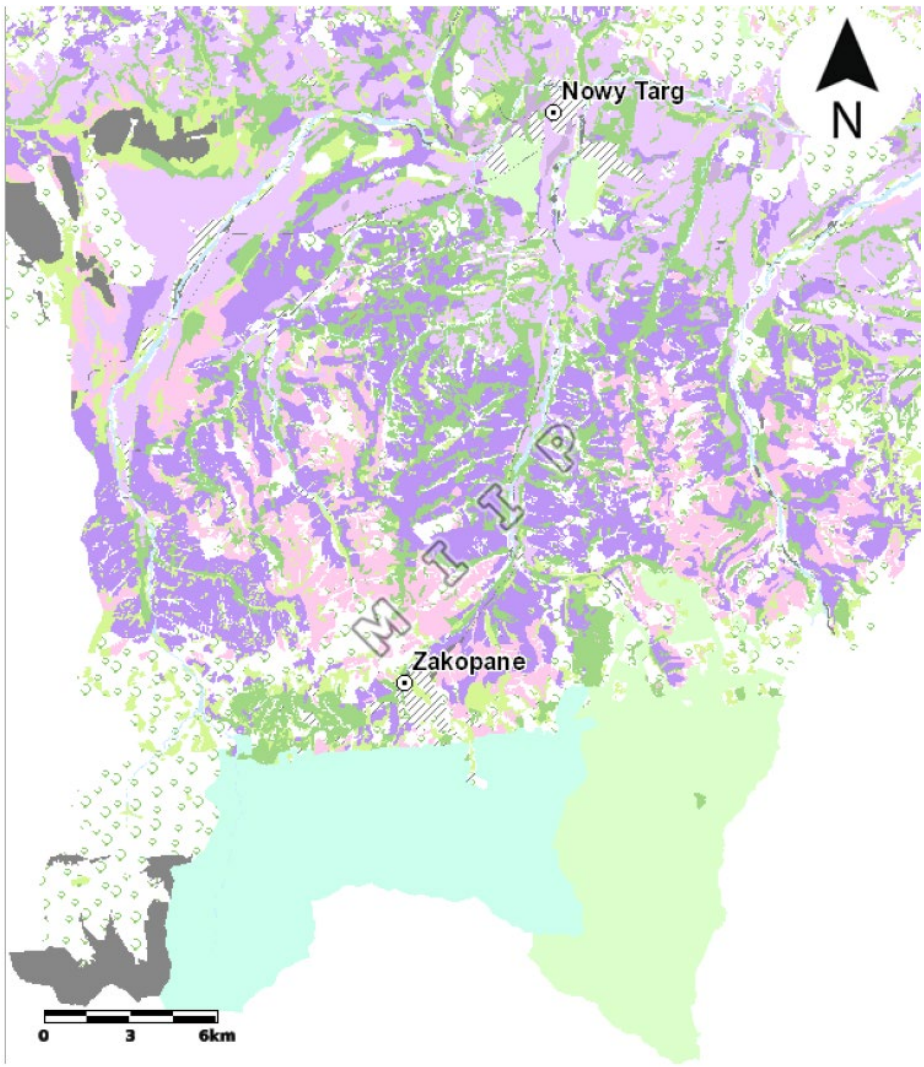


Figure 4 soil type Podhale("Map: Soil and Agricultural Map in Podhale" n.d.)

Climate

The town of Zakopane is located in the temperate mountain climate zone, characterised by a low average annual temperature [5.1°C]. The coldest month is January [-4.5°], and the hottest month is July [+14.5°] (Ustrnul et al. 2022). Even the hottest month does not meet the minimum thermal requirements (average temperature above 15°C), to be

classified according to lowland standards as climatological summer. Winter in the Tatras begins at the turn of October/November (although the first snow may fall earlier) and ends in April or May. The average length of the snow cover at higher altitudes is 290 days, but in some places (e.g., shaded gullies) the snow lasts all year round.

The advantage of the Zakopane climate, which was one of the reasons why this place gained popularity among tourists, was a small amount of wind: on average 295 days a year are characterised by complete silence or wind speed not exceeding 3 m/sec. Nowadays, when air pollution has increased significantly, the lack of winds is problematic. Smog in this city is one of the highest in the whole country. Reasons for that poor air quality might be found not only in the results of no-windy weather and localisation of the city between mountains but also in anthropogenic emissions caused by heating households with inferior quality fuels and insufficient filters.

Frequently in spring or autumn occur a sudden warm wind called *halny*. It is a fen-type wind that is blowing from south to north. This wind, rolling over the ridge of the Tatra Mountains, warms the valleys melting snow in the lower mountains. The speed of the *halny* is relatively high; the strongest gusts of wind were recorded in May 1968 and amounted to 86 m/s, i.e. about 300 km/h.

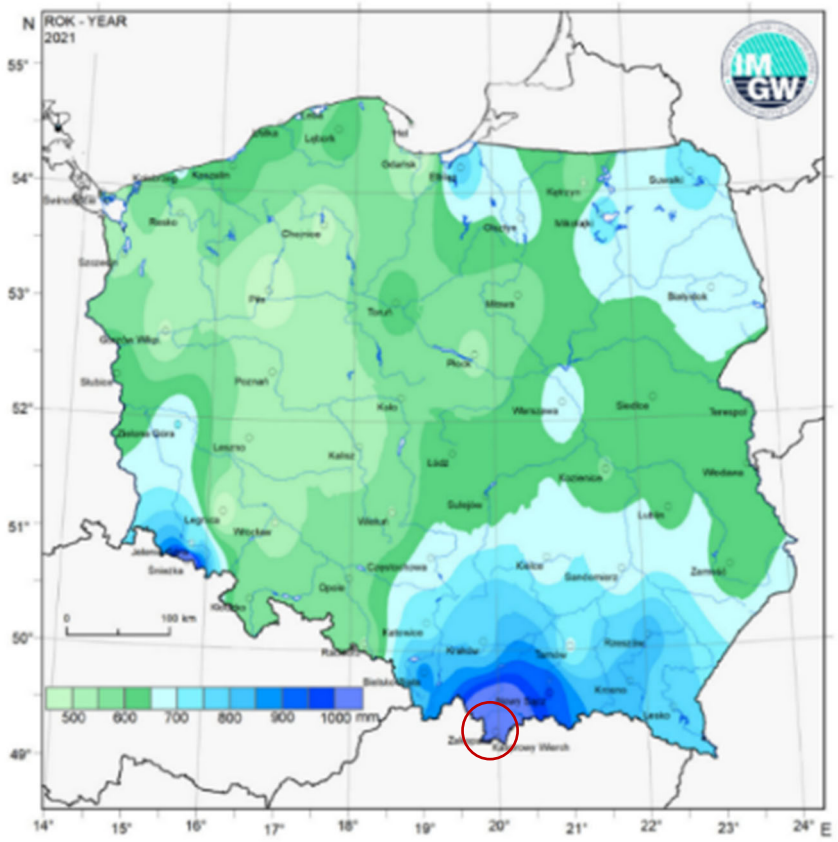


Figure 5 Precipitation in Poland; Podhale marked with circle (Ustrnul et al. 2022)

Figure 6 Air Temperature in Poland; Podhale marked with circle (Ustrnul et al. 2022)

Historical context

Many factors influenced the culture of the Podhale region. The history of Podhale started in the 13th century when the first settlers began coming to the area. Before the 13th century Podhale region was mostly an untarnished land. The first wave of more numerous settlers gradually appeared in the most accessible regions in valleys near rivers. Valleys offered the possibility of agriculture, even though the soil was not very fertile and severe weather conditions were a significant obstacle to farming. Higher parts of the land were also serving inhabitants - the slopes of mountains were used for grazing animals, and the forest offered hunting opportunities, picking forest fruits and sources of heating and building materials. In the Kuźnice area, which is now part of Zakopane, people started to mine and process iron. This steel mine was influential in the area but was not significant on a whole country scale (Moździerz 2020). Incoming settlers mainly came from around Sandomierz and Cracow areas. The colonisation process was continued not only under the patronage of the governors but also by clergy such as Cistercians, who came to Ludźmierz in the 13th century. They relocated the monastery in 1245, after Tatars burned the settlements, to Szyrzyc, but they still influenced the economy and settlements of the region. A significant moment that increased the interest in Podhale was given by Casimir III the Great[3] localisation act[4] to Nowy Targ in 1346 (Trela 2019). New city attract more people and become major trade market in the area. In the late 15th century, another ethnic group started to settle in Karpaty Mountains - Vlachs, who originated from Indie, in Europe settled mainly in the Balkan region. There they were leading nomadic pastoralism life. They brought their cultural identity that, in time, influenced Highlander culture. The Vlachs initiated the local tradition of shepherding, which in these areas quickly turned out to be much more profitable than agriculture.

[3] Polish: Kazimierz III Wielki; King of Poland from 1333 to 1370
[4] Localisation act – the polish equivalent of city status

Figure 7 Migration of Vlachs (Kłapyta 2013) translated by Z.Miłek

The Podhale region, due to the mountainous character of the land and geopolitical localisation in the place that during centuries was determining borders was highly influenced by Hungarian, Slovak, German and Ruthenian cultures. Cultural connections with central Poland were small until the late 19th century when the Young Poland intelligentsia started studying, writing about folklore and travelling to the Tatra mountains (Stachura & Mantyka, 2019). In the 17th century, Poland was tarnished by many conflicts that significantly worsened the situation of the lower class. Podhale was under the governance of an aristocracy that did not rule effectively - several deputations were on a delegation to the king to complain about their superior (Trela 2019). Famine and fires plagued the Podhale. After the partition of Poland that took place at the end of the 18th century, region become the part of Austrian Empire[5]. Austrian Partition was perceived as the poorest partition among the three, however, the political situation was not so oppressive and inhabitants had more freedom than in those ruled by Russia and Prussia. Zakopane in 1818 was populated by 1805 people. (Stachura and Mantyka 2019) In 1846 Highlanders raised against local governors and Austrian occupation. Although, the uprising was quickly suppressed it become a symbol of aspiration for independence that is well reflected in art and music.

[5] Austrian Empire till 1886 than the Austro-Hungarian Empire

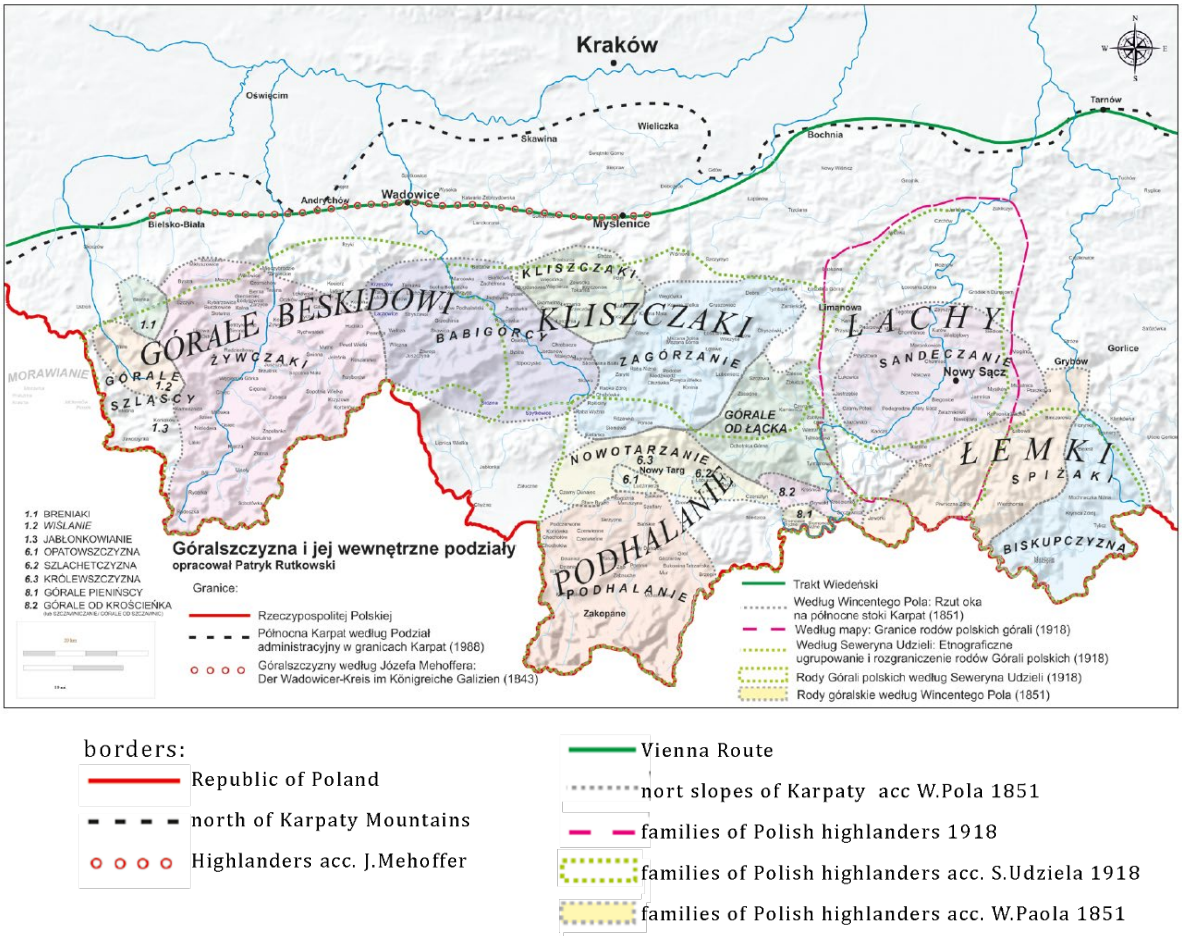


Figure 8 Map - the division of different Highlanders groups. Podhale region is associated with the Highlanders from Podhalanie group.

From the beginning of the 19th century, the Tatra mountains started to be an inspiration for artists such as Jan Nepomucen Głowacki[6], that was the first well-known painter that captured the Tatra mountains in his works, and Seweryn Goszczyński, poet and author of "Dziennik podróży do Tatrów"1832 that was his travel diary to the Tatra Mountains describing not only mountains but also highlanders (Jabłońska 2016).

[6] Jan Nepomucen Głowacki –(1802 –1847) Polish realist painter of the Romantic era

Figure 9 Jan Nepomucen Głowacki, View of Tatra Mountains from Poronin, 1836 (Polish org. title: Widok Tatr z Poronina*) (source: http://www.pinakoteka.zascianek.pl)*

After two harshly ended military uprisings, in 1831 and 1863[7], Polish people started looking for another way to save their nationality and independence. Art, cultures, economic improvement and education started to be perceived as a field to preserve identity. In the last decade of the 19th century, Cracow was the main city of the Polish Arts and Crafts Movement[8], mostly due to mentioned bigger sheer of freedom than in other partitions and the migration of elites connected to military movement against Russia and Prussia. Intelligentsia that visited mountains more often, started to be interested in the folklore of the region (Węcławowicz-Gyurkovich & Godula-Węcławowicz, 2021).

The beauty of mountains and the potential benefits of fresh air and outdoor exercises were also noticed by Tytus Chałubiński. He was a physician specialising in internal illnesses from Warsaw. He started to spend summer holidays in Zakopane, a village then. During the cholera epidemic that reached Podhale in the 1870s, Chałubiński, risking his life helped with the disease that decimated people. In 1873 was created by Chałubiński,

[7] 1831 - November Uprising – Polish-Russian War resolving in the liquidation of Polish autonomy
1863- January Uprising; Both uprisings were followed by suppressions and thousands of people exiled to Siberia

[8] Polish Arts and Crafts Movement -Young Poland (Polish: Młoda Polska), period in Polish art, music and literature around 1890 – 1918

his friends and affluent people from region Polish Tatra Society (PTT)[9] . It was a milestone for the whole Podhale region that gained popularity and started to host mountain trips from intelligentsia (Rafacz 2015). The PTT had an immense contribution to spreading carpentry knowledge by establishing in 1876 Imperial and Royal Professional School of the Wood Industry in Zakopane, that was one of the best of its kind in the entire Austro-Hungarian monarchy. Although school had prominent level of education, provided by foreign professors, the main taught architectural patterns were based on Swiss and Bavarian architecture. However, professionally qualified in carpentry craftsmen were a base for later development of the Zakopane Style(Węcławowicz-Gyurkovich & Godula-Węcławowicz, 2021).

Answering to Chałubiński's invitation Witkiewicz[10], Polish painter and art critics, come to visit Podhale. Here started the Zakopane Style history. Affluent tourists attracted by the beauty and health benefits of "undiscovered" mountains influenced the economy of the region, particularly the growth of Zakopane as a summer and health resort, which gave reason to construct new buildings, guesthouses and hotels (Moździerz 2020).

[9] Polish Tatra Society (PTT) – Polish: Polskie Towarzystwo Tatrzańskie - tourist organisation created in 1873, had a big influence on promoting Podhale and preserving culture and natural resources of mountains
[10] Stanisław Witkiewicz - Polish painter and art critic; his works popularised Zakopane Style, which he is claimed to invent (more about Witkiewicz in chapter: Stanisław Witkiewicz – father of Zakopane Style)

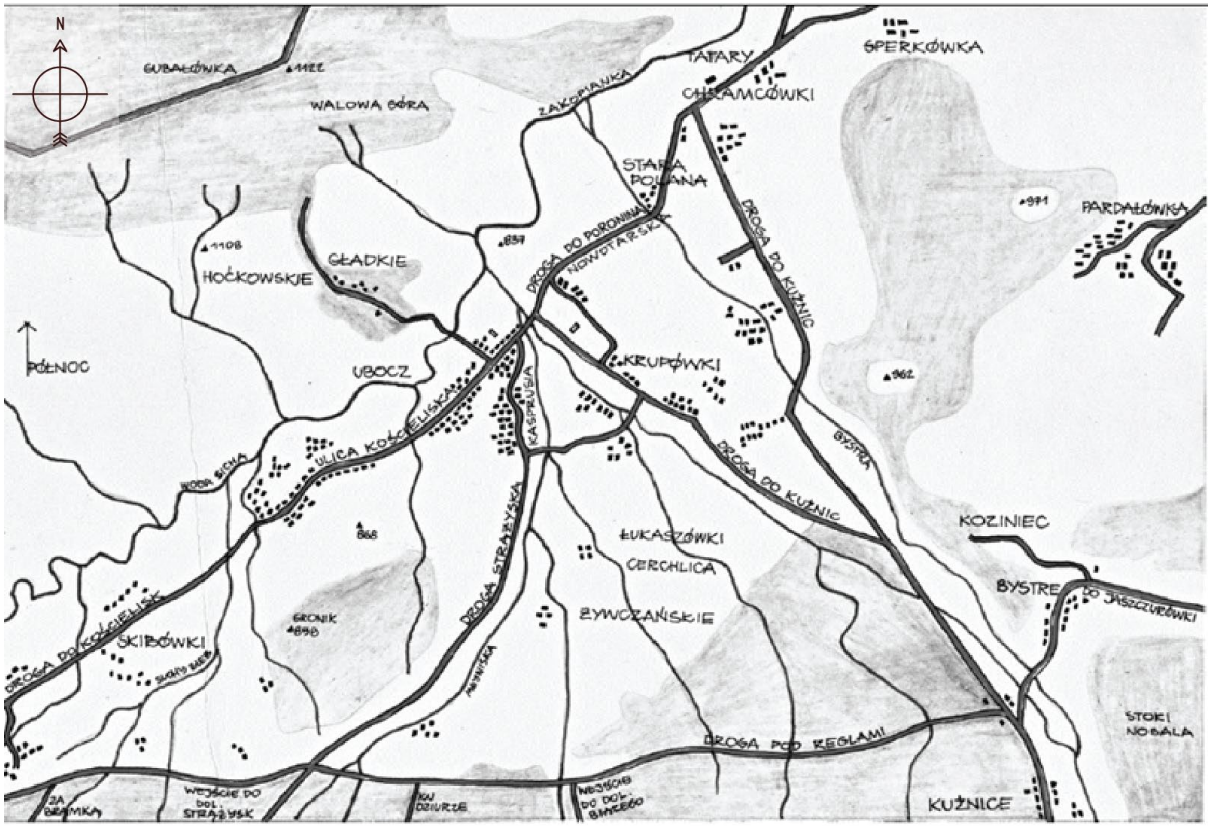


Figure 10 Plan of Zakopane - tourist Guide by Walery Eljasz, 1881 W. Eljasz: Nowy ilustrowany przewodnik do Tatr i Pienin, Kraków 1881, (from archives Moździerz.Z)

akopane, firstly a summer resort at the beginning of the 20th century, gain also popularity among winter sports lovers. It was a host city of the FIS[11] World Championships in 1929, 1939 and 1962 (Kwiatkowski 2019). The 20th century two World Wars brought poverty and death, which did not spare the region. However, when the geopolitical situation started to be more stable in the second part of the 20th century the Podhale region did regained fame. In 2019 Zakopane Commune had 27010 inhabitants, population density of 321 people/1 km^2(GUS 2020).

Highlanders created The Polish Highlanders Association to cultivate traditions, enhance knowledge about region and finance cultural activities. Along with PTTK[12], association is still working organisation that preserve the culture and Podhalan's architecture.

[11] FIS- International Ski Federation
[12] Polish Tourist and Sightseeing Society – in 1950 Polish Tatra Society (PTT) was recreated after IIWW but under a different name – PTTK polish: Polskie Towarzystwo Turystyczno-Krajoznawcze

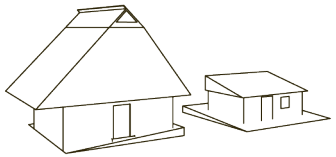
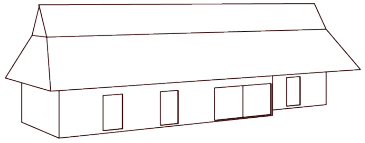
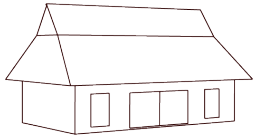
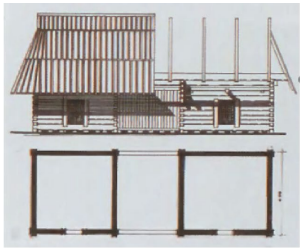
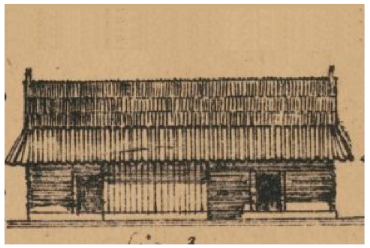
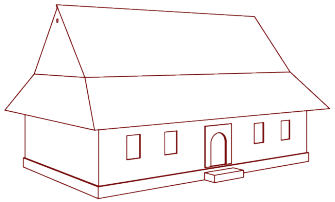
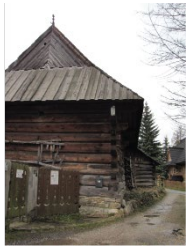
Podhale vernacular architecture

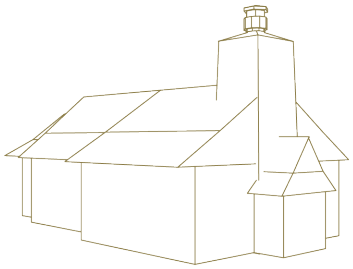
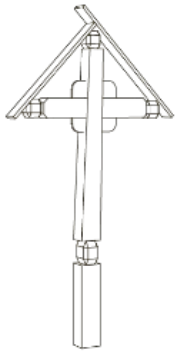
The beginning of vernacular architecture in Podhale were shepherd's huts used also by *hawiarz*[13] and outlaws that flew to hard-to-reach areas of mountains. (Moździerz 2020) These were temporary/seasonal buildings, erected hastily, usually without the participation of qualified carpenters. The most characteristic were stone sheds, low-log huts and high-log narrow-front and wide-front huts.

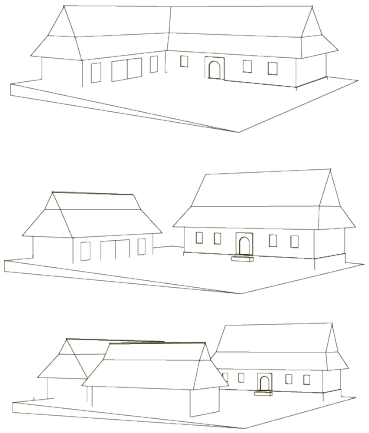
Figure 11 The hut on Krzyżne 1894-1898 photo: W.Radzikowski

Figure 12 Hut in Mała Łąka Valley 1890-1900 photo: W.Radzikowski

[13] Hawiarz- formerly Tatra miner

Table: Main typologies of buildings in vernacular architecture			
	scheme	examples (if no source = author Z.Miłek)	notes
hut		  (Radzikowski, n.d.-b)	Not a lot of huts were preserved. They were mostly hastily erected structures without paying attention to details or decorative aspects.
service buildings/ shed / stable etc.	 	 (Matlakowski, 1892)  (Matlakowski, 1892)	Service buildings consist of sheds, stables, granaries, pigsties, and chicken-coop, which provide shelter for cows, and sheep. Characterised by small openings and one centrally placed *boisko* - a place opened to both sides. Roofs were similar to house structures with decorative elements such as *pazdur* (at the end of the ridge)
house		  	Houses were varied from each other. Often had additional sheds or roofed entrances. Most characterised were the shape of roofs and rich decoration both inside and outside. The vast majority of houses were oriented N-S so the entrance was in N direction.

sacral buildings		  	Podhalan vernacular architecture did not have a different shape of a church than other Highlanders in north Karpaty. However, part of the solutions were implemented e.g. roof shape on added later volume or interior decorations. Here is worth mentioning the Gothic, wooden parish church in Dębno, which is close to Podhale and was enlisted in the UNESCO list along with other churches localised east of Podhale, but not so remotely so the patterns and way of building Podhalan churches could follow.
crosroad crosses /chapels/ cementary		   (source:I-tatry.pl)	Crossroad and cemetery crosses were inspired by local carpentry by carved decorations and even by the shape of tiny roof that creates characteristic bend on the ridge.

homestead			Together houses and service buildings created homesteads that were placed or L or U shaped. Courtyard was mostly only partially paved by plain stones.

Functional plan

Gorals'[14] settlements were placed in the most accessible areas with water supply. Buildings were built not very tightly to each other, and most of the time they did not share wall or roof. In the late 19th century book describing way of living and building in Podhale is telling that all Gorals buildings, no matter if they are close to stream, on slope or plain, all of the houses are oriented north-south. It resulted in the situation where from road, which was not east-west directed, could be view on houses under different angles. Structures did not follow the orientation of the road. Main entrances to the houses were on north side of the building, so even when the road is from south from building the access would be throughout courtyard (Matlakowski 1892). Later in, this arrangement sometimes was changed, in order to have an entrance form the road. Moreover, in buildings erected in second part of the 19th century and later it could be observed the tendency to start to orient a house toward the road e.g., on Kościeliska St in Zakopane are late 19th century vernacular houses that are slightly turned toward the road.

Figure 13 Chochołów, visible orientation pattern; source: Google Maps

As visible in the the picture above, in some villages, the orientation of buildings was continued even in newer structures.

[14] Gorals - Polish Highlanders; (singular: Goral / Góral)

Primary permanent settlements basic type of buildings were single-building homesteads- a one-room house with a *sień*[15] and a stable/barn. At the end of the 18th century, and more commonly in the first half of the 19th century, they were replaced or enlarged to two-building homesteads - a two-room house with a *sień* and a utility/stable / barn building from the west side. (Możdzierz, 2020) Mostly the service building was perpendicular to the house, to achieve the shortest way of communication under the eaves in case of rainy or snowy days. In richer homesteads, there was more than just one service building that either was placed along the first one on the western side or was closing courtyard in U-shape (Matlakowski, 1892).

Service buildings consist of *szopa* (storage/granary), *boisko*[16] (middle part of building with openings from both sides), barn, stables and pigsty. If the family owned sheep there was a building for sheltering them and their food for winter. Most of the service buildings had an earthen floor, but if it was paved were used big stone slabs called *skrzyżole*. This paving type might also be placed in courtyard and cellar ceilings (Baniowska-Kopacz 2014).

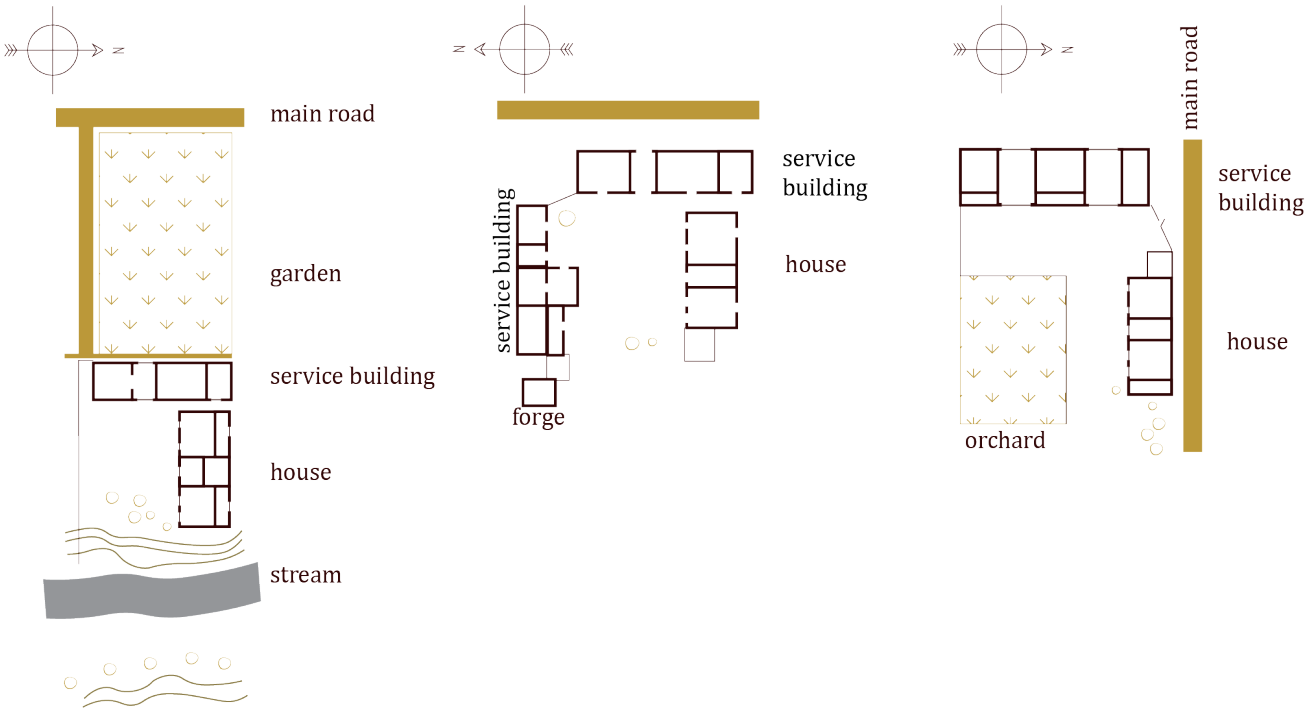


Figure 14 Graphic of examples of homesteads layout; based on drawings by Matlakowski

[15] *Sień*- entrance small room, located between the entrance and other rooms of the building
[16] *Boisko* – middle space in service building that has openings for both sides, used eg. for threshing grain

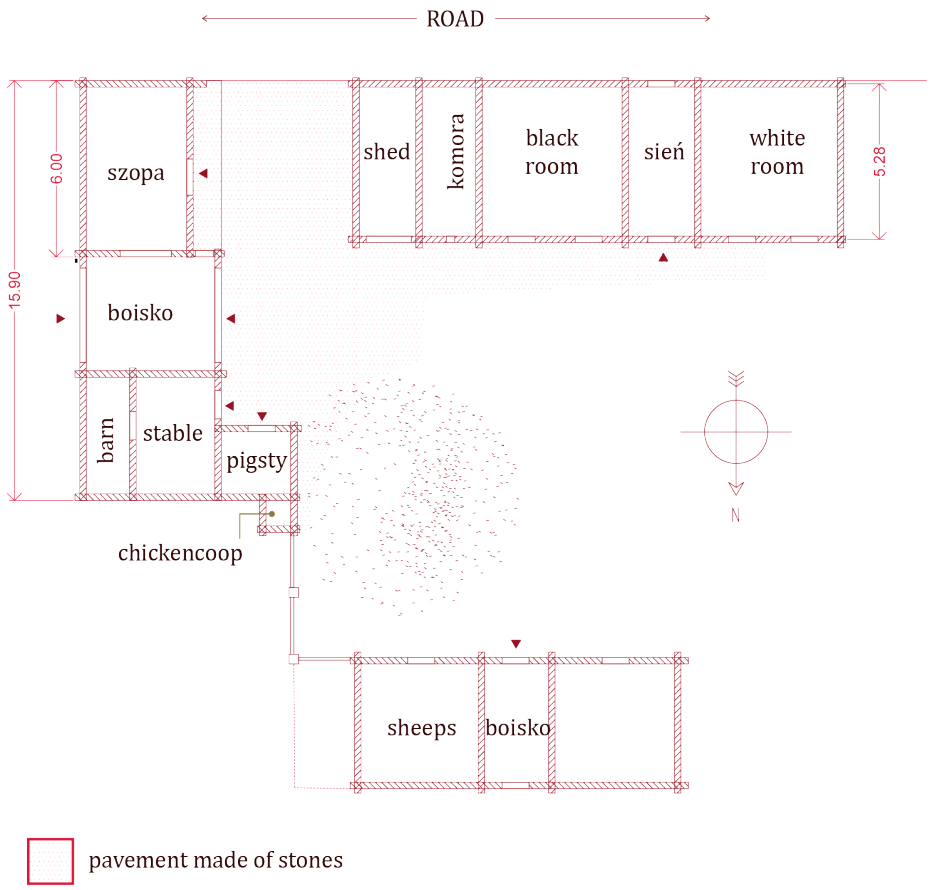


Figure 15 homestead of W. Michna on Furmanowa Str., Redrawn by author from: (Matlakowski, 1892)

Figure 16 Podhalan homestead from the 19th century (photo: J.Łaś)

Podhale had two popular types of houses: *śląsko-spiski* cottage and *podhlański* house. Windows were north-south-directed. Closely to buildings were planted trees to protect building from wind, torrential rain, and light strikes and save them from fire spreading. The most popular type was ash tree (*Fraxinus*). The close surrounding of the homestead was not fenced till late 19th century (Łaś 2016).

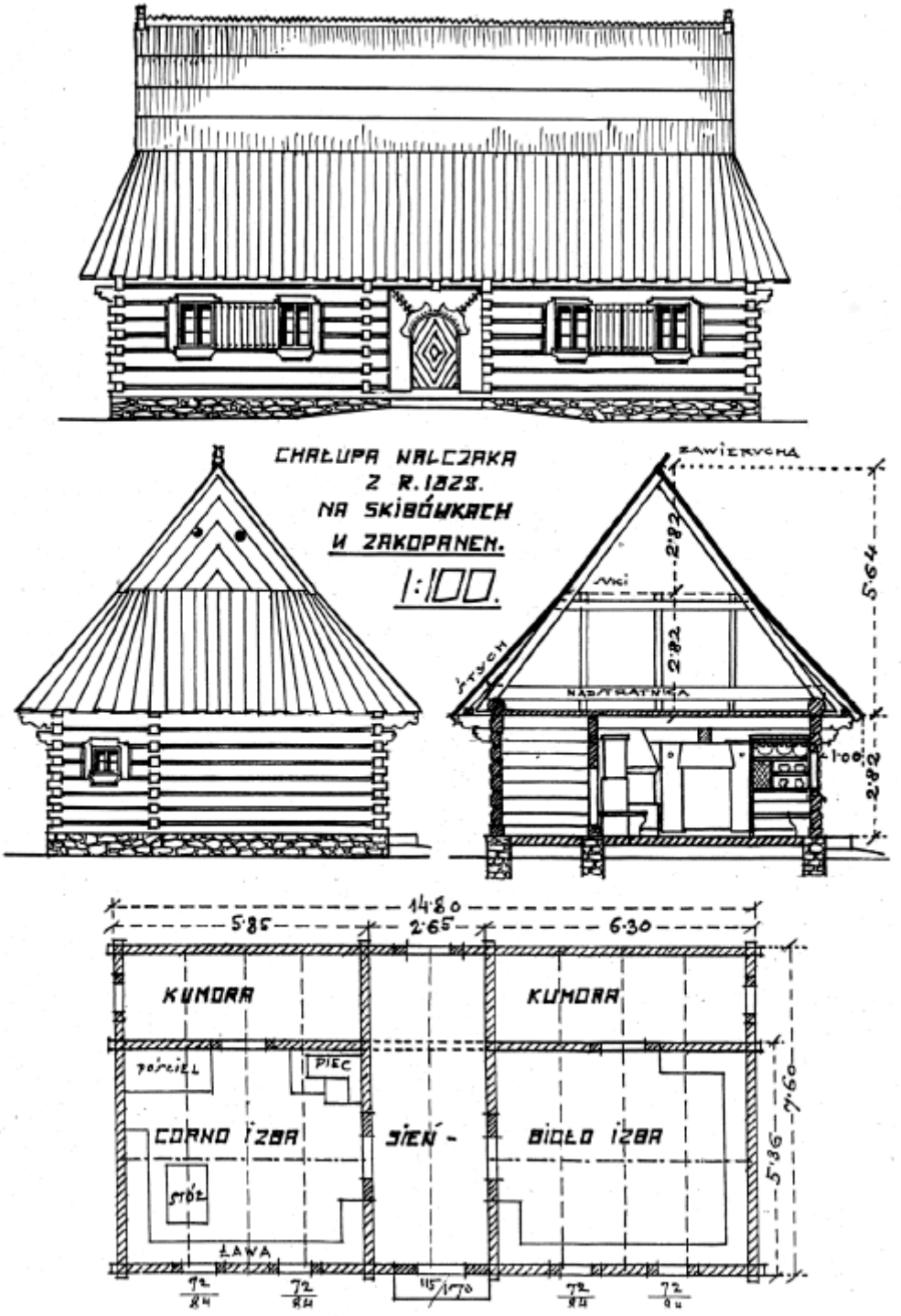


Figure 17 Zygmunt Ostfalin: Walczak's House in Skibówki 1828 (redrawn in 1940) two-rooms traditional house; Podhalański type (Tatra Museum archives)

Śląsko-spiski type – was on a long rectangular plan, one tract, enfilade building that has *sień* rectangularly shaped which connect "black"(that chamber was daily used, had stove, whole year life of family was going on there,) and "white" (that chamber was playing purely representative role – used during events such as weddings, Sunday clothes were stored there. It was the most decorative and clean room without stove) room called *izba*

(Kwiatkowski 2019). Black *izba* was named after the effect of darkening by smoke and covering walls with black soot from a hearth, which started to be directed into a flue to the attic from which smoke was leaving through small opening in the gable wall; till the second half of the 19th century, when the chimneys were introduced (Baniowska-Kopacz 2014).

Podhalański type – was like the *śląsko-spiski* type but was more symmetrical and often contains additional small room called *komora* that was used as storage. Additionally, to main volume were added sheds, which were used as storage, to cover the wood for winter etc. There were mostly having separate roof because they were added after completing the main building.

K - *komora* - service/ storage room

I – *izba* - black or white room

S – *sień* - hall

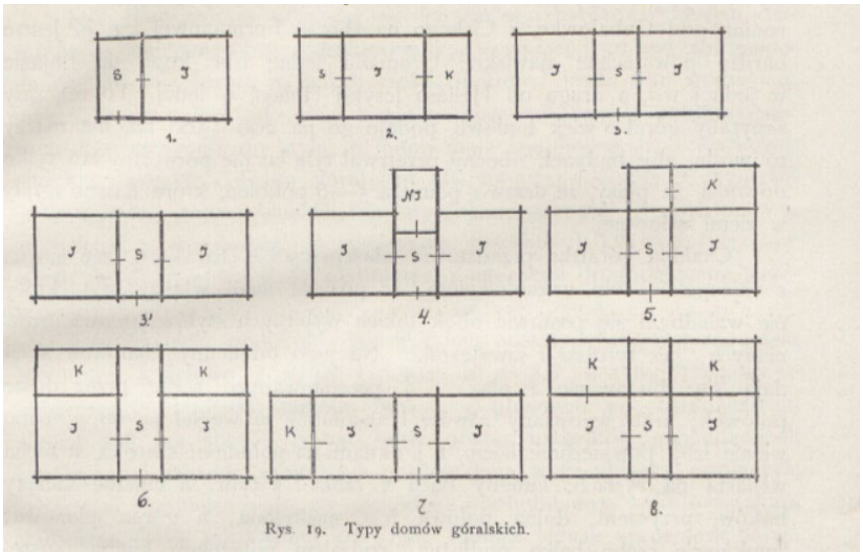
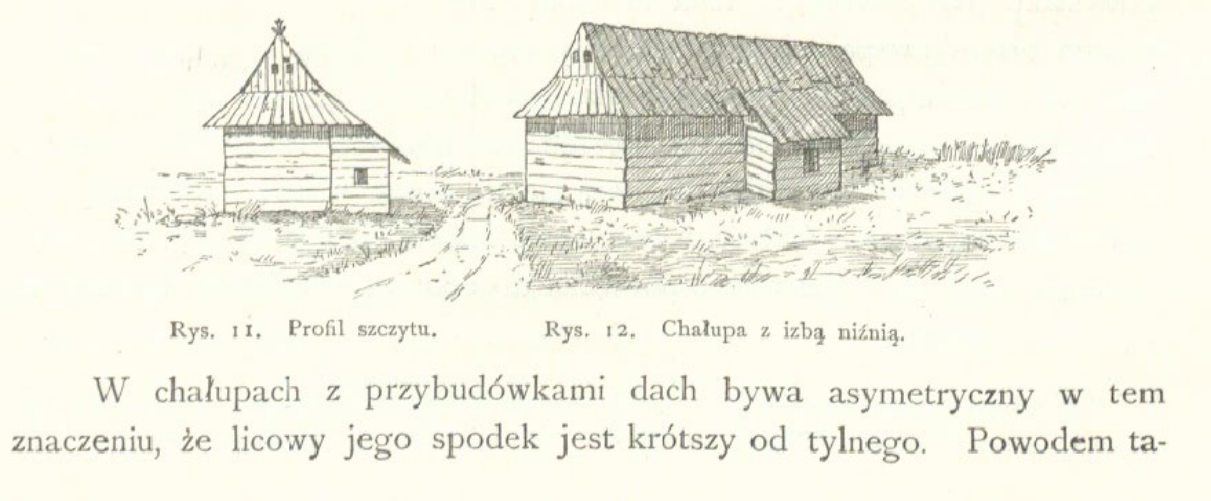


Figure 18 Different types of Gorals' houses (Matlakowski 1892)

Sometimes, in more affluent houses, to the central void was added *ganecek*- a little roofed, not glazed entrance. In the second part of the 19th century, along with increasing numbers of visitors and brought by them money, additional volumes were often added to principal buildings. Moreover, the frequent practice was renting white chambers to visitors. The room then was occupied the whole summer; often guests brought their own duvets and equipment stored in the house until the next summer. Attics were not used as living quarters, but after introducing a chimneys, they started to be used as storage and even additional bedroom. What is very interesting about the plans and construction system is

the possibility of dividing building among family members. A characteristic feature of a Highlanders' cottage was the mutual independence of both chambers connected only by a common roof. The space between them was closed after the house was erected entirely, thus creating a *sień*. Quite common practice was to divide a house among two brothers in a way that one part of the house, for instance, one room, was completely detached and moved to the other plot, even into another part of the village. It was performed, due to financial reasons, when the material was in good condition and of enough good quality to perform it (Matlakowski 1892).


Rys. 11. Profil szczytu. Rys. 12. Chałupa z izbą niźnią.

