

Both forest technology and forest science in North America were borrowed from Europe in the late 1800s. As a result, forest challenges also were transferred as this story of forest use in Switzerland in the early 1800s portends. This article is adapted from a paper given at the international IUFRO conference “Analysis and Management of Forest and Rural Landscapes” held in Florence, Italy, in September 2002.*

TOPOGRAPHY, TECHNOLOGY AND DEMAND FOR TIMBER:

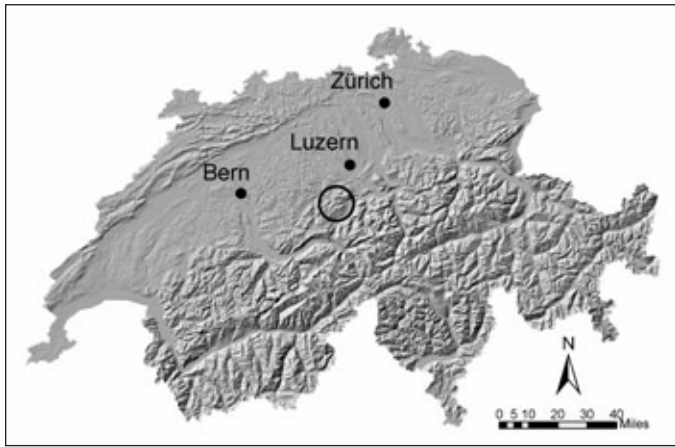
*ENTREPRENEURS AND FORESTERS SHAPING
THE LANDSCAPE IN A SWISS ALPINE VALLEY*

A relic of wilderness in a cultural landscape?
“For centuries impenetrable forests have covered the steep and craggy mountainsides, barely accessible for the foot of the chamois hunter, surrounded by cliffs and abysses so that no valley dwellers ever brought an ax there—instead, the primeval forest, being left untouched, grew up high, collapsed, and regenerated, nature never being disturbed in her business.”¹

This text was most likely published for the first time in 1812, in a German magazine. It tells the reader about enormous stocks of timber, left untouched in the region of the Schlierentäler, two valleys located in central Switzerland. And it describes how a foreign hunter started a bold project to make these resources accessible by means of new and ingenious technology for timber

transportation. Throughout the nineteenth century, this text was repeatedly published with some modifications in French and German magazines. The picture of untouched wilderness in the heart of Central Europe conquered by daring entrepreneurs was obviously attractive to readers of this time.

BY MATTHIAS BÜRGI AND ANTON SCHULER



Location of the study area (circle) and three major cities of Switzerland.

THE LOCATION IN CENTRAL SWITZERLAND

Switzerland, located in central Europe, includes three physiographic regions: the Jura Mountains (about 10% of the land area), the Central Plateau (30%), and the Alps (60%). Today, agriculture dominates 37% of the country's land area, 31% are covered by forests, 7% include settlements and urban areas, and 25% are unproductive areas.² The two Schlierentäler, are located in the Canton (State) of Obwalden which falls in the alpine region. With a population density of 66 people per square kilometre, this mountainous canton is much less densely populated than Switzerland as a whole at 175 people per square kilometre.

To many people the Swiss alpine region represents iconic images of towering mountains like the Matterhorn or the famous trio of Eiger, Mönch and Jungfrau. Yet, many parts of the alpine regions are not covered by ice, snow and rocks, but by forests and alpine pastureland. Dairy production was and still is the main agricultural activity there—visible and edible in the form of many varieties of Swiss cheese. For centuries, wood taken from the forests in the Alps was used for milk processing and as a source of timber and firewood for the local residents.

The transformation of forest to pastureland was widespread and lowered the upper timberline in some areas by several hundred meters. Markets for the timber included the major settlements in the valley bottoms and the major cities, such as Zurich

and Berne, located in the Central Plateau. Whereas the forested area in the lowland remained remarkably constant after the 17th century, forested area declined in the mountains.

