







Geotrail Plöckenpass – an Interdisciplinary Approach

The area around Plöckenpass (Passo di Monte Croce Carnico, see photo above) with an altitude of 1357 m is not only characterized by an important mountain road connecting Austria with Italy but offers much more:

- It reflects a long history from Roman times with rock inscriptions documenting an Alpine transit for many centuries;
- even further back Earth's history is testified by rock strata and fossils of almost 500 million years;
- this long-lasting peaceful time was interrupted by an apocalyptic event named World War I when the surroundings of Plöckenpass was the center of heavy fighting resulting in more than 1500 killed soldiers by fire and avalanches;
- since the second half of the 19th century the mountainous landscape has always attracted mountaneers to ascend every peak which finally was achieved close to the end of

the century with the exception of the most challenging routes waiting and reserved for the following generations after World War II.

The main purpose of the project to renew the old Geotrail from Plöckenpass to the Cellon Avalanche Gully constructed in the year 1988 is not only to replace the old panels and establish newly designed modern ones but aims also on content-related changes focusing on trilingual panels for each interdisciplinary topic listed below with short texts in a plain language accompanied by historic and todays photos.

- 1. World War I (2-3 panels)
- 2. Mountain Challenges The first ascents of the mountains of the Carnic Alps (2-3 panels)
- 3. Earth's History in the Carnic Alps A journey through Time (2-3 panels).

The trail ends at the famous Cellon Avalanche Gully at an altitute of 1500 m.

This interdisciplinary project is a joint effort between the Geopark Carnic Alps, the Friends of the Dolomites (Dolomitenfreunde) and the Alpine Club, Section Obergailtal-Lesachtal.

The following report was compiled by Hildegard Lederer, Sepp Lederer and Hans P. Schönlaub. The photos were kindly provided by the Friends of the Dolomites, the archive of the Alpine Club (Sepp Lederer), Reinhard Ranner and Hans P. Schönlaub, all Kötschach-Mauthen.

The War in the Mountains 1915 - 1918 in the Plöcken region

Around 1914, the Plöcken region hardly looked like it does today. There were no comfortable roads at all and hardly any paths. People did not walk up mountains, except a few hunters, shepherds, smugglers, customs officers, who could not avoid it. A first kind of Alpinism had only started, for town people and a few exotic tourists from abroad. The Lake Wolayer area may have seen a few mountaineers, but the Dolomites promised certainly more adventure than the Carnic Alps.

The trigger for World War I was the assassination of Archduke Franz Ferdinand of Austria, heir to the throne of Austria-Hungary, by the Bosnian Serb Gavrilo Princip in Sarajevo on 28 June 1914. This set off a diplomatic crisis when Austria-Hungary delivered an ultimatum to the Kingdom of Serbia, and entangled international alliances formed over the previous decades were invoked. On 28 July, the Austro-Hungarians declared war on Serbia and subsequently invaded the Balkan state.

In May 1915 the Great War had already lasted for nearly a year, the soldiers had not returned home at Christmas 1914, as they had been promised and had willingly believed. Many of them would come back home wounded, disabled, mentally ill or not at all.



The southern military front during World War I.

The Austro-Hungarian troops were fighting in Serbia and Russia. Of the male population, only the too young ones and the too old ones were left at home.

Then, on May 23, 1915 Italy declared war on the Austro-Hungarian Empire, following secret promises of the Allies and renouncing her obligations to Austria-Hungary and Germany (Central Powers):

"Unredeemed Italy", "Italia irredenta", hoped to gain the territories of the Austrian Littoral, Dalmatia, Trentino and South Tyrol. Emperor Franz Joseph I, "I have been spared nothing", he probably murmured, had to send his troops, already overstrained, from the Eastern to the Italian front.

The Carnic Alps, stretching from Sillian in the West to the Nassfeld in the East, became part of the front line. The Plöckenpass was of strategic importance, and, not surprisingly, the Italians were quicker reaching the positions on the peaks.

During the first days, no trained troops were available on the front line, the earlier mentioned too young and too old ones had to do the job. These were so-called *"Freiwillige Schützen"*, volunteering rifle-men. They lacked everything: good arms, equipment, training, experience. But they were quite sure, they would not allow the enemy to take over their home country (oral communication by Hauptmann Gressel and the Alpini on the Pal mountains).

The leader of the Italian army, Field Marshal Luigi Cadorno, had dreams of taking Ljubljana and threatening Vienna; after all, there was an Italian numerical superiority. But in the rugged Alpine terrain his tactics were not successful, the losses of lives of young fighters were enormous on both sides, and the Italian offensive soon bogged down into trench warfare, similar to the western front.