W chałupach z przybudówkami dach bywa asymetryczny w tem znaczeniu, że licowy jego spodek jest krótszy od tylnego. Powodem ta-

Figure 19 Asymmetric roof in houses with sheds and additional volumes (Matlakowski 1892)

Buildings materials

The Podhale region was not rich in terms of the amount of crops or easiness of animal husbandry; however, there was richness in forests that provided timber. This material is characterised by relatively high compressive, tensile and torsion strength, elasticity, low density and low thermal and acoustic conductivity. Another advantage is the easiness of processing and decorative aspects. The most commonly perceived weakness is the easiness of starting a fire, mainly in densely built areas. Although proper wood processing, maintenance and impregnation immensely minimalise the possibilities of fire spreading (Nagrodzka and Małozięć 2011). Another disadvantage of timber is hygroscopicity and related phenomena: shrinking and swelling, cracking and warping, soaking and difficulties in maintenance in high humidity. Timber processing hugely impacts the characteristic of each construction piece. As a region full of forests, Podhale offered the possibility of choosing a tree before cutting it down. It allows choosing pieces without

defects, not twisted and with branches that don't cause material degradation. Trees were cut down in March, before the spring growth. When deforestation in Podhale became a problem, choosing a perfectly appropriate tree was no longer possible. Highlanders were overcoming obstacles of not ideal materials with more meticulous processing. Nowadays, raw materials are most often obtained from areas damaged by harsh wind or drought in TPN[17] or brought from the forests in other regions such as Spisz or Orava (Łaś 2016).

Timber was mostly sourced from spruce and occasionally from fir, species that were the most popular in the region. Gorals[18] choose mainly spruce due to its better thermal insulation and visual quality such as lighter colour. While fir was used in floor construction; floorboards. Another species like oak was not popularly used, due to it very rarely growing in Podhale (if it was probably timber was imported from another region on lower altitude), although was seen as the hardest tree with the longest durability (Baniowska-Kopacz 2014). Apart from the tree species, it is also significant where it grew. The preferable place would be a dense mountain forest on the northern slope. There, winters are long, growth is small, a tree does not quickly add to its girth, so the tree has dense rings and is good for processing.

Second, vastly used material, which is easy to find in Podhale, were stones sourced from streams. Highlanders used them as parts that were dangerous by humidity – in other words where the timber would soak. Construction of foundations, cellars and filling of the gap between bottom log and wall were built of broken stones. Places requiring big stone slabs, called *skrzyżole,* were used as a flooring material in courtyards and farm facilities such as cowsheds (Baniowska-Kopacz 2014). In streams bed were sourced lime, sand and clay that mixed were used as agents.

Wood species

[17] TPN- Tatra National Park (Polish: Tatrzański Park Narodowy)
[18] Gorals – Polish Highlanders

Wood species

Spruce / *Picea abies* / *Świerk*

eng. / *lat.* / *pol.*

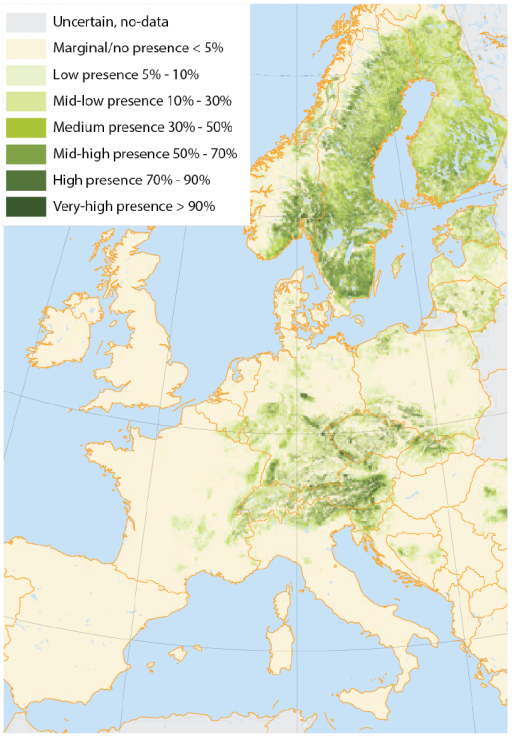
other names: Whitewood, Norway spruce

General description:

- main species in the Boreal and subalpine conifer forests,
- height about 30m (up to 55 m),
- diameter of about 60 cm (up to 1,5 m),
- colours : creamy white / light yellow / red-brown
- heartwood is not distinct from sapwood
- one of the most important coniferous species in Europe both from an economic and ecological point of view
- low fire tolerance
- shallow root system - as a result it is less resistant to windthrow and rock-fall
- tendency to split when nailed

(Caudullo et al., 2016)

Uses:
For stuctural purposes both indoor and outdoor. In Podhale used for wall, roof stuctures. Also used in joinst that fastened vertically logs in wall.



distribution map estimating the relative probability of presence (Caudullo et al., 2016)

isolated spruce in a mountain field (Caudullo et al., 2016)

Physical characteristics:

Density (at 12 % moisture content)	441 kg/ m3
Total longitudinal shrinkage	0.3%
Total radial shrinkage	3.6%

Mechanical characteristics:

Tension strength	95 N/ mm2
Compression strength	44 N/ mm2

Natural durability and treatability:
(according to en 350-2)

Fungi Class	4 –poorly durable
Dry wood	borers susceptible
Termites Class	S susceptible
Treatability	3-4 poorly or not permeable

Wood species

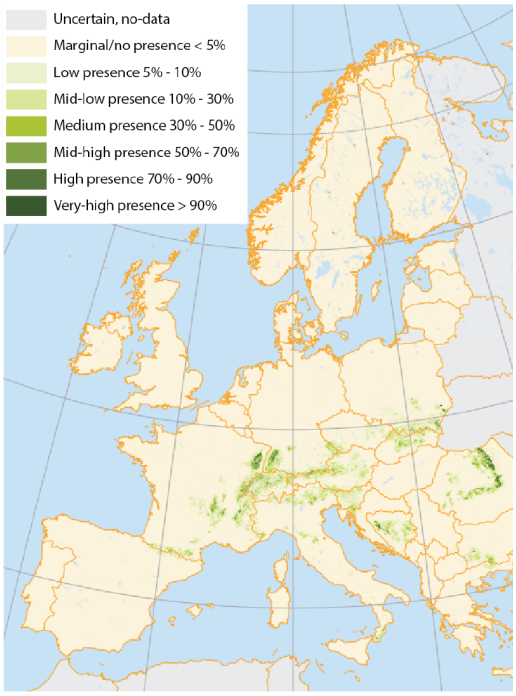
Fir / *Abies alba* / *Jodła pospolita* / *L'abete bianco*
eng./ *lat.* / *pol.* / *it.*

other names: Silver fir, Sapin

General description:

- mainly distributed inin Central Europe montane areas
- height about 40m ,
- colours : white / violet shades
- heartwood is not distinct from sapwood
- one of the most important coniferous species in Europe both from an economic and ecological point of view
- low fire tolerance
- susceptible to frost desiccation due to late spring frosts
- good strength properties
- slight tendency to split when nailed

(Caudullo et al., 2016)



distribution map estimating the relative probability of presence (Caudullo et al., 2016)

Uses:
For stuctural purposes both indoor and outdoor. In Podhale spruce was rarely used for wall, roof stuctures; mostly for floor construction; floorboards.

Physical characteristics:

Density (at 12 % moisture content)	441 kg/ m3
Total longitudinal shrinkage	0.1 – 02%
Total radial shrinkage	3.8 %

Mechanical characteristics:

Tension strength	84 N/ mm2
Compression strength	45 N/ mm2

Natural durability and treatability:
(according to en 350-2)

Fungi Class	4 –poorly durable
Dry wood borers	susceptible
Termites	Class S susceptible
Treatability	2 – 3 poorly to moderately permeable

Young fir near Zwardoń villagein Poland (Caudullo et al., 2016)

source:(Caudullo et al., 2016)(Fellner, n.d.)

Wood species

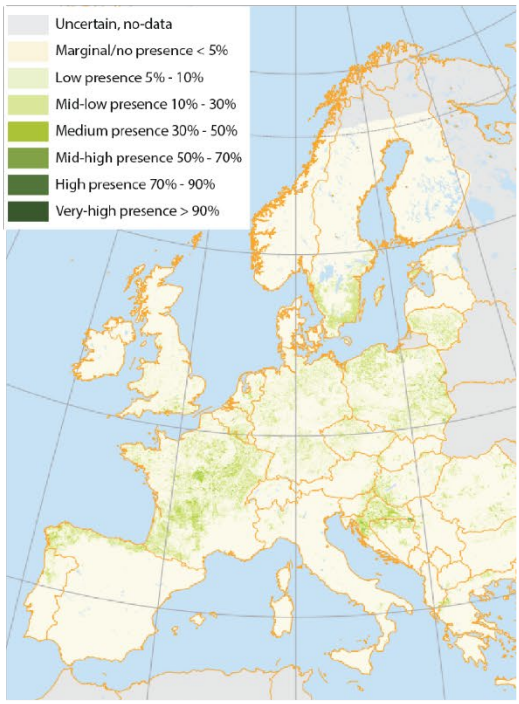
European Oak / *Quercus robur* / *Dąb szypułkowy*
eng. / *lat.* / *pol.*

other names: European White Oak

General description:

- distributed in most of Europe
- height 20 – 30 m ,
- diameter about 40 – 80 cm
- colours : white / violet shades
- sapwood is thin; heartwood is light brown to dark brown
- one of the most important hardwoods
- good strength properties
- the wood is dense, slightly acid

(Caudullo et al., 2016)



distribution map estimating the relative probability of presence (Caudullo et al., 2016)

Uses:
It does not grow in Podhale region, so it as mostly transported from other areas, wchich caused it hiher price.Used for furniture and decorative elements.

Oak near Łuniew village in Poland (Caudullo et al., 2016)

Physical characteristics:

Density (at 12 % moisture content)	702 kg/ m3
Total longitudinal shrinkage	0.4 %
Total radial shrinkage	4.3 %

Mechanical characteristics:

Tension strength	90 N/ mm2
Compression strength	61 N/ mm2

Natural durability and treatability:
(according to en 350-2)

Fungi Class	Class 2 durable
Dry wood borers	durable
Termites	Class M – moderately durable
Treatability	4 – not permeable

source:(Caudullo et al., 2016)(Fellner, n.d.)

Construction technology

Base

In no plainly shaped landscape, Gorals were finding, most desirable, quite a flat surface in which they were placing layers of substructure that was also flattening the place. However, often even after place preparation, there was a significant slope on the plot. On the *węgieł*[19] were placed large stones called *pecki*. Which were only half dug into the ground and sometimes laid only from the slope side. Inside were placed middle-size stream stones and pebbles. From outside, these "foundations" were covered by soil and grass, so the wind was not able to blow throughout. Sometimes if the slope was big instead of filling a whole space necessary to build on flat was constructed a cellar that was available throughout the opening inside in floor deck. (Matlakowski 1892). There can be found also buildings in which the wall frame was placed directly on the ground - mostly in service buildings. Along longer walls, directly on the prepared ground, were placed rough logs – *podwalina* (Baniowska-Kopacz 2014).

Figure 20 [left] Corner of a mountain hut in Strążyska Valley with visible rough foundation (photo Z.Miłek)

[19] *Węgieł* - corner of the two outer (vertical) walls of the building; structural framework connection system crowned construction when the *płaza* in adjoining walls are joined at the corners by complex carpentry locks

Figure 21 [right] Corner of Sabała's House, Zakopane. Visible pecki (photo Z.Miłek)

Walls

The most popular technique for raising the walls was using a blockbau structure. Logs were processed in site of construction to fit perfectly with other pieces. Trees chosen for construction needed to be healthy, without defects and with desirable size. Then they were debarked and seasoned. After the time of drying, they were squared. Trunks were cut along the length into a piece named *płaza*. In corner crowned connections called *węgieł*, all logs were interlocked with lap joints that were constructed by notching logs at the end and blocking notches inside(Baniowska-Kopacz 2014). So, the term *węgieł* is not only associated with corner of the building but also with the overlapping join connection in corners. Among the types of corner connections in blockbau constructions that were built in the Podhale can be included:

- Saddle notch corner joint without protrusions (double half lap joint with pegs)
- Saddle notch corner joint with protrusions (double half lap joint with protrusions)
- Dovetailed lap joint
- Lap joint (Slavic lap joint) lap joint with key locking

And the most popular one that was the most characteristic for Podhale region:

- Podhale lap joint (Highlander scarf joint) lap joint with key locking.

Additionally, the *węgieł* could be strengthened by extra fastening. Characteristic for Podhale architecture was *czop*[20] fastening in corners. It is not always possible to say how particular *czop* connections work since it is not visible outside, as a result, many connections were understood during the renovation and restorations works. It is a more complicated and complex connection than for instance dovetail joint – that also could be seen in Podhale – and has many varieties (Pawlicki 2010). They were transformed over time and used not only in *węgieł* but also in fastening interior walls with exterior frame. Those connection is called "blind *węgieł*" because it does not create corner of building but just like insert interior wall into external.

[20] *Czop*- Technical expression for the type of binding of *płaza*-s in *węgieł*. The notched end of each *płaza* has a tenon and an appropriate mortise - single or double(Pawlicki 2010)

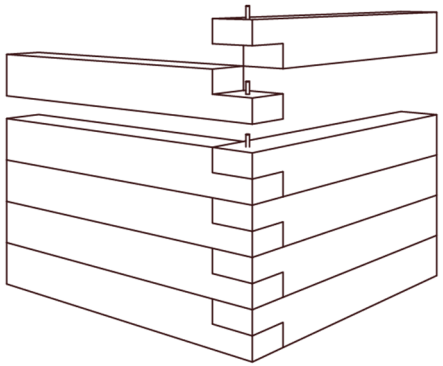
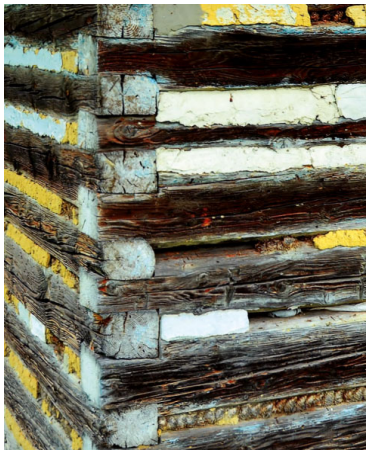
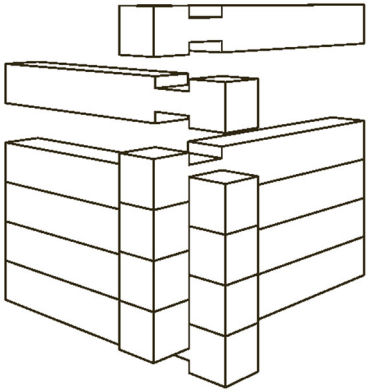
Different solution of connecting logs were used during adding new rooms to main volume. Than the pillar was used – placed tightly to existing wall erected in *węgieł* - overlapping way was having constructional function that the new logs were supported by it. Pillars than marked the place where the building was expanded and allow today to see the history of the building (Łaś 2016).

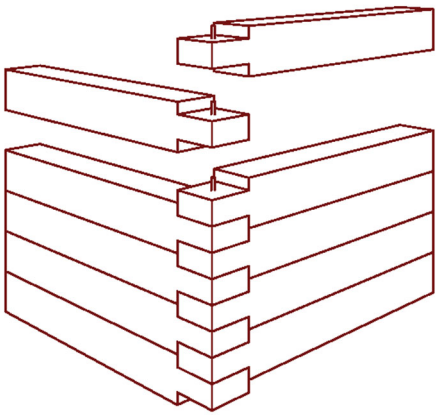
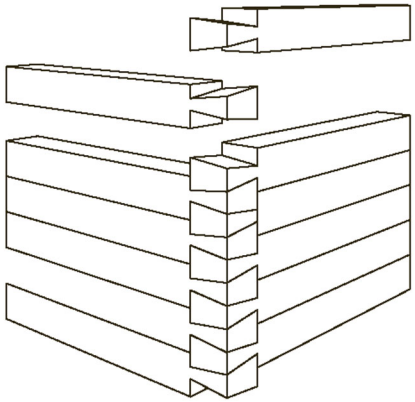
Figure 22 Visible connection of added to house volume, Zakopane (photo Z.Miłek)

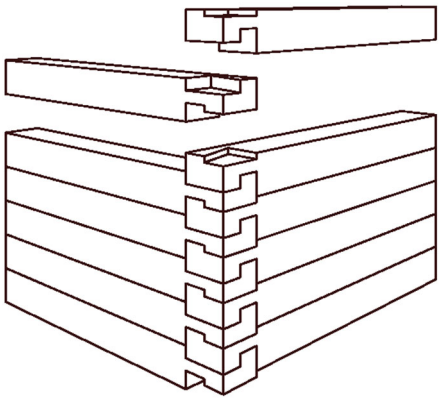
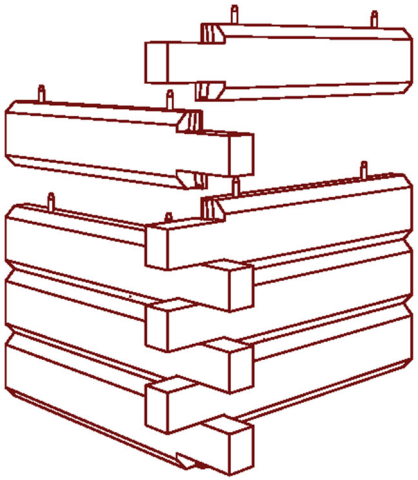
The construction of sheds, that were added to houses was different. The system was post-and-plank, which means that timber pillars were supporting horizontal planks in a frame way. Those structures were not designed to

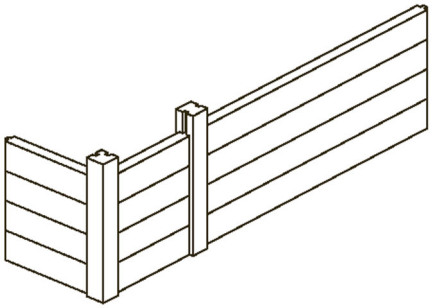
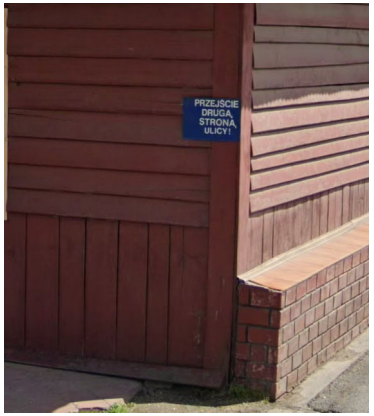
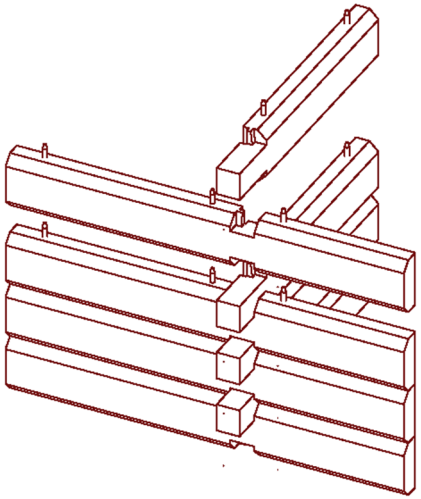
keep warm. For them were used the worst quality of wood that would not be sufficient for the house. Horizontal planks were not smoothly overlapped so the wind was able to blow through fissures – this feature was desired when sheds were used for wood storage(Pawlicki, 2010).

An average wall was built on ten courses of logs height. In the construction of the walls out of *płaz* always were used joints – *teble*. Inside each log were drilled holes, and into them inserted wooden pegs – *teble* – to fasten together logs and not allow them to distort. Average *tebel* had diameter 4 cm and was 20 cm long. It was put into two touching logs. They were mostly done out of fir or spruce. The holes were drilled on construction site, during assembling by *teblok* – manual drill/ gimlet (Pawlicki 2010). Pillars were used in house construction only in doors and windows, and as mentioned in ancillary volumes.

		Type of joint	joints scheme	Photo (where no source author =Z.Miłek)	brief description
wall joints	corner connection in crowned construction *Polish: Złącza ścian wieńcowych w narożach*	Saddle notch corner joint without protrusions (double half lap joint with pegs) *Na obłap bez ostatków (nakładka obustronna z kołkowaniem)*		source: NID.pl 	Rarely seen in Podhale and it is hard to find it in modern realisations.
		Saddle notch corner joint with protrusions (double half lap joint with protrusions) *Na obłap z ostatkami (nakładka obustronna z ostatkami)*			Not often used, but still visible in modern realisations. In vernacular architecture mainly in huts, shelters in mountains.

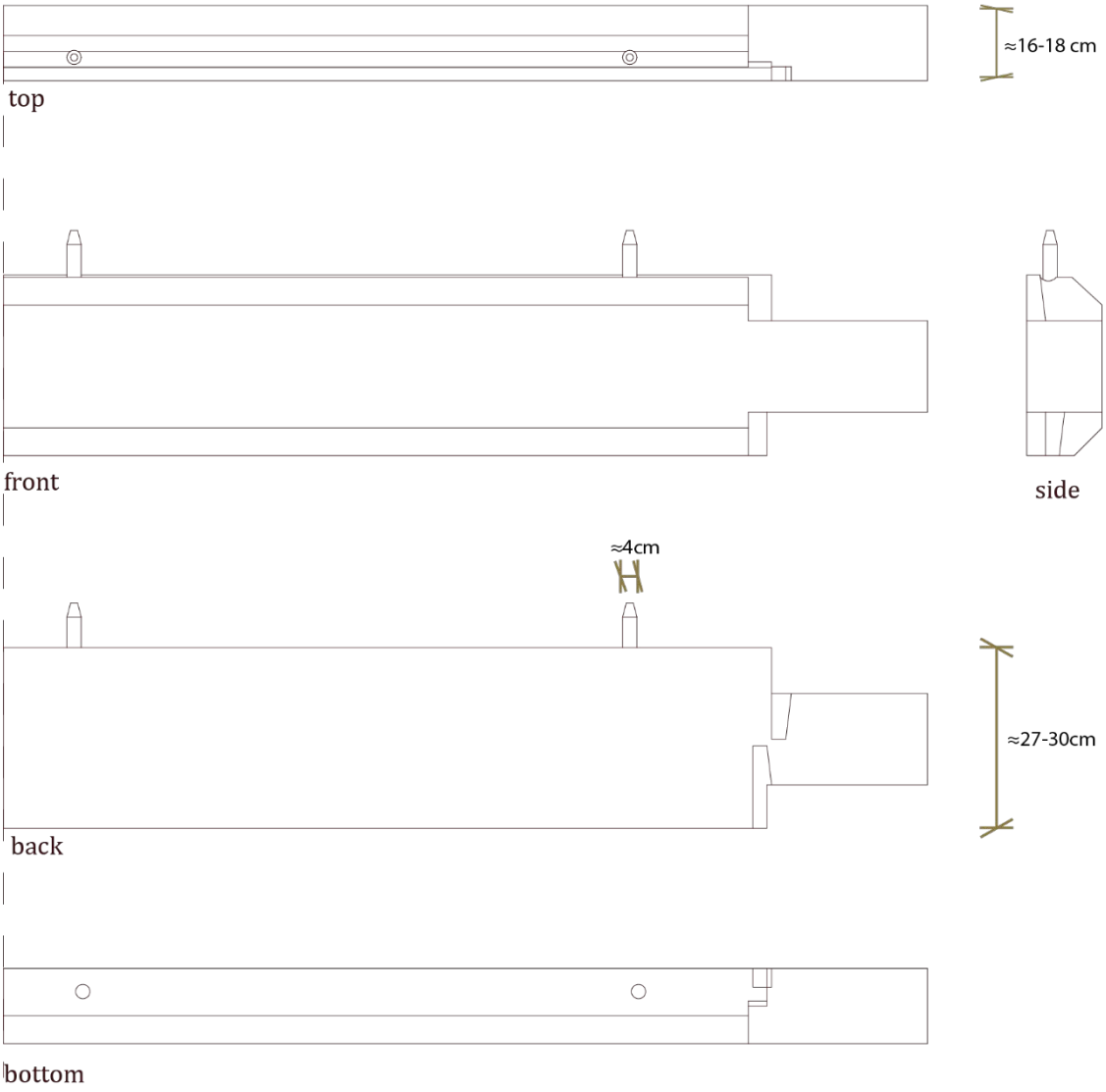
		Finger lap joint (double lap joint widened on both sides) *Nakładka płetwowa(nakładka obustronna poszerzana)*			Not often used in Podhale.
		Dovetailed lap joint *w jaskółczy ogonw jaskółczy ogon* *known also as:* Lap joint (Slavic lap joint) lap joint with key locking *Zamek płetwowy (zamek słowiański)*		source:NID.pl 	Not often used in Podhale.

		lap joint with key locking *na zamek*			Example from photo found in the service building.
		Podhale lap joint (Highlander scarf joint) lap joint with key locking *Zamek podhalański (zamek góralski)*			The most popular in preserved vernacular architecture and in Zakopane Style realisations. A wedge-shaped tenon is put into a notch in the next *płaza*. *Teble* - securing the *płaza* vertical position.

	post and planks *sumikowo-łątkowe*			source: Google Maps 	Construction in vernacular architecture was used in sheds, additional volumes were added to existing houses or service buildings.
connection of externalwall- internal wall elements	Connecting elements with notches	Podhale lap joint (Highlander scarf joint) lap joint with key locking			The most popular connection of internal wall and log-outside structure.

Podhale lap joint (Highlander scarf joint) lap joint with key locking

The dimension mignt differ, because logs dont have exacly same sizes.



photos from Zakopane Tatra Museum

1

2

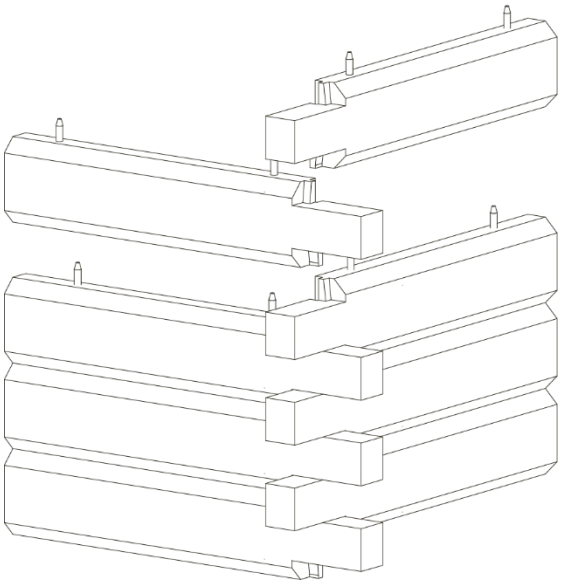
photos: Z.Miłek

1 Corner connection model by Witkiewicz without added insulation - mek

2 section of vernacular house wall with insulation

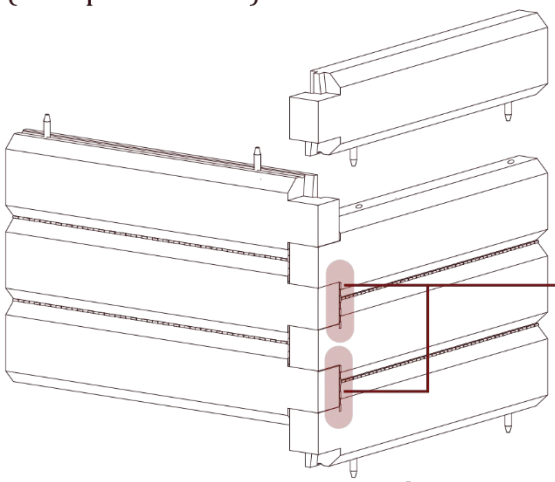
axonometry / plan was done basing on model of connections from Tatra Museum and drawings of S. Witkiewicz for project of villa"Pod Jedlami"

photos from Zakopane of orner connections

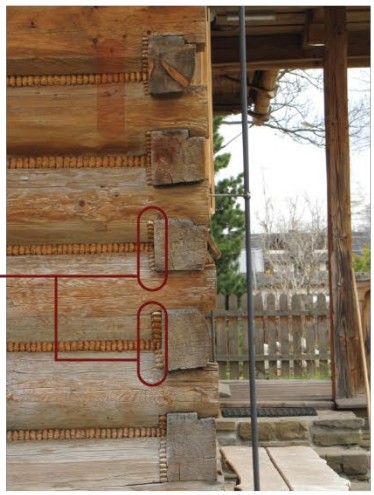


corner connection half-covered
(with protrusions)

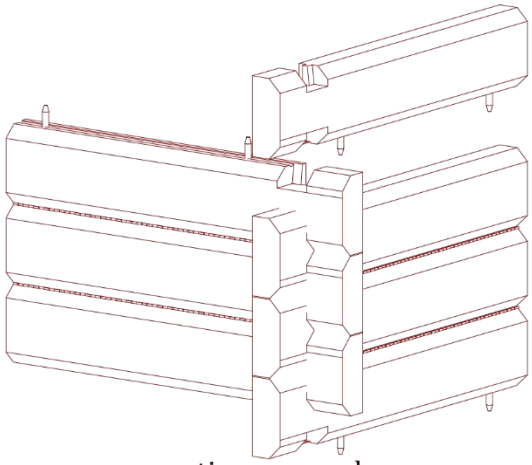
vestybul in church MB Częstochowskiej



corner connection notcovered
(without protrusions)
and with mek (insulation)



vernacular house on Kościeliska St.



corner connection covered
(with protrusions in płaza shape)
and with mek (insulation)

Zakopane Style villa in Kościeliska St.

photos Z.Miłek

Figure 23 Apart from division shown on previous page there could be distinguish different types of płaza shape – some of logs were shaped with leaving rounded edges, others were formed to sharp edges

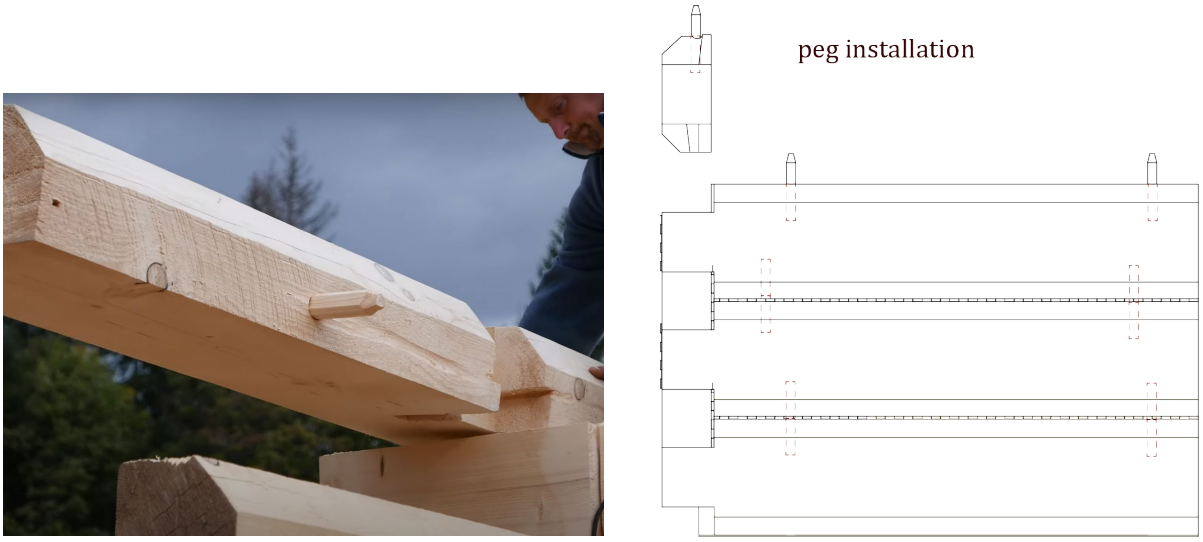


Figure 24 Peg installation (source: Studio 51 - biuro architektoniczne)

Process of sourcing płaz was not easy, for that were used the thickest trees than trunks were cut in half in a longitudinal direction. For cutting first technique was to drill holes and split the log with wedges. The second, far more popular in the 19th century was using a mechanical saw called *troc*. After splitting, the flat surface was whittled and planned (Łaś 2016). In the article *"Drewno w Architekturze i Krajobrazie Podhala"* the author is giving few probable reasons why Gorals were not using thinner pieces of wood:

- harsh climate,
- already high knowledge about carpentry
- probably aesthetic motivations (Łaś 2016)

The choice of płaz as a building material affected positively thermal insulation – in big pieces there were not necessarily numerous connections that might cause thermal bridges. Big sizes of elements make the *węgły* more stable and connections between logs more thermally efficient, *płazy* were approximately 16-18 cm thick. Aesthetical reasons might be explained that inward part of wall was smooth.

Płazy were placed meticulously, although the insulation between them was still needed. *Mek* was put into fissure that was approximately 2cm. It is a material created of braided long wood shavings. Those braided elements – *skrątki* – were stuck so extremely tightly into the gaps that it was said that driving a nail should be as hard as it would be in wood. The insulation was recommended to be fixed and filled cavities after two heating seasons (Pawlicki 2010). If the house was created out of *płazy* for thermal insulation was used *mek*, which mostly was not visible on smooth part, although in time sometimes as added also into internal walls. The etymology of the word *mek* might inform how the chinks were filled before the wooden shaving was used - *mek* in Highlanders' dialect means *mech*; English: moss. Later additions to main volume such as *ganecek* could be risen in frame technique along with the use of timber of lower quality.

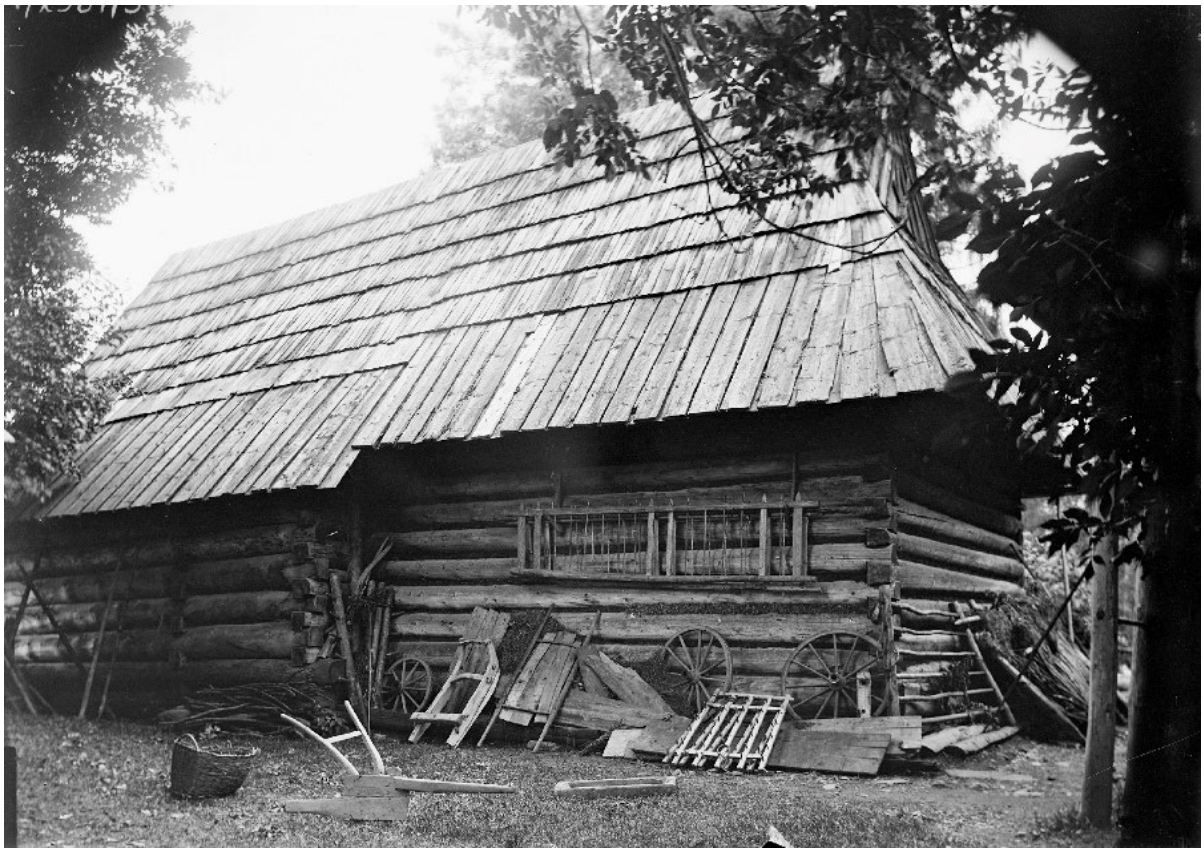
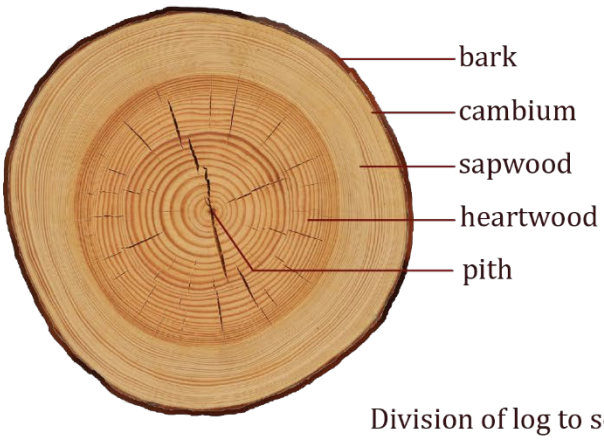


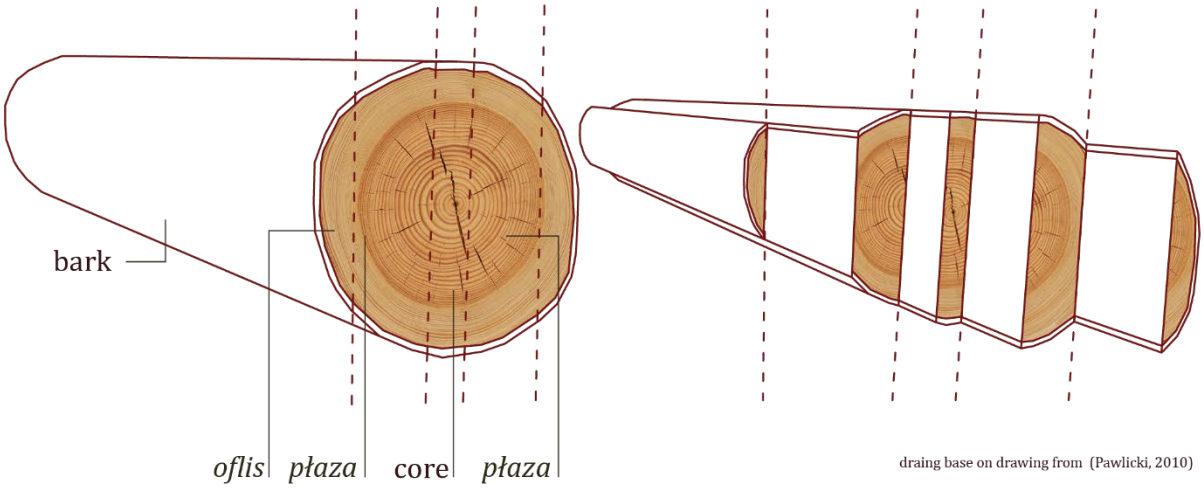
Figure 25 Zakopane cottage 1895-1905(“Photo: Zakopane Cottage 1895-1905,” n.d.)

> *“Starting from the ceiling, supported in the middle by a single beam: sosręb, decoratively hewn, in the middle of which there is the year of erection of the cottage, ending with the table, stools, a shelf on which faience, often old and interesting bowls shine, a certain type of beauty, style, a certain repetitive character of the lines is reflected everywhere. In general, a Highlanders’ cottage is a higher type of construction, in which the useful side is decorated with the expression of certain aesthetic needs. It is no longer a raw material, but a quite refined style, from which independent and new construction could develop.”*
>
> (Witkiewicz 1891)

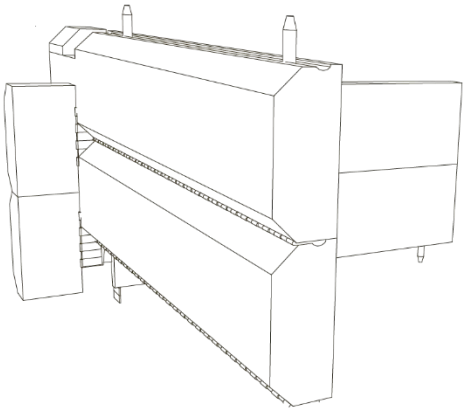


Płaza could have diferent size but usually it was 16-18 cm wide. “Face” of płaza could be very flat but also a little rounded. Between was inserted thermal insulation called *mek* - made of braided wooden shavings.

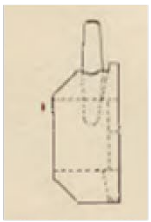
Division of log to source *płaza*



draing base on drawing from (Pawlicki, 2010)



Shapes of tongue and groove were in different variations (could also be smooth connection)



(Witkiewicz et al., 1911)

(Miłek.Z)

(Miłek.Z)

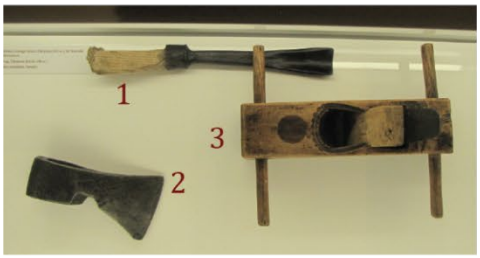
Builders and their tools

M. Gąsienica with carpenters workers during construction of Villa "Koliba" in 1893 (Moździerz, 2003)

visible tools:(from left) plane tool, square tool and bucksaw.

carpenters workers during construction of Villa "Koliba" in 1893 (Moździerz, 2020)

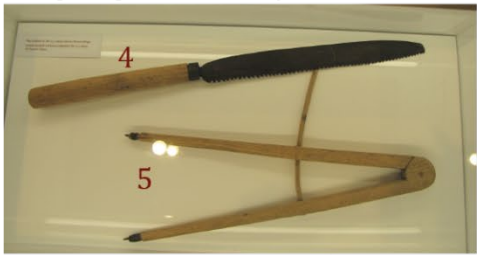
visible tools:(from left) adze, plane tool, adze and hand saw



(tools from the XIX century; Tara Museum, Zakopane photo: Z. Miłek)

(source:Ethnographic Museum in Kraków)

1 woodcarving hand tool
2 ax (without handle)
3 plane tool
4 hand saw
5 carpenter's compass
6 shaving horse
7 gimlet - for drilling holes
8 drawknife - debarking tool and to shape wood by removing shavings

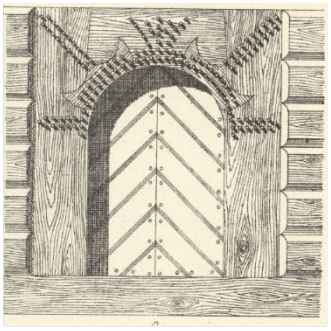


(tools from the XIX century; Tara Museum, Zakopane photo: Z. Miłek)

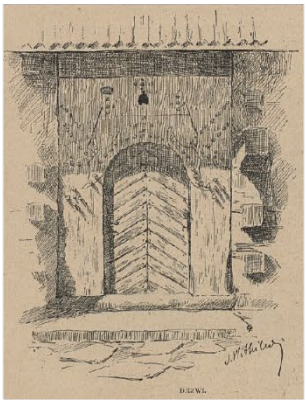
(source:Pawlicki, 2010)

Openings – windows and doors

According to Witkiewicz's observations, in Zakopane entrance doors were arched and very decorative. The creator of the Zakopane style noticed that the closer to Cracow they were losing their pompous effect (Witkiewicz 1891). Additional grace to this element were adding big pillars that often were decoratively carved and steps, to which were used flat stones. Door constructions to both rooms of a house were placed on the *podwalina* – wooden beam. Frame consists of pillars - about 30 cm thick - connected with a lintel on the groove called *ratka*. This joining is typical for Podhale highlanders. During construction, the ends of the *płaza*-s touching the doorposts were placed inside the pillars. The same technique was used in external door. After about three lines of *płaza*-s from the bottom, window pillars were placed at the height of the windowsill. They were identical to the door pillars, except that they additionally had a bottom part - a windowsill. The windows had small dimensions, around 60x80 cm to keep warm inside the building and to avoid pricy glazing. Window pillars, in difference from the main construction elements, were sometimes connected in advance by a carpenter (Moździerz 2003). For decoration, these pillars were chamfered - the edges were cut off. Moreover, sometimes there were used windows shutters that could be placed inside or more popularly outside. They were sliding type that blinded window as one element (Matlakowski 1892).

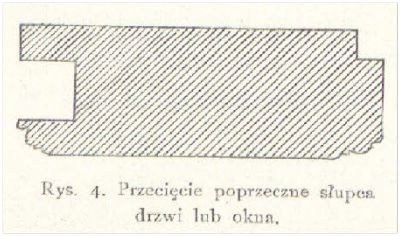


Drawings of entrance doors in Skibówka, Zakopane and Cichem. (Matlakowski, 1892)



Drawings of entrance doors by S.Witkiewicz, 1891 ←

cross-section of pillar for window or door (Matlakowski, 1892) →

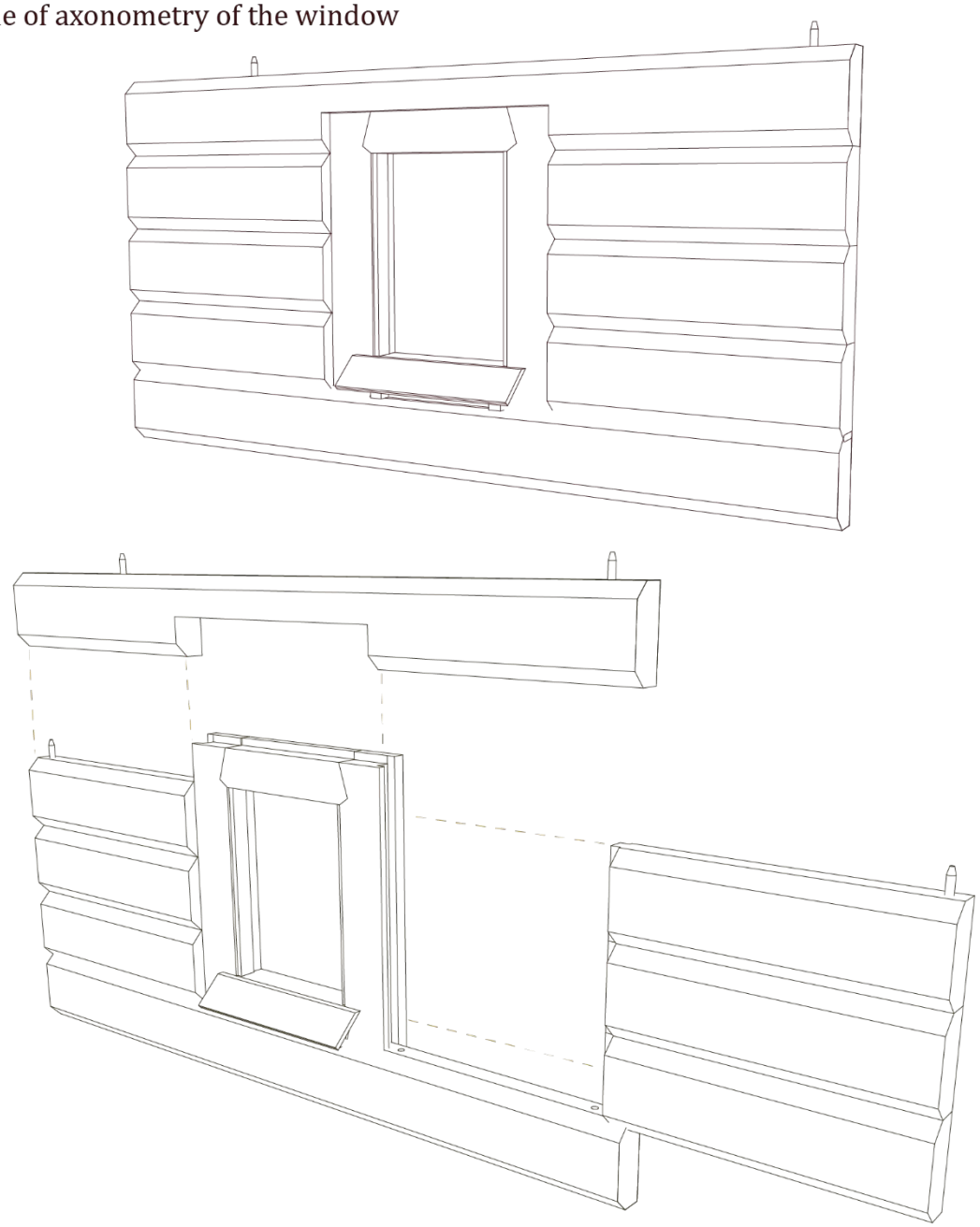


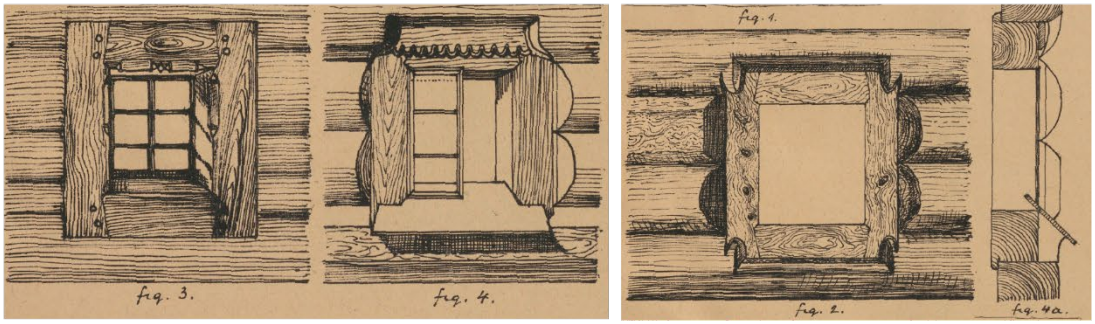
Entrance doors througout *ganecek* to Gąsieniców-Sobczaków house in Zakopane

Entrance doors to house on Droga Do Rojów St., in Zakopane

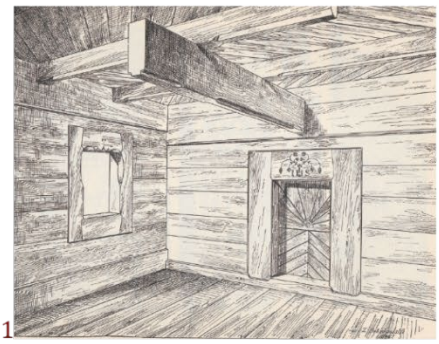
photos: Z.Miłek

Example of axonometry of the window





Examples of windows from (Matlakowski, 1892)



1

2

1 drawing from (Matlakowski, 1892)

2 inside side of window in Gąsieniców- Sobczaków house (vernacular architecture)

outside side of window in Gąsieniców- Sobczaków house after retrofitting interwention - double glazing

other vernacular houses along Kościeliska St. in Zakopane

7

8

7 villa "Koliba" by S.Witkiewicz

8 chapel in Jaszczurówka by S.Witkiewicz

Zakopane Style; different shapes of windows that follow folklore patterns but still the same assembly

photos: Z.Miłek

Roofs

Most houses had the same type of truss roof structure, in which rafters were stiffened by *bont*, the equivalent of a collar beam. A lower part of the roof slope is lifted up through the overhangs attached to the rafters -*przysztychy*. A specific change - resulting from the connection of a residential building with a service building in L shaped homestead - was the appearance of a roof valley. Even though roofs appeared as one, they were constructed separately as independent structures (Łaś, 2016).

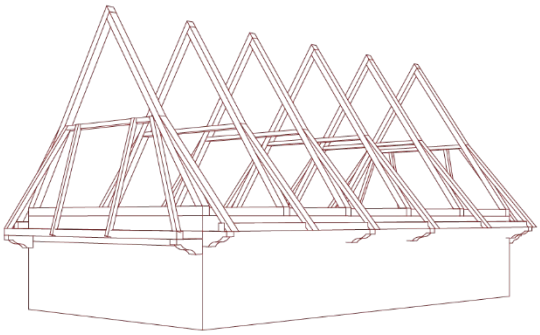
Throughout the centre of the rooms (not in *sień*) from the wall between the room and *sień* to the gable wall was placed a beam called *sosrębik* / *sosręb*– carrier beam that main function was to decrease the span of the supported construction of the roof. It was very neatly done with bevelled edges and zig-zag-like carved decorations, and an owner's initials along with the carved year of construction (Witkiewicz 1891). To this element were attached, in a grid manner, three smaller beams that were connecting with the front and back of the building. They exceeded the wall face – elements named *rysie* – on that part, the edges of a roof structure were supported. As a result of this construction system were created big eaves, cladded from below with clapboards, that were protecting walls from snow and rainfalls. Additionally, they were used to storey tools such as ladders and scythes in summer.

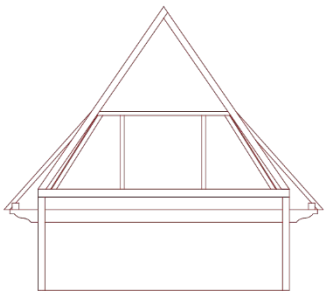
> *"In older houses, the ceiling was made of boards overlaying one another, pegged to the sosrębik beams with thick wooden dowels. Sometimes the ceiling was made of narrow slats pegged decoratively in a herringbone pattern. The sosręb beam was the most carefully made (…) A six-pointed star surrounded with a circle would by carved in its centre to protect the house against misfortune, especially against fire. The date of construction and various decorative motifs, usually vegetal, were carved to the sides of the star. Sometimes longer mottoes, or the name of the owner and even carpenter who built the house, were carved along the sosręb. Thus, the beam became a sui generis certificate of the house."*
>
> (Baniowska-Kopacz 2014)

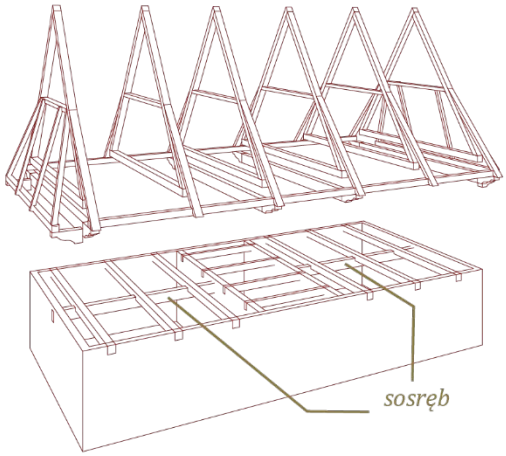
Above the ceiling level were added two logs to mask the uncovered place that was left after putting the wall frame, which also resulted in broadening space in the attic (Baniowska-Kopacz 2014b). The ends of the rafters in the Highlanders' house were gouged out and based on the previously mentioned *rysie*. Inside they are supported by purlins, with which they are connected by drilled openings in both elements. Gable edges were closed by downward slats which were usually decorated with characteristics for Gorals' house sun-shaped elements. The average snowfall is 216mm in January and the angles of roof slopes, which vary from 45 to 54 degrees, were built in a way to enable snow to fall.

Materials and techniques for covering the roofs varied depending on the wealth of the owners. The less affluent households were using basic, handmade boards of different size; shorter on upper part of roof and longer on the bottom. Thatching roofs were rare, probably due to not cultivating rye, which demands good weather conditions, and in the region was easy to source wood (Baniowska-Kopacz 2014b). More rich houses were covered with wooden shingles, that were made of wood split along the grain and mostly not hewn, in order to keep wood fibres intact and to provide a higher durability. In a time when shingles were made more precisely, they started to be put in an *owijka* way that creates circular shaped edges. Shingles were nailed to the battens and this connection, by placing elements in overlapping manner, was not visible. Under the eaves edges were placed wooden gutters made of gouged out thin logs. The gutter was supported on wooden elements made of curved branches that were hook-like ended. They were not bended to this shape but naturally growing (Matlakowski 1892). Along with the development in region, houses were enlarged, so to the main basic rectangular plan were added new rooms, and roofs were extended in less regular ways.

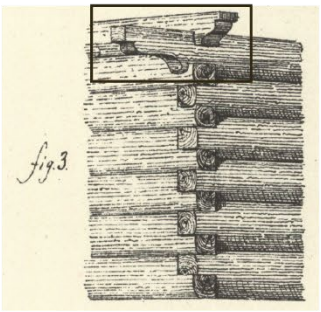
Example of roof structure in house







schemes of Podhalan roof, the example of trusses here rafters are stiffened by collar beam and added diagonal beams called *przysztychy* that are placed on cantilevered beamscalled *rysie*,drawings based on (Pawlicki, 2010)



rysie

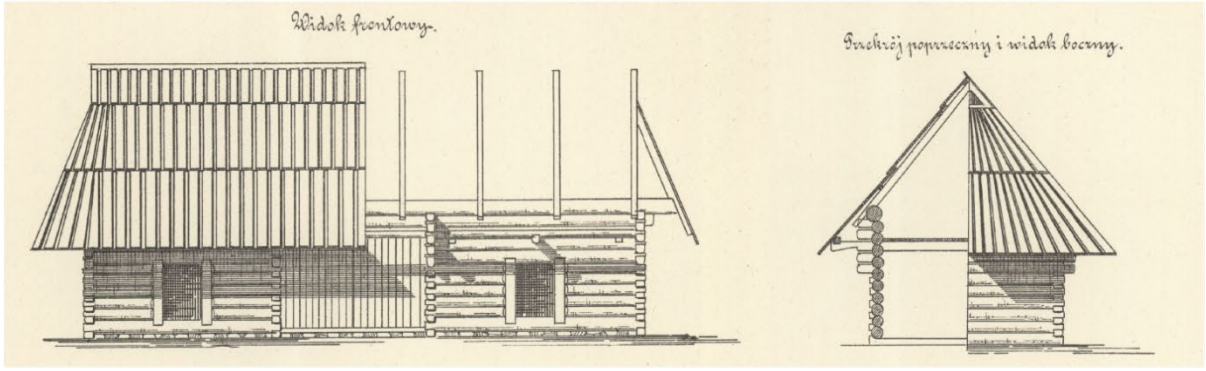
(Matlakowski, 1892)

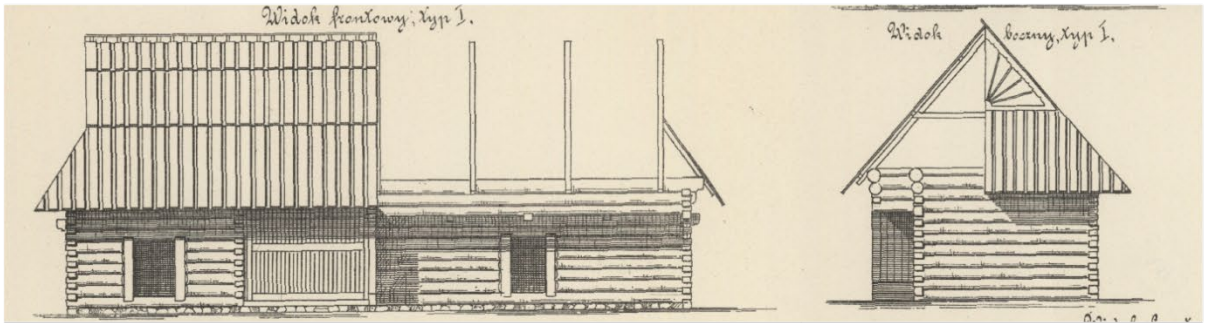
↑
Model of Higlander's house in Tatra Museum, Zakopane

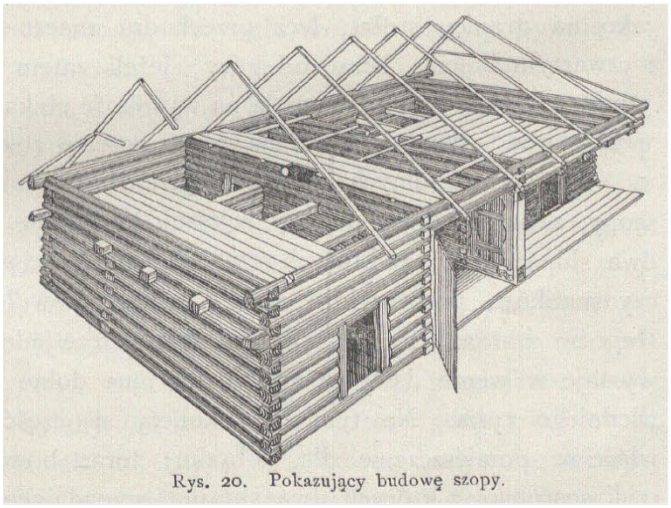
Photo of Gąsieniców- Sobczaków house. Visible rysie, shingles and gutter that as made from gouged-out log. →

(photo: Z.Miłek)

Examples of roof structures in service building






Rys. 20. Pokazujący budowę szopy.

Drawings of service buildings published in 1892 "Budownictwo ludowe na Podhalu" by W. Matlakowski.

Photo of shepherds huts in Strążyska Valley
↓

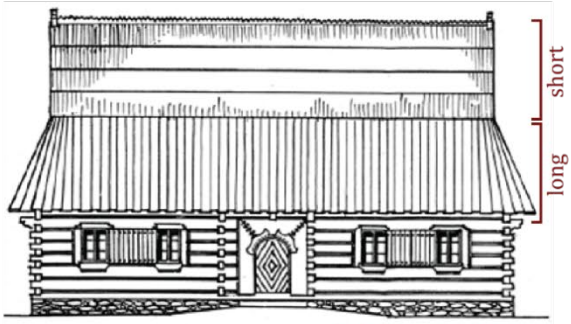
(photo: Z.Miłek)

Roof covers

Wood covers called *dranica* - boards made of confierous species. The boards were laid alternately so that one overlapped the next.

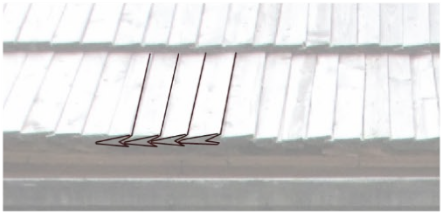
Often boards were shorter on the upper part and longer on the part of roof that create smaller angle. ↓

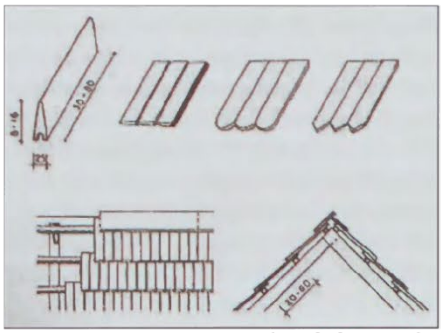
← However, there ware examples of using long boards on whole roof.



(Matlakowski.W, 1892)

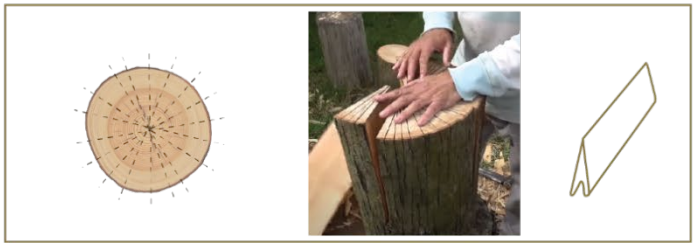
In the photo, the corner of the roof is circularly shaped - *owijka*





(Pawlicki, 2010)

Since the middle of XIX century more popularly were used shingles that were manualy splited alongg the grain. More decorative were placed on the outskirt and on riedge of roof. Sometimes those two way of covering were mixed - shingles on longer part and boards on gable wall.



(photo: Z.Miłek)

Decorations and interior design

Figure 26 Gorals in festive outfits, 1939 (source: archives of Tatra Museum)

Gorals' cottage was consisting of two living quarters. As it was mentioned, the white room was having a representative function and was not used daily. Black room was facilitating an everyday life. Both rooms were richly decorated, but the newest and more beautiful furniture was placed in representative part. The black chamber was equipped with a whitewashed lime stove. The couple was sleeping in the bed placed in the corner and the children sleep in *ława* – kind of a long bench that went along the two walls of the room that daily was used as a sitting place because closely stand table. The bed places were equipped with *siennik* that could be translated as pallet – straw or hay covered not meticulously with the material. A baby cradle was hung over the bed.

"There are beds here; hanging on ropes, a cradle high above the ground; benches stretching wide along the walls; the corners are full of all sorts of utensils, waterpots, vessels and tools. A calf or white lamb roams the room; here, sitting on the floor, the proprietress is peeling potatoes and the old man is smoking his pipe, warming himself at the stove, where he is churning or punching something ... It's a bedroom, a kitchen, a workshop, a juvenile sheep shed, which, caring little for social conventions, is not embarrassed by anything and does not discourage, the air of this room is already stuffy; where the children who play, feed and learn in the cold and mischief. However, dirty and untidy, this room is nevertheless very ornate."

(Witkiewicz 1891)

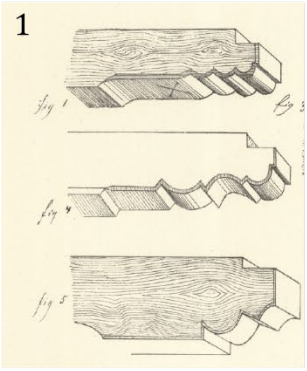
Figure 27 Black room in Gorals' house [today part of Tatra Museum] (photo: Z.Miłek)

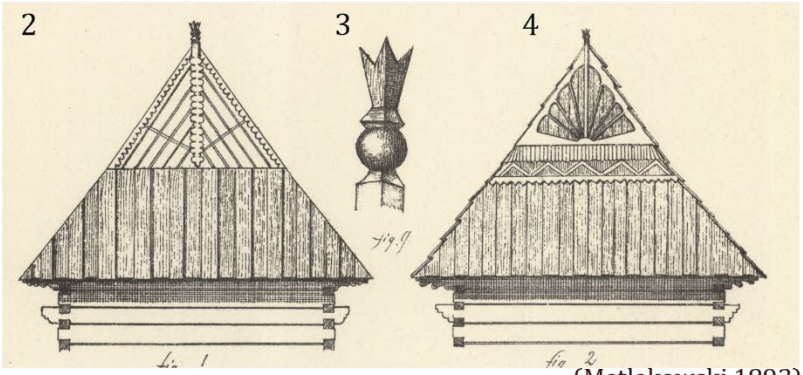
Huge variety of decorations were inseparable part of Highlanders life[21]. They could be found on everything that Gorals created, starting from outfits, and ending on architecture. Decorations were carved in wood, embroidered on materials, made in metal elements and ceramics. It is hard to choose the most popular one, but if trying it might be said that characteristic were sun-like decorations on gable wall, roof décor, entrance decorations, *parzenica* pattern performed in different materials, carved rosette decoration in *sosręb*. Most of motifs had their roots in nature – flowers, trees, animals etc. Just to highlight the popularity of ornaments and decorative elements it is worth to mention Gorals' painted glass, that were placed on high shelf in room, that itself are the separate topic.

[21] There are books of the late 19th century specifically dedicated to drawings and notes about different types of decorations. Some of them are nowadays fully available online, such as:

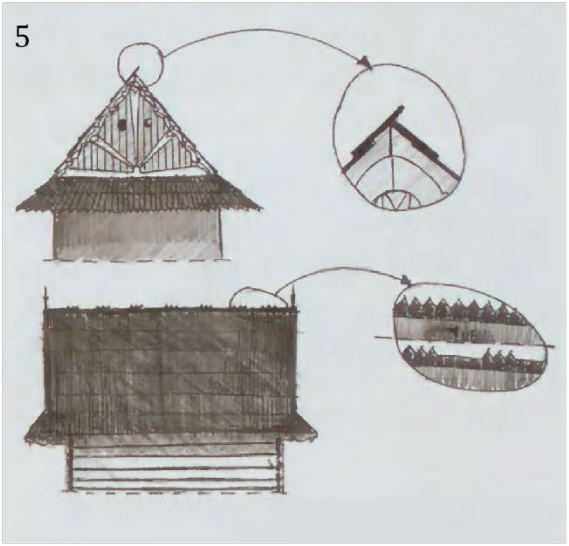
- Matlakowski, Władysław; Budownictwo ludowe na Podhalu. Tablice , 1892 (link: https://polona.pl/preview/9b267b97-2d36-45a8-a110-90e6f9a21728)
- Witkiewicz, Stanisław; Na przełęczy : wrażenia i obrazy z Tatr, 1891(link: https://polona.pl/preview/948ee0e9-ebbe-43ac-913c-d21d48601dd6)
- Matlakowski, Władysław; Zdobienie i sprzęt ludu polskiego na Podhalu : zarys życia ludowego, 1901 (link: https://polona.pl/item-view/880e4d09-194a-4bcc-9ddd-c619e9b5b1bf?page=139)

Most popular decorative elements - outside





(Matlakowski,1893)



(Pwlikowski, 2010)

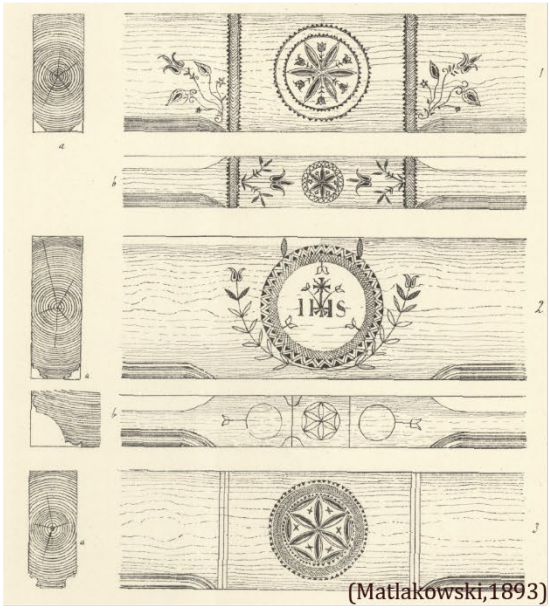
In Podhalan architecture, most of the decorative elements that are visible outside had their primary function as constructive and then they became ornamented. Showed examples are distinctive Highlander architecture. Later on, they also were used in the Zakopane Style.

1 *rysie* - supported the eaves roofing
2 gable wall with decoration
3 *pazdur* - could be find in whole Małopolska voivodeship, in Podhale region mostly in tulip-like shape
4 gable wall with sun-like decoration
5 *grzebień* - decoratively enede last row of shingles
6 decorativedoor frame with wood studs

(photos: Z.Miłek)

Interior decorations

1



(Matlakowski,1893)

2

1 rosette carved in load beam, with bevelled edges - often apart from rosette as made date of completing the building and name of the owner, and the Christo-gram
2 different kitchen utensils, with heart decoration and carved floral motifs, characteristic milk vessel
3 stained glass paintings
4 stools and chairs with heart, and floral motifs
5 dowry chest
on all photos also are visible linear carved motifs

5

3

(photos: Z.Miłek)

Zakopane Style

Stanisław Witkiewicz – father of Zakopane Style

Figure 28 (left) Stanisław Witkiewicz in his studio; photo circa 1891 (Moździerz 2019)

Figure 29 (right) Stanisław Witkiewicz „Kozica" (eng: mountain chamois) (source: Warsaw National Museum)

Stanisław Witkiewicz was born in 1851 in Żmudź Region in Poszawsze, part of the Russian Partition, which nowadays lies in Lithuania. He came from a Polish noble family that took part in January Uprising against Russian Empire in 1863, for which was sent on Siberian exile to Tomsk. Having only 16, Stanisław came back to the country and gained a pardon for the whole family. Unfortunately, his father during an exhausting journey back home passed away. Stanisław Witkiewicz, talented in painting, joined the Academy of Fine Arts in Saint Petersburg[22] [1868–1871]. During this time, he had an opportunity to travel around Neva River settlements and learn about the wood carpentry in that region. The track of his inspirations that affected his future work could be found in his notes where he expressed his admiration for details found in the typical folk architecture of the region (Kossowska and Floryńska-Lalewicz 2006). In 1872 he continued his studies in Munich, then a very influential centre of artistic culture. During his study years, he perfected his

[22] Academy of Fine Arts in Saint Petersburg - Imperial Academy of Arts in Petersburg

workshop skills at the Munich Academy under the supervision of Adolf Heinrich Lier and Hermann Anschütz(Kossowska and Floryńska-Lalewicz 2006). There he befriended outstanding Polish painters - Aleksander Gierymski, Henryk Siemiradzki and Józef Chełmoński. After his studies, he run an art studio in Warsaw and worked as an art critic. With his wife, Maria Pietrzkiewiczówna had a son Stanisław Ignacy Witkiewicz called Witkacy – later an important figure in Polish arts, writer, and philosopher. As a result of his fragile health condition, Witkiewicz travelled for treatment, among others to Merano in South Tyrol and Marienbad in Karlovy Vary Region. He went to Zakopane for the first time in 1886 and only four years later forced by worsening tuberculosis he settled permanently. There he become fascinated with folklore and the Tatra Mountains and created the norms of the "Zakopane Style" in architecture and applied arts. Since 1904, he published the handbooks *"Zakopiański Style"* that included descriptions and drawings of this new style. For the last seven years of life, he lived in Lovran on the Istria peninsula, present-day Croatia. He died in September 1915. His body was brought back and buried in the cemetery in Zakopane next to the graves of his friends and significant Podhale persons: Tytus Chałubiński and Sabała (Olszewska 2018).

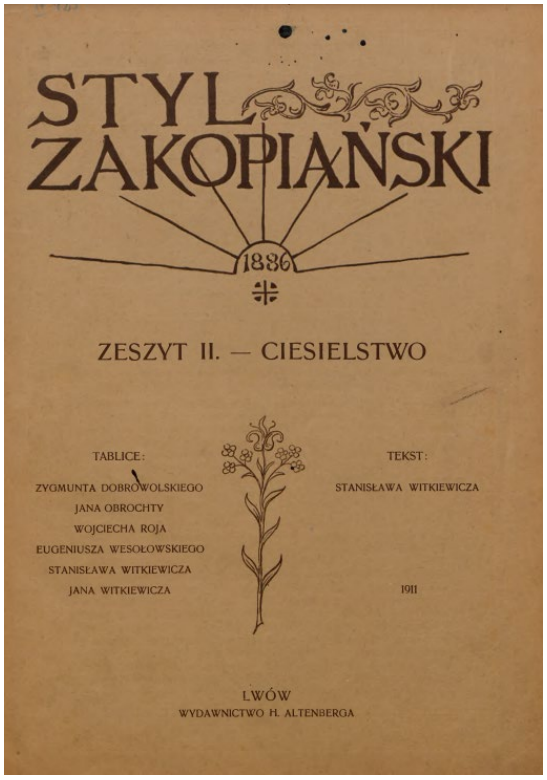


Figure 30 (left) Book cover "Na Przełęczy. Wrażenia i obrazy z Tatr" by S.Witkiewicz, 1891

Figure 31 (right) cover of "Styl Zakopiański" by S. Witkiewicz ,1904

Zakopane Style

Stanisław Witkiewicz nowadays is described as a creator of the Zakopane style. However, he called that he just summarised what Gorals have achieved in their simple but efficient architecture that had good proportions, generated characteristic ornaments and wise use of materials. It must be mentioned that there are different opinions about who actually first started inspirations by Highlanders' architecture; among them might be mentioned Franciszek Tournelle, Rafał Krajewski, and Antoni Podgórski. Moreover, Charles Buls, the major of Brussels and architects, during his visit in Podhale in 1882 had wrote that Zakopane Carpentry School should create new style that would include Highlanders' ornamentation (Moździerz 2003). However, neither of them brought Zakopane architecture such popularity and redefinition for current needs as Stanisław Witkiewicz.

At the beginning of his work, he wanted to start local style, make Gorals' vernacular architecture more recognisable. Later, he increased his ambitious to design a national style that, following the Gesamtkunstwerk, would be coherent for architecture, furniture and all tools of everyday use including clothes. The idea of national style was popular among scholars in the late 19th century. Moreover, the aim was to provide well-organised and sanitary architecture (Kwiatkowski 2019). Apart from those reasons, Stanisław tried to persuade his thesis, that in Gorals' folklore was hidden a core of true Polish "ancient" art and saying that would give a justification of spreading Podhalan architecture in whole country (Tarnowski 2018).

Main characteristic of Zakopane Style on example of villa "Pod Jedlami"

A lot of decorations inspired by traditional local architecture.

The characteristic shape of the roof.

A lot of additional volumes and elements such as verandas, terraces, balconies, and openings in the roof.

Big windows with decorative frames.

Stone base with arches.

(source: archives of Tatra Museum)

Witkiewicz created forms after deep study and understanding of Highlanders' buildings. Proposed design was then complete – taking into consideration not only the first visible layers such as decorations but also construction ideas and material processing.

Introducing the New Style was possible due to several reasons (Rafacz 2015):

- Style that would be glorifying the life of hard-working people that cultivating their tradition was perceived as a vessel of Polish culture.
- Popularity of the idea of creating a unified style for the nation
- Popularity of holidays in spa towns
- connecting the railway line to Zakopane in 1899 – easy access from Cracow, one of the cities popular among Polish intelligentsia in that period – additionally it made possible to transport other types of materials.
- fires in 1899 and 1900 in Zakopane in the area of main street – opening well-situated plots for investments.

Zakopane style was not the first architectural idea different from vernacular one in Podhale. It was an answer for Swiss-style architecture, spa architecture that since the tourists became rest there, was the first approach for newly constructed buildings such

as villas, hotels and boarding houses. There were characterised by bigger windows, more spacious verandas and changed functional design (Moździerz 2020). Witkiewicz saw the danger of marginalisation of Gorals' vernacular houses by imported eclectic architecture, which although beautiful was not ingenuine for the culture of the region.

Houses designed by Witkiewicz were meant to be for visitors who mainly came from Cracow intelligentsia. Boheme that were settling in Zakopane despite their enhancement toward peasant culture did not want to share all spectrum of Gorals' difficult life. They required facilities far more comfortable that will be still rooted in folklore but more as a decoration, reinterpretation than the implementation of everyday Highlanders struggling and cheers (Bonsdorff et al., 2020). The main difference between vernacular and new styles buildings was than the change of a function that was followed by other design consequences.

Here worth mentioning is villa "Pod Jedlami" the most characteristic and fully achieved project of Witkiewicz which was built with the cooperation of experienced carpenters: Zapotoczny and Obrochta. It is the manifestation of the Zakopane Style. Completed in 1897. The building is in the Registry of Cultural Property (Polish: *Rejestr zabytków*). The model of the villa was meant to represent the Style at the 1900 Paris Exposition. Nowadays the villa is still a private property with no possibility to visit as it is in museums. However, the model of the villa created under S. Witkiewicz supervision along with plans, private notes, and sketches is shown in Tatra Museum in Zakopane.

Still, during the life of the creator of the Zakopane Style, other designers also started to be inspired by folklore and already built villas; among them were Zygmunt Dobrowolski, Wojciech Roj, Kazimierz Kreczmer. During Paris Exposition in 1900, Zakopane Style was presented on the first floor of the Austrian pavilion, in a separate space for the exhibition of "Galician art", albeit it was part of the disagreement between Witkiewicz and the designer of the exhibition - Edgar Kováts. The first one created the model of villa "Pod Jedlami"; seen as the most representative for Zakopane Style, but it was never presented. The project of the room, that eventually was the presentation of the Style, was criticized due to it mix of local and foreign motifs and superficial interpretation of Highlanders' folklore(Kozina 2015). The disagreement had also political background; Austrian

government prefer designer who directed the school and was loyal than the Witkiewicz, who find in Zakopane Style way of showing independence and difference of Polish nationality. However, the discussion of two fractions, Witkiewicz's supporters, and his critics, brought the case more publicity and helped to gain popularity for the new style.

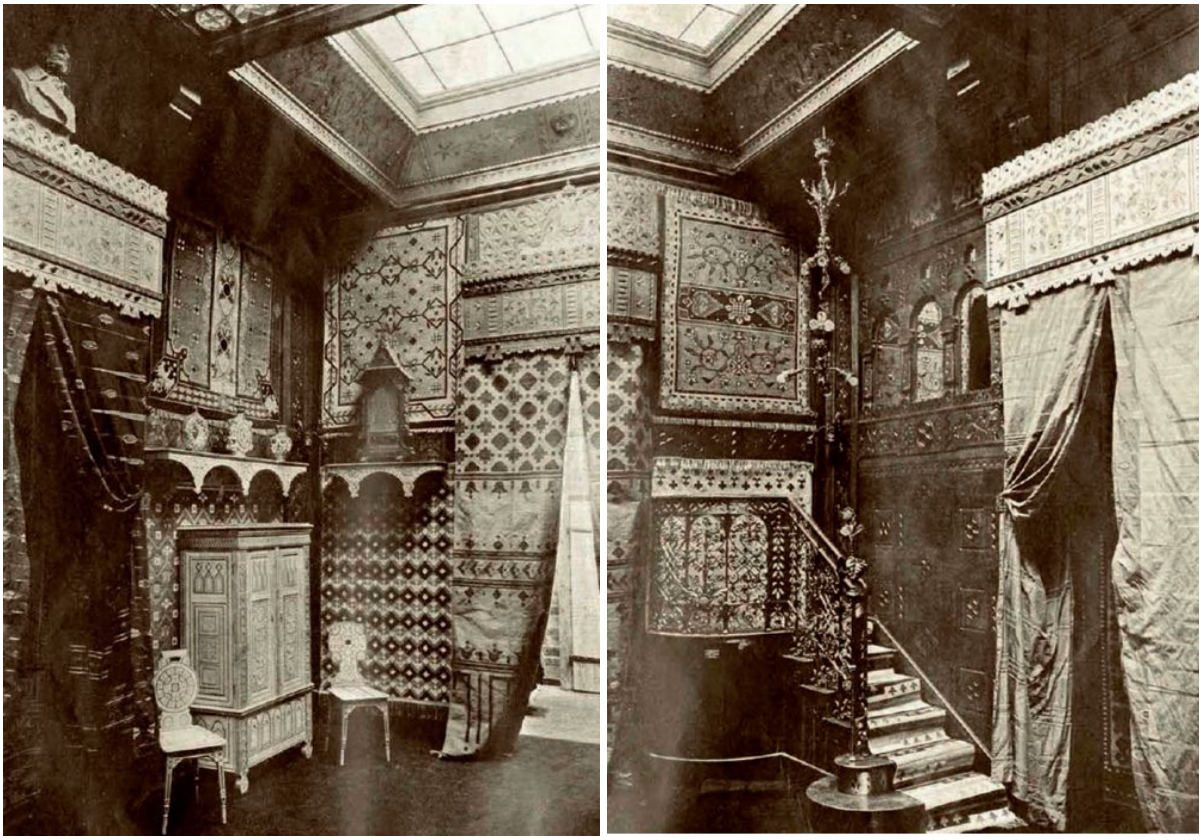


Figure 32 The interiors of the halls designed by Edgar Kováts at the International Universal Exposition in Paris in 1900 that were meant to show art of Podhale region (Kozina 2015)

At the beginning of the 20th century the Zakopane Style was eagerly followed and applied not only in the Podhale region. Wooden houses, masonry buildings with distinguished décor were erected in different cities and villages, crossing the border of the Austrian Partition. There were many examples of Zakopane style; just to mention a few: in Lwów villa in Mikuliczyn, villa “Renetka” in Tatarów, Stecki manor in Łancuchów, tenement house in Warsaw, “Zakopiański Pavillon” oversee in Kurytyba, Brasil (Moździerz, 2003).

Although in the beginning, the vast majority of buildings in that style were realised in timber there were many examples of those constructed in bricks, stone, and concrete, such as Tatra Museum main building by Witkiewicz, Grand-Hotel “Stamary” in Zakopane by E. Wesołowski. They were proof that it is possible to abandon timber logic, but still

keep the Style in decorations and folklore inspirations in totally different materials and techniques. The aim of Zakopane Style was to become country-wide, so the "translation" into other more spread, easier accessible materials was necessary.

Figure 33 (left) headquarter of PTTK in Zakopane, by architect Wendelin Beriner built in 1902 – 1903 (photo Z.Miłek)

Figure 34 (right) Bank in Zakopane by arch. Marian Józef Heitzman built in 1921 – 1923 (photo Z.Miłek)

During the inter-war period, Podhale's architecture again became a topic and inspiration for artists. This re-interest was named Zakopane Style II when the followers of Art Deco found folklore and precursored by Witkiewicz architecture. It gave the style new vitality and reinterpretations. Undoubtedly, this new interest embraced the popularity of the style in the region. Maybe, due to coming back to this Style the Podhale nowadays is mainly covered by houses that at least in decorations trying to resemble or correspond to Zakopane Style.

> *"Witkiewicz, this newcomer, hailing from elsewhere, created an original style in architecture and decoration, derived from the folk tradition of goral culture and from the motifs of historic styles and elevated it to the rank of a national style. He made it so skilfully that the consecutive generations of the inhabitants of Podhale identify with it, building their*

houses in the style that they consider their own. What is essential—it inspires architects who creatively develop it. The oeuvre of Witkiewicz and its enduring character is a phenomenon which is inscribed into the cultural category of "invented tradition." However, one that that is not understood literally, as an unchangeable, formalized and closely reproduced tradition, according to Eric Hobsbawm[23], but rather as a processual one that is modified and reinterpreted in new cultural realities".

(Węcławowicz-Gyurkovich & Godula-Węcławowicz, 2021)

Critics

Although Witkiewicz is perceived nowadays as an architect, he did not have an educational background in this field. His opponents were highlighting that those villas had been following folk inspirations, changing function but did not propose good mobility. Moreover, criticised was mixing the local inspirations with other, foreign influences. Witkiewicz designed buildings that strictly followed traditional Gorals' house proportions and enlarging it by adding smaller volumes. That logic was an obstacle in creating a fully functional plan. Next argument against Witkiewicz's idea was the introduction of the style into concrete, brick structures that were having different construction logic. Attempts of the Zakopane Style in bigger, more monumental structure was also seen as problematic. There was an issue of adapting the Podhalan roof into wider spans and in solution such as replacing potentially huge roof structure with several smaller the proportions were lost (Tarnowski 2018).