Trench warfare in the mountains demanded labors of all sorts (see photos above):

- building ways, paths, tracks, rope ladders to get access to the summits,
- constructing trenches, caves, caverns, quarters shacks,
- protection from rock fall, from avalanches, from the enemy's attacks, from fragments of grenades, from lightning,
- shoveling snow of enormous amounts,
- building tunnels inside glaciers, as on the Marmolata massif,
- building underground tunnels inside the rocks, fill them with explosives and blow up whole mountains, as the Col di Lana in South Tyrol,
- constructing new railway lines, as in the Gail Valley, narrow gauge railway lines,
- establishing numerous cable cars,
- taking care of power lines and telephone lines,
- learning to ski, to climb rocks,
- standing guard, and
- carrying extremely heavy artillery pieces up the highest mountains.

They had to do these jobs and many more while they were far away from home, while their food rations were getting inadequate (the average weight of a soldier in 1918 was around 50 kg), while their uniforms, shoes and other equipment were getting worse and worse, and while their hopes of a decent future were getting smaller and smaller.

The main theatre of the Italian front, however, was not the Carnic Alps, it was rather the Dolomites in the West and the plains of the Isonzo (Soca in Slovenia) in the East. The front line hardly changed at all, the many efforts could move it only to the one and the other side for a few metres.





Upper row: Restored trenches and fortifications on summit of Kleiner Pal. Below left: Turmmulde Czernowitz on Kleiner Pal. Right: Barracks snow shoveling. Left: Military supply carriers during winter. Right: Kötschach after bombardement in 1914. Lower row left to right: Eiskar cavern in the Kellerwand Cliff. Cable road to Kleiner Pal. Inclined lift to Köderhöhe. Left: Transport of a wounded soldier.

By courtesy of Dolomitenfreunde and S. Lederer, Alpine Club Obergailtal-Lesachtal



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Map of the western wing of fortifications at the summit of Kleiner Pal (© Dolomitenfreunde)

There were eleven battles of Isonzo, battles of attrition, battles of material, ending in stalemate and exhaustion. The twelfth one, in October 1917, brought a decision. Austria-Hungaria got help from the German Alpenkorps, and the gas Phosgene, a colorless gas gained infamy as a chemical weapon during World War I, was used. At the end of the day the Italians retreated 12 miles, and eventually, withdraw its troops to the lower reaches of the river Piave. So the combatants left the Carnic Alps front line.

Unfortunately, this did not mean the end of the war:

- When in June 1918 the Battle of the Piave River was fought, Italy got Franco-British and US support (coal, steel, troops).
- Germany pulled out its troops for use on the Western Front.
- the Austrians had outrun their supply lines, the army was on the verge to collapse.

The end of fighting was the Battle of Vittorio Veneto, Austria surrendered on Nov 3, 1918.

The end of the war meant the end of the Austro-Hungarian Empire, also known as k.u.k. Habsburg Monarchy or Dual State. Hungary signed its own armistice, Czechs and other non-German-speaking soldiers had already left the army in direction of their newly-to-found home countries.

In the Treaty of Saint-Germain Austria-Hungary was partitioned into Austria, Hungary, Czechoslovakia, Yugoslavia. Ethnic lines were not always followed, as to be seen in South Tyrol. In this Mountain War, on the Italian Front, about one million soldiers were killed and more than two million were wounded. The end of the war didn't mean an end to hunger and misery. Economies suffered from runaway inflation and unemployment. A flu pandemic killed 50 million people. There was the feeling of humiliation when very high reparations had to be paid. So, after the war was before the war.

In a very different way, all the hard work of building up a network of tracks and paths along the former front was not all in vain: in the seventies of the last century, the club of **"Friends** of the Dolomites" ("Dolomitenfreunde") was founded.

Colonel (Oberst) Walter Schaumann had the idea to reconstruct the soldiers' work with the help of volunteers, preferentially from countries that had been enemies in the war.

The operation was very successful. Starting in the Dolomites (Monte Piano, Drei Zinnen area), the open-air museum on the Kleiner Pal, the Maschinengewehrnase (machine gun ledge) and Cellonstollen followed. The latter is the entrance to Austria's only secured subsurfaced climbing track. In addition, there is the well-equipped **museum** of World War I in the city hall at Kötschach.