Great opponent of Witkiewicz and his followers ideas was Edgar Kováts, architect and the headmaster of Imperial and Royal Professional School of the Wood Industry in Zakopane and rector of the Lviv Polytechnic. He wrote a critical article with designs ideas "*Sposób zakopiański – Manièrede Zakopane – Die Art Zakopane"*, in this publication, he argued that Podhale folklore can become a source of inspiration only for a certain narrow creative manner. He perceived that Highlanders house: "*has not enough self-generated separateness and self-generated content, so that from wood to stone translated, he gave*

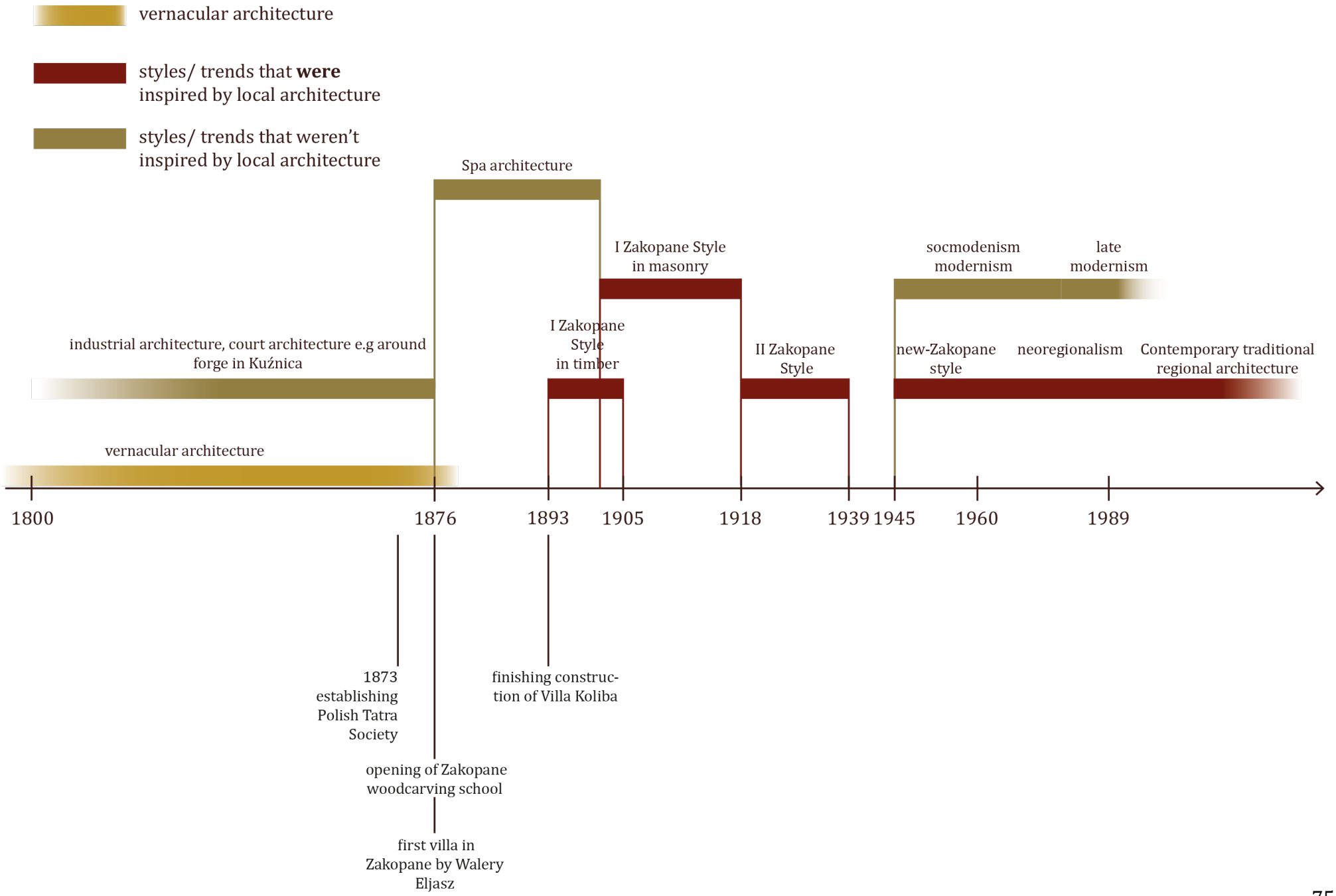
[23] Eric John Ernest Hobsbawm – (9.06.1917-1.10.2012) historian, he worked on the idea of invented tradition", perceived that most of the traditions are quite new and their origin somehow invented and because they are perceived as ancient people will be willing to keep them

complete novelty, but understood in a modernist way, using all the Zakopane region, could give something different and valuable." Kovàts than described his designs as "Zakopane way" expressing in this that following this folklore is more a *way* of building and decoration than a separate *style* (Kozina 2015).

Zakopane Style initiator aspired to create a national style and this attempt itself caused the criticism. Idea of one unified architectural code for the nation was throughout time challenged and even though some of the styles that were created in this trend survived in transformed way to present times they did not conquered and dominated the whole country architecture. The predefined choice of historical forms from one period of time or one region contributed to the further rejection of the idea(Kwiatkowski 2020).

Figure 35 Dłuski 's Spa,; Kościelisko 1910; proj. Jan Rembowski - salon in Art Nouveau style. (source: Tatra Museum archives)

Timeline of styles/trends in Podhale region



Main typologies of Zakopane Style buildings

Table: Typology of buildings in Zakopane Style architecture		
	examples (if no source = author Z.Miłek)	notes
villa	  villa on Kasprusie St. Villa "Pod Jedlami"	Those types of buildings were the most popular. Mostly constructed in stone base+ timber structure.
guest house / spa	  villa "Rialto" used as cabinet source:zabytek.pl; villa "Czerwony Dwór" designed as guesthouse	Zakopane was perceived as a spa town and the guesthouses and doctors' cabinets were constructed. It is hard to say without checking which building is having this function because they were very similar to villas.
hotel	  hotel Stamary hotel Sabała .	The much bigger volumes had hotels both constructed in wood and masonry.

mountain hut	 mountain hut in Roztoka Valley source:https://i-tatry.pl/	The base for touristic escapades was in a mountain hut. Nowadays most of those shelters built in the 19th century were enlarged or changed to bigger ones.
chapels / churches	  chapel in Jaszczurówka interior of Sanctuary of the Holy Family	Both the interior and exterior of the sacrum places were designed in Zakopane Style. Moreover, a lot of convents placed their monasteries in Podhale.
public use / museums	   PTT centrum; Tatra Museum; Hospital .	Public-use buildings were mostly constructed in masonry, due to bigger volumes.

Functional plan of villas

From villas, different features were demanded than from basic cottages. Buildings were far more spacious, and three floors were used: cellar, ground floor and 1st floor. Basement lost its only storage character by placing a building on a high slope that enable it to create spacious rooms mainly used as services, a pantry, and a kitchen. An example might be designed as a holiday house for Jan Gwalbert Pawlikowski and his family, villa "Pod Jedlami" which was erected on a slope that the high of base is half meter on one side and four meters on the other. In this study case in a basement were located *sień*, service rooms, kitchens, laundry, and pantry. The idea of this functions was inspired by Gorals' cottage black chamber inside which whole, ordinary life was going on.

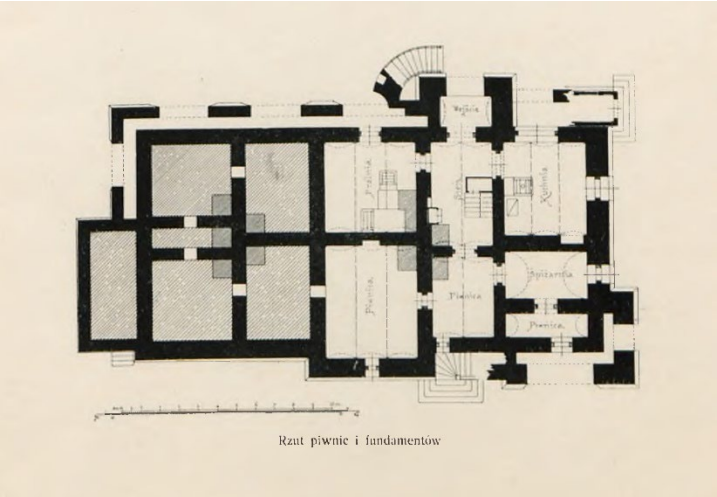


Figure 36 Plan of Basement Villa "Pod Jedlami" (Witkiewicz et al. 1911)

Therefore, ground floor was significantly elevated, to a main entrance led decorative stairs. This storey was dedicated to social life – living rooms, dining rooms, cabinets, sometimes one or two bedrooms and kitchen. Here most of decorations were placed making the interior design full of folklore art and inspired designs. The rectangular plan was deformed by adding verandas, glazed verandas and so-called *przyłapy*[24]. Big eaves gave the possibility of creating additional, outdoor communication. Most of these forms could be found in vernacular architecture, however, never so elaborated and placed together.

[24] Przyłap – roofed, open entrance terrace-like place

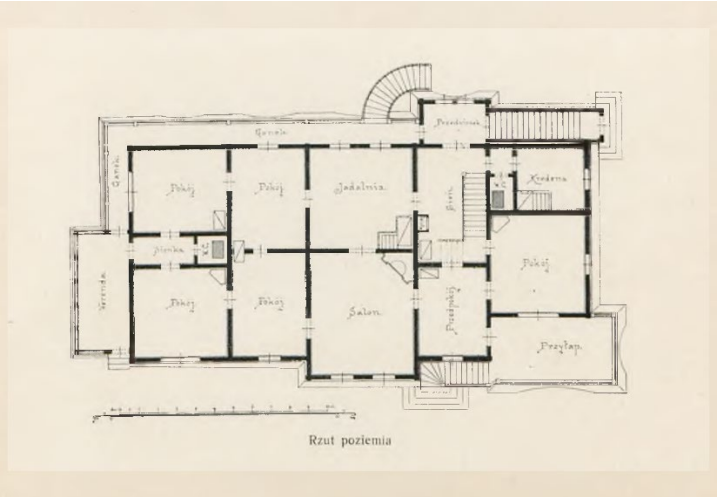


Figure 37 Plan of Ground floor Villa "Pod Jedlami"(Witkiewicz et al. 1911)

On the first floor, that was often put perpendicularly to the previous one, to which led steep stairs, were bedrooms toilets and *komórka* which were small storage spaces with inclined by roof walls (Baniowska-Kopacz 2014). This last floor was a reinterpretation of Gorals' attic to which were added dormers, balconies and *wyględy* ("outlooks"). They were not part of traditional Highlanders' architecture but were created by Witkiewicz, who took an inspiration from characteristic roof hatch that could be found in some sheds used for throwing out a hay. This solution allows to significantly enlarge the attic and create fully functional space. Side walls of *wyględy* were often decorated with sun–like decorations(Kwiatkowski 2020).

> *"In the building's roof Stanisław Witkiewicz had applied the so called wyględy—"outlooks," inspired by a small fragment of a roof, raised by means of a pole, used in highlanders' sheds to throw out hay or straw. In this way, in the attics, glazed verandas of balconies were installed."*
>
> (Węcławowicz-Gyurkovich and Godula-Węcławowicz 2021)

Enlarging made possible to use that space for rooms different than only storage, as it was in traditional houses. In the case of villa "Pod Jedlami" the building was designed for one family use and their guests, so the horizontal communication was one for all inhabitants.

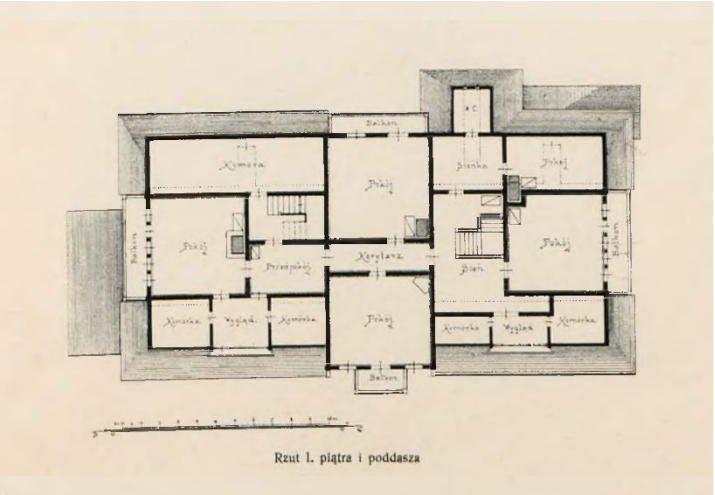


Figure 38 1st Floor Villa "Pod Jedlami" (Witkiewicz et al. 1911)

Buildings materials

It can be said that material did not differ from the one used in the vernacular architecture in Podhale. Still, timber was dominant and stones, collected mainly from streams, were used in a base. Later on, stones were sourced in quarries, which example might be the biggest quarry in region in slope near Capki, Zakopane that exploited Tatra quartz boulder, which was used as road and building material. This company, created in 1903 was operating till 1934[25], when raised protests against ruining ecosystem of the place. In the whole massive of Tatra Mountain were sourced granite rocks, limestone rocks, metamorphic rocks, but mostly, apart from Capki quarry, in quite primitive way. Tatra stones does not have a very high construction value, due to the technically non-uniform quality of the material, often highly weathered, along with the small number of monoliths. Additionally, the operating costs were disproportionately high, and the sourcing was performed in non-responsible and non-sustainable way (Wielka Encyklopedia Tatrzańska, n.d.).

[25] Quarry in Capki was closed in 1934 but the but work resumed for a short time during the IIWW under the German occupation.


Figure 39 and Figure 40 Quarry in Capki; source: The National Archives in Krakow

The species of trees used for construction were still the same as in vernacular architecture, the specification of spruce, fir and oak can be found in chapter Building Materials regarded to vernacular architecture on page 33. However, the sourcing of wood began to be more problematic, due to the process of deforestation and as a result, trees weren't chosen before being cut down. Nevertheless, forests were still fulfilling the needs. The technology of splitting trunks was already advanced in the late 19th century. Cutting rarely was performed by drilling holes and splitting the log with wedges. Mostly used were mechanical saws that were powered by water (Pawlicki 2010).

However, later along with development of the Style some buildings started to be raised in brick. The technique was than masonry with plaster. Some decorative elements still might be performed in wood. The material, in brick buildings, was no longer tightly connected with vernacular patterns and volumes in structure and techniques were raised according to the 20th century knowledge.

To Zakopane Style were introduced other materials than those traditionally used such as ceramic tile that were used instead of shingles in for example: villa "Jutrzenka"(1900), west wing of "Koliba" (1901), villa "Czerwony Dwór" (1901). Often during renovations of buildings was used roof sheeting, like in last mentioned villa "Czerwony Dwór".

Figure 41 villa "Czerwony Dwór" by Wojciech Roj

Ceramic tiles as roof cover.

Villa was constructed in 1901-1902 for residential use. Than was changed into guest house, in years 1951-2016 building was used as kindergarten, since 2016 it is the Native Culture Center.

Photo taken in 1904; source: archive of the Tatra Museum.

Figure 42 During the interwar period roof cover was changed to metal sheets, following the colour of the original design.

Figure 43 Villa after modernization conducted in 2017-18. The roof cover is in colour and shapes similar to the original project, but the material is different - metal sheets.

source: photo taken in 2023 by Z. Miłek

Construction technology

Significantly enlarge, in relation to vernacular cottage, was a base. Cellar walls were thick, masonry more complex than in simple Gorals' houses, additionally new features were arches. They were constructed in a base on slope part - where supported verandas, stairs and *przyłapy*. Undoubtedly, they were pleasant in appearance and gave a little of lightness to a massive stone wall. Thick walls were having retaining and fundamental functions. They were dug into the ground deep enough to reach the level of soil freezing that in Podhale is 1,2m deep. As a result, there were no effects of seasonal changing of position, lifting and lowering, of a building as it was in the case of vernacular architecture.

Figure 44 (left; photo by R. Górz) and Figure 45 (right; photo by Z.Miłek)

Chapel in Jaszczurówka designed by S. Witkiewicz 1904-1907 The stone base was used to obtain flat surface for the wooden structure and to protect it from snow.

Wall construction in timber structures was based on the same rules as in vernacular houses – *węgły* - corner connection in crowned construction and mostly was used Podhalan lap joint. The shape of the building was no longer basic, and it was necessary to add more internal divisions. Although, from a construction point of view methods were the same as in adding walls of rooms in cottages, but with increased number of joints.

Connections of *płazy* were following carpentry tradition – drilling holes and putting joints. *Węgieł* was constructed similarly, by using well-developed by Gorals interlocking logs described previously. Similar was also assembling of logs that lay on each other – by drilled by gimlet holes and inserted pegs.

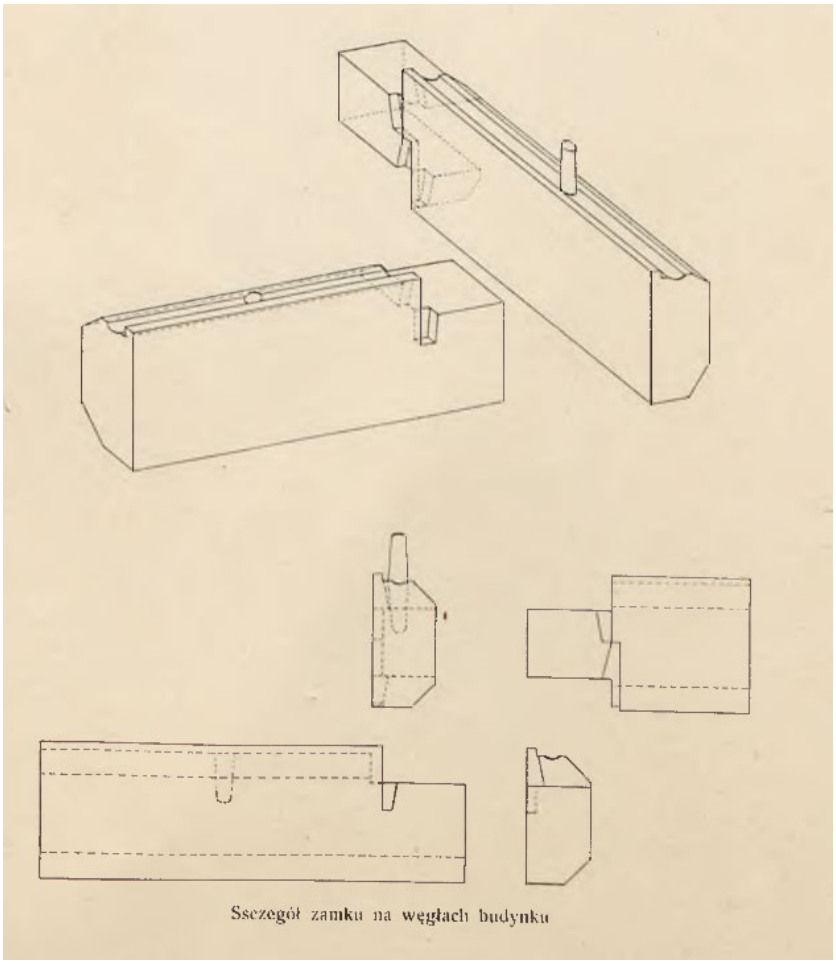


Figure 46 Detail of carpentry connection in węgieł Villa "Pod Jedlami"

(Witkiewicz et al. 1911)

The main part that was significantly redesigned was the roof. In inclination and mostly in used materials, it was as in a small Goral homestead, but the roof structure no longer could be rafter stiffened by *bont,* purlin prop was added. Reasons to change a system were larger span, high of rooms and complication of shape. To villas was implemented heating system based on masonry heaters and flue. Chimneys were very decorative and were similar to those built in the 19th century in vernacular houses.

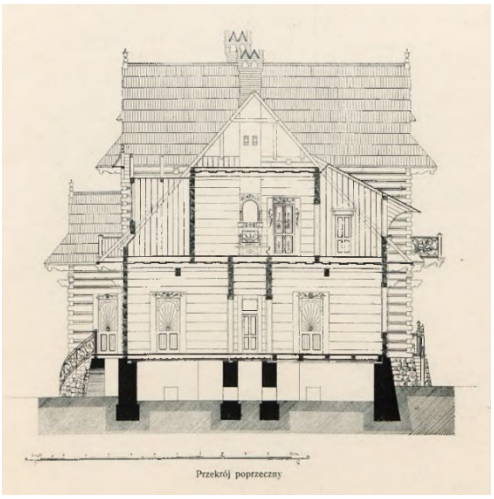


Figure 47 (left) Cross-section Villa "Pod Jedlami"(Witkiewicz et al., 1911)

Figure 48 (right) villa "Pod jedlami" by S.Witkiewicz (photo: Z.Miłek)

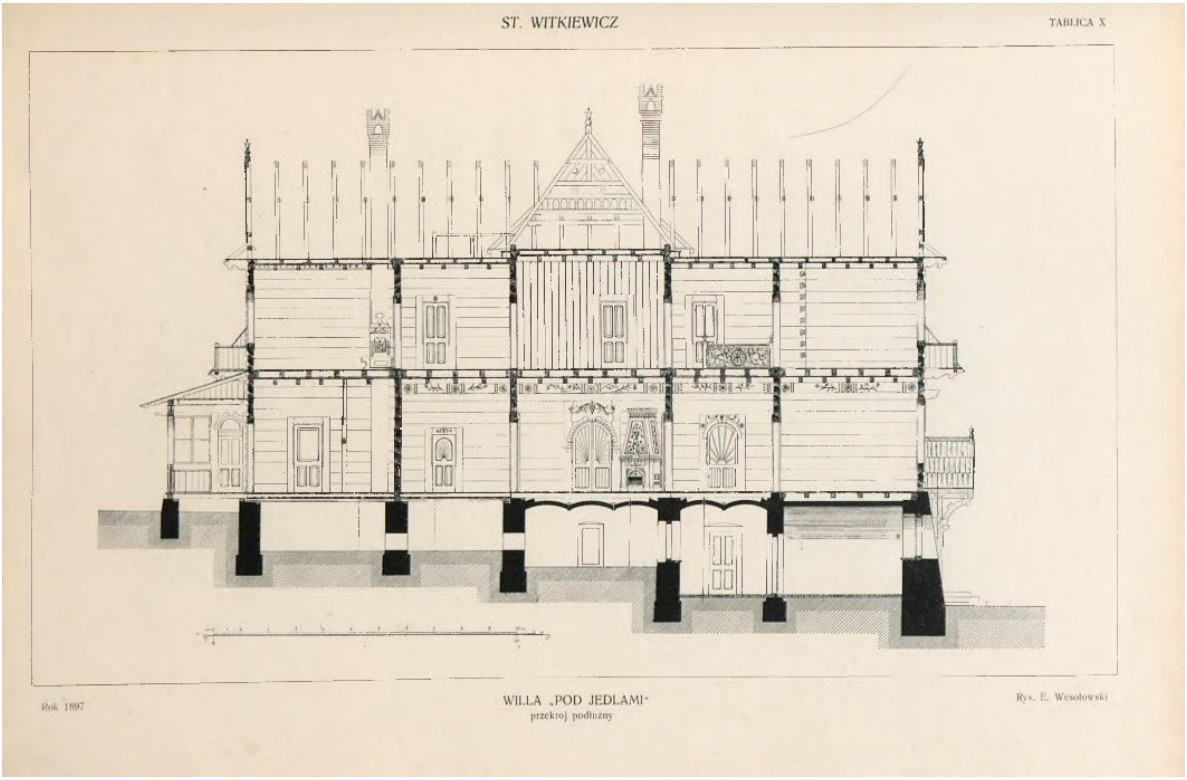
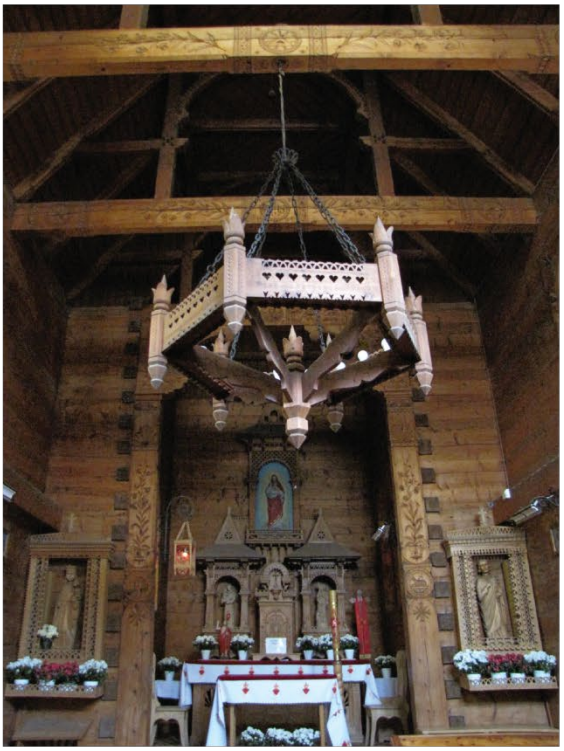


Figure 49 longitudinal section Villa "Pod Jedlami"(Witkiewicz et al. 1911)

Villa " Koliba" by S.Witkiewicz 1892, first building in Zakopane Style

Villa " Jaszczurówka" around 1930 in Zakopane Style

Chapel in Jaszczuróka by S. Witkiewicz 1904



(photos: Z.Miłek)

Decoration, interior design

Richly decorated Gorals houses were having ornaments in so many varieties that Witkiewicz did not need to invent new ones from scratch. Mainly, he used what was already developed but additionally new elements - for instance, glazed verandas were full of cut-in wood decorations that followed those which could be found in cottage houses in *ganek*. One of main feature of Zakopane Style was then intensification of all types of decorations (Kwiatkowski, 2020).

Architecture and interior design were proposed as a coherent project that also involves furniture design, ideas for things of everyday use. Equipment, utensils, ceramics, and fabric were mostly collected for years and even though most of their motives were rooted in Highlander culture other influences might be noticed such as Bosnian, Slovakian patterns and eastern kilims, for example in interior of Villa "Pod Jedlami" (Moździerz 2017). Witkiewicz was fascinated by Gorals' doors decorations and it is reflected in a huge variety of decorations that could be found in his realisations. Project of the house was then a multidimensional design. All pieces of furniture and even tiny elements of Witkiewicz's design were ornamented and resembled folk art.

> *„ Such, for example, a milk czerpak26 has such exquisite forms that without adding anything to it, you can decorate the most demanding sideboard with it."*
>
> (Witkiewicz 1891)

Again, similarly to vernacular architecture the one of the most popular decorations was sun-like *słonecko*, that were mainly put in gable walls, but also in other elements both architectural and in interiors. Windows, balustrades, girders, doors frames – all of them were covered with decorations mostly of floral and animal origin, which were cut with a fretsaw. Many motifs used in furniture; materials were having their roots in vernacular Highlanders' architecture even without processing – decorations from e.x. doors in traditional architecture were without substantial changes used in clock design.

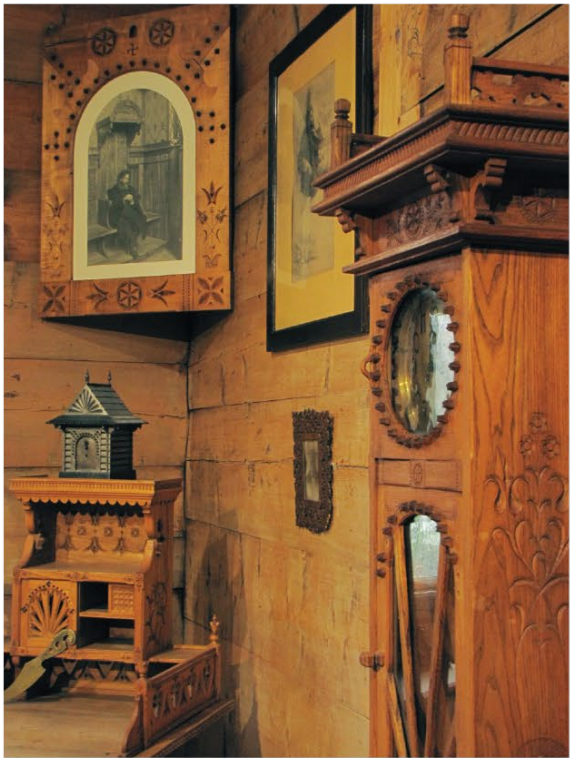
[26] Czerpak – a small vessel to collect water from well milk or other fluids.

When the Zakopane Style had its second period (interwar) the decorations although in Art Deco were still inspired by folk art. Example of that might be art of Zofia Stryjeńska, or interior design of west wing of villa “Koliba” by Stefan Mayer with the crystal like carved balustrade.

Figure 50 villa "Koliba" balustrade by S. Mayer (photo: Z.Miłek)

Interior design Zakopane Style

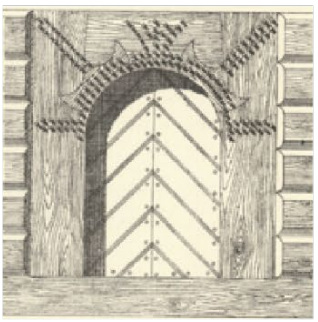
motifs from vernacular architecture



interior desin in villa "Pod Jedlami"

where the motif could be found in vernacular architecture, folk culture:

frame, desk and clock - door frame

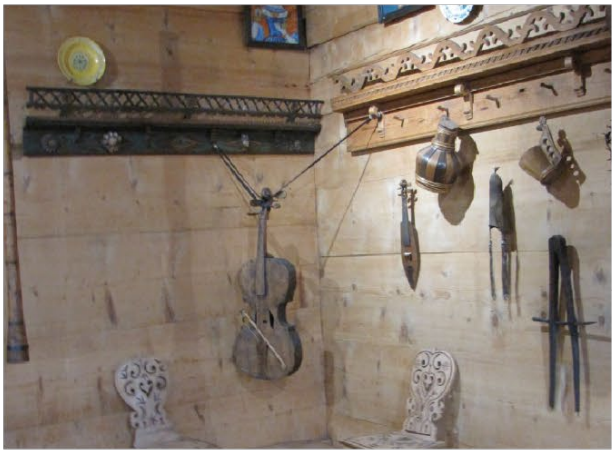


entrance doors to Goral's house

interior desin in villa "Pod Jedlami"

where the motif could be found in vernacular architecture, folk culture:

sofa and chairs - violins decorations and linear Hilander decor



exibition of Higlander house in the Tatra Museum

(photos: Z.Miłek)

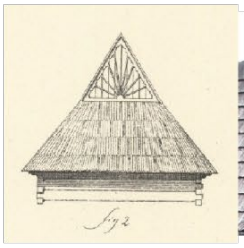
Interior design Zakopane Style

motifs from vernacular architecture, folk

interior desin in villa "Pod Jedlami" (photo Z.Miłek)

bed decoration

- sun-like decoration in gable wall



wall carpet in villa "Pod Jedlami" (Możdzierz,2003)

courtain motif, wall carpet

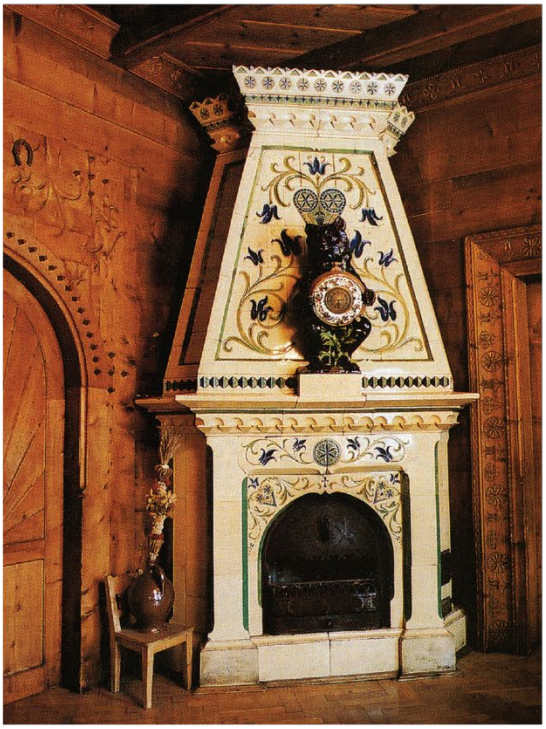
- *parzenica* on Higlander's trouses

parzenica - Initially, it had practical functions - it protected the cloth from fraying. In time it become more ornamental and distinguish different Highlanders groups.

archive photo from the Tatra Museum

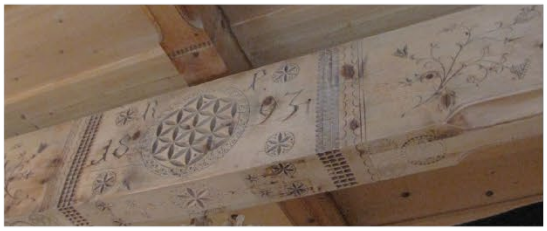
Interior design Zakopane Style

motifs from vernacular architecture, folk



interior desin in villa "Koliba" (Moździerz,2003)

masonry heater - decorations that were popularly carved in wood e.x. in *sosręb* beam



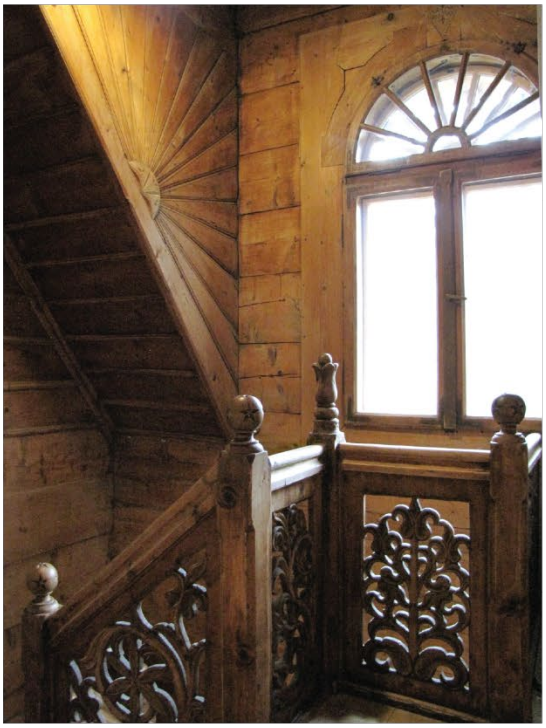
sosręb beam with rosette

window and wall cladding - sun-like decoration

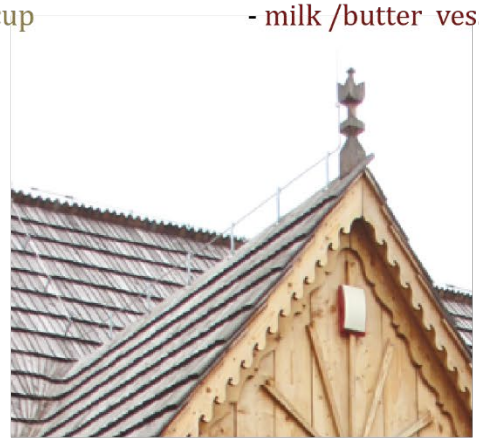
balustrade - traditional floral motifs

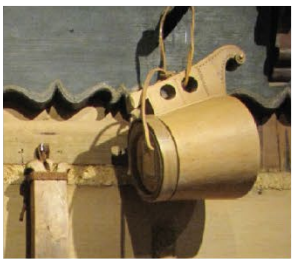
railing - *pazdur,* decorative element from roof

cup - milk /butter vessel



staircase in villa "Pod Jedlami"





(photos: Z.Miłek)

Comparison with similar examples in Europe at the same time

National Styles

Witkiewicz's ambition to create the Zakopane style as a national style was not exceptional at that time. He followed the ideas of inspired by folk architecture and design, which he could observe since his study in Petersburg. The idea of creating National Styles become popular in the late 19th and the beginning of the 20th century, so the vernacular revival in Podhale was part of European national Romantic movements. It was meant to be like a stamp for a nation giving an example of "authentic" art, literature, music and all the mediums of culture. One of the aims of sourcing from folk culture was to unify life and art, linking human beings with its traditions. The origin of this phenomenon might be linked to the rise of nations that marked the 19th century in Europe and as a result, independence and nationality become a popular topic for artists. Forming of modern country was triggering looking for national style inspiration in historical styles e.g. Gothic style – in France, and Germany, Renaissance in Italy and Byzantine style in Russia. In the second part of the 19th century in England was formed the Arts and Crafts movement, which combined ornamental patterns and compositions of folk art with a modern approach that was led by William Morris. The aim of this movement was to renew various fields of art so that the objects surrounding people (interior design, furniture, etc.) were both beautiful and fully functional ("EUROPEAN REVIVALS From Dreams of a Nation to Places of Transnational Exchange" 2020). It was in opposition to mass production of not meticulously designed objects.

Sources of inspirations for the Zakopane Style might be found not only in the attempts to create national styles in Europe but also in careful observation of wooden architecture in a different region than Podhale. Witkiewicz during his stay in Russia, was noting construction solutions and decorative motives.

> *"Summing up, it can be said that the creator of the Zakopane style, Stanisław Witkiewicz, was sufficiently prepared to put forward his folkloric concept of the national style. After all, from an early age he was in contact with folk culture and art - initially Żmódź (Lithuanian), and in the years of exile West Siberian (Russian). During the St. Petersburg period, he had the opportunity to become acquainted with the post-years of modern art criticism in Russia and its main representative, Vladimir*

Stasov. It was also there that he could become acquainted with the concept and realizations of the folkloristic variety of the Russian National Style, i.e. the Ruthenian style, whose main assumption was the revival of Russian wooden architecture and artistic craftsmanship about the 17th century Ruthenian folk art. However, during his stays in Munich (1872-1875, 1882) he came across the birth of Heimatstil. All these experiences contributed to the creation of the concept of the first Polish National Style."

(Moździerz 2003)

Russia and National Style

A similar process as happened in Podhale took place in the territory of Russia, for instance, around Petersburg, Onega Lake, and Moscow. Those territories were rich in wood vernacular architecture that was well preserved and local culture cultivated. Mainly in the Onega region, that due to being isolated, was a territory of well-preserved peasant culture and icons that took origin in medieval Russia. In the second part of the 19th century, especially after the abolition of serfdom in 1861, interest and respect for national heritage arose among the intelligentsia. Scholars undertook expeditions to the remote parts of Siberia and northern areas to search for authentic Russian themes and document churches, fortifications and also homesteads. The study of vernacular architecture contributed to the preservation of culture (Opolovnikov et al. 1989). This interest resulted in many realisations that were taking inspiration from log houses, folk decorations, and handicrafts. Shapes of buildings in northern villages varied but they have one characteristic that bound their appearance together – interlocking logs as a system of construction that beautifully presented the features of wood. In the late 19th century architects that found inspiration in folk culture were following the construction system in realisation such as villas, summer houses and churches. The period of 1860–1870, when the Ruthenian style developed, was mainly represented in the works of Wiktor Hartmann and Iwan Ropet. They focused on the revival of wooden construction. In the rich decoration, not only architectural elements were used, but also ornaments found on everyday objects. Both studied at the Academy of Fine Arts in Saint Petersburg and were

part of the Russian elitist focused in the Abramstevo[27] circle (iljanen et al. 2020). It was an artist colony, north of Moscow, that gathered scholars, artists, and musicians looking for inspirations in folk culture, similar to British Arts and Crafts movement.

Witkiewicz, when he was studying in Petersburg, had an opportunity to observe both authentic folk architecture and the scholar's study and reinterpretation of it. He must be aware of the trend of neo-Russian style and Abramstevo colony. Some similarities might be found in the Zakopane Style such as following the construction solutions and rich ornamentation.

Figure 51 (left) Yelizarov house, from Medvezhegorsky District, Karelia; 19th century, Reerected at Kizh I(Opolovnikov and et al. 1989)

Figure 52 (right)) Detail of the facade of a 19th century house in Suzdal (Opolovnikov et al. 1989)

In Russia could be found many examples of log houses. As it was mentioned above, the vast lands of Siberia were dominated by wood architecture. It resulted in interesting ideas for construction. The building material was logs, that due to big forest resources were not in shortage, and mostly they were not deeply processed. The most spread corner-jointing in northern Russia was interlocking logs with or without projections. More complex structures could be found for instance in churches. Builders of bigger structures were

[27] Abramstevo Circle – a centre of the artistic colony in the second part of the 19th century. The initial motives that inspired this Avangard movement were peasant life and culture in which they were looking for "essence" hidden in artefacts.(Salmond 2002) Abramstevo was a summer resort for elites located north from Moscow.

experienced craftsman that knew both how to perfectly assemble the logs and create artistic decorations (Opolovnikov et al. 1989). There were several typologies of buildings – one of them homesteads that were huge structures, sometimes with several functions combined. Rich cottage houses sometimes more resemble a mansion than a homestead of peasants that were serfs. Buildings were changing throughout time according to needs and affluence. Below is presented the house of Yelizarov, which owned by not a very rich serf, however, it is spacious and well preserved in an open-air museum in Kizhi [28]. From the plan, it could be read that the building was reorganised several times. The one big room was used as a living quarter for whole family. There was no chimney, so the smoke from the hearth was escaping through dedicated ventilation openings. The middle space on the ground floor was a roofed courtyard and then were workshops, service rooms, storages, and places for animals. The main decorative elements were a balustrade that girds external communication and the gable part of the roof. Significant role were having windows that were small, in order to reduce loses of warmth and spendings on glass, but all were framed in ornamental way. Additionally, bellow is presented example of axonometric view of typical Russian homestead that is showing idea how building was constructed and their complexity.

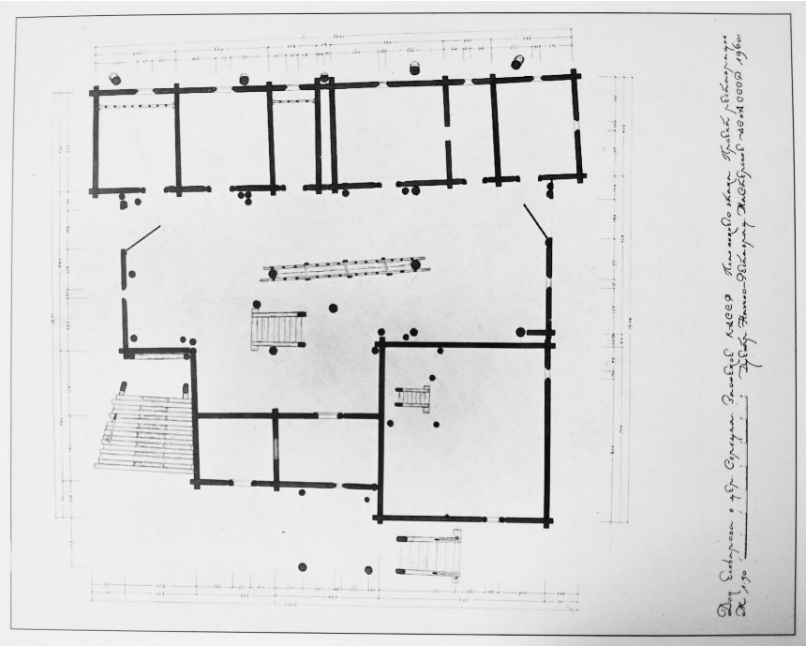


Figure 53 Ground floor of the Yelizarov house in Seredka(Opolovnikov et al. 1989)

[28] Open Air Museum in Kizhi, island on lake Onega – created in 1951 museum that presents transported from different parts of Siberia wood architecture.

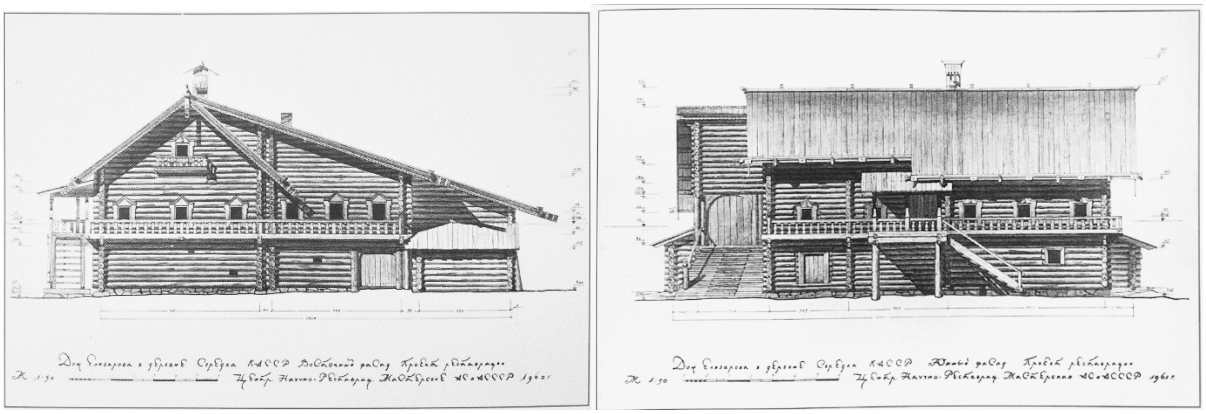


Figure 54 Elevations of the Yelizarov house in Seredka before removal to Kizhi (Opolovnikov et al., 1989)

Figure 55 Yelizarov house re-erected in Kizhi (Opolovnikov et al. 1989)

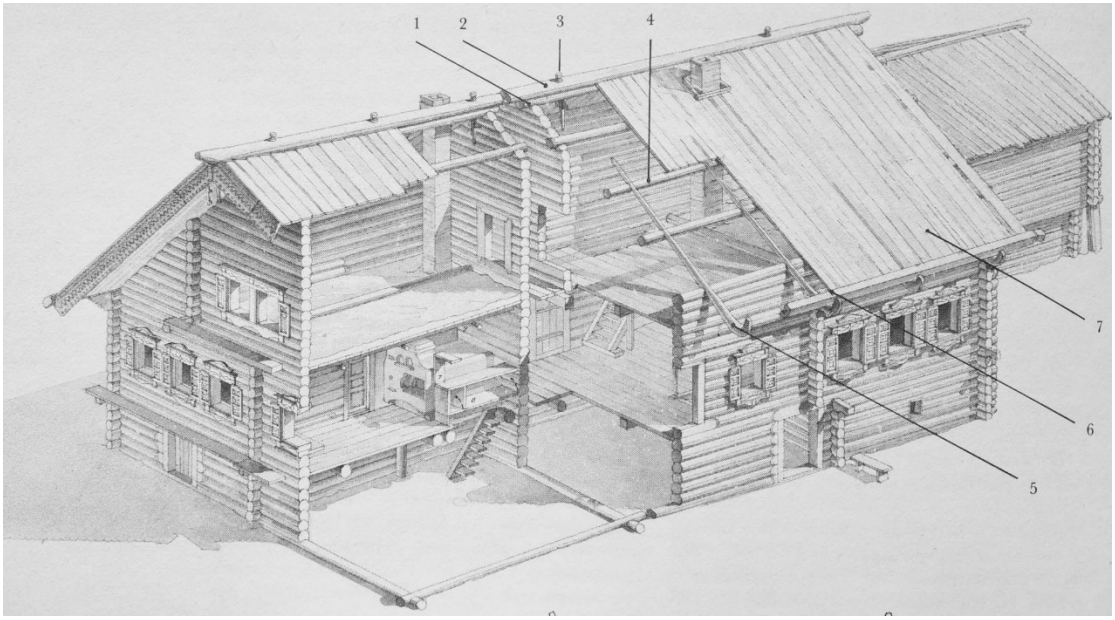


Figure 56 Drawing of a model of a Russian house (Lissenko 1989)

Finland

Finding an identity and works intended to preserve culture were also important in the late 19th century Finnish society. Grand Duchy of Finland[29] was autonomous part of Russia and former part of Sweden - both countries were having an influence on not military strong and undeveloped state. Finnish scholars, for instance in The Finnish Literature Society, were seeking on promoting the Finnish language and culture, that was seen as a shield protecting from russification and Svecomane[30]. As a result of geopolitical situation, the movement for finding an authentic New Style that was popular in Europe fell on fertile ground.

Finnish architecture was vastly dominated by wood buildings in all types of structures. Not different was in the case of vernacular architecture that sourced timber from taiga forests. In folk culture inspiration found, one of first in Finland, Vilho Penttilä that made a research about wooden architecture and New Styles in Switzerland, Germany, Russia and Norway (Ashby 2006). Moreover, native crafts were promoted by the Society of Friends of Finnish Handicraft, founded in 1879 by Fanny Churberg. Tight connections between Finland and Sweden, Norway resulted in the Old Norse style and the dragon style influence into Finnish architecture. At that time, architects and art critics started a discussion on what should be perceived as "local" architecture. Popular was Fennomania, movement that emphasised the Finnish language and culture. The traditional ornamentation and construction of Karelia was considered to be natively Finnish, because it was believed that it was not subject to Western European, and especially Swedish, influences. Karelia is a borderland region in Finland and in Russia. Main inspiration for national style, sometimes called a new language of ornament, was Karelian architecture, but with the evolution of style the inspiration were broadened. Partially it happened, due to Tsars reforms in the 1890s that aimed to limit Finnish autonomy and shared with Russians Karelia lost its status of being rooted in Finn's culture ("EUROPEAN REVIVALS From Dreams of a Nation to Places of Transnational Exchange" 2020). Additionally, the

[29] Grand Duchy of Finland – an autonomous part of Russia between 1809 and 1917. In the state, people were having more rights and freedoms than in ruled by Tsar Russia where citizens had no law power. Important minority in the state was Swedish-speaking society.

[30] Svecoman movement – late 19th century pro-Swedish movement. Smaller part inside the movement was even claiming the superiority of Swedish culture over Finnish. Contrary to the Fennoman nationalist movement that was raising awareness of the independency of Finnish language and culture. Both Svecomania and Fennomania were a movement focused inside intelligentsia, that state for less than 2% of the tottal population.

interest in the past and traditional architecture did not stay in contrary to modern structure and implementing the new gains of technology.

Those researches of national style resulted in similar as in Russia and Poland interest, and travels to region with preserved, and still alive folk culture. It could be said that the Finnish New Style was flourishing at the same time or little latter than Zakopane Style in Poland.

Figure 57 Self-designed studio of of sculptor Emil Wikström, inspired by Karelian architecture (photo from Visavuori Museum)

Figure 58 Kettumäki House-Museum designed by Lars Sonck in 1897. (Source: kuusankoskiseura.fi)

Finnish National style was presented on Paris World Fair exposition in 1900 in the pavilion designed by Eliel Saarinen, Armas Lindgren, Herman Gesellius. The design

connected folk inspirations and Art Nouveau in the building that was inspired by a village church.("EUROPEAN REVIVALS From Dreams of a Nation to Places of Transnational Exchange" 2020)

Figure 59 The Finnish Pavilion at the World Fair in Paris, 1900 (architects Eliel Saarinen, Armas Lindgren, Herman Gesellius; interior design by artist Akseli GallenKallela,)(iljanen et al. 2020)

Analyse nowadays

Following Zakopane Style

Zakopane Style that started from Witkiewicz, instantly spread in the Podhale, where all types of buildings were taking from it. Starting from small, urban architecture such us benches, gates ending on cable car station and big sanctuary. Zakopane style were having two phases: I Zakopane Style during the life of the S. Witkiewicz; II Zakopane Style in interwar period with Art Deco influence. Although, the popularity of this way of building did not stop and it is still immensely popular mostly in Podhale but also in other regions of Poland.

> *"The aims of the Podhale regionalism were, among others, to study and preserve the local cultural heritage; this found a reflection in the programme of the Association of Podhale Highlanders. Locally, the style was not only accepted but, what is more, the highlanders were advised, or at least encouraged, to build their houses in the Zakopane Style; this was evident during the first congress of the Association in 1911."*
>
> (Baniowska-Kopacz 2014a)

What could be named Zakopane Style nowadays? Is this term limited only to buildings that were designed near the century ago? Zakopane Style from the beginning was meant to start something more lasting and create a "new tradition" that could be implemented to variety of structures. Moreover, it was meant to be used in different techniques, not only in timber. Is there a III Zakopane Style nowadays when vast majority of Podhale buildings are inspired by old villas and folklore?

Different functions

Witkiewicz was the author of several villas and chapels that were made of wood but also, he contributed to the design of the Tatra Museum in Zakopane, which is built in bricks. The main functions were then residential but with an extended program that for example in Villa "Pod Jedlami" was a space for ethnographical collections of the investor. Buildings were prepared for each season even though owners spend time in the mountains mostly in the summer months. That feature allows to use buildings for different purposes, but often re-organised by retrofitting interventions.

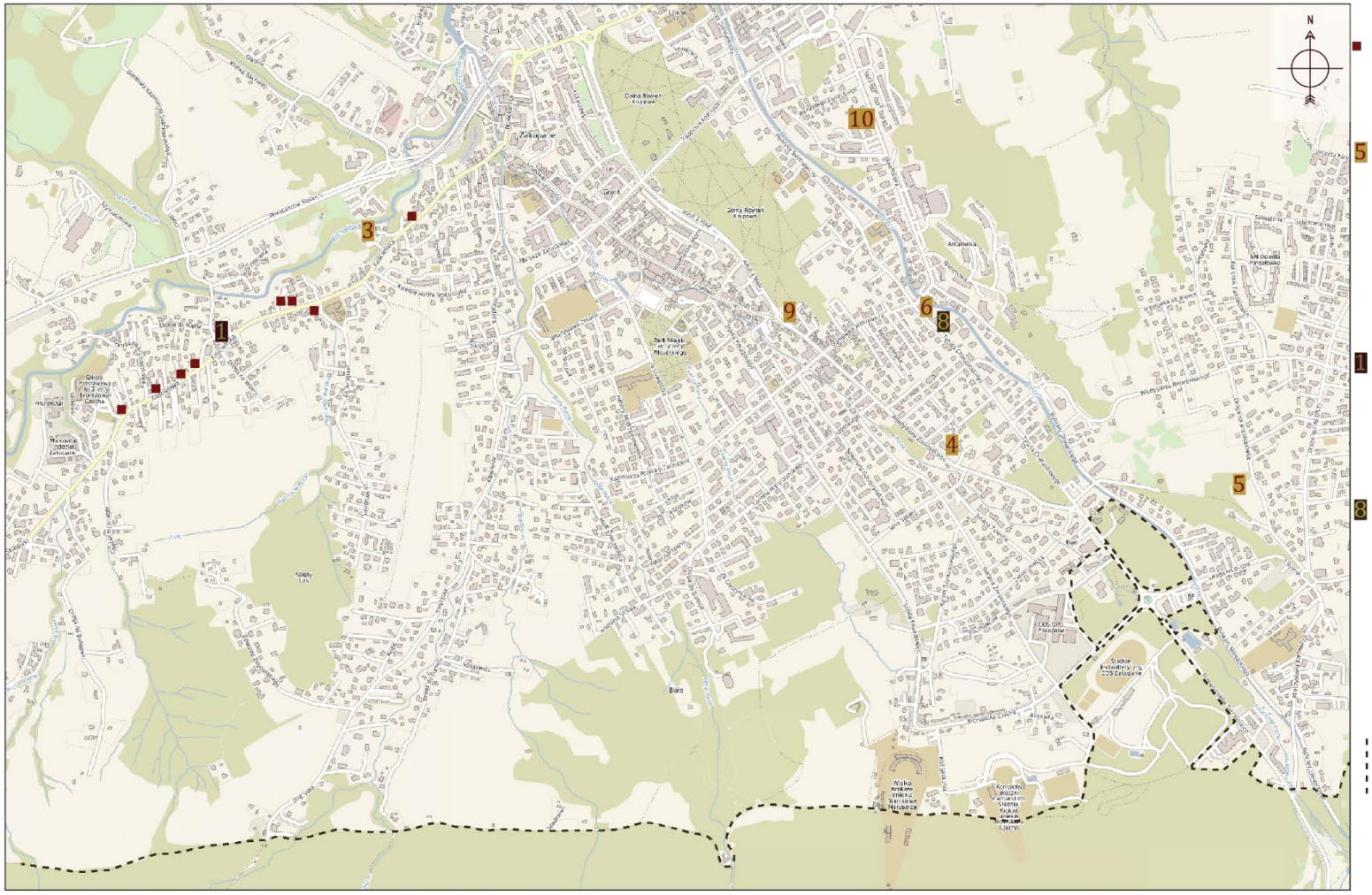
Zakopane throughout decades was and still remains a popular destinations for all groups of tourists such as seniors, enthusiasts of mountain tracks, families with children. Houses in Zakopane increased in value. Many of old villas and new constructions were projected to facilitate needs of visitors. Most of villas are now use as guesthouses. One group of buildings that did not change a function are no-secular structures such as the Chapel of the St. Cross on Kalatówki (1898, By S. Witkiewicz), the Chapel Of The Sacred Heart Of Jesus In Jaszczurówka (1904-1907, By S. Witkiewicz).

Underneath in the table, is presented a survey with selected vernacular homesteads and villas designed by Witkiewicz and their changing functions. All listed objects are under the law protection (apart from those that not-exist anymore).

Nr	year of constr uction	name	designer	location	primary function	nowadays function
1	1845	Cottage Gąsieniców Sobczaków	local carpenters	Zakopane	Homestead consisting of a one-room cottage and a building	Museum of the Zakopane Style
2	19th century	Eight buildings on Kościeliska St. Nr 12, 37, 38, 40, 52, 56, 66, 78	local carpenters	Zakopane	Homestead consisting of a one-room cottage and a building	Nr.12, 37 40, 56, 66, 78 house Nr. 38 accommodations Nr. 52 restaurants
3	1892-1893	villa "Koliba"	S. Witkiewicz	Zakopane	apart residential function facilitate ethnographic collection	Museum of the Zakopane Style
4	1894–1895	Villa "Oksza"	S. Witkiewicz	Zakopane	residential, holiday house	1927 - 2006 internat, school and medic point; since 2006 part of Tatra Museum exposition about Podhale
5	1897	Villa "Pod Jedlami"	S. Witkiewicz	Zakopane	residential, holiday house	residential, holiday house
6	1897-1898	Dr Marian Hawrank's Health House	S. Witkiewicz	Zakopane	during planning house but before construction was finished changed into Health Center	communal apartments *to timber walls were added plaster
7	late 19th	Villa "Skoczyńska"	S. Witkiewicz	Zakopane	residential, holiday house	destroyed by fire
-	late 19th	Villa "Łada"	S. Witkiewicz	Zakopane	residential, holiday house with literature salon	1928 destroyed by fire
9	1902	Villa "Ślimak" later known as "Zośka"	S. Witkiewicz	Zakopane	guesthouse, in years 1923-28 managed by Maria Witkiewicz (widow after S.Witkiewicz)	guesthouse, restaurant
10	1901 – 1902	Villa "Konstantynówka"	S. Witkiewicz	Zakopane	residential, holiday house	hotel, restaurant

Zakopane Map - fragment

location of the vernacular houses along Kościeliska St. and choosen villa designed by Witkiewicz in Zakopane



vernacular houses, refers to nr 2 in the table

5 villas designed by Witkiewicz; number refers to position in the table

1 vernacular house; number refers to position in the table

8 villas that no longer exist designed by Witkiewicz; number refers to position in the table

borders of Tatra National Park

source: geoportal Zakopane (https://mzakopane.e-mapa.net/)

Changes in style, building materials and techniques

Zakopane Style is still popular in the Polish mountainous region, mainly in Podhale, but new buildings that trying, with different success from an aesthetic point of view and connection with local architecture, to follow this tradition are scattered in whole Poland. It can be mainly observed in type of holiday house, that somehow touch the subject of utopian settlement, is tangible representation of owner's dreams. Wooden houses from Tatra Mountain are often connected with holiday experience. Podhale architecture is so distinctive and during decades maintaining popularity that many companies are proposing easy-to-built quasi Zakopane Style buildings, that without the context usually seem at least out of place. Moreover, nowadays Podhale is full of structures that rarely could be named beautiful and managing well the connection to tradition. Changed the quality and type of materials, additionally, the elements that were meant to stick to Highlanders' architecture often look like they were created without the understanding of their original purpose.

> *"A search for the simplified, even sterile forms, with the use of the newest building materials, became the ambition of the young generation of architects. In newly completed buildings in Zakopane one may observe their various forms; some of them are controversial, whereby others that feature superficial ties with tradition are easier to accept. Inspiration with vernacular forms and their skilful transformation still seem to be an unusually challenging task."*
>
> (Węcławowicz-Gyurkovich and Godula-Węcławowicz 2021)

Figure 60 House built around 2010 - reinterpretation of Zakopane Style in Mazovia Voivodeship, central Poland, Kobylin (photo: Z.Miłek)

On the other hand, conservation works and protection by law of approximately two hundred monuments in Zakopane benefited in better preservation and cautious dealing with the subject (Website: Zabytek.Pl, n.d.). The Podhale region is characterised by foresting traditions and valuing folklore. The vast majority of structures in Zakopane city and neighbouring villages are in design trying to follow mostly the Zakopane Style, but by this in a way, the vernacular settlements.

Mentioned in the chapter related to the history school named firstly Zakopane Woodcarving School; nowadays, Wood Industry School, along with the second school that teaches local art - State High School of Fine Arts in Zakopane – has undoubtedly had a huge influence on keeping the tradition alive and exploring it in modern use.

Inseparable parts of newly constructed buildings that somehow follow tradition are wooden elements that might stand for the whole structure or just external decorative elements. If the investor would like to follow Zakopane building traditions it is possible to still use *płaz* interlocking structure. Due to law demanding regards the thermal conductivity in buildings in most cases it is necessary to add layer of thermal insulation.[31] However, this also might cause that wood does not have to be so good quality; it won't be only one layer that preserve from losing warmth. Therefore, might be found buildings that treat wood layers as solely decorative façade. The same situation might be found in masonry stone base that often is reduced to stone facing. The techniques of sourcing and

[31] In case of heritage monuments, the insulation law requirements are different

woodcraft changed for more mechanical sawing with better adjusting. Nowadays, most in use are professional sawmills, sometimes with the option of preassembling elements.

Figure 61 [left] interlocking planks on elevation; Zakopane (photo: Z.Miłek)

Figure 62 [right]modern construction technic with adding traditional materials; Bystre, Zakopane (photo: Z.Miłek)

Retrofitting interventions

Most retrofitting interventions are related to two types of works: rearranging building for new functions, and needs of modern time and reassembling, changing and conservation of structural elements along with providing insulations. First might include providing new installations basic for nowadays functioning.

Case of the vernacular building - House Gąsieniców Sobczaków

This building was constructed to be a family house on one of the main roads of Zakopane. Now it is the Tatra Museum with exposition related to Highlanders' traditional way of living. General restoration was undertaken after purchasing a building by Tatra Museum. In 1977-1979 were renowned stone bases and few of the main construction elements

were replaced, due to old ones were deeply moulded: such as rafter's elements, foundation beam, and several wall beams. Moreover, the roof shingles were changed. Into the building were provided water and sewage installation, electricity and lightning protection. The subject of maintenance works in 1992 were impregnations of roof shingles and walls along with replenishing *mek*. Similar works were undertaken in 2001 with additional adjusting attic for use and thermal insulation of part of the floors. In 2008 was next renovation that changed the function from residential to museum exposition. In the white chamber, the stove was decorated by artist based on drawings of traditional stoves in Gorals' houses (Moździerz 2019). Interesting retrofitting interventions were windows, that not only were made double by adding second glassing but also the blinders that are placed inside were added. The blinders in this house primarily were most probably on the outside side, however, examples of indoor blinders could be found in Podhale and for this solution, conservator decided (information provided in museum boards).

Figure 63 Newly added indoor blinders House Gąsieniców Sobczaków (photo: Z.Miłek)

Figure 64 Double glassing and visible new *mek*, House Gąsieniców Sobczaków (photo: Z.Miłek)

Law protection and enhancing of heritage

Legislation

In the Polish legislation system, the most important legal act regulating issues related to monuments is the Act on the Protection and Care of Monuments of 23 July 2003 (Journal of Laws of 2003, No. 162, item 1568). It defines the subject, scope, and forms of monument protection, as the rules for creating a program for the care protection of monuments. Also, it regulates the organization of institutions responsible for the protection of monuments as well as financing of all works related to the monuments. Additionally, other legal acts sometimes are related to the protection of monuments such as construction law and the nature protection act.

The Registry of Cultural Property[32] is the basic form of protection of monuments and is based on the mentioned above act. However, it is not a new form of protection of heritage. This register was firstly created by the President's regulation in 1928 and has been functioning for nearly 90 years based on unalterable principles. Registration of the object is the finalisation of administrative procedures that results in legal protection. The registry content is constantly changing, which results both from the inscription of new objects that meet the definition of a monument on the request of the owner or by a voivodship office and also from the deletion of objects which for various reasons no longer qualify for further conservation protection (Brudnicki et al. 2017). The register for monuments in the voivodeship is kept by the provincial conservator of monuments in the form of separate books for monuments: A – immobile B – movable C – archaeological. In total, there are 62,359 objects in the Registry of Cultural Property. Currently, 30% of the monuments are owned privately, churches and religious associations own 24%, rest is owned by the municipal property, the State Treasury or has a more difficult legislative situation (Brudnicki et al. 2017).

In the Registry of Cultural Property, there are many enlisted objects of vernacular architecture of Podhale, mostly: shepherd's huts, and buildings in Zakopane style, mainly villas, mountain shelters and places of cult such as chapels and churches. Examples of vernacular architecture that survived to our times are rare, but they are scrutinised studied and in the Registry. In 2014 was created route of Zakopane Style, which include 41 objects, that aims to promote the heritage of this architecture. Apart from the

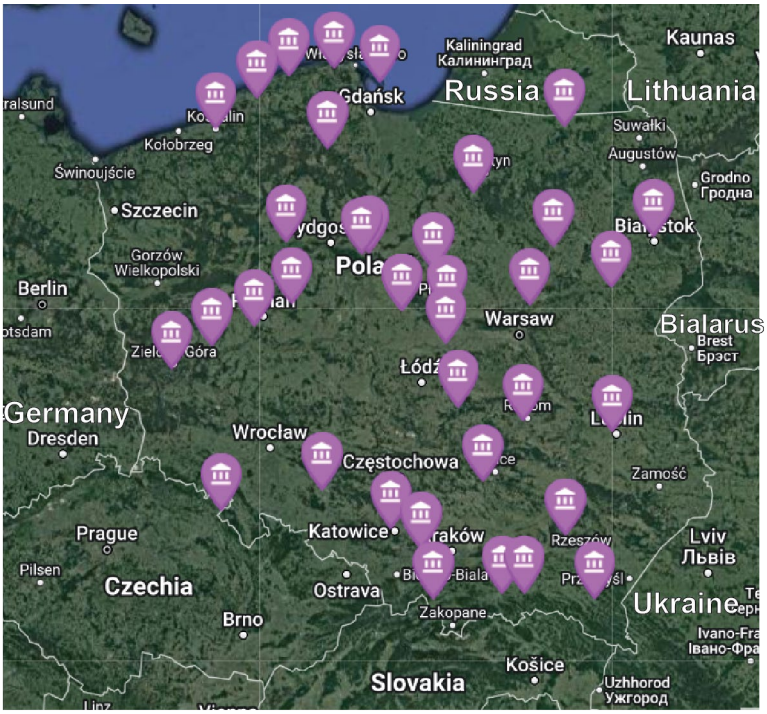
[32]Registry of Cultural Property - Polish: Rejestr zabytków

proposition of visits, all structures were described in publications. The main author of the route is Zbigniew Moździerz, whose books are cited in this thesis.

In the Registry only part of monuments are enlisted and there are still a lot of omitted heritage structure that are a vessel of culture. Crucial role in not only protecting, but also popularization and informative role is playing National Institute of Cultural Heritage (Polish: *Narodowy Instytut Dziedzictwa* NID). This governmental institution cannot create the law but has a power to publish recommendations that should be follow by conservators and keepers of monument. When the object enlisted in the Registry during any works need approval of the conservators, those buildings that are not enlisted but carry the historical /cultural value are often not properly maintained. Recently NID published guide related to maintenance of wooden house that is trying to face the question: *How should a historical building be preserved so as not to falsify or destroy the knowledge it contains?*

Different forms of preserving

Apart from inscribing into list of protected monuments there are different forms of preserving heritage. One of them is creating open-air-museum, in Polish called *skansen*. It is quite popular way of preserving and enhancing vernacular building traditions and folk culture. Most of buildings that are exposited in such places were taken from primarily localisation and reassembled in dedicated museum place. Reason to take the building from original position is mostly possibility of providing better care of them, preventing from demolition, and grouping the valuable buildings in one place to present them to visitors that would not be able to see them if they would be scattered around whole region. Additionally, most of *skansens* presents also the popular spatial development of villages. Wood architecture is relatively easy to transport and re-assemble, because it is made of elements that are mostly connected by carpentry joins. Aim of open-air-museum is not only to show the architecture but also to present how people were living. The program of those museums is then not only expositions but the propositions of experiencing the traditional way of life, learning about it and taking part in many activities such as pottery classes, making traditional decorations etc. Those museums often offer also a place to organise events such as concerts, and more cameral as wedding organization.



STOWARZYSZENIE
MUZEÓW NA WOLNYM
POWIETRZU W POLSCE

Figure 65 Map of Open-Air museums that are part of organisation of Open-Air Museums in Poland, on right logo of this organisation ("Mapa – Stowarzyszenie Muzeów Na Wolnym Powietrzu w Polsce" 2023)

Another form of preserving is enlisting the specific for community tradition into the intangible heritage list. The national list is a list of living intangible heritage from Poland and is created basing one example of UNESCO Intangible Cultural Heritage Lists. The list is maintained by the Minister of Culture and National Heritage in cooperation with the National Heritage Board of Poland (source: nid.pl). Polish List consists of forty-nine positions, but none of them is tightly connected with Podhale. On the UNESCO Intangible Cultural Heritage Lists there are two enlisted traditions: Flower carpets tradition for Corpus Christi processions and Nativity scene tradition in Krakow, again non strictly related to Podhale. However, on the List of World Heritage Sites (that in Poland consists of 17 properties), there are enlisted Wooden Churches of Southern Małopolska, that are very close to Podhale and influenced the local carpentry ("Poland - UNESCO World Heritage Convention" n.d.).

Another way of preserving, enhancing and educate about heritage is creating the routes that attract tourists and help to inform local communities about their legacy. Below are presented three examples of routes: cross-border route, regional route and local route.

Figure 66 (left) advertising poster for opening Cross-border Wooden Architecture Route

Figure 67 (right) Sign in Jaszczurówka Chapel that informs about the Zakopane Style Route with a QR code that redirects to an online description of the monument. (photo: Z.Miłek)

Cross-border route that was developed recently, in years 2014-2020, is Polish – Ukrainian Wooden Architecture Route that is seen as an opportunity to preserve the unique cultural heritage ("Centrum Projektów Europejskich" n.d.). The works on this started after enlisting Polish and Ukrainian churches and Tserkvas in UNESCO Word Heritage List. Website that shows this route presents also ideas for short trips visiting (because route itself is long) and contain information about each object.

In 2001 was undertaken project to create Wooden Architecture Route in Małopolska Voivodeship. This regional route was completed in 2003 and then few times updated. All 254 of the most valuable and interesting historical objects were marked with boards, and access to them marked with road signs. The route was enlarged and is connecting different regions of southern Poland ("O Szlaku | Szlak Architektury Drewnianej" n.d.). Similar initiatives were undertaken in many regions in Poland, this one was chosen to show because it include timber monuments of Podhale.

Also, local initiative might be promoting and gaining fundings for their heritage by creating route with descriptions to encourage both tourists and local residents to experience and learn about their monuments. Example of this is Zakopane Style Route that creates an opportunity to find and learn about monuments in Zakopane Style in Zakopane. Apart from access to website with information about each object there is an

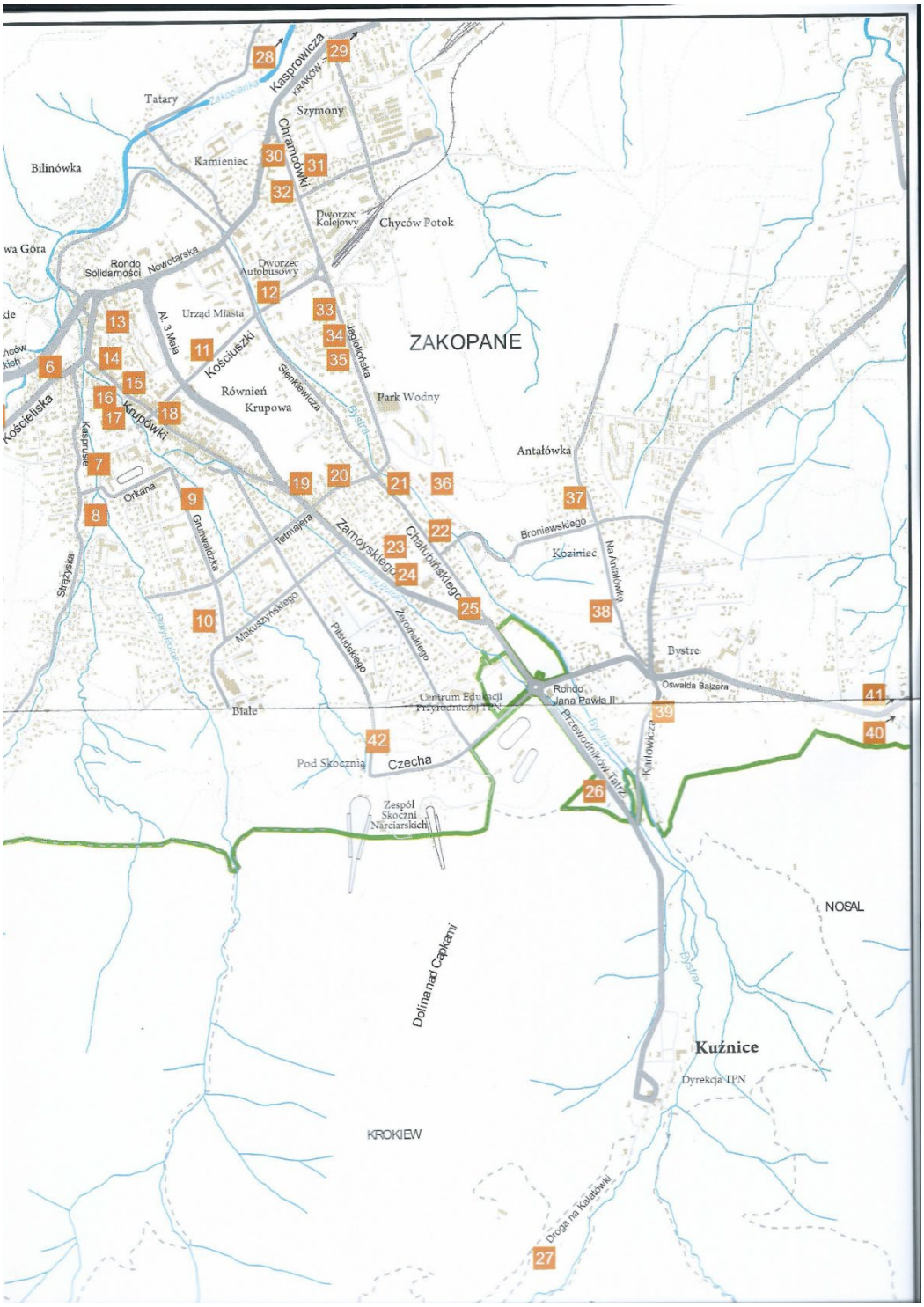
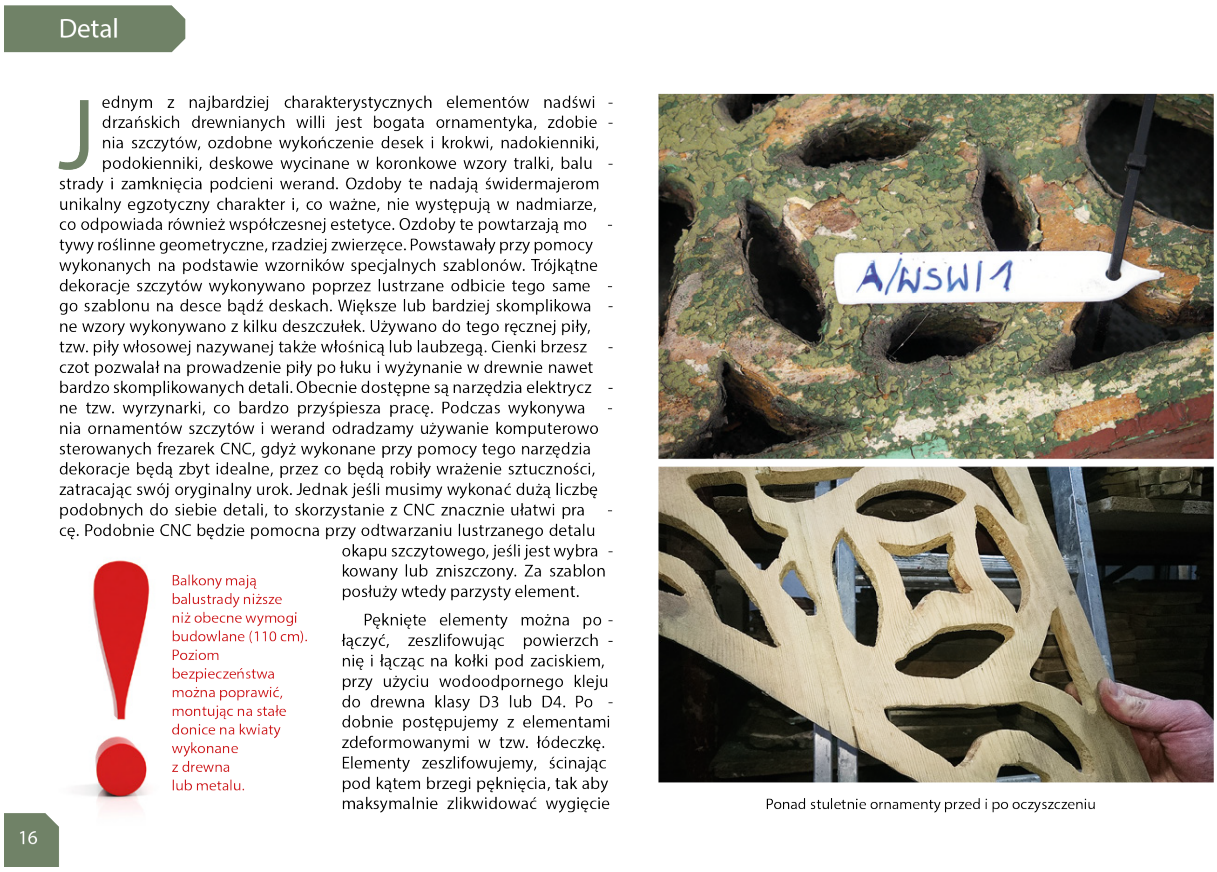


Figure 68 Map of Zakopane Style Route; this route include wooden and masonry buildings erected in 19th and 20th century. (Moździerz 2019)

Publications

In Poland, there is noticeable lack of easily accessible source of knowledge for non-professional about how to preserve, reuse and repair. Naturally, there are publications related to timber structures, however, not many could be found that cover the topic of "know how" repair and renovation. The handbook might be an opportunity for local governments and organisations to sponsor and create help for non-specialist focused on local architecture example of which could be: "How to renovate Świdermajer - renovation and construction guide"[33] – the handbook for timber frame structures characteristic for Otwock area close to Warsaw. This publication contains examples of popular damages, retrofitting interventions and their step by step fixing / implementing.



Detal

Jednym z najbardziej charakterystycznych elementów nadświdrzańskich drewnianych willi jest bogata ornamentyka, zdobienia szczytów, ozdobne wykończenie desek i krokwi, nadokienniki, podokienniki, deskowe wycinane w koronkowe wzory tralki, balustrady i zamknięcia podcieni werand. Ozdoby te nadają świdermajerom unikalny egzotyczny charakter i, co ważne, nie występują w nadmiarze, co odpowiada również współczesnej estetyce. Ozdoby te powtarzają motywy roślinne geometryczne, rzadziej zwierzęce. Powstawały przy pomocy wykonanych na podstawie wzorników specjalnych szablonów. Trójkątne dekoracje szczytów wykonywano poprzez lustrzane odbicie tego samego szablonu na desce bądź deskach. Większe lub bardziej skomplikowane wzory wykonywano z kilku deszczułek. Używano do tego ręcznej piły, tzw. piły włosowej nazywanej także włośnicą lub laubzegą. Cienki brzeszczot pozwalał na prowadzenie piły po łuku i wyżynanie w drewnie nawet bardzo skomplikowanych detali. Obecnie dostępne są narzędzia elektryczne tzw. wyrzynarki, co bardzo przyśpiesza pracę. Podczas wykonywania ornamentów szczytów i werand odradzamy używanie komputerowo sterowanych frezarek CNC, gdyż wykonane przy pomocy tego narzędzia dekoracje będą zbyt idealne, przez co będą robiły wrażenie sztuczności, zatracając swój oryginalny urok. Jednak jeśli musimy wykonać dużą liczbę podobnych do siebie detali, to skorzystanie z CNC znacznie ułatwi pracę. Podobnie CNC będzie pomocna przy odtwarzaniu lustrzanego detalu okapu szczytowego, jeśli jest wybrakowany lub zniszczony. Za szablon posłuży wtedy parzysty element.

Balkony mają balustrady niższe niż obecne wymogi budowlane (110 cm). Poziom bezpieczeństwa można poprawić, montując na stałe donice na kwiaty wykonane z drewna lub metalu.

Pęknięte elementy można połączyć, zeszlifowując powierzchnię i łącząc na kołki pod zaciskiem, przy użyciu wodoodpornego kleju do drewna klasy D3 lub D4. Podobnie postępujemy z elementami zdeformowanymi w tzw. łódeczkę. Elementy zeszlifowujemy, ścinając pod kątem brzegi pęknięcia, tak aby maksymalnie zlikwidować wygięcie

Ponad stuletnie ornamenty przed i po oczyszczeniu

16

Figure 69 Example of the handbook about retrofitting intervention in Świdermajer wooden architecture (Górski and Lach 2016)

Worth mentioning also is the Journal Of Heritage Conservation, quarterly which is published in Polish and English and is fully available online. It covers topics related to the conservation of all type of structures not only in Poland. Moreover, the articles are results

[33] How to renovate Świdermajer - renovation and construction guide; Polish original title: Jak wyremontować Świdermajera – poradnik remontowo-budowlany

of work both academics and researchers practitioners from Poland and abroad. All reviewers are either University professors or doctors.

Information about the heritage, not only wooden, could be found on website dedicated to monuments that collects the information about objects inscribed on the The Registry of Cultural Property. It is *zabytek.pl* where in map section most of monuments are marked on map with brief description. When some of monuments are very well described, with numerous photos and documentations from archives, the other one are just marked on map without further information – this website work is still in progress. To part of the object are added the old Monument registration card that collected information about monuments, its state, construction technology, building materials etc.

Source of material for renovation

Another critical issue in preserving the timber structures is necessity of reassembling, sometimes replacing parts that are deteriorated and cannot be saved. For those reasons providing the source of timber is a necessity. Podhale, nowadays, is still rich with forest, but the quality and appropriate dimensions of trunks are problematic. Moreover, the huge part of mountain is under the strict law protection of National Park, in which most of trees that fallen are leave without human intervention. Other forests, own by state or by private owners, are a subject of governmental regulations that implied forest should have a forest management plan or a simplified forest management plan that prevent rapid and unplanned deforestation (Szałata 2014). As a result, for sure not saying that forest management is bad thing, there are quite limited options of sourcing good building material that could be used following the tradition *płaza* shape (long crafted pieces of wood). The main supplier of raw material to the Polish market is the State Forests, which cover over 90% of the needs of the domestic industry and residents. In the recent years the foresters are increasing the harvesting of wood: since 1990, it has more than doubled to over 35 million cubic meters in the whole country. Since the area of forests is growing at the same time, and above all their abundance, it is estimated that the State Forests will be able to increase the harvest of wood to 40 million cubic meters in 2030 (Maroszek 2022).

Timber used in Podhale is sourced not only in this region. In cases of building that are protected by law the conservators are supervising the appropriate choice of wood following the ICOMOS recommendation for timber structures, but in cases of buildings not protected the situation might be different.

"33 Institutions responsible for the conservation of monuments and sites should encourage the protection of original woodland reserves and establish stores of seasoned timber appropriate for the conservation and repair of the wooden built heritage. This policy should foresee the need for large properly seasoned wooden elements in future repairs. However, such policies should not encourage the extensive substitution of authentic elements of historic structures, but rather constitute a reserve for repairs and minor replacements.." (ICOMOS 2017)

III Comparison of Podhale and Walser architecture

Walser architecture overview

Geography and environment – Walser around Mont Rosa

The chain of the Alps is the highest mountain system in Europe. It creates a clear dividing line between the central area of the continent and the Mediterranean area, both from a geographical and from an ethno-linguistic point of view. In the sense of width, the Alps are divided into three longitudinal bands; in the sense of length they are distinguished as western, from the Colle di Cadibona to the Passo del Sempione; the central part - from the Passo del Sempione to the Passo di Resia, in Eastern part - from the Passo di Resia to the Passo Vrata. The chain then divides into various stretches, which generally take their names either from the regions that extend at their feet, or from the names of the populations who had settled there in very distant historical periods. Starting from west to east, they find: the Ligurian Alps, the Maritime Alps, the Cottian Alps (Mt. Monviso), the Graian Alps (Mont Blanc and Gran Paradiso), the Pennine Alps (Monte Rosa and Matterhorn), the Lepontine Alps, the Rhaetian(Bernina, Ortles, Cevedale and Adamello), the Venetian Alps divided into Atesine, Dolomite, Carniche and Giulie (Zanzi & Rizzi, 1988).

Walser people settled in valleys of the Central and Western Alps. Nowadays those parts of the mountains belong to five different countries: Italy, Switzerland, Liechtenstein, Germany and Austria. In Piemonte and Valle d'Aosta regions, most of the villages where Walser people live and their architecture could be observed are mostly in the area of Monte Rosa such as: Gressoney [1.385m a.s.l.], Alagna [1.191m a.s.l.], Macugnaga [1.327m a.s.l.] and Pomatt [1.280m a.s.l.] (Formazza Valley) -marked on the map below. In the south from Monte Rosa especially valleys of Lys, Anzasca, Sesia, Toce, Formazza and, Bosco/Gurin in Ticino, are considered to be at least partially Walser influenced(Zanzi and Rizzi 1988).

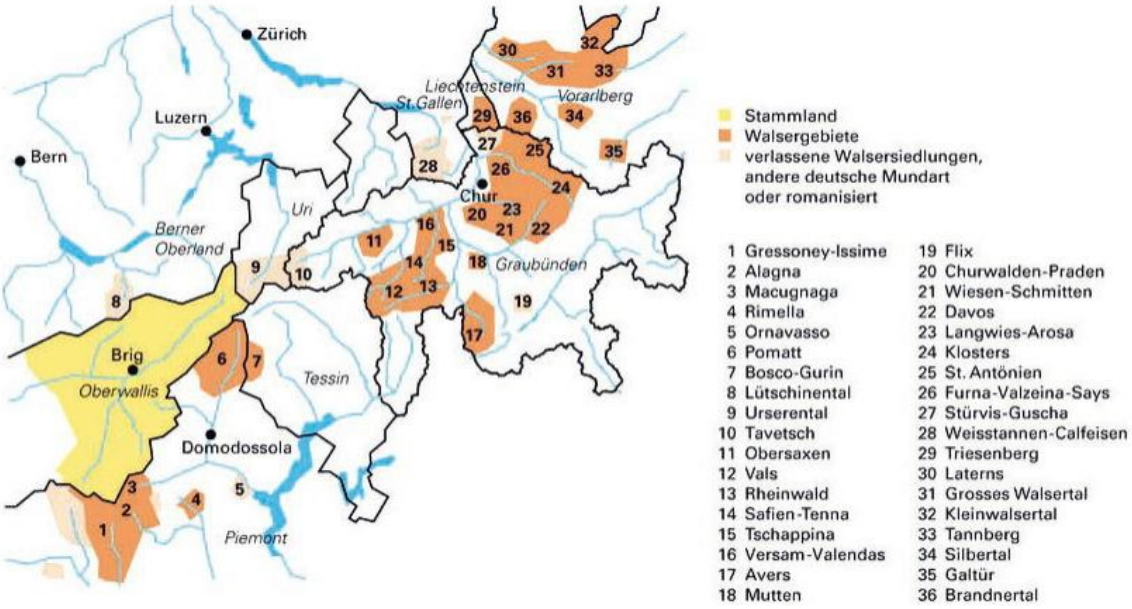


Figure 70 Walser settlements in the Alps ("Walser in Alps" n.d.)