Today, the two museums commemorate this sad time in the mountains with the mission statement: *"Mai nemici sempre piu amice!" – "Never being enemies, always being friends!"*

Mountain Challenges

Es early as 1824 the first report from the famous German naturalist Leopold von Buch about the impressive and scary "Kellerwand Cliff" in the central Carnic Alps was published. In the succeeding years many generations of Earth scientists gradually became aware of this area and were increasingly attracted by both the aesthetic landscape and its rich geological heritage. Following the discovery, however, in peoples' mind no one ever would be able to conquer this more than 1.000 m high vertical limestone cliff.

Numerous first ascents of mountains and peaks around Kötschach-Mauthen started in the years around 1860.

- For many years Adam Riebler the Elder, a locksmith from Mauthen, was the only guide to the peak of the Kollinkofel or Creta di Collina (2.691 m) and probably was the first who ascended the summit. Together with Josef Moser from Kötschach he reached the peak of the 2.238 m high mountain Cellon (Frischenkofel);
- the first geologists guided by Adam Riebler who ascended several peaks of the central Carnic Alps were Edmund von Mojsisovics and Carl Diener from the Geological Survey of Austria and the University of Vienna, respectively. In 1862 they climbed from Plöckenpaß to the peak of Kollinkofel (Creta di Collina, 2.691 m);
- in 1865 their friend Paul Grohmann and two guides ascended the highest mountain peak of the Carnic Alps, i.e., the Hohe Warte (2.780 m);
- about the same time two hunters, Thomas Bucher and Franz Stramitzer, reached the southernmost glacier of Austria in the Eiskar along a trail from Valentintal;
- a few years later, in 1868, Josef Moser together with Peter Salcher and Paul Grohmann successfully climbed through the Kellerwand to the peak of the western Kellerspitze, also known as Grohmannspitze (Creta delle Chianevate, 2.718 m);
- Adam Riebler the Younger, also a locksmith in Mauthen was one of the best mountain climbers of that time and made the first traverse along a new route from Kollinkofel to the eastern peak of Kellerspitze (2.774 m);
- in 1884 the two Italian counts Guido and Cesare Mantica with their guide Nicolò Silverio from Timau also made a successful traverse between Kollinkofel and and the main peak of Kellerspitze (2.774 m) followed by a descend to the Eiskar;
- another geologist, i.e. Fritz Frech from Breslau University ascended at the end of the 1880s the Kollinkofel (Creta di Collina) and descended along the eastern crest to Grüne Schneid and from here to the Eiskar glacier. Later he also climbed on the middle Moos- and the Gamskofel (2.359 and 2.526 resp.). His interest focused on Devonian fossils from limestone sequences. In the 1930s of the 20th century Hans Rudolf v. Gaertner from Göttingen University continued geological studies in the central Carnic Alps. It was the heroic time of Earth science-reated studies carried out mainly by the Geological Survey of Austria and the University of Graz.
- In the 1890s other mountain climbers from Kötschach and Mauthen like Albin Ortner, Heinrich Koban, Hans Klaus, Heinrich Prunner, Johann Waizer and others made several first ascents at Cellon, Kellerwand, Hohe Warte, Polinik and the Moos- and Gamskofel;

- in 1888 Pietro Samassa from the village of Collina ascended several peaks of the Biegengebirge (Cima di Sasso Nero, Seekopf and Monte Canale) while Hans Kofler of Sittmoos climbed on August 11, 1895 through the northern face of Mooskofel. Ten days later he and Albin Ortner traversed from the peak of Mooskofel to the summit of Gamskofel. During this tour he discovered new ascents through the northern wall of Hohe Warte and the eastern crest of Kollinkofel;
- close to the end of 19th century almost all peaks of the Carnic Alps were ascended with the exception of the most challenging routes waiting and reserved for the following generations after World War II.



The Kellerwand Cliff from the East with indication of rock climbing routes with different degrees of difficulty up to no.9. Numbers indicate first ascents by Reinhard Ranner from Kötschach-Mauthen beginning from 1987 (Courtesy by Reinhard Ranner).



Adam Riebler, the Younger(1844-1914)



Dr. Heinrich Koban (1877- 1962)



Hans Kofler-Jast (1835-c.1920)



Sunrise in the Valentin Valley with Kellerwand Cliff (left), Hohe Warte (2.780 m, center in the background) and mountain Rauchkofel (2.460 m, right). Courtesy Reinhard Ranner, Kötschach-Mauthen.