Focusing on the region where Walser people settle near Mont Rosa can be said that the climate of this area was hard for maintaining permanent settlements, which were localised mostly in more than 1000 m a.s.l. Annual precipitation is high – around 1500 mm, but since it's a mountainous area with a low-temperature significant part of it is snow. There are approximately more than 120 days per year when the temperature drops under 0 C degree. In the Mont Rosa region and Formazza Valley average length of the growing season is around 100 days (1981-2010 data)(PORTALE SUL CLIMA IN PIEMONTE, n.d.). However, those numbers can greatly differ if the subject is low or high valley. Longer winters in higher valleys resulted in shorter harvest time and high altitudes localisation resulted in different diets, due to not all species of trees, bushes were growing on such high mountains. For instance, at the altitude of approximately 500-600 m a.s.l winter wheat is ripe by mid - July, meanwhile in the higher fields, 1300-1600 m a.s.l, it was harvested one month later and the chestnut could extremely rarely be found above 1200m a.s.l. so there were present only in low mountains dishes/diet.

Additionally, to this harsh climate, the soil is not fertile - with rocky remains and shallow humus cover. Valleys were getting heated quicker in the spring because of the warm wind. Once more there are great differences even inside one valley in terms of which slope is considered. The shadowed slope is mostly characterised by the dense forest, which is more stepped and more rocky. Meanwhile, the slope that is facing the sun, more south

directed often declines less harshly and is much more fertile, which makes it more suitable for agriculture and to accommodate human settlement (Mirici Cappa 1997).

However, important is to underline that the climate has been changing so when the expansion to higher altitudes started in the late Middle Ages the climate was mild in comparison to later changes such as in the "Little Ice Age" in the 15th-16th centuries. The climate is not constant, and its fluctuation had an immense impact on people who depended on just a few months of possible farming.

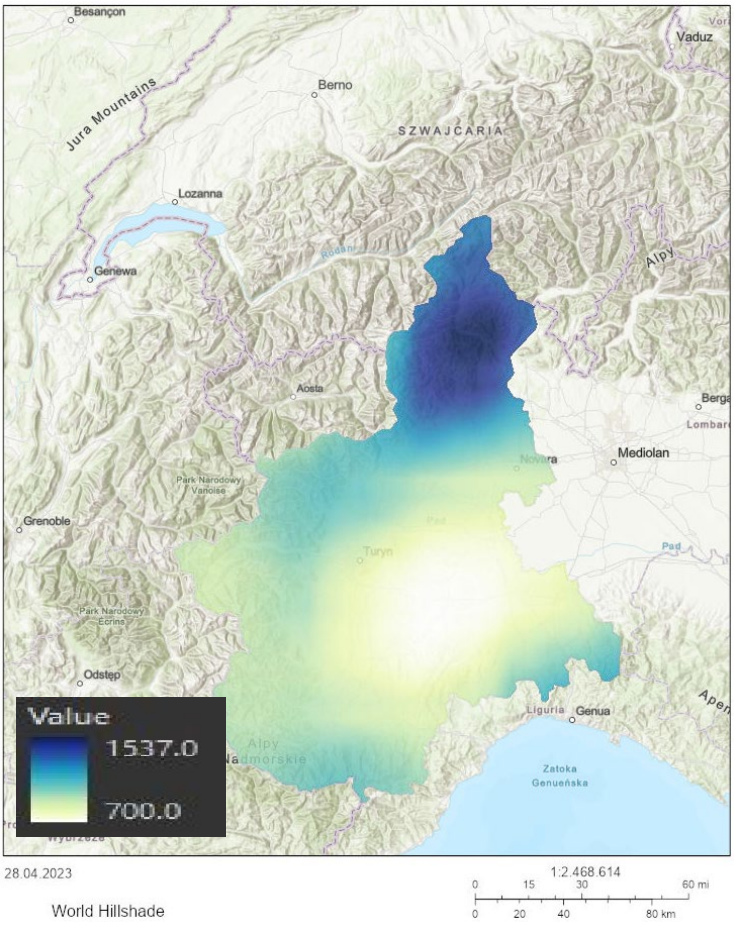


Figure 71 Average of the precipitation accumulated annually in the period 1981-2010 ("PORTALE SUL CLIMA IN PIEMONTE" n.d.)

Figure 72 Average number, on an annual basis, of the days in which the minimum recorded temperature was below 0 °C. Reference period 1981-2010 ("PORTALE SUL CLIMA IN PIEMONTE" n.d.)

Historical context

Above altitude 1000m above sea level in the Alps till Middle Ages was an untarnished land that due to difficult weather conditions and hard access remained untouched in the heart of Europe. Germanic tribes did not exceed the Swiss plateau till the "small climatic optimum"[34] that lessen the glaciers reach and drop the temperature, which allows expansion to higher territories.

Since the last centuries of the Middle Ages, Walser people were living in the highest valleys of the Central and Western Alps, where more than 150 settlements were scattered across Savoy (France), Valle d'Aosta, Piedmont, Lombardy (Italy); Canton Ticino, Grigioni, Bern, Uri, San Gallo, Vallese (Switzerland); Principality of Liechtenstein; Vorarlberg, Tyrol (Austria) (Rizzi 2003; 2005). They lead agro-pastoral life that can be described also as

[34] Medieval Warm Period that lasted about ad 900-1300 and was characterised by a warm, dry climate

semi-nomadic on very high altitudes and colonised areas in valleys near Monte Rosa. The crucial role in colonisation south of Mt. Rosa played by Benedictines that introduced cultivating of wine, and flax. Between the 14th and 15th centuries Walser in their "economic colonisation" arrived in valleys of Grigioni and Vorarlberg and Tyrol, Bavaria. It was not a spontaneous decision to move forward and gain new territory, because peasants were at that time connected to the land and under the feudal lord. Moreover, settling in another land required permission to stay(Rizzi 2005). Colonisations were than encouraged by lords who saw a possibility of cultivating land and overcoming increasing density of people.

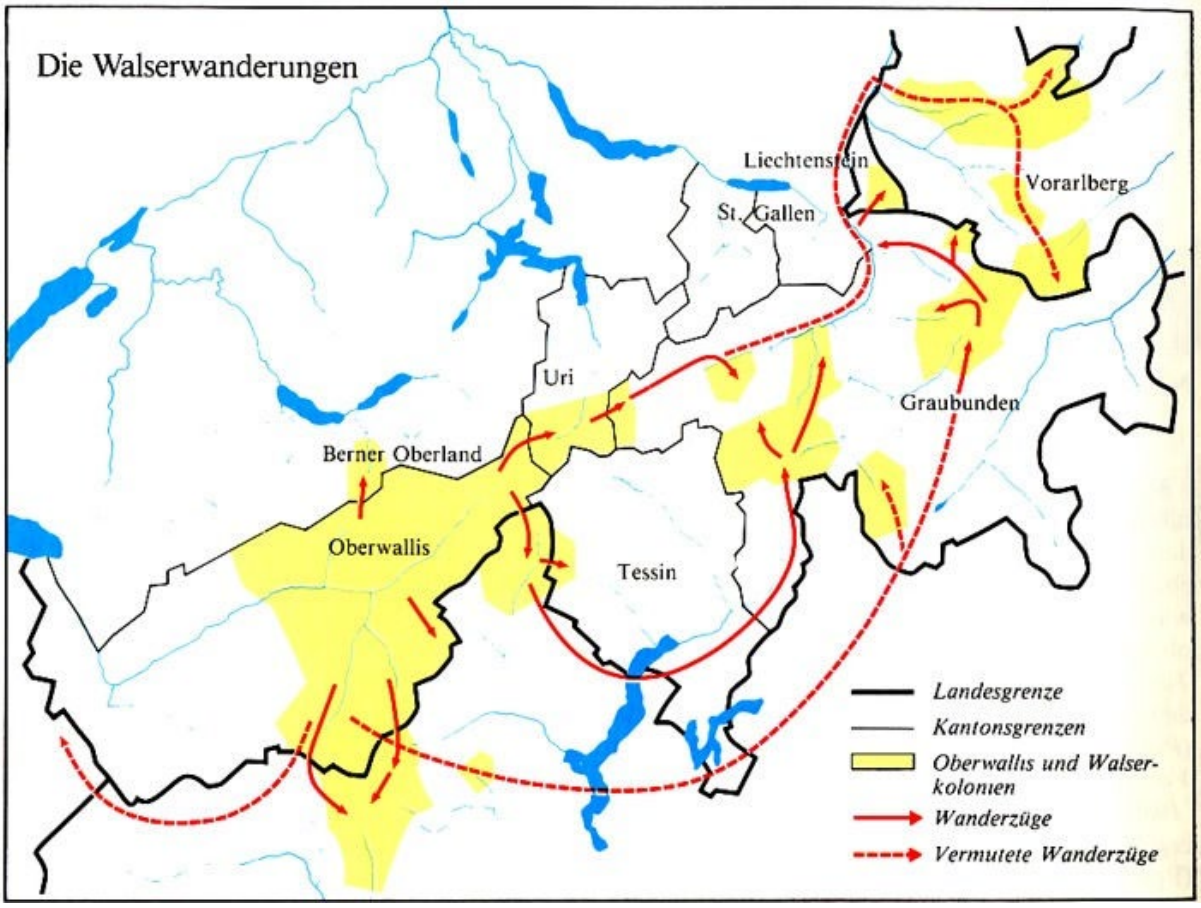


Figure 73 Walser migrations (Fibicher 2004)

Terms Walser was used to distinguish the small group of nomadic settlers that had come from Valais (in German Wallis), that was speaking Walser German dialect – evolved from Highest Alemanic. There is another theory about origin of Walser people, formed by Sergio Gilardino - university professor of comparative literature at the University of Cambridge in the United Kingdom and at the McGill University of Montreal in Canada. He explained that due to linguistic affinities with the Viking, Scandian and Saxon, there is a possibility that Walser people came from Saxon settlers.

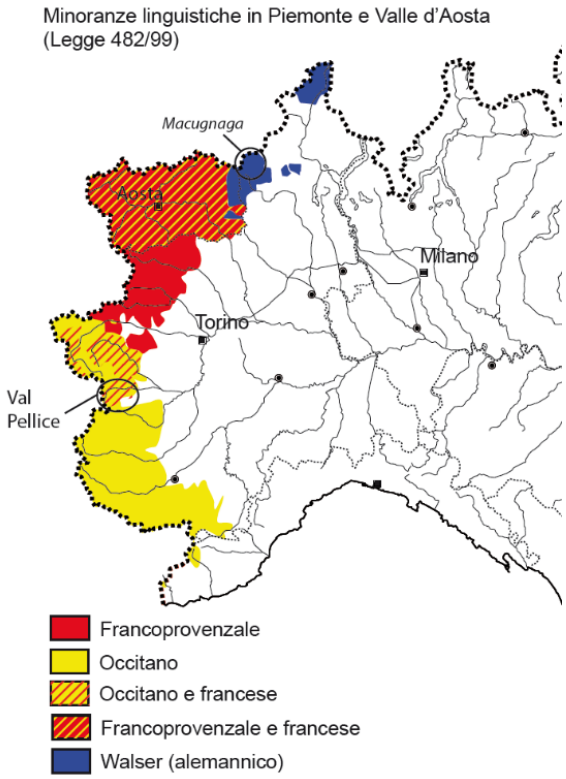


Figure 74 Linguistic minorities in Piedmont and Valle d'Aosta(Porcellana et al. 2016)

However, by name Walser were also called other groups of settlers in the Alps that were under the so-called *Diritto dei Walser* (Walser-law). So the term described their legal status, not solely their origin. It was mainly created to encourage settlers to acquire new land in high mountains. As a result, there were groups of farmers that didn't originate from Valais but were called also "Walsers". In other to promote expansion, the law was giving the possibility of perpetual lease, certain freedoms, and specific autonomic judicial and administration. The settler's law was formed between the 10th and 11th century, in a time when agricultural activity transformed Europe in a scale similar to the Industrial Revolution (Rizzi 2003).

> *"Se invece di ricevere l'alpe in affitto per un anno - risponde nel 1420 un Walser valesiano al delegato del Vescovo - il colono riceverà in affitto perpetuo, potrà sforzarsi di migliorarlo, ricavandone campi e prati, costruire case d'abitazione per andarvi a vivere con la famiglia e ricoveri per gli animali e io stesso sarei contento di avere in concessione un'alpe"*

> *"If instead of renting the alp for a year - a Valesian Walser replied to the Bishop's delegate in 1420 - the colonist receives a perpetual lease, he will*

be able to strive to improve it, obtaining fields and meadows, build houses to live there with family and animal shelters and I would be happy to have an alp in concession"

(Zanzi & Rizzi, 1988)

Walsers according to the law were not obliged to work for landlords, consult marriage decisions and pay tributes (Zanzi & Rizzi, 1988). The whole colonisation process was extremely difficult and required decades of work and adaptation to severe weather. Land could be cultivated for only a short time, so settlers were putting in an outstanding effort to make use of the most of land, to deforest, regulate river bed and develop tools. Due to remote localisations of settlements Walser people, even though they erected bridges and had paths /roads, were mostly self-sufficient. Although the economic independency, Walsers were living in a border region and could (after deliberate expedition) enhance the economy by trading. They were self-providing in agriculture, milk processing and cattle breeding. The last one was the base of their economy. In those high altitudes, only a few crops could survive such as: hemp, barley, rye. In the first half of the 17th century, potatoes were introduced. Agriculture and animal breeding were tightly bonded – numbers of animals depend on how much the family was able to store crops for the long winter (Zanzi and Rizzi 1988). In summer time animals were grassed in heigh placed meadows so the herdsmen sheltered in seasonal huts.

"Cultivation of the fields and cattle breeding were not however sufficient to guarantee survival in such a difficult environment: the Walser therefore had to resort to substitutive activities, which could supplement the income deriving from agriculture and livestock. Thus it was that they devoted themselves to commerce (Macugnaga), to packsacking (Formazza), to craftsmanship, to seasonal emigration and, even if rarely, to the exploitation of the mines."

(Mirici Cappa 1997)

Walser communities had to face the effect of the growing popularity of media and its consequences on the language and tradition. 20th century brought also an increasing number of tourists and tempting opportunities for the younger generation in cities, causing the possibility of interrupting the continuity of passing tradition from generation to generation. One of first the answer for these changes and works to preserve identity

was creating in the 1962 network connecting all Walser communities by the organisation Walsertreffen, that integrated people during meeting each 3 years. Three years later was constituted the International Walser Association (IVfW). This organisation focus on preserving the language, culture, landscape and identity along with creating plans for future popularisation and implementation of Walser heritage (Petite 2009). Nowadays, the Walser settlers are no longer leading only agro-pastoral life, when pastoralism remains the pillar of the local economy, another sector is making bigger contributions – tourism, which effect can be seen in retrofitting interventions and function changes (Bamert, Ströbele, and Buchecker 2016).

Walser Architecture


Figure 75 and Figure 76 Walser settlement; Alagna (photo: Z.Miłek)

Walser people developed their way of building and adapted to the surrounding environment. There were different types of buildings, that were common facilities typical for settlements such as dwellings, mills, forges, chapels, and churches, however, developed and organised in particular Walser way.

"(...) instead there are concrete "local" constructions which now allow the reconstruction of a common model handed down by a class of builders; now of a technological commonality and of "working uses" in response to certain challenges of the territory and to certain common needs of a type of civilization (...) The Walser house must be understood as a result of the material service and use for which it was made , both as a result of the material employed, the tools and the processes used for the construction. It must also be considered as a concrete mirror of the social life of the Walsers, of which it is one of the most important material supports, not only as a housing structure but as a unit of allocation (temporary or permanent) serving agricultural activity and livestock breeding, as a storage system for food and other stocks, as a laboratory for various craft activities and so on"

(Rizzi 2003)

Starting from granaries that were an inseparable part of Walser architecture. In Gressoney they were called *stadel*, in Gaby *granir*, *stoadal* in Issime. Their use was not limited to just the storage of crops, they were also placed of the drying of bundles of rye, barley or oats, their threshing, the storage of hay and conserving seeds and breads. Additionally, the stone base could facilitate stables. The basic squarish shape (in the example below 5mx6m) could have been added balconies that run on two walls that allowed drying hay. The oldest preserved structures of this type are dated to the 15th century.

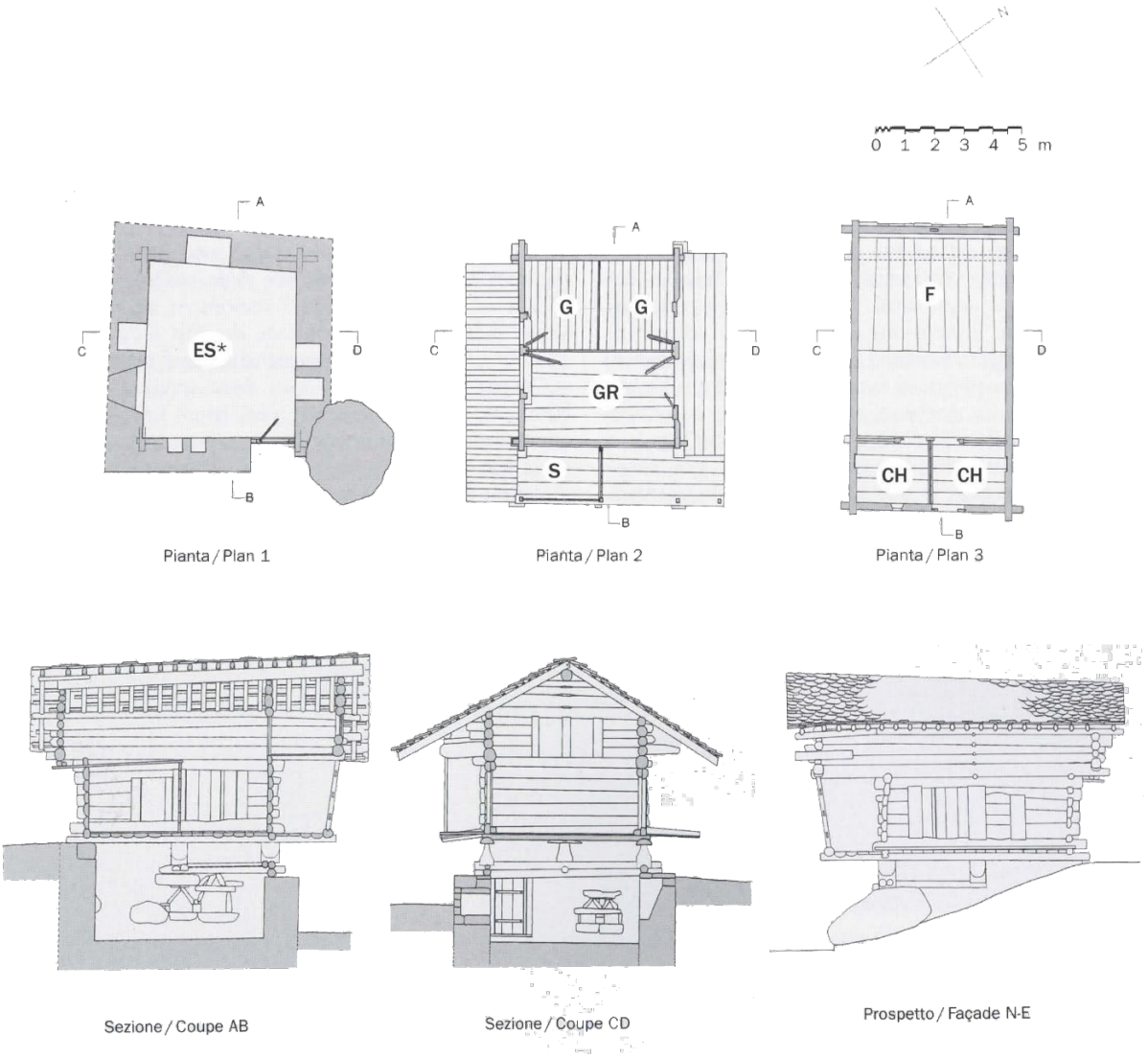


Figure 77 One of the oldest buildings among those known to be dated in the Lys Valley: the cutting of the timber took place between the years 1423 and 1427 (Remacle and Danilo 2014)

ES* - stables

G – granary

GR – storages for sheaves

F - barn

Figure 78 Stadel Gressoney-La-Trinite (Remacle and Danilo 2014)

To communicate between settlements and pastures were organised roads – mule tracks and bridges that not only were placed according to the position of the hamlet but also transversely connecting valleys such as: from Issime one could reach the Évançon valley through the hills of Dondeuil (2338m a.s.l.) and Chasten (2549m a.s.l.).

Figure 79 (left) Alagna; stones along the road (photo: Z.Miłek)

Figure 80 (right)Gressoney-La-Trinité (photo Guindani) Arrival in the Gressoney-La-Trinité. Early 20th century (Remacle, Marco, and Paul 2006)

The introduction of agriculture in the Alps demanded various types of soil modelling aimed at facilitating the operations of plowing and cultivating the fields or mowing the meadows.
Example of such is:
dry stone retaining walls - modelling the slope; in italian called *terrazzamenti*

forest near Alagna
(photo: Z.Miłek)

Other facilities were grouped in compact settlements. Barns, stable and the most characterised for Walser architecture houses are placed close to each other, which alignment might help face the harsh wind and help in communication throughout winter. Essential for choosing the place to build was to settle where natural disasters such as avalanches and floodings would not be constantly worrying (Petite 2009). Part of the Walser settlements were also chapels, in villages churches were built mainly in stone masonry with mortar. Most of the time buildings were placed on stepped slopes and were not closely surrounded by the thick forest or planted trees but by pastures or fields.

The main and most characteristic of Walser typology is a house. Due to the remoteness of settlements and rare opportunities to contact, they were not strictly unified for all Walser colonies. In buildings, a lot could change from valley to valley: the building materials available, the needs of the work on the land, the weather, the space for building and living, and the influences of the valley shape (Rizzi 2003). Naturally, in remote villages with a small population there were no needs for raising fences. Pastures, facilities and forests were well planned and organised – as it is shown below. They were favourably placed in terraced-like order determined by altitude – the so-called vertical type.

"When the confirmation of the site allowed it, the preferred model for allocating parcels to settlers was the "vertical" type. Following a sort of altimetric scale in the use of the land, the house and other rural buildings (the barn, the barn and the granary) were placed in the centre of the farm, while the crops were distributed at different altitudes but always in the sunniest areas; the upper part of the farm was used for grazing in spring and autumn; above it was the forest for the stock of timber, and further up the summer pastures."

(Maculan 2020)

Figure 81 Vals - Platz, centre of the scattered Walser colony of Vals, in the first half of the 20th century, photo Ernst Brunner (Basel Swiss Society of Popular Traditions. (Rizzi 2005)*.*

Functional Plan

The plan below [Fiure 83] shows an example of the distribution of houses in hamlet Oubre Rong and their close-to-square shapes. Houses 1 and 2 are representing typical units for one family. They are multi-storey buildings in which each space has a different predetermined function. Starting from cellars, which were used as storage. The ground floor, approximately 1,8 m high, could have different function such as stables and storages for fodder and food, a living room, kitchen (mostly from the north wall side) as in the example in the figure below. The hearth did not have a flue; the walls were therefore covered in black soot as the smoke could only escape slowly, through the openings that acted as windows.

Figure 82 (left) kitchen with hearth; Walser Museum in Alagna (photo: Z.Miłek)

Figure 83 (right) stable with living room; Walser Museum in Alagna (photo: Z.Miłek)

Openings in walls could help in distinguishing the function; tiny square windows in stables and more decorative in rooms not made for animals, but still all rooms remained quite dark on this storey. On the first floor, which was made entirely of wood (including wood flooring) were most of the time placed bedrooms of approximate dimensions 3 – 6 m2 and 1,8m – 1,9m high. They were taking advantage of the animal heat from the below floor. The access to rooms was either from outside galleries or throughout the internal staircase (not always present). The upper floor was designated as a warehouse, barn, and

granary with rooms for processing, drying, and preserving agricultural resources (Di Paola et al. 2022). Bathrooms in today's meaning did not exist; used latrines that were localized separately outside or under the staircase, or under the loggia. Water was brought not to the house but to outdoor fountains or basins located in the centre of the hamlet.

> *"The buildings present almost always the ridge line parallel to the line of maximum slope, to allow exposure of the fronts to the valley axis (generally coinciding with southern exposures). The orthogonality of the ridge with respect to the contour lines made it possible to take advantage of the slope of the land, developing an extra basement floor on the downstream side compared to the upstream side. All the buildings share a stone base, generally limited to the basement. The volume obtained inside this basement, which thanks to the partial burial and the almost complete absence of windows maintained a constant temperature, housed the stables and the rooms where the fire was made. The upper part, developed on one or two floors, is almost always completely in wood. The intended use of these floors is differentiated in rural, civil, or multifunctional buildings."*
>
> (Fantoni 2008)

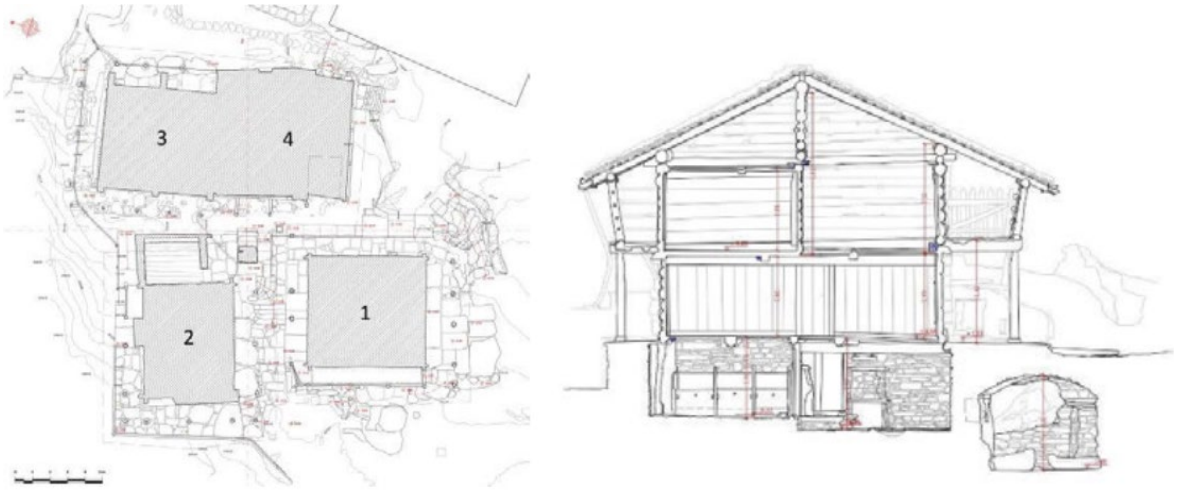
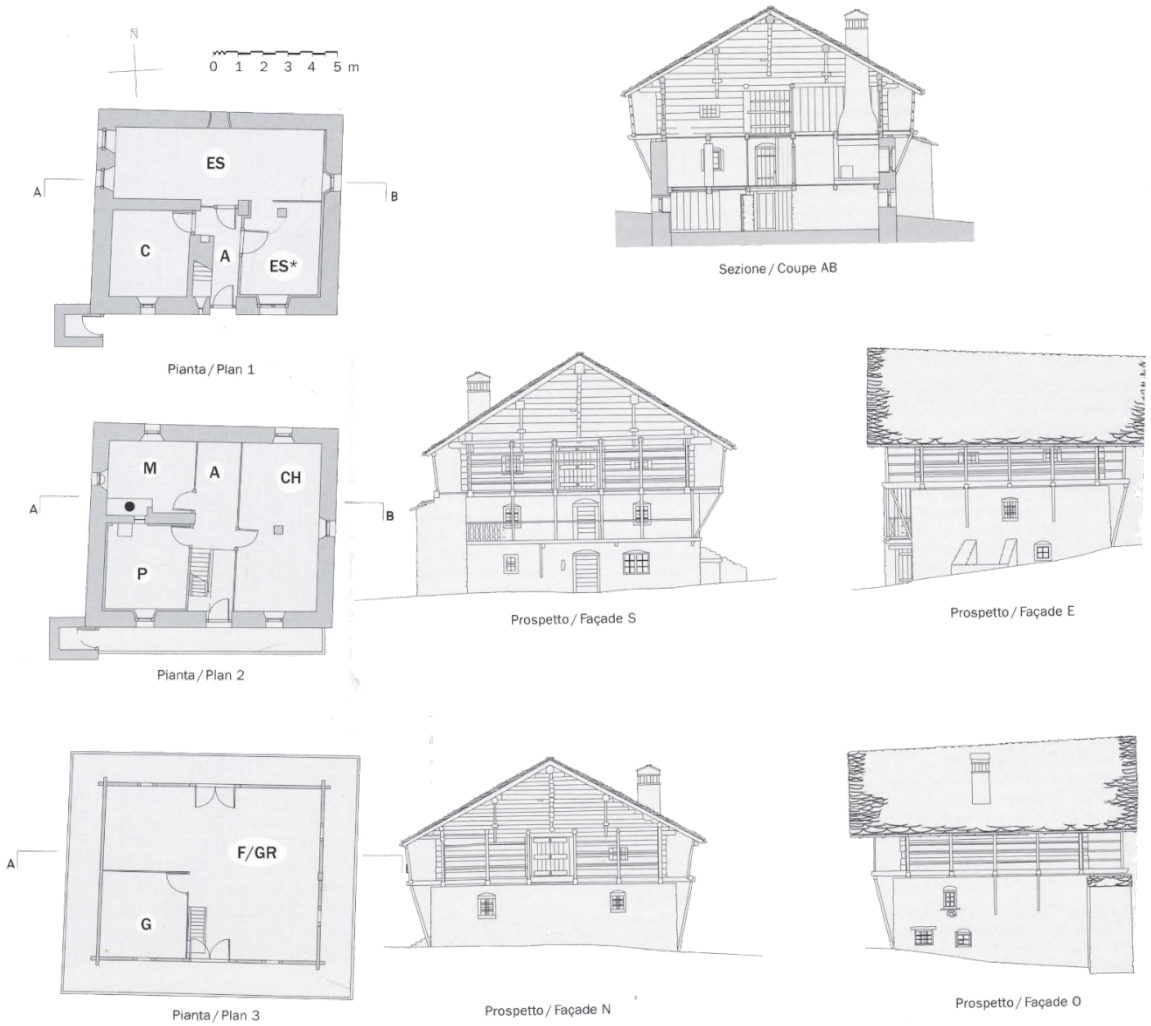


Figure 84 Planimetric map with identification of Walser Houses in Oubre Rong

Figure 85 Section of House 1. On the lower floor, stables and the living room are divided by a wooden partition; on the first floor bedrooms; on the upper flow ware-houses reachable from outside (Di Paola et al. 2022)

The characteristics of Walser houses were external galleries and their railing that surrounded each floor and were accessible throughout the staircase in the upper part of the slope. They were approximately 1,2 to 1,6 m wide furniture with tables, benches, etc. They were an external corridor that allowed them to enter rooms from outside. Moreover, horizontally placed railings were designed in order to allow the drying of hay (Remacle and Danilo 2014). Below is presented a house from the Gressoney-Sint-Jeant that was built at an altitude of 1370m a.s.l. It is an example of the structure built in that area around the 18th century. The distribution of rooms was very similar to that described above with the main difference of two storeys made in stone masonry. The main entrance highlighted by two columns led to a centrally placed corridor (called *degang*) with stairs. Internal staircase was an effect of evolution in Walser architecture so is not present in all structures. Stables were as in all cases located on the lower floor. In this house, the living quarters are all in the stone-made part. The wooden blockbau structure facilitates barn and storage. Till the 19th century common was a fireplace placed directly on the floor with no vacuum system, later there were introduced more organised stoves with chimneys; so, the kitchen must be placed in a masonry part. The gallery, with the typical slatted structure for drying hay, closed the wooden structure on all four sides. Although, there could be observed different types of railings – wooden carved planks – as a balustrade on the south façade (Remacle and Danilo 2014).



(Remacle & Danilo, 2014)(Remacle & Danilo, 2014)Figure 86 Plan and section of Gressoney-Sint-Jeant house (1370m a.s.l)(Remacle and Danilo 2014)

ES – stable

ES* - inhabited part of the stable

A – corridor

C – cellar

M – kitchen

P - heated living room

CH – room

F/GR - barn - storage with threshing floor

G – barn

- fireplace

Buildings materials

High mountains were rich in two materials – timber and stone, and the Walsers were making efficient use of these local goods. The base of the buildings, or the whole structure as in the case of pastoral's hut, placed often on a stepped slope, were made of worked, small stones adhered together by a small amount of lime or clay mortar. The mortar was

obtained from a mixture of putty[35] and sand, collected from the bed of the streams. The lime begins to harden in contact with the air and the mortar thus returns to the state of limestone, forming a solid bond between the stones (Fantoni and Ragozzi 2008).

The choice of material (granite, schist, gneiss, etc.) is linked to local availability. Stones of a schistose nature were easily divisible into slabs and used as a roof covering, and as flooring. Thanks to their considerable weight, they offered good resistance to snow loads and were able to withstand daily temperature amplitude. Roof cover was most of the time made of stone slabs, however, there are examples of houses that initially had a wood cover – shingles of larch split along the grain, locally installed (Oro di Ferrate; val d'Egua) (Fantoni 2008). Shingles were always split - not sawn to obtain waterproof and resistant material. Furthermore, soapstone which was easy to work with, was used for the manufacture of stoves and kitchen utensils – such as dishes.

Rooms on the ground floor than were having stone flooring and thick masonry walls that were resisting winter wind blowing and had a fire resistance - especially crucial for kitchen fireplace. Stone was used in the foundation to stop the capillary rise of water and prevent wood soaking. The construction of galleries was based on wood piers placed on the stone plinth (Fantoni & Ragozzi, 2008). Next floors were made most of the time in timber and also in the construction of roof, furniture and utilities. Timber structures, that guaranteed good thermal insulation, were possible in the area of great accessibility of forest, due to construction was needed a significant amount of material. However, it was relatively low cost. To made overlapping logs without thermal bridges it was not sufficient to attach them smoothly; there must be moss or other material inserted into small fissures (Fantoni and Ragozzi 2008).

Type of wood was matching the role so the advantages might be maximally used. Spruce timber could be found construction of block-bau external walls. Larch (*Larix decidua* Mill) is an semi-hard wood that is extremely difficult to treat, but is stable and elastic, strong, durable, resistant and not shrinking significantly was used in construction and roofs. The next most popular species was fir characterised by easy shaping and used mostly in floor boards, internal walls and elements of carpentry. The third type of wood - *Maggio ciondolo* (*Laburnum anagyroides Medik*)- was used only in nails, due to its superb resistance to deformations. This tree could be found in altitudes up to 1500m a.s.l.

[35] Putty – obtained by firing limestones and immersing them with water resulting in white paste

Nowadays colour of the wood part is close to dark-black shades that are an effect of the resin which has formed a protective layer against humidity. Sometimes fir wood was used, but mostly for stairs or furniture.

> *"In these buildings, the upper floors are mainly made with worked trunks and differently squared beams. The transition from the round trunk to an increasingly squaring has progressively favored the increase of the contact surface between the elements and the consequent reduction of air penetration. (..) The quantity of wooden material used in the large multifunctional buildings was considerable; an analysis conducted on a large building in the village of Frantse (val d'Ayas) with two wooden levels, assuming an average size of the trunk with a diameter of 35 cm at the base and an average height of 20 m, indicates 200 the number of the trees felled for the construction of the house."*

(Fantoni 2008)

Wood species

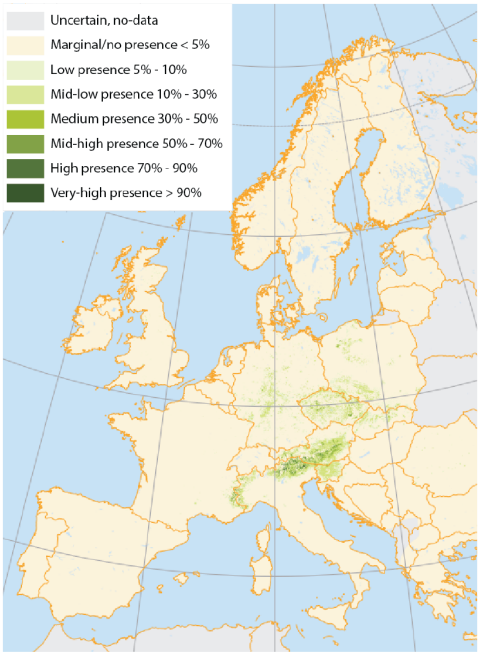
Larch / *Larix decidua* / Modrzew / Larice
eng. / *lat.* / *pol.* / *it.*

other names: European Larch

General description:

- main species in the Boreal and subalpine conifer forests,
- height about 45m (up to 50 m),
- diameter of about 40 – 70 cm,
- colours : creamy white / light yellow / red-brown
- sapwood is about 1 to 3 cm and yellow
- stable and elastic, strong, sturdy
- a good resistance to windthrow
- nowadays mostly could be found in forest reserves and are no longer logged

(Caudullo et al., 2016)



distribution map estimating the relative probability of presence (Caudullo et al., 2016)

Uses:
In Walser architecture used both inside and outside for walls, roof and floor construction.

isolated larch in a mountain field (Caudullo et al., 2016)

Physical characteristics:

Density (at 12 % moisture content)	583 kg/ m3
Total longitudinal shrinkage	0.3%
Total radial shrinkage	3.3%

Mechanical characteristics:

Tension strength	107 N/ mm2
Compression strength	55N/ mm2

Natural durability and treatability:
(according to en 350-2)

Fungi	Class 3 – 4 moderately to poorly durable
Dry wood borers	durable
Termites	Class S susceptible
Treatability	4 – not permeable

source:(Caudullo et al., 2016)(Fellner, n.d.)

Wood species

Maggio ciondolo / *Laburnum anagyroides* / *Złotokap pospolity*

it. / *lat.* / *pol.*

distribution map in Europe (source: https://www.i-flora.com)

General description:

- mainly distributed inin Central Europe montane areas
- height up to 7m ,
- trunk diameter estimate 15-30 cm
- wood is hard and heavy
- colour - yellow / brown
- is cultivated as an ornamental tree
- very good resistance to deformations

Uses:

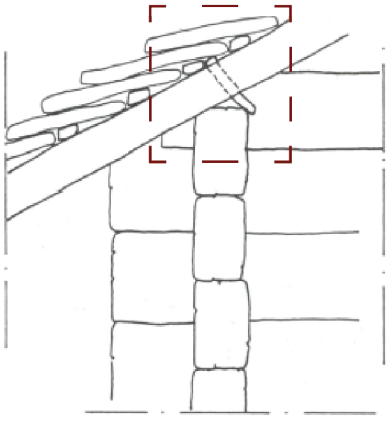
In Walser architecture used as roof nails.

Physical characteristics:

Density

(at 12 % moisture content) 850 kg/m3

(source: https://www.wood-data-base.com/laburnum/)



nodo

(Mirici Cappa, 1997)

(source http://www.makaques.com/)

Wood species

Spruce / *Picea abies* / *Świerk* / *Picea*
eng. / *lat.* / *pol.* / *it.*

other names: Whitewood, Norway spruce

Uses:
In Walser architecture could be found construction of block-bau external walls.

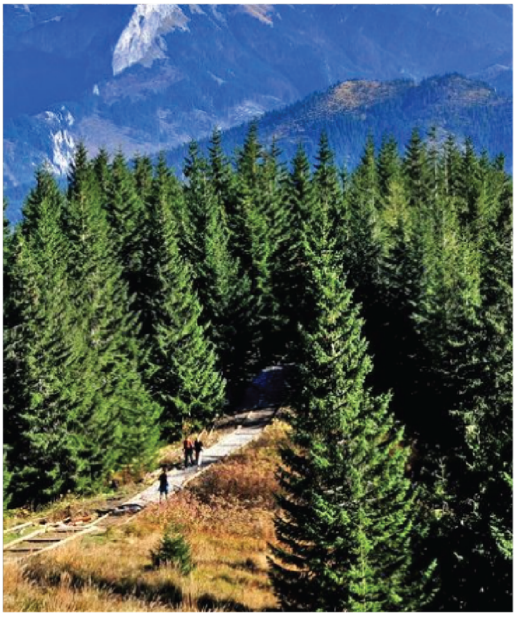
source: (Caudullo et al., 2016)
(http://www.poznajtatry.pl/)

Wood species

Fir / *Abies alba* / *Jodła pospolita* / *L'abete bianco*
eng./ *lat.* / *pol.* / *it.*

other names: Silver fir, Sapin

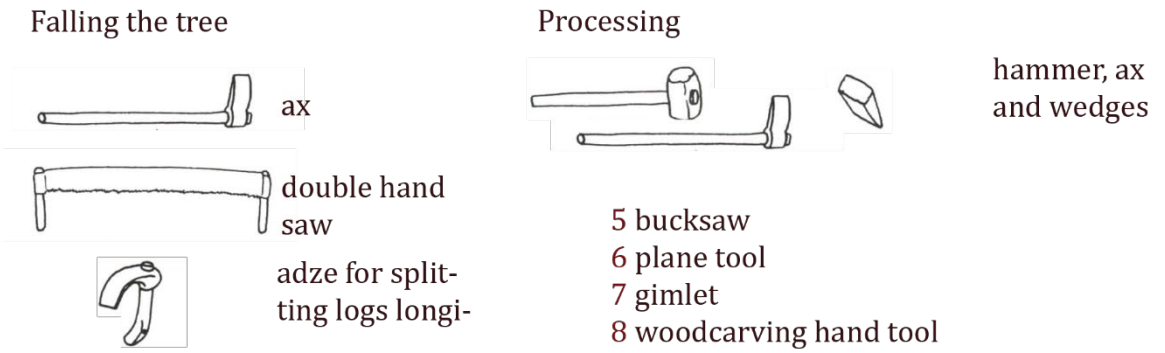
Uses:
In Walser architecture mostly for stairs or furniture.



source:(https://www.regiontatry.pl/)(Fellner, n.d.)

Detailed information related to spruce and fir are in chapter: Podhale vernacular architecture –Wood species page 34.

Tree cutting was performed in autumn or winter, using axes, after choosing the tree with no branches at the bottom and in healthy condition. After felling the tree the crown was cut off to make transport easier and was performed on dedicated for that sledges. Detached branches were carried on back in wood holders. Then the material was seasoned and processed. The length of seasoning was not one and predetermined. There were houses both built in spring out of trunks that were sourced in autumn/winter and houses for which material was drying more than one year (Fantoni and Ragozzi 2008).



drawings from (Mirici Cappa, 1997)

(carpentry workshop in Comune di Gressoney-La-Trinité, source: https://www.ecomuseowalser.com/)

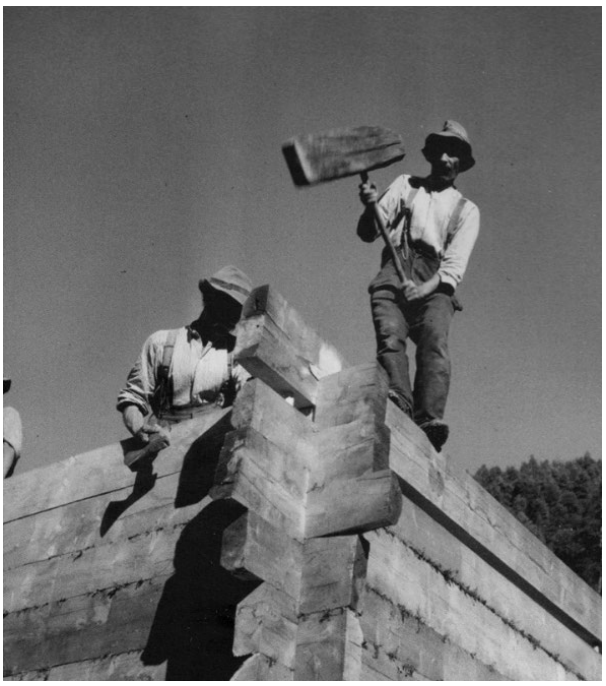
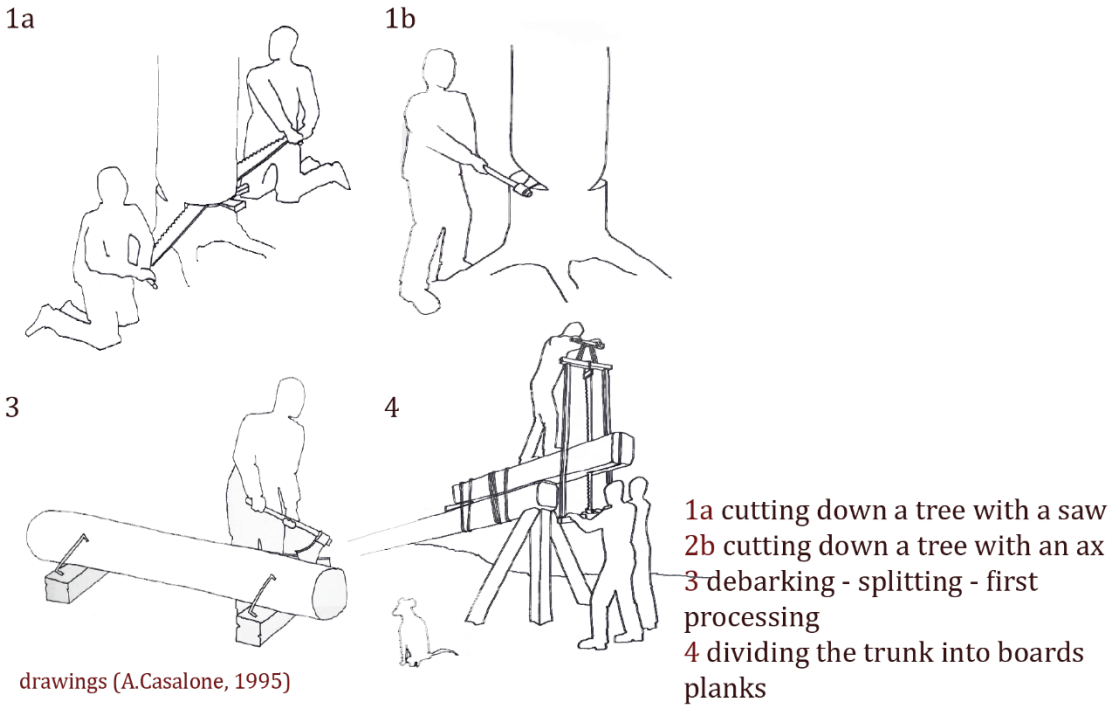


Figure 87 (left) Builders raising the blockbau wall, Vallese ,1930 (photo: Ernst Brunner)

Figure 88 (right) transport of goods on sledges (Rizzi 2003)

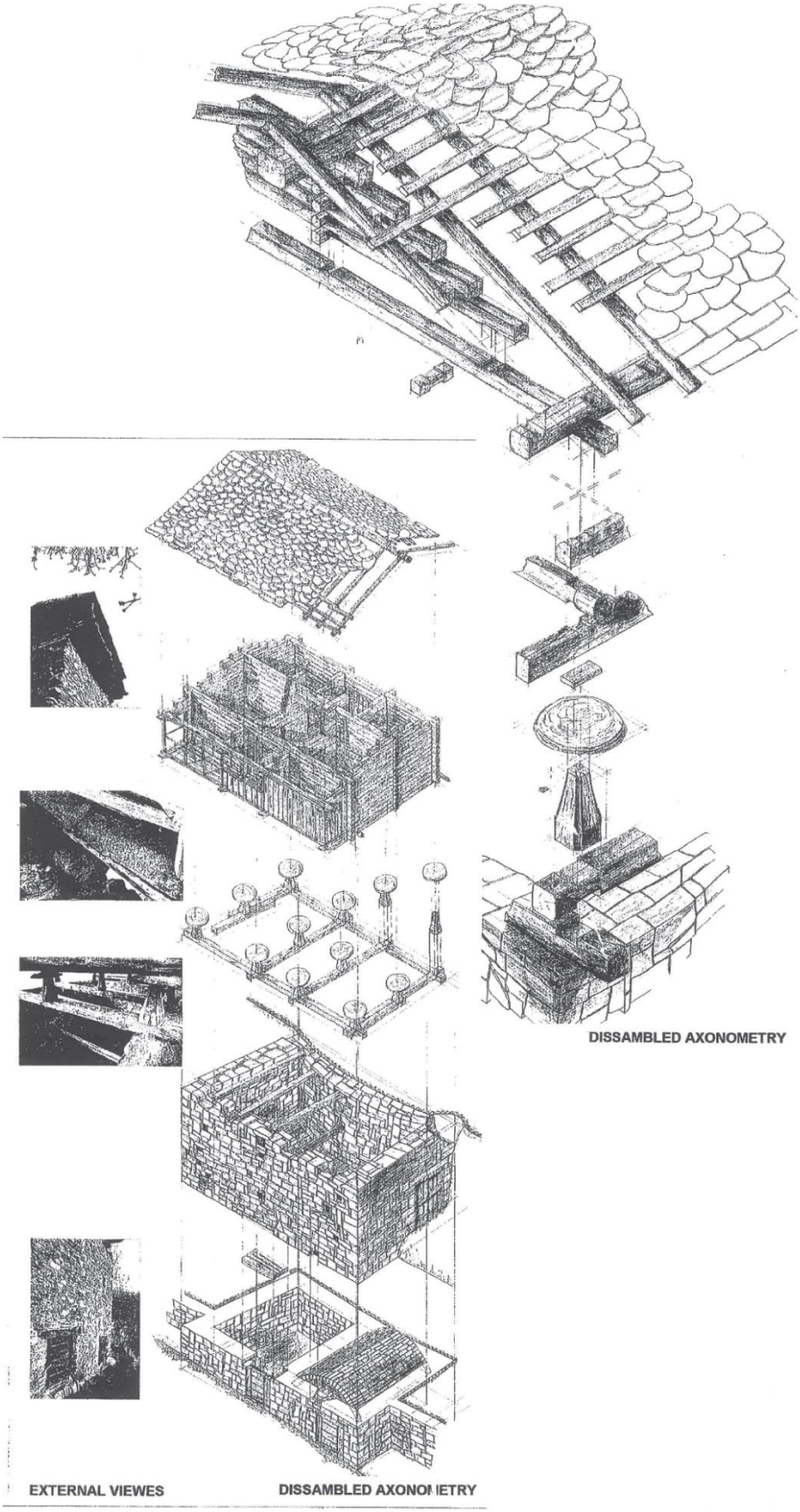
In construction were used half-trunks, planks etc. were sewed and planned by the use of dedicated tools such as a planer, axe, frame saw, hammer, and wedges; most of them in different sizes and shapes. Drilling holes was performed by using different types of gimlets and precise carving by woodcarving hand tools (Mirici Cappa 1997).



It was necessary to invent the tools and utensils that would be more efficient and easier to use without requiring a lot of "muscles work" in order to prepare and divide timber. Water, for a long time, was the power that allowed highlanders to exploit all energy by harnessing it and adapting it to their needs ("Unione Alagnese – The Oldest Association in Alagna" n.d.). Naturally, the solution for wood processing was a sawmill, which preserved example could be found in Resiga (near Alagna Valsesia).

> *"In the sawmill in the Resiga hamlet, the water is collected directly from the Otro stream. Conveyed in a long wooden supply channel, the water reaches a water wheel which sets in motion the complex propulsive mechanism. In times past, the water supplied a large cassette wheel, called a multi-stage or augustana. In 1841, during the restructuring, some parts were replaced by the more modern and still functioning hydraulic wheel with small blades, called the "Venetian style", which instead of the quantity of flow exploits the speed and weight of the water. A lever regulates its capacity according to need and simultaneously sends the remaining water into a drainage channel. The wheel turns the transmission shaft to which a flywheel connecting rod is connected which transmits the reciprocating motion to a frame. The blade is placed on the side of the frame which, by performing the reciprocating motion, activates a forward mechanism of the trolley on which the logs are placed. The supports on which the tree rests in its rotation (there were no ball bearings) are made of apple wood (Malus domestica)or laburnum, used for their resistance to water and wear. The trolley runs on beech rollers with a sloping guide to facilitate its return to the starting point."*
>
> (Mariano 2015)

Construction technology



(Soikkeli, Touliatos, and Bertolini Cestari 2001)

Base

To prepare the construction site there were undertook works to flatten the place and cut the slope by building the first walls. Foundations of buildings could be said that were of the same nature as walls of a stone base just dug into the soil. There might be found interesting bases on stones that look like mushrooms that were dilatating stone base from blockbau structure and protecting it from capillary raise of water. The vertically placed carved wood piece leg-like; was surmounted by a stone plinth on which was a superimposed wooden log structure (Fantoni and Ragozzi 2008). The circular stone slab is simply placed on the head of the support, without joints. On this support is superimposed the log structure and the first overlapping floor beam was often gouged out to fit the convex shape of the stone . This model remained in use till the 18th century.

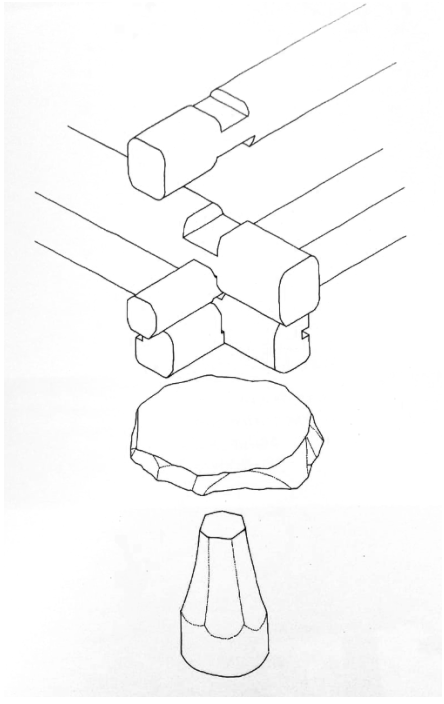
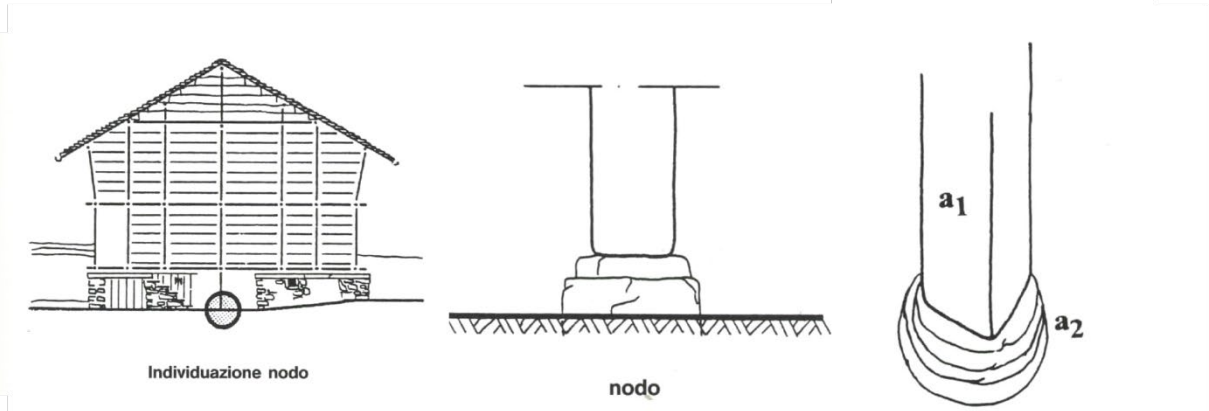


Figure 89 photo and Figure 90 axonometry -support of the stadel structure on a small pillar with a stone disc(Fantoni and Ragozzi 2008)

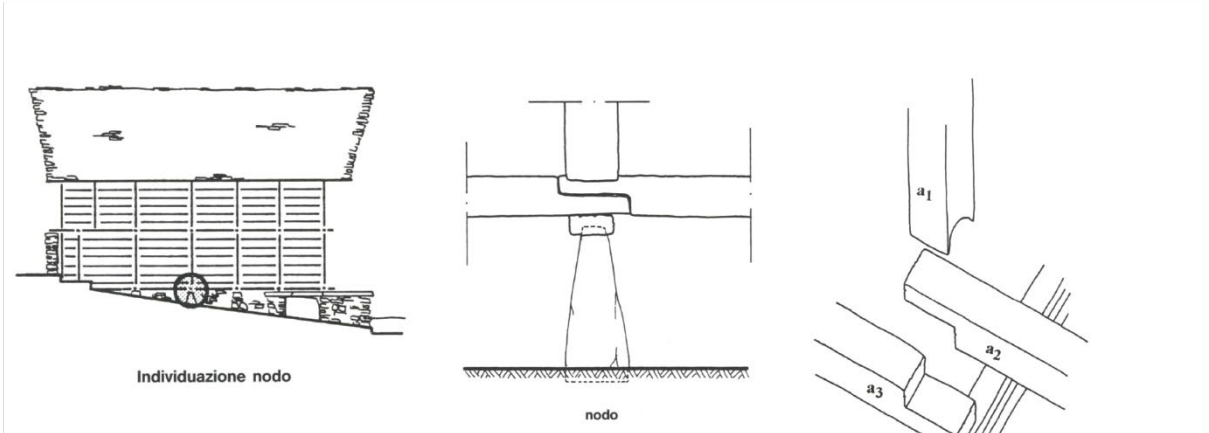
As was mentioned in the material section, the stone was used in a base in masonry thick walls superimposed as in dry stone walls but with a small amount of mortar. Walls could be plastered with lime. Part of the ground floor was often partially dig into the slope. There could be found examples of buildings where more than just a base is masonry – such as in Formazzina house the entire north façade is made of stones (Prati 2018).

Figure 91 Walserhouse in Cresta (Rizzi 2003)

Vertical pillars that support the galleries were based on stone plinths that were put into the ground on approximately 15cm or cone-like shaped stone that was dug into the ground on approximately 50cm (Mirici Cappa 1997).



base of galleries; house in Alagna (Mirici Cappa, 1997)



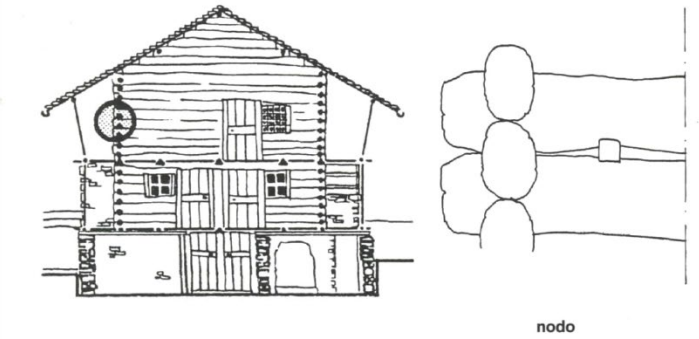
base of galleries; house in Alagna (Mirici Cappa, 1997)

base of galleries; houses in Alagna (photo: Z.Miłek)

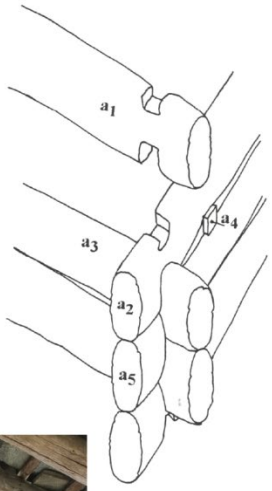
Walls

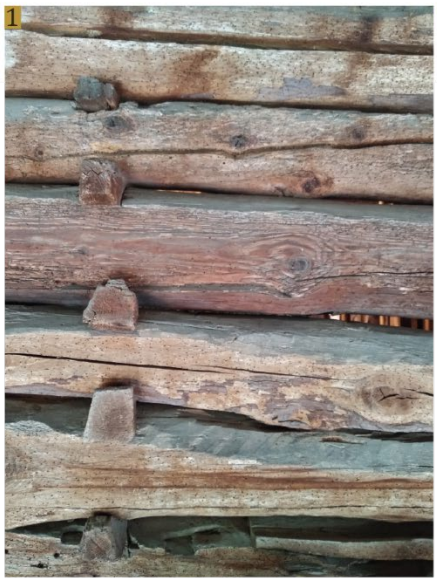
On top of base was constructed timber blockbau structure – known as *il Cassone Ligneo*. Logs were processed into half-trunks or as whole debarked trunks and arranged horizontally into interlocking four walls joined at the corners with U-shaped notches. They position was reassured by using connection between over-imposed logs by drilling a hole throughout them and inserting the pegs. The hole was created after putting the logs

in place and was crossing their whole section (Soikkeli, Touliatos, and Bertolini Cestari 2001).



Blockbau structure in house in Alagna; made of larch and fir wood (Mirici Cappa, 1997)





blockbau walls;
1 visible fissures in part of the house used as a storage /
2 corner connection u-shaped

houses in Alagna (photo: Z.Miłek)

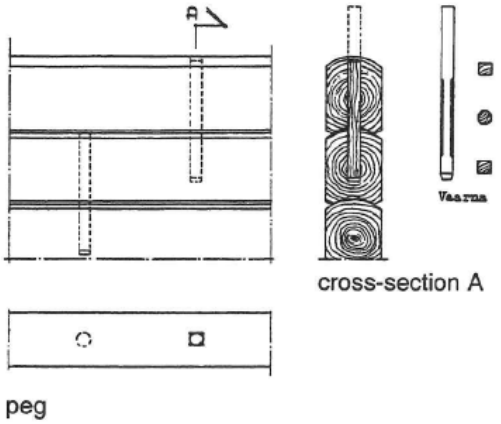


Figure 92 Example of connection of layers of logs by pegs (Soikkeli, Touliatos, and Bertolini Cestari 2001)

Inside, the logs were planned so the surface was smooth. Meticulously prepared elements fit together quite closely, but where was necessary the moss and fern were used as thermal insulation. This scrutiny was possible because of quite common the practice of pre-assembling (it does not mean all structures were prepared this way) the elements before the achieving desired dryness of the material.

> *"In some cases, according to written documentation, the installation was carried out by carpenters from the Goms area, in particular from the town of Meiringen. During the drying phase, the timber tends to warp and shrink. The beams, laid in the direction of the fibres, lose almost nothing in length as they dry; while transversally with respect to the fibres, the loss of volume is considerable. So after installation, a wall tends to sag. To overcome this transformation, the vertical elements were cut shorter, leaving spaces of a few centimetres between the vertical and horizontal elements, as in the case of doors and windows. Subsequently, due to the variation in the size of the elements and the weight of the construction itself, these spaces disappeared and the structure settled down, remaining firm throughout its life cycle."*

(Prati 2018)

Another factor that influenced the type of processing, and preparing the timber was its use in terms of function in the room. The trunks of the barn were almost fully debarked, to ensure that the fissures between the elements allowed the room to ventilate, while those corresponding to the inhabited rooms and the granary were obtained by dividing the trunk in half; these were placed with the planed face inwards and the axe-worked one outwards. The blockbau building technique had one more advantage – allow for dismantling and reassembling the structure along with easily changing the deteriorated elements (Fantoni and Ragozzi 2008).

Internal partitions were made of planks joined to the ceiling by a beam with a central groove (Di Paola et al. 2022). That system made possible to change the layout of rooms if necessary. Outdoor galleries were railed with vertical rods that were inserted into pillars.

Openings

Windows and doors were made small to limit heat losses. Windos and doors frame were made of pillars, that were carved that the wall elements could be put inside. Bottom of this pillars was assembled to blockbau structure by tenon (Mirici Cappa 1997) . Windows were having the shutters that additionally helped to keep room warmth.

Figure 93 (left) Window in house in Alagna (photo: Z.Miłek)

Figure 94 (right)Window to living quarter in Biel (Rizzi, 2003; photo: Stella, 1994)

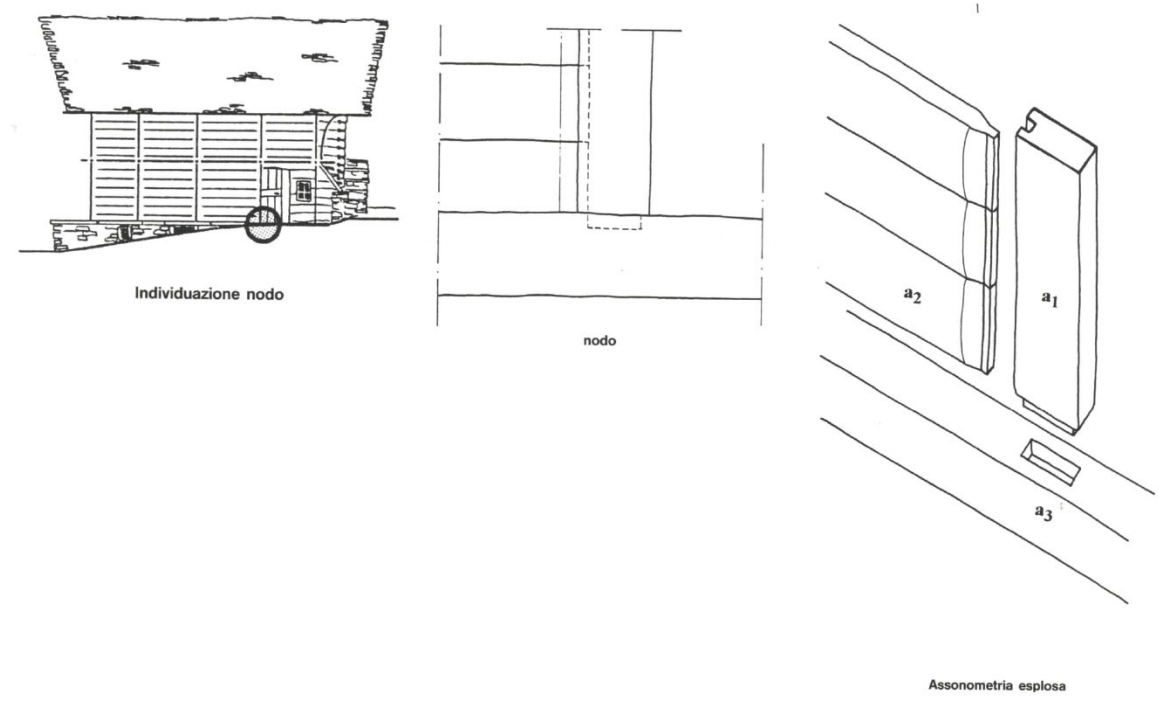


Figure 95 doorframe connection; house in Alagna (Mirici Cappa 1997)

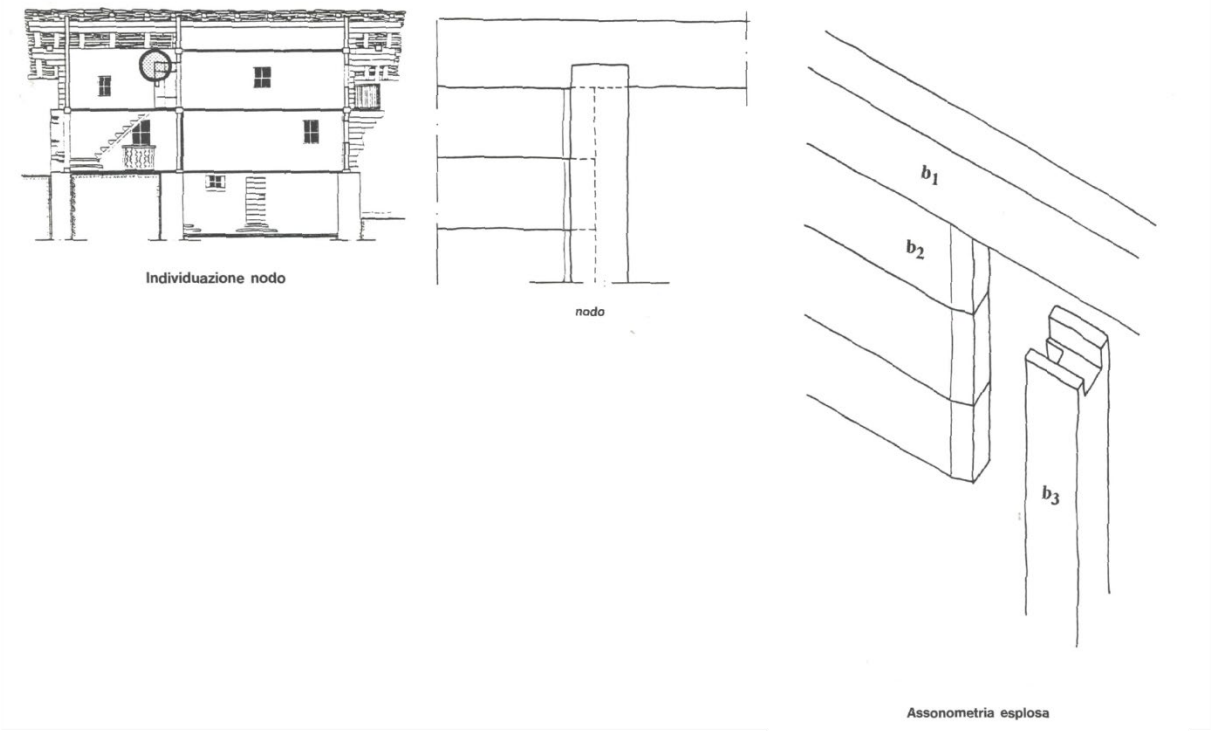
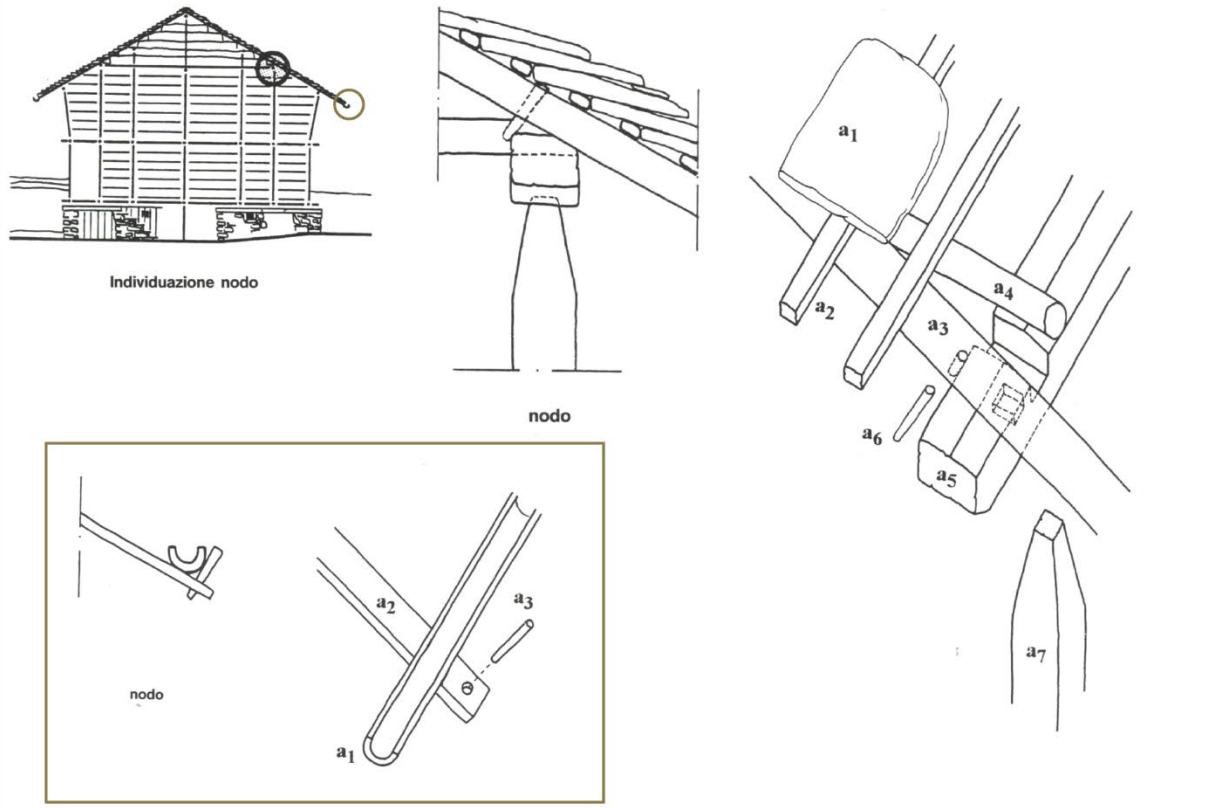


Figure 96 doorframe connection; house in Macugnaga (Mirici Cappa 1997)

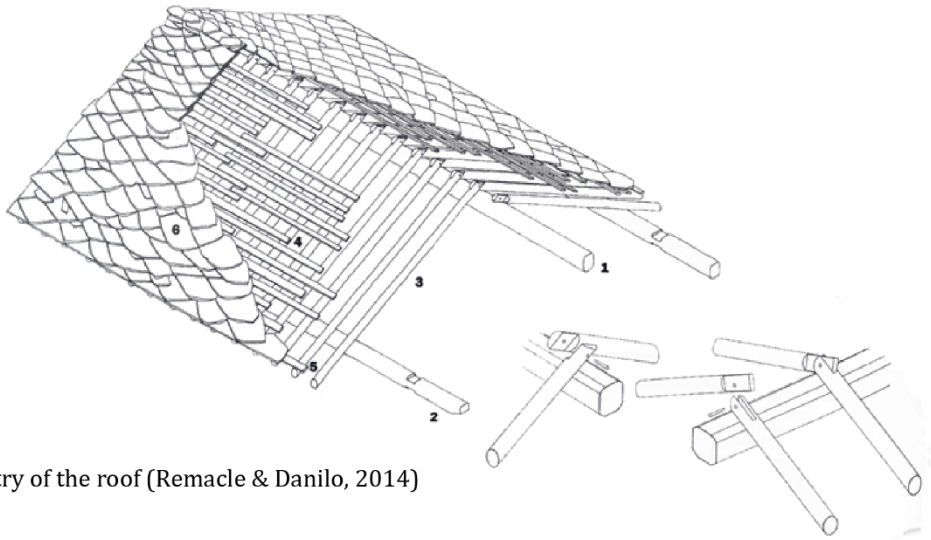
Roofs

The roof was always gabled (with a triangularly shaped tympanum) composed of two pitches and covered with larch boards or shingles that were over time replaced with stones called *piode*. Those stones were laid from the bottom to the top and attached to the battens by wooden nails (made of different kinds of wood; *Maggio ciondolo*)(Remacle and Danilo 2014). Due to the heaviness of the cover and seasonal snow load the construction of the roof was reinforced by two interlocked gables linked by ridge beam. Additionally, to increase rigidity were added two cantilevered beams that were acting as chains. To reinforce the structure between the ridge and the underlying beam there are two compact semi-walls of interlocking logs linked to the external walls which extend inside the attic forming two characteristic rooms. At the edge of rafter beams were installed gutters made of the gouged-out branch (Remacle and Danilo 2014).



Roof structure with gutter, house in Alagna (Mirici Cappa, 1997)

details of roof; houses in Alagna(photo: Z .Miłek)



Carpentry of the roof (Remacle & Danilo, 2014)

Alagna (photo: Z .Miłek)

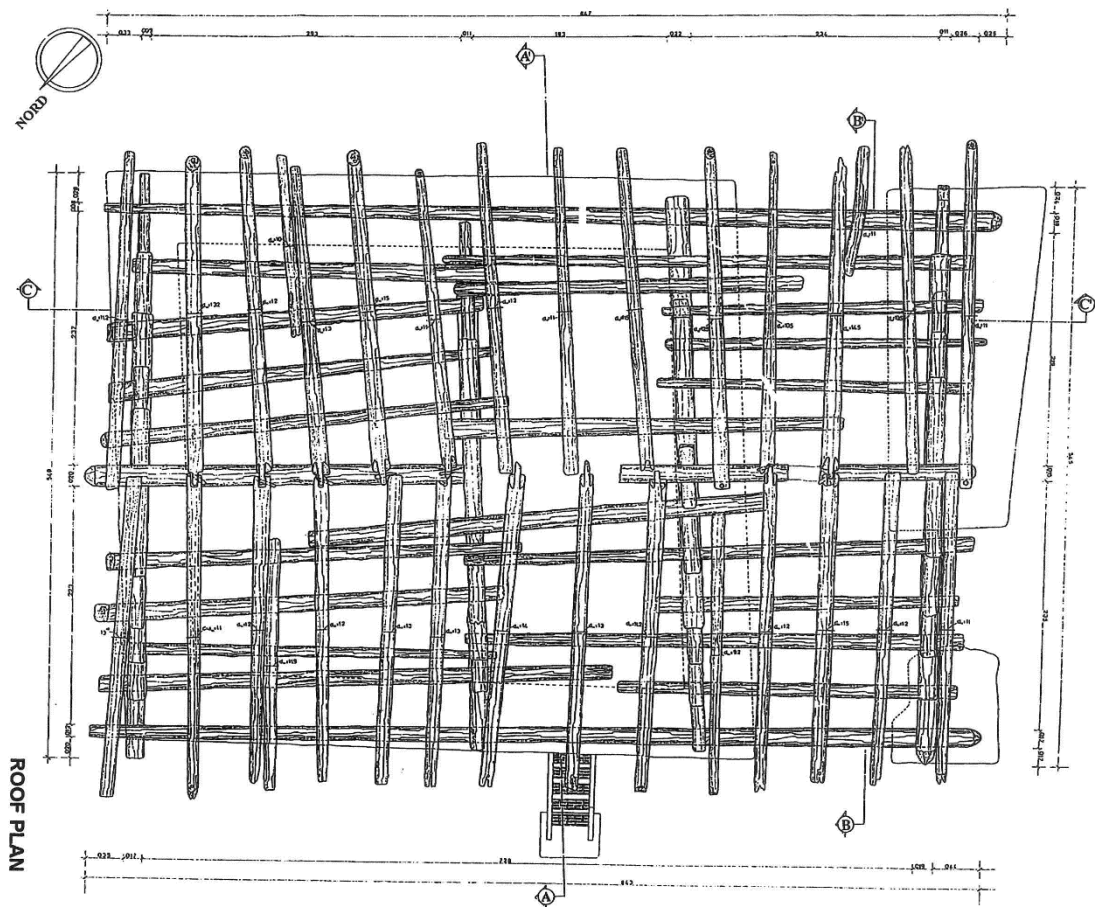


Figure 97 roof plan from Saint-Vincent; Valle d' Aosta (Soikkeli, Touliatos, and Bertolini Cestari 2001)

Assembly of the gable

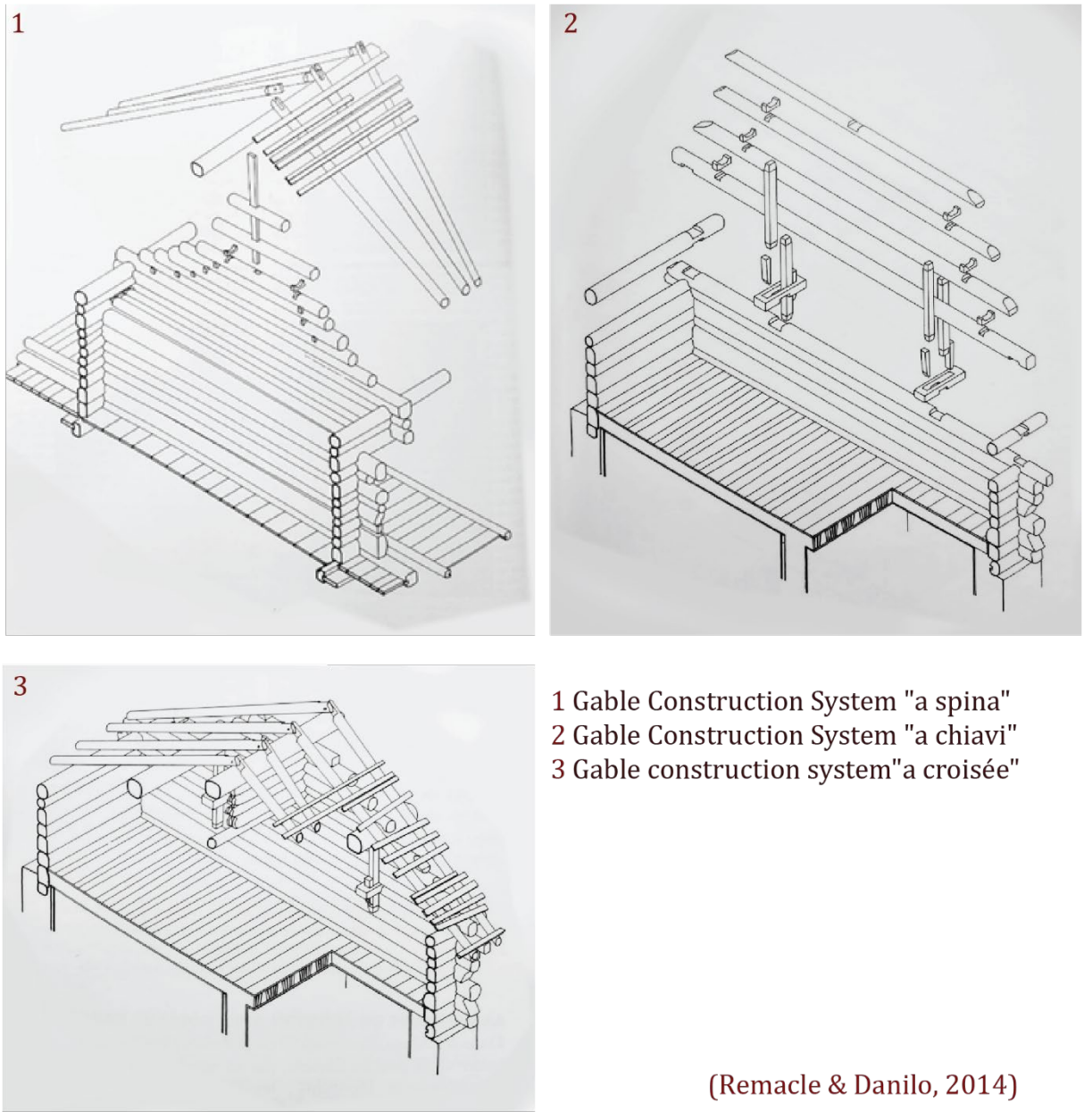
The construction of the tympanum was not an overlapping joined logs as in the rest of the building. Few different methods were used to build this part and they developed at different times.

The oldest one was called spina (present in buildings dated 16th-17 century). The vertical stability of a gable is supported by an element inserted into the cavity made in the centre of the logs. The dowel, in a shaped trapezoidal to avoid sliding out, is inserted with little possibility of movement in case of shrinking. It happened that the pediment juts out from the face of the façade for even 1,5m. This formed sort of mezzanine that could be storage for straw and hay.

Next technique that evolved from the spina was based on two keys, placed in and out- side of wall that were inserted into cavities and spined by a horizontal trans-wall element.

Again, in design was taken into consideration possible shrinking of wood and system to allow for vertical movementClick or tap here to enter text..

In the late 17th century the key system was added a perpendicular wall to the tympanum that guaranteed better rigidity. This way of assembling was called "*croisée*" and remained in use till the 19th century (Remacle and Danilo 2014).



1 Gable Construction System "a spina"
2 Gable Construction System "a chiavi"
3 Gable construction system"a croisée"

(Remacle & Danilo, 2014)

Chronology of the construction technique of wooden gables in Gressonay

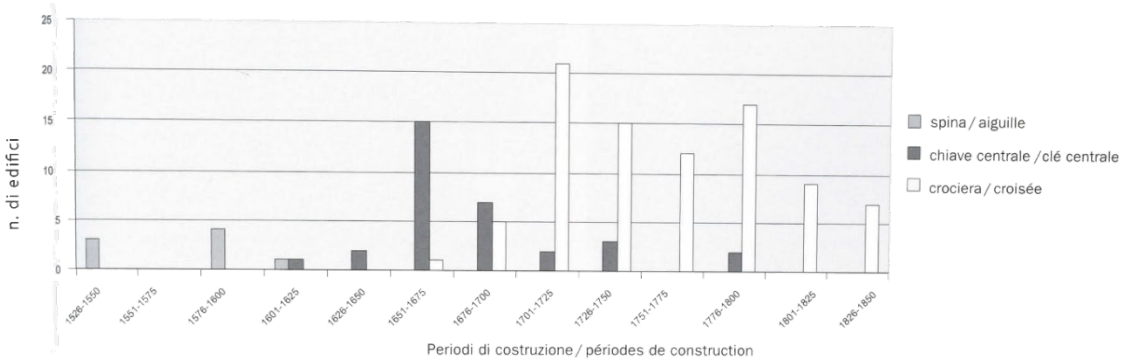


Figure 98 diagram with the chronology of the construction technique of wooden gables in Gressonay (Remacle and Danilo 2014)

Mentioned different techniques were performed in different time period. The tympanum assembling then might marking the time that building was constructed.

Decorations

Most of decorative elements were carved in wood, probably due to relatively high easiness of processing this material. Decoration could be find mostly inside the house on furniture and utensils. Most popular motifs were having floral origin. Decorations could cover all surfaces such as doors, ceiling and walls. Walser culture is characterised also by distinguish folk clothes that are different in scattered communities (Rizzi 2003).

Figure 99 and Figure 100 interior of Walserhouse in Alagna (Rizzi 2003)

Figure 101 decoration on ceiling and Figure 102 entrance doors Alagna (Rizzi 2003)

Figure 103Bedroom, Walser Museum of Alagna, (photo: Z.Miłek)

New use and retrofitting interventions

The rural wooden buildings had to be constantly maintained, often with arbitrary replacement of the deteriorated parts. That is why, it is not enough to look at one element, part of the house to determine the date when it was erected. Dating the structure must be done by keeping the reference to the whole settlement and when it was built.

Traditional Walser settlements were often growing in number of inhabitants and as a result, new buildings were built; that did not always follow the traditional way of construction but made use of new systems, and materials and were inspired by other non-Walser Alps architecture (Bamert, Ströbele, and Buchecker 2016).

Figure 104 stadel with collapsed roof; close to Alagna (photo: Z.Miłek)

Many of the Waler houses were redesigned to accommodate current needs, starting from putting toilets inside the houses and organising bathrooms. Naturally, by introducing electricity way of life changed and many previously basic tools fell into disuse. Adapted were kitchens and reorganised the rooms. In villages the animals were no longer having stables inside house cubature but separately, if the animals were still breed. The economy of the valleys inhabited by Walsers evolved into a more touristic sector, and so did the use of the structures. Many of the buildings, especially those in good localisation with connection to media, started to work as holiday homes, but other vast parts of peripheral

economic buildings for instance barns or stalls were not reused and as a result, deteriorated (Bamert, Ströbele, and Buchecker 2016). Walser community faced that to preserve their heritage both tangible and intangible they must save the architecture, but somehow balance the new reuse of structure with their traditional functioning. Moreover, fostering the traditions affected newly risen structures that with different successes trying to continue Walser architecture.