A detailed list about first ascents in the surroundings of Mauthen and Plöckenpass is provided by the booklet "Alpingeschichte Kurz und Bündig, Mauthen im Gailtal, published by R. Peters & S. Lederer (2013). The geological history of mountain climbing is included in the book "Der wahre Held ist die Natur – Geopark Karnische Region" by Hans P. Schönlaub (2005).

Carnic Alps Earth's History – a Journey through Times

The Carnic Alps are widely regarded as being among the most attractive mountain ranges in Austria and beyond. Their intrinsic beauty originates from the interplay of spectacular limestone mountains with more gentle mountain pastures and foothills. A great diversity of colors is derived from the contrasts between the pink to pale-colored limestone massifs and the intervening green forests and flower-covered mountain meadows.

The mountains rise either as isolated peaks or ranges with intersecting ravines, in places forming spectacular arena-like sceneries. Some limestone sections extend vertically over more than 1,500 m and are among the highest limestone cliffs found in the Alps.

Pioneering geologists were among the first who were excited by the beauty of the mountains, and their writing and subsequent publications attracted generations of scholars and visitors alike to become acquainted with the extraordinary aesthetic and scientific appeal of the area.

The Carnic Alps represent an outstanding combination of internationally significant geological and geomorphological features. The property comprises largely unspoiled nature of unrivalled beauty.

Its geology spanning the interval from the Ordovician to the Triassic, reflects approx. 250 Million years of Earth's history, including a number of internationally important timemarkers, reference sections and fossil localities. The area also contains a range of outstanding landscape features and is characterized by dynamic processes with occasional rockfalls, floods and avalanches.

The Carnic Alps are renowned for its contribution to Earth science-related activities for almost 200 years. They include geology, structural geology, paleontology, sedimentology, geochemistry, and Quaternary research. Based on more than 1000 scientific publications the Carnic Alps are considered by Earth scientists as one of the most intensively studied mountain ranges in the world.

The fossiliferous sedimentary sequences of the Carnic Alps provide an almost continuous record of Late Ordovician to Middle Triassic rocks spanning the Palaeozoic and early Mesozoic Eras and thus document approximately 250 Million years of Earth's history.

The mountainous region includes a range of globally significant fossil occurrences which represent well preserved evidence of life of both highly diverse marine and terrestrial faunas and floras during these times.



The Palaeozoic sequence of the Carnic Alps (© Hans P. Schönlaub)



Some geological impressions from the central Carnic Alps (© Hans P. Schönlaub)

The Carnic Alps also contain textbook-like examples of geomorphological features including up to 2800 m high rising cliffs, mystical gorges, silent mountain lakes, roaring waterfalls, loosely scattered glacial deposits and on-going geological processes.

With regard to plate movement and palaeoclimate, the Carnic Alps suggest a rapid northward drift of one of the Peri-Gondwanide terranes from high southern and cooltempered latitudes in the Ordovician to the moderate and tropical belt in the Silurian, Devonian and Carboniferous followed by an equatorial position with desert conditions in the Permian; ongoing drifting during the remaining 250 m.y. moved the continental plates to the present position.

As far as mountain building is concerned, the Carnic Alps fill an important gap in Earth's history by documenting the Variscan Orogeny in the Middle Carboniferous. It is represented by an distinct angular unconformity between the pre-Variscan basement rocks and the post-Variscan cover sequences.

In conlusion, the outstanding universal value, i. e., some of the "USPs" of the Carnic Alps are

- rock formations spanning the Periods from Upper Ordovician through the Silurian, Devonian, Carboniferous and Permian to the Lower and Middle Triassic, followed by Jurassic and Cretaceous strata on the Italian side
- depositional sequences ranging from the shallow sea to the shelf-edge, slope and deep sea
- fossil-based occurrences of geological time boundaries of international and national significance for, e.g., the Ordovician/Silurian boundary, Silurian/Devonian boundary, Devonian/Carboniferous boundary, Carboniferous/Permian boundary and the Permian/Triassic boundary
- rich occurrences of highly diverse rugose and tabulate corals, trilobites, cephalopods, gastropods, bivalves, brachiopods, echinoderms, graptolites and a high variety of micro-fossil groups
- > many type localities of original descriptions of mega- and microfossils
- textbook-like contacts (angular unconformity) between older basement rocks and younger cover sequences
- many options for national and international field trips including national and international conferences
- many opportunities for touristic activities
- high scientific recognition based on the results and knowledge of generations of qualified national and international groups of Earth scientists
- Iong experience in outreach activities to address the public at large in Earth sciencerelated matters – and
- > the UNESCO Global Geopark Carnic Alps!