Figure 105 Newly risen reditential buildings "Baite Monte Rosa" that follow the Walser tradition (source: https ://www.illen.it)

Preserving heritage policies

The example of preserving this scattered in the Alps heritage is organised trans-countries trail related to the Walser architecture. The route is starting in France and ending in Austria. All worth visiting places are marked on the map and are descripted both in internet and on informative boards in place. The route not only connect a point of interest related to architecture but also lead throughout paths in mountains that were used by Walser people presenting by this all forms of the Walser influence on the land ("Walserweg - Grande Sentiero Walser" n.d.).

The Great Walser Trail
(source: https://www.walserweg.it/en/)

sign informing about the trail Alagna (photo: Z.Miłek)

Figure 106 Map of The Great Walser Path. This path is following the migration and colonisation of Walser people in 12th -14th century.

An important part of preserving the heritage is creating preserving policy by local/regional governments, in this case, the government of Piemonte. The Region enhance and support the cultural heritage along with promoting the knowledge and

development of culture ("Patrimonio Culturale | Regione Piemonte" n.d.). Additionally, by creating adequate policy might support promotion and collaborations between public-private sectors.

The key for preserving and spreading the knowledge about proper carrying for this mountainous heritage are the handbooks and numerous publications that documented live of Walser people. The documents created by specialists and sponsored by authorities are the base for local and private initiatives that might gain necessary knowledge from them than might help in revalidation and planning of interventions.

The Regione Piemonte commissioned the creation of handbooks for preserving traditional architecture and landscape development in the whole area. The effort for documenting and showing a way of maintenance is not only focused on specific places or very small communities but is holistic for the whole region and created by experts. Below are mentioned those related to the Walser architecture.

"Programma Di Sviluppo Locale Coltiviamo Il Futuro – Tra Collina E Montagna, Lo Sviluppo Sostenibile Delle Terre Del Sesia"[36] is one of example of handbooks that collect the knowledge about one region and its architectural traditions and propose ways of continuing it. The Local Development Program is followed by the handbook that shows good and bad examples of interventions. *"Manuale per la valorizzazione del paesaggio delle Terre del Sesia"*[37] is easy to read for non specialist and in many examples propose retrofitting interventions and how to adjust new designs. G.A.L. (Local Action Group) promotes, together with other institutions, activities aimed at supporting tourist resources, protecting and enhancing local products and recovering the landscape and built heritage.

[36] English: *"Local Development Program We Cultivate The Future – Between Hills And Mountains, The Sustainable Development Of The Terre Del Sesia"*
[37] English: *"Handbook for the enhancement of the landscape of the Terre del Sesia"*

REGIONE PIEMONTE

GAL Terre del Sesia
Manuale per la valorizzazione del paesaggio delle Terre del Sesia
Barbara Drusi, Gianfranco Airoldi, Enrico Fabrizio

TERRE DEL SESIA

Abbaini congruenti ed abbaini incompatibili con la tutela

Lucernari tubolari

I lucernari tubolari consentono di illuminare in modo razionale, con luce naturale diurna, qualunque spazio di un edificio, in alternativa o associato ai sistemi tradizionali di illuminazione naturale quali finestre, lucernari e abbaini.

Composto da un captatore con dispositivo ottico, un condotto tubolare riflettente e un diffusore (plafoniera), il sistema permette di trasportare a tutti gli ambienti – anche a distanza dal captatore – la massima quantità di luce ricavabile dalla luminosità del cielo.

Questo sistema consente di risolvere i problemi strutturali legati alla mancanza di luce in spazi che non beneficiano dell'illuminazione diretta attraverso finestre o vetrate, consentendo una sensibile riduzione dei consumi energetici a parità di comfort abitativo e si prestano ad interessanti impieghi su coperture pesanti ed estese quali quelle in pietra. Rispetto ai lucernari tradizionali permettono una installazione meno complessa e di ridotto impatto sull'aspetto esterno del manto di copertura.

Fermaneve ed elementi rompitratta

L'inserimento di elementi fermaneve in più punti sulla superficie delle falde è determinante ai fini della sicurezza in quanto trattengono dallo scorrimento il manto nevoso depositato sulla copertura, frammentandolo in fase di progressivo scioglimento e proteggendo gli altri elementi che ostacolano lo slittamento della neve, quali pluviali, comignoli, abbaini e lucernari.

Il posizionamento dei fermaneve sul manto di copertura ed il loro numero dipendono essenzialmente dalla pendenza delle falde e

Figure 107 Page from "Manuale per la valorizzazione del paesaggio delle Terre del Sesia" showing the solutions for roof (Drusi, Fabrizio, and Airoldi 2011)

Specific literature and publications are dedicated to construction techniques, building materials and tools, as represented in work of the Michela Mirici Cappa: *"Ambiente e sistema edilizio negli insediamenti walser di Alagna Valsesia, Macugnana e Formazza".* This detailed with drawing work meticulously documented the building traditions of Piemontese Walsers. Mentioned book is one from the series about Alps built environment - *Quaderni Di Cultura Alpina.*

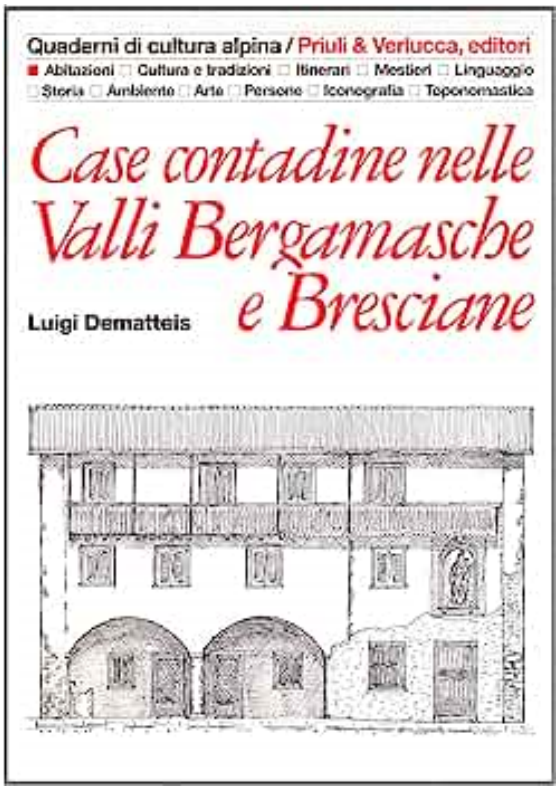


Figure 108 covers of the books from the series Quaderni Di Cultura Alpina; the First one related to the Walser architecture.

Comparison

The aim of comparison of these two tradition of raising a buildings is to show amazing human ability of adaptation to difficult conditions and the huge variety of using wood in structures that are the vessels of culture. This wooden built heritage provides evidence of the skills of craftworkers and builders, expression of the culture of a community, of its relationship with its territory and cultural diversity. Both regions – Podhale and Piemonte around Mt. Rosa – were the place of sometimes extreme weather and harsh climate conditions with difficultness of land cultivation. One of the main pillar of economy was breeding animals that provided milk, meat and possibility of creating clothes out of their fur. The inhabitants of mountains were facing difficulties with having the permanent contact with other human settlements, however, Walser people had to overcome more obstacles than Podhalan who lived in area more flat and managed to have all-year available roads to bigger towns. This higher easiness of transport definitely influenced a development of the region and attracted tourist. Vernacular architecture in the Tatra Mountains had than a possibility of evolutions and being an inspiration for the Style, which gain huge popularity.

Both vernacular architectures - Walser's and Polish Highlanders' - were having the same functions but the plan of households was differently resolved. Piemontese Walsers were settling on high altitudes where they raised their helmets as tightly placed houses that create the covers from harsh weather conditions as a whole. Their buildings were connecting residential functions with barns, storages and stables in vertical households (Rizzi 2003). When the Gorals, using more flatten land were placing each homestead separately, might be said in a more horizontal, linear way; and most of the houses did not incorporate stables and barns.

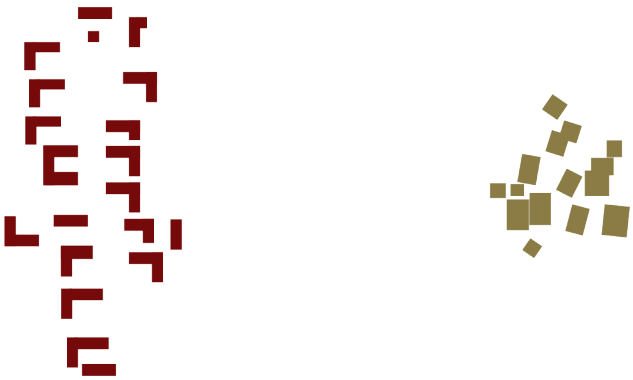


Figure 109 diagrams showing examples of spatial development in Podhale (left), and in Valle Formazza; Walser village (right)

The purpose of raising the Zakopane Style villas was different than shelter for humans and their livestock; more emphasis was placed on comfort and representative issues that were executed by raising spacious, more complicated in shape buildings which could be erected thanks to much greater budget of investors, who often could owned more than one residence. This wealthier social class found an interest in the "simple life " of Highlanders and used, and reinterpreted the tradition, but throughout it helped to survive the folklore to present times.

The Alps and the Tatra Mountains supplied the mountainous settlers with the same two main building materials – wood and stone- the fundamental parts of local architecture. In both regions base were made of stones that prevented capillary raising and help to preserve buildings during high snow. Even more similar were use of building technologies, with timber structure built out of overlapping logs, that either differently processed and differing in connections were working in analogous ways. Windows and doors were following the necessity of preserving as much heat as possible, again having comparable way of construction in those two traditions. The Zakopane Style villas had different principles and did not have to radically answer for the need of saving the heat expenses so the windows were mostly big to provide good light and connections between indoor and outdoor. Interesting are answers from this two regions towards the requirement of covering the structures and facing the high precipitations of snow. In Walser houses, primarily were used wooden boards but they were changed into stone roof cover that did not shaped big angle – so they were more prepare to lift the weight the snow cover and face the wind blowing. In Podhale, wooden roofs were steep to make the snow slide from the surface. The use of timber evolved to different shaping the roof covers – into shingles. All three ways of building were characterised by rich ornamentations, variety of decorations mainly performed in timber.

Walser culture survived to our times facing struggles throughout the changing the way of lives, implementing the modern construction methods such as greater popularity of using concrete and the influences of styles not rooted in local traditions e.g. modernism. Houses were often transformed to fulfilled tourists needs – for example into hotels, spas, museums. Nevertheless, the culture was preserved by Walser communities, local organisations, and interest of scholars into this exceptional traditions. They are still

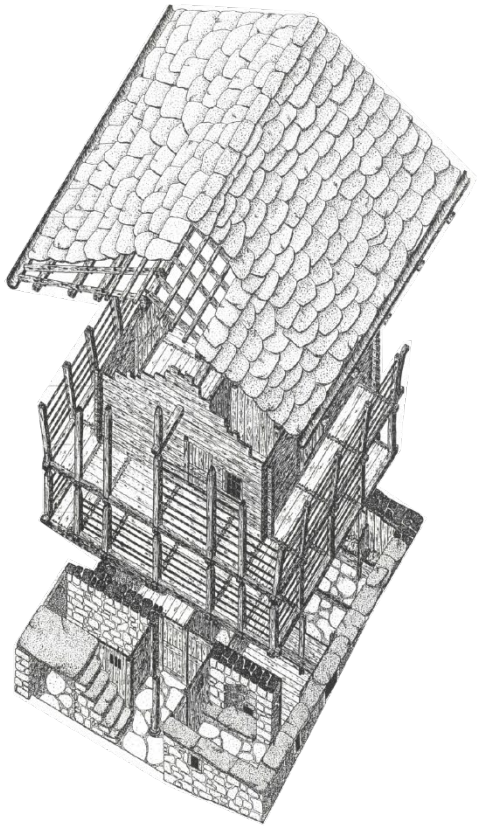
constructed buildings that very strongly stick to traditions and at the same time make an use of new materials and techniques that allow to meet the requirements of law.

Podhale's vernacular architecture ended in the 19th century by the means of strictly following the tradition of Highlanders. However, it could be said that throughout the reinterpretation and adaptations in the Zakopane Style, it somehow evolved to the changing needs. In today's Podhale the newly raised buildings are sourcing from the style started by Witkiewicz and structures far more resemble the villas than the ordinary Gorals' house. Throughout the Zakopane Style the carpentry traditions, and decorations are still present in modern buildings. As was mentioned in the critic part, the Zakopane Style was not purely sourcing the inspirations from Highlander culture, so the foreign patterns for the region were also repeated and in time implemented into today's folklore.

In both places different actions took place to preserve heritage. Both in Polish cases and Italian the enhancing and protections is supported by law and promoting culture. However, the Piemonte might be an example to follow in case of documenting and spreading the knowledge. Polish heritage, not only in Podhale, is still waiting for professional documentation and the handbooks that would support investors in taking good decisions. Showing the right and wrong examples of interventions may benefited in scale of one building but also eventually in spatial order.

model of Gorals house
Tatra Museum

model of villa “Koliba” - Zakopane Style
Tatra Museum



exploded axonometry of Walser house in Alagna, today Walser Museum
(Mirici Cappa, 1997)

Below is presented table that summarise the main characteristics of the vernacular architecture of Podhale, Zakopane Style in villas and Walser architecture in Piemonte.

			Podhale; Poland vernacular architecture in Zakopane		**Piemonte; Italy** Walser architecture
			vernacular architecture in Zakopane	Zakopane Style - case of villa	
enviroment	geography	area (now and in past)	Podhale region, Tatra Mountains; Vernacular buildings were constructed till the sec. part of the 19th century	Podhale region, Tatra Mountains and many realisations scattered around the whole country; started in 1893; had different phases	high mountains, settlements in the Alps scattered in Italy Switzerland, Germany and Austria
environmental background	geography climate	topography	mountainous area but mostly in valleys	mountainous area, stepped slopes, sometimes valleys	
		altitude	around 900m a.s.l.		mostly more than 1000 m a.s.l.
		soil type	rendzina and brown earth with rocky materials		soil is not fertile - with rocky remains and shallow humus cover
		precipitation	around 1500 mm		around 1500 mm
	climate types of breed animals	temperatures	average temp.January [-4.5°], July [+14.5°]		more than 120 days per year when the temperature drops under 0 C degree
			the most popular cattle, horses and sheeps		the most popular cattle and sheeps
	origin of people		South region of Poland and Vlachs migrations		migrations from Valsesia, Walser
Histor ical	language		Polish with Highlanders dialect		Walser language
	law and authonomy		during history, Highlanders had some freedoms and were not serfs		Diritto dei Walser (Walser-law).

			Podhale; Poland vernacular architecture in Zakopane		**Piemonte; Italy** Walser architecture
			vernacular architecture in Zakopane	Zakopane Style - case of villa	
Building material functional plan	wood species	Abies alba Mill Fir	yes was rarely used for wall, roof structure; mostly for floor construction; floorboards		yes used mostly in stairs and furniture
		Picea abies Spruce	yes used in the structure of walls and roof		yes could be found construction of block-bau external walls.
		Quercus robur Oak	yes imported from different regions used in furniture		no
		Larix decidua Larch	no		yes both outside and inside walls, floors, roof structure
		Laburnum anagyroides Magio cindolo	no		yes used in connections, pegs, roof nails
	stone types		granite rocks, limestone rocks, metamorphic rocks, pebbles, mostly sourced from streams		soapstone, gneiss, limestone, pebbles
	mortar		rarely used	lime or clay mortar	lime or clay mortar
	insulation		*mek*	*mek*	moss, straw
	source of wood		forest in valleys, primarily meticulously chosen trees	forest but also imported from other areas due to process of deforestation	high mountains, planned with settlement
	segmentation of wood		for walls preparing logs into *płaza* planks		mostly half-trunks or whole trunks

			Podhale; Poland vernacular architecture in Zakopane		**Piemonte; Italy** Walser architecture
			vernacular architecture in Zakopane	Zakopane Style - case of villa	
	seasoning		approximately one year		Approximately one year
	assembling of timber elements		Main structure assembled in coconstruction site; often doors, and windows frames were assembled in a carpentry workshop and then transported to the site; by using carpentry connections and wood pegs	Main structure assembled in construction site; often doors, and windows frames were assembled in a carpentry workshop; by using carpentry connections and wood pegs but also metal connections and in the case of masonry buildings mortar	structure assembled in constuction site; but sometimes elements were pre-assembled to make smooth connection without fissures; by using carpentry connections and wood pegs
	tools		a planer, axe, adze, frame saw, hammer, hand saw, shaving horse and wedges; Later on mechanical saw drawknife	the same as vernacular but with often use of mechanical saw,	a planer, axe, frame saw, hammer, and wedges; Later on mechanical saw
	transport		not precise	not precise	trunks on sledges, branches were carried on back in wood holders
	plot		stepped slope or if possible more plain area; till mid-19th century without the fence; often very close planted trees; good access to water	stepped slope or plain area; fenced	stepped slope; not closely surrounded by the thick forest or planted trees but by pastures or fields; not fenced;

			Podhale; Poland vernacular architecture in Zakopane		**Piemonte; Italy** Walser architecture
			vernacular architecture in Zakopane	Zakopane Style - case of villa	
functional plan general dimensions	arrangement of buildings; spatial development		North-South orienting - gable, shorter walls on E and W sides; till mid-19th century orientation of doors was always on N; service buildings from one side or creating U shaped homestead;	not specified, mostly according to existing urb an development	buildings placed very close to each other; sometimes barns and stables were incorporated into one building with house
			 (photo: Z.Miłek)	 (photo: Z.Miłek)	 (photo: Z.Miłek)

			Podhale; Poland vernacular architecture in Zakopane		**Piemonte; Italy** Walser architecture
			vernacular architecture in Zakopane	Zakopane Style - case of villa	
		cellar	if present accessible from inside the house and used as a storage; sometimes were built cellars as separate volumes, storage use	quite spacious, used as storage, service rooms, kitchens	here is considered stone base used as storage, stables, kitchen but also living quarters; function could change in relation to season - in harsh winters sometimes families were sleeping in the masonry part to save more heat
		ground floor	consist of to rooms: white chamber (representative function) and black chamber that was daily used; storages (*komora*) and hall (*sień*)	in villas, representative rooms, salon , cabinets	here is considered floor above a stone base, because it is hard to determine which floor was on the ground, due to the slope; mostly living quarters but also could be barns; workshops, and granaries with rooms for processing, drying, and preserving agricultural resources
		first floor	not present	mostly private rooms, bedrooms, bathrooms	here is gonna be considered floor above a stone base, because it is hard to determine which floor was on the ground, due to the slope; mostly living quarters but also could be barns; workshops, and
		second floor	not present	mostly private rooms, bedrooms, bathrooms storage	
		attic	not used; when implemented chimney started to be used as		

			Podhale; Poland vernacular architecture in Zakopane		**Piemonte; Italy**
			vernacular architecture in Zakopane	Zakopane Style - case of villa	Walser architecture
			storage and sometimes as a bedroom		granaries with rooms for processing, drying, and preserving agricultural resources barn, storage
	access to water		either from nearby stream or from well	implemented plumbing	either from nearby stream or from well
			mostly houses no bigger than 16m x 8m, but could be found different sizes when were added additional volumes; ground floor no higher than 2,8 m	not specified; huge variety	not specified measures - close-to-square shapes; storey high approximately 1,9m

<table>
<tr><td></td><td></td><td></td><td colspan="2">Podhale; Poland
vernacular architecture in Zakopane</td><td rowspan="2">Piemonte; Italy

Walser architecture</td></tr>
<tr><td></td><td></td><td></td><td>vernacular architecture in Zakopane</td><td>Zakopane Style - case of villa</td></tr>
<tr><td rowspan="2">Construction technology</td><td rowspan="2">walls</td><td rowspan="2">in houses</td><td colspan="2">logs crowned structure - blockbau;
Trunks were cut along the length into pieces named płaza. In corners, all logs were interlocked with lap joints that were constructed by notching logs at the end and blocking notches inside.

(photos: Z.Miłek)</td><td>masonry walls - base
blockbau structure

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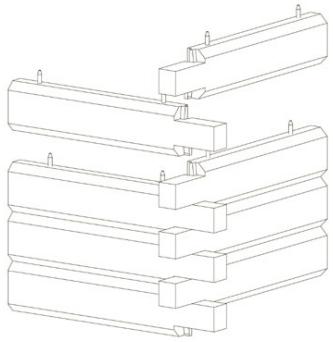
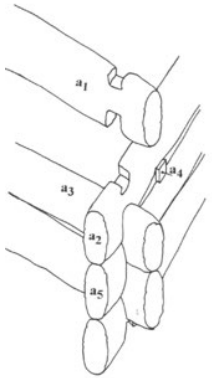
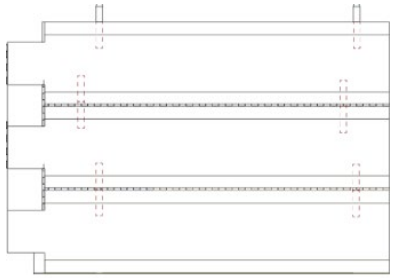
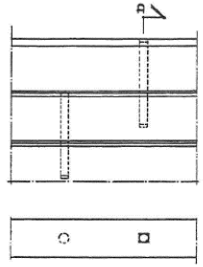
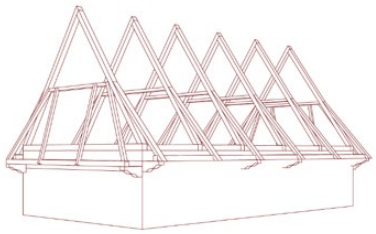
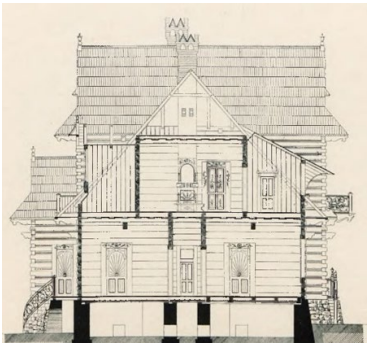
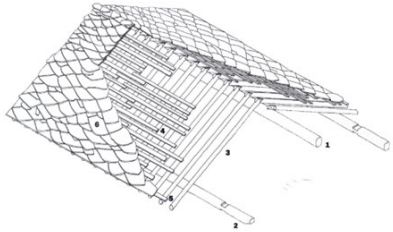
</table>

			Podhale; Poland vernacular architecture in Zakopane		**Piemonte; Italy** Walser architecture
			vernacular architecture in Zakopane	Zakopane Style - case of villa	
construction		in other structures	post and planks structure in service buildings; or the same as in house; huts made of stones without the mortar (just for temporary sheltering)	mostly the same as houses, because most buildings that were erected in Zakopane Style were the property of more affluent owners	the same as houses - granaries;
	types of wood joints		corner connection in crowned construction: • Saddle notch corner joint without protrusions • Saddle notch corner joint with protrusions • Dovetailed lap joint • Lap joint And the most popular one that was the most characteristic for Podhale region: • Podhale lap joint	Mostly used corner connection in crowned construction Podhale lap joint 	corner connections: U-shaped notches  (Mirici Cappa, 1997)

			Podhale; Poland vernacular architecture in Zakopane		**Piemonte; Italy** Walser architecture
			vernacular architecture in Zakopane	Zakopane Style - case of villa	
	types of connections between overlapping logs		the connection between overlapping logs - pegs that are inserted into holes made before putting next log 		pegs inserted into holes drilled throughout whole section of the log, after putting next log 
	openings		approximately size: 60x80 cm for windows; frame for both windows and doors sometimes were performed not in construction site; frame made of pillars inside which was inserted wall frame; very decorative; sometimes windows with sliding shutters	big windows and doors of different sizes and shapes that were inspired by vernacular architecture but adjusted to needs of villa	very small openings; decorative frames and doors; windows with shutters
	floors		in not affluent households earthen floors in service buildings;	Around the building paths made of stone slabs; Parquet inside the villas	floors in the base made of stone; kitchen with stone flooring;

			Podhale; Poland vernacular architecture in Zakopane		**Piemonte; Italy** Walser architecture
			vernacular architecture in Zakopane	Zakopane Style - case of villa	
			in houses mostly wooden plank floors; outside around the house and in service buildings big slab stones		in wooden part of the house floor made of boards
	roof	Structure /type of trusses	truss roof structure, in which rafters were stiffened by the collar beam 	truss roof structure, in which rafters were stiffened by the collar beam and often reinforced by ridge beam and purlin 	beams connected by wooden pegs placed on the ridge beam 
	roof	cover	primarily wooden boards; than more popular wooden shingles that were split along the grain; no thatched roofs	wood shingles, metal sheet, ceramic tiles	primarily wooden boards or popular wooden shingles that were split along the grain; then cover with stones called *piode*, plain-shaped slates

			Podhale; Poland vernacular architecture in Zakopane		**Piemonte; Italy** Walser architecture
			vernacular architecture in Zakopane	Zakopane Style - case of villa	
					
		gables	gable walls were facing E and W; gable wall had a small roof - slightly simmilar in shape to dutch roof	Because of the much bigger volume than in traditional house gable wall was also increased and modified by adding balconies , windows, etc.; always with decorations	open gable roof

			Podhale; Poland vernacular architecture in Zakopane		**Piemonte; Italy** Walser architecture
			vernacular architecture in Zakopane	Zakopane Style - case of villa	
		gutters	gouged-out small log	different types; sometimes following vernacular architecture wooden; but if the more complex shape of the roof the gutters were more likely made in metal	gouged-out small log
			decorations of a house had primarily function as construction elements; most popular decorations were carved in wood, furniture and were put on utensils; mainly motifs inspired by flora, animals and humans	reinterpretation of vernacular architecture motifs; sometimes exaggerating one motif so it covers whole surfaces e.x. curtain with *parzenica*; using on materials, carpets eastern European and Balkan motifs	decorations carved in wood of floral inspirations; covering surfaces as ceilings; decorative entrances
decorations interior design	the most characteristic features		sloppy roof shape with gables; many decorations; very decorative main entrances;	sloppy roof shape with gables and many openings for balconies or *wyględy* many decorations; very decorative main entrances; adding volumes such as verandar, roofed terraces	connecting stone base with bllodkbau structure; characteristic external galleries with horizontal railings for drying a hay
			a repetitive interior layout that could be found in most of	villas were created for comfortable leisure time and	the kitchen was mostly placed in the stone base to prevent

			Podhale; Poland vernacular architecture in Zakopane		**Piemonte; Italy** Walser architecture
			vernacular architecture in Zakopane	Zakopane Style - case of villa	
			Higlander's houses; two main rooms; one for representative function had most of the newest furniture and Sunday clothes, the second room - there slept all family, there was a stove/kitchen, and table and there were performed all daily tasks; one room dimensions around 5x6m; latrines if made, were placed outside the building	so it was reflected in spacious rooms with good light going throughout decorative windows; furniture was not basic but with Higlander's inspired decor, made for comfort ; comfortable bathrooms	spreading a fire; rooms could be placed in masonry part or in wooden blockbau part; approximate dimensions of bedrooms 3 – 6 m2 and they were taking advantage of the animal heat from the below floor; The access to rooms was either from outside galleries or throughout the internal staircase; Bathrooms in today's meaning did not exist; the use of latrines that were localized separately outside, under the staircase, or under the loggia.

Conclusions

Presented cases showed that since the beginning of settlement humans sourced the most available materials, in presented cases wood and stones, and perfected their use throughout centuries. The houses of people from Podhale or Piemonte might seem simple and not elaborated from the first view. But after closure study their technology, processing the material and creating the reliable shelter in harsh climate is an achievement. Those technology, that might be perceived as simple in comparison to advanced hi-tech structures, answered to needs and were connected to the place of construction.

Compared architectures and building technologies were from places where the main accessible material is wood and stone, where the climate is demanding and where the borders crossed. Nevertheless, those building traditions evolved differently and the differences between Podhalan and Walser construction can be found in shapes, functional plans, connections and use of material. Reasons that caused those differences are numerous, such as different types of wood, variety of tools, local folklore and traditions.

Moreover, those local traditions survived to our times in different ways. Walser architecture was more preserved in its original shape. It was studied and kept throughout many publications, also used in that thesis as references, that shows meticulously described plans and researchs, which contributed to spreading a good understanding of the topic. Vernacular architecture in Podhale is present in very few surviving structures, but the Zakopane Style is a living tradition that does appeal not only to Highlanders. Local traditions were the research topic for scholars; however, neither vernacular nor Zakopane Style have not received much attention in creating handbooks or publications related to step by step renovations. Those good practices of Piemonte's researches can be an example for Podhalan preservation of heritage.

Following few pages are aiming to show, basing on Piemonte’s handbooks, an example on how a possible handbook for Podhalan architecture could look like. Naturally, those handbooks in Piemonte were created in cooperation of many experts with funds for research and are covering all issues of restoration and ideas how to follow a local architecture. Nevertheless, the presented pages might encourage to create full guide for not only local construction in Podhale but also in other regions in Poland.

What is aim of the Handbook - to whom it is addressed - where the idea came from

Handbook - following pages are aiming to show how the handbook for vernacular, Podhalan architecture could look like. Document like that could be created to preserve the architecture and landscape heritage that is owned by non-specialists, who have great influence on preserving the buildings and their surroanding.

It is created on the example of retrofitting interventions proceeded in House Gąsienisców-Sobczaków, which is a branch of the Tatra Museum. The restoration works were performed under the supervision of qualified builders and academic experts. Moreover, there are shown others, relevant cases that help explain the idea.

The proposition of this handbook is based on the Piemontese publications, written by experts, related to maintaning traditional architecture and landscape such as:

- “Manuale per la valorizzazione del paesaggio delle Terre del Sesia” ,
- “Programma Di Sviluppo Locale Coltiviamo Il Futuro – Tra Collina E Montagna, Lo Sviluppo Sostenibile Delle Terre Del Sesia”,
- “Manuale per l’individuazione degli elementi di pregio del patrimonio naturale e agropastorale della Valsesia”

What is vernacular architecture?

Vernacular architecture could be described as a regional or local construction with the use of traditional resources and materials. It is closely related to context, surrounding nature, landscape and is connected with folk culture and beliefs. Primarily, vernacular architecture was shaped by local builders.

Podhale vernacular architecture - this mountainous tradition of building has survived to our time in not numerous examples. However, many houses although following modern movements and changes sourced from it. An important factor in it had the creation of the Zakopane Style in the late XIX century. This Style highly influenced the built environment that we see today. Although, the Zakopane Style is not a vernacular architecture it was sourcing from local traditions, and often uses similar or the same construction systems and materials. Additionally, Zakopane Style is using features based on folk architecture such as decorations. As a result, some solutions for enhancing and preserving might be implemented both in vernacular architecture and the Zakopane Style.

(photos:Z.Miłek)

Shapping the surroanding

The planning policies have an immense impact on the development of the villages and cities. It is, however, created by local governments. The direct influence is then limited in that subject (naturally it exists throughout elections, public consultations, and non-governmental organizations). Knowledge about prospective changes and investments is crucial for local communities that need to take care of their neighbourhood. The influence on the area, however, might be made with privete resources. The small changes if multiplied have great outcome.

The increase of the quality of the neighbourhood is starting with the management of the plot and goes through the choice of materials, colours, decorations and types of heatin systems. Those changes might be implemented in the all types of buildings not only the traditional ones.

Advertisements, banners

Advertisements policy could be implied by local goverment. Alas, in many places this issue is not regulated. Podhale as a touristic region composed of many communes has a big problem with anti-ad-policy. The organised information system might significantly improve visual quality of the area. However, changes might be done even without imposed policy by limiting the numbers of colorful signs to the minimum that is essential. Even colorful and big banner will disapear in chaos.

In the Podhale there are communes with ad policy - example might be Chochołów village, in wchich many vernacular houses and their surrouanding is protected from unnplanned ad.

(source: http://etraveler.pl/)

The change might be done by the owners of property.

Here is shown an example of a modern house that if looked closely has some wood decorations and although not following the local traditions has some features that put it into the mountainous architecture. Unfortunately, it is covered by many advertisements and chaotically placed multicolours banners.

This photo was digitally edited - the advertisement partially deleted and those that are necessary to inform clients are smaller and less saturated.

(photos:Z.Miłek)

Fences, small architecture, materials

Both vernacular architecture and the Zakopane Style were using local materials to build elements around the buildings, roads and barriers along with small architecture. There are traditional ways of managing surroundings. In vernacular architecture material that dominated was wood.

Private investors can source from vernacular architecture by takin care of : choosin typical for area wooden or stone fences, use local materials for paving, create new elements by using the logic of traditional architecture.
Below are good examples of designing the landscape.

Car crash barriers with timber cladding - example from Alagna, Italy

↑Example of traditional fence

↓Example of new wooden fence that correspond with tradition

Wooden fence with decorative gate in house at Kościeliska St. Zakopane

Stone fence with cross , wooden decorative bench
Droga na Anatłówkę St. Zakopane

House Gąsieniców - Sobczaków - use of local stone for paving

(photos:Z.Miłek)

Retrofitting interventions

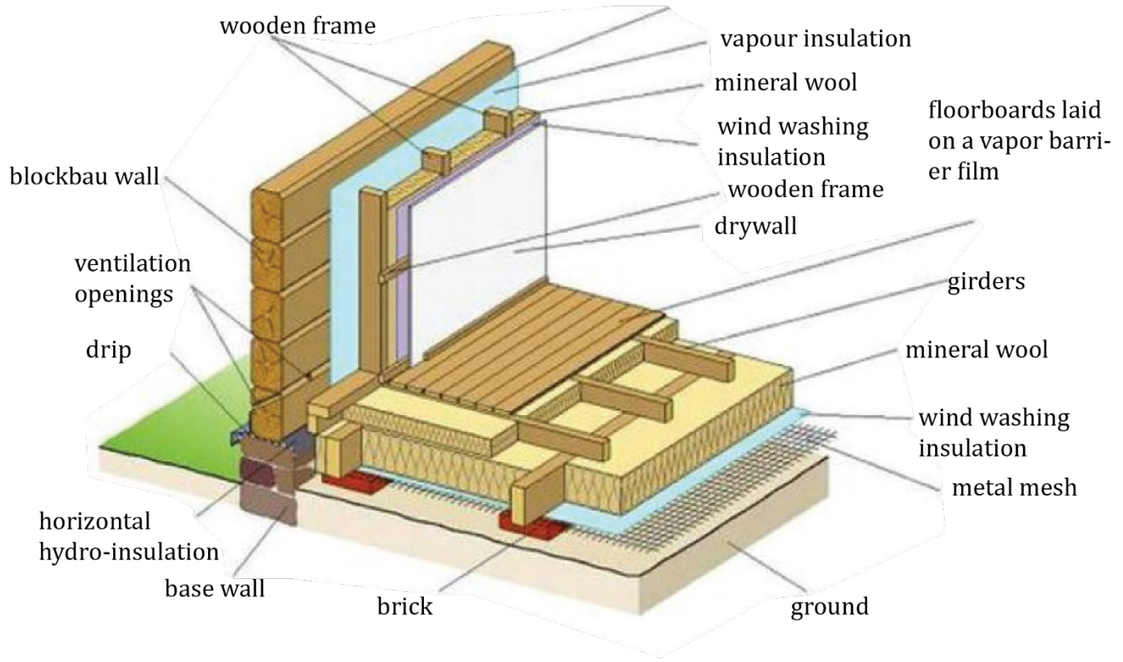
In Podhalan architecture most popularly was used stone for the base and wood for the walls. However, to fulfil law demands related to no-monuments buildings walls most of the time should be thermally insulated. Additionally, often hydro insulation is required to preserve the wall from mould and capillary raising.

Each case must be considered separately. It is important to highlight that proper membranes should be chose for the beathability of wood (waterproofing but at the same time open-vapour). In wooden architecture is highly valued visibility of the material. The solution for insolation might be than adding layers inside the building. In Podhale there are multiple companies that are proposing solutions for existin buildings.

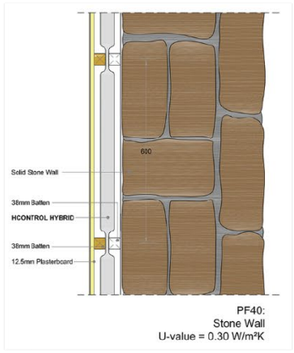
House Gąsieniców Sobczaków - retroffitting interventions:

- stone bases were renowned;
- few of the main construction elements were replaced, due to old ones were deeply moulded: such as rafter's elements, foundation beam, and several wall beams
- the roof shingles were changed;
- into the building were provided water and sewage installation, electricity and lightning protection;
- impregnations of roof shingles;
- cleaning and impregnations of walls;
- replenishing **mek* - thermal inulation;
- thermal insulation of the floors;
- adding second glassing in windows;

* mek – (in Highlanders dialect) insulation material that filled the fissures between logs in Podhalan architecture, was made out of skrątki



Author: Agnieszka and Marek Sterniccy
Insulation of the log wall from the inside



Example from *https://rcimag.co.uk/*

Drawing shows masonry wall with insulation placed inside. Insulating vapour control layer is installed on the internal side of an existing wall. The existing solid masonry wall must be in good condition, have a low moisture content and low driving rain load on the outside.

Example of uncorrect solution - covering thermal insulation *mek* with plaster.
Mek should be replaced but with new *mek*.

Roof - materials, details

Traditionally in vernacular architecture for roof coverings ere used wood boards or wooden shingles. In time those materials were often replaced and in newly risen buildings most popularly were used metal sheets or ceramic tiles. All of those solutions are now visible in the Podhale. Nevertheless, if the house is constructed in log crowned structure with the use of płaza it is advisable to use materials and colours that match the building.

In House Gąsieniców - Sobczaków - old shingles were replaced with new one due to very bad condition. Replacing the shingles is not a new idea, in vernacular houses if roof cover was very deteriorated was performed partially or full replace of shingles.

On the picture it
is visible also the way of adjusting the gutter that is made of gouged out small log.

Charaacteristic of podhalan house is roof - its shape, material and decorations. During restoration process all of them should be preserved.

Example of badly maintained building:

- different colours of the roof covers
- different materials of roof cover
- gutter is half-wooden half-plastic
- the stone base was cladded with wooden planks
- mek was replaced with different material

(photos:Z.Miłek)

Technologies for solar panels

The use of alternative energies is of particular interest in areas, such as precisely those being researched, more disadvantaged compared to the connection to the electricity network and to other energy infrastructure. Additionally, it might help to reduce air poluttion that is a big problem in Zakopane and other Podhalan cities and villages.
Implementing technological solutions should be performed with use of camouflage photovoltaic cells in the roofing elements in order to limit their visibility and mitigate its aesthetic-perceptive impact. Those panels could be installed on service buildings - in that way the most decorative roof of house will be untached.

Below are presented technological solutions that migt ba implemented in shingle roofs and ceramic roofs.
source:*"Programma Di Sviluppo Locale Coltiviamo Il Futuro – Tra Collina E Montagna, Lo Sviluppo Sostenibile Delle Terre Del Sesia"*

Villa in the Zakopane Style with unmatching solar panels

Service building with blended in solar cells example from handbook in Piemonte

Glossary

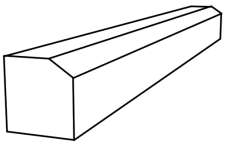
Polish – this colour is marking Polish word

Italian – this colour is marking Italian word

English – this colour is marking English word

- Adze – tool similar to axe but with blade turned approximately 90° to the handle.

- bevels / bevelled edges - edge of that is not perpendicular to the faces of the piece

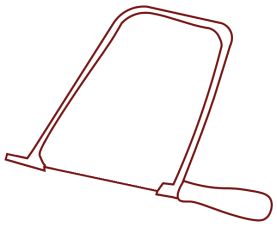


- *bont* – collar beam
- chamfered edge – like bevelled edge but always under 45°
- coniferous species / conifers - group of cone-bearing seed plants
- *czop* - Technical expression for the type of binding of *płaza*-s in *węgieł*.
- drawknife - debarking tool and to shape wood by removing shavings

- fissures – narrow opening
- flue - pipe for smoke that leads from a fire source to the outside of a building
- forge – place for heating metals, wokshop smithy

Figure 110 Forge in Podhale

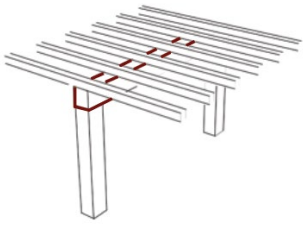
- fretsaw - bow saw for intricate cutting



- frost desiccation - are used to indicate the gradual desiccation of

above-ground plant organs which occurs during the winter
(source: glossary of Frost-Drought and Its Ecological Significance
W. Tranquillini)

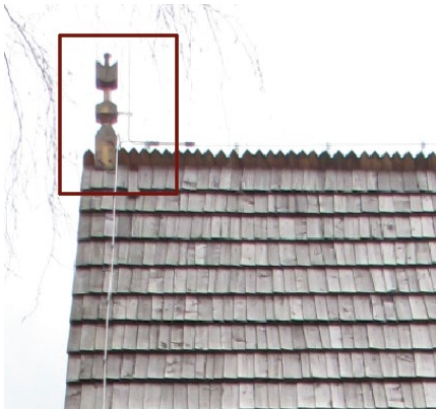
- *ganecek* – (Highlanders dialect) porch
- gimlet – tool for drilling holes
- girder - horizontal support of a structure which supports smaller beams



- Gorals – *Górale* - Highlanders
- *grzebień* – (in Highlanders dialect) part of shingles that exceed the ridge

- hemp - a family of plants, some of which are used to make rough cloth
- *mek* – (in Highlanders dialect) insulation material that filled the fissures between logs in Podhalan architecture, was made out of *skrątki*
- pallet - straw or hay covered sleeping place, not meticulously with the material
- *parzenica* - characteristic Highlanders motif, primarily on men trousers

- *pazdur* – (in Highlanders dialect) roof decorative elements that had a constructional function



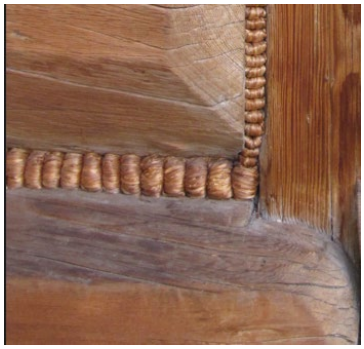
- *pecki* – (in Highlanders dialect) corner big stones slates that worked as a base in Podhalan architecture

- *piode* – Stone slates put as roof cover in Walser architecture

- *płazy* – the processed log use by Gorals to build walls
- *przyłapy* - roofed, open entrance terrace-like place
- purlin - horizontal, structural part in a roof.
- *ratka* - (in Highlanders dialect) groove
- resin - substance by some trees, mostly sticky; becomes hard and yellow after being collected
- *rysie* – beams that exceed the face of the wall and are used for supporting roof

- shaving horse – tool , in shape a bench like that combines vice and workbench

- *skansen* -open air museum
- *skrątki* – (in Highlanders' dialect) braided elements used for thermal insulation made from wood shavings or dry hay



- *skrzyżole* – (in Highlanders' dialect) big stone slabs used as flooring material ex. in stables
- *słonecko / słoneczko* - (in Highlanders dialect) the popular

decorative motifs resembling the sun; mainly placed on gable walls

- *sosręb* - (in Highlanders dialect) carrier beam that helps to support the roof structure, visible inside a room
- *teble* – (in Highlanders dialect) pegs that inserted into borred holes were fastening together overlaying logs
- thatched roof – roof that is covered with dried hay
- treatability class - is based upon the resistance offered by the heartwood of a species to preservatives under a working pressure of 1.05 N/mm2 (source: European Journal of Wood and Wood Products)
- *troc* - (in Highlanders dialect) mechanical saw
- *węgieł* – corner crowned connection

- *wyględy* - openings protruding from the roof slope

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