The region of the Schlierentäler covers 48 km² and includes an altitudinal range from 450 to 2,133 meters above sea level. It consists of two separate parallel valleys, the "Gross (large) Schlierental" and the "Klein (small) Schlierental". Both empty into the Lake of Alpnach, just south of the Lake of Lucerne. The lake of Alpnach, named after the village of Alpnach, is located at the bottom of the two valleys. In the lower part, the valleys are quite steep and narrow, and the underlying geology, consisting of mellowed sandstone and moraine, hinders access. The village of Alpnach, built on the alluvial fan formed over a long period of time by debris that was brought down to the valley, is evidence of the erosive power of the Grosse Schliere and Kleine Schliere. The rugged topography of the Schlierentäler was probably the primary reason that the forests there were not harvested to the same degree as in other parts of the Alps.

EXPLOITATION OF THE FORESTS

Long before the vast forests of the Schlierentäler caught the eye of the German forester, they were part of the local economy. Alpine pastures were present on higher elevations throughout the area. Even a path through one of the valleys, connects Alpnach with the nearby region of Entlebuch.³ It is therefore very likely that the forests at higher elevation were grazed, used for firewood for heating, cooking, and production of cheese and milk sugar, and splints for light. The lower elevations, being within reach of the people of the nearby village of Alpnach, were probably utilized heavily by the local population. But to the passing visitor, the vast forests in the Schlierentäler valleys, being relatively less exploited than forests in other parts of the Alps, probably appeared to be untouched.

In 1790, the community of Alpnach had decided to build a new church.⁴ To raise money, concessions were granted for the harvesting of several forests, including forests in the Schlierentäler. Because no one could imagine how to harvest the timber in these remote forests, the concessions were inexpensive. But technology helped to overcome the natural obstacles. Johannes Rupp from Germany bought the concession and in 1810 he and 160 workers started the construction of a wooden channel of about



Wooden channel for timber transportation, Lower Engadin in 1886. The construction in the Schlierentäler might have looked quite similar.

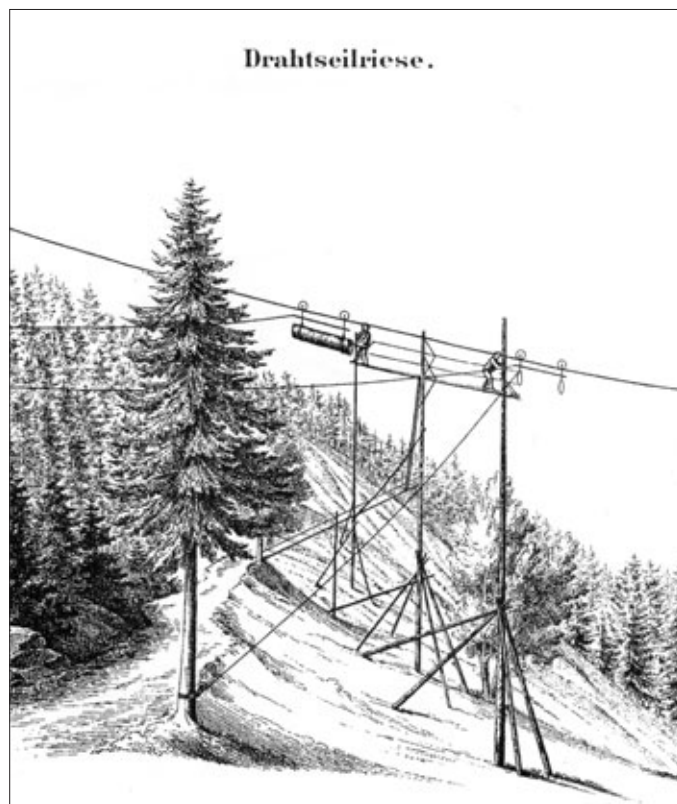
SOURCE: HUGGER, PAUL; SCHALIB, ANDREA. 1975. WALDARBEIT UND WALDARBEITER IM PRÄTICSAU (GRAUBÜNDEN). CAPTION ACCORDING TO MATHIEU, JOHN. 1982. DIE AUSBEUTUNG DER WÄLDER IM ALTEN UNTERENGADIN. BEIHEFT BÜNDNERWALD. 10:109-120.

12 km in length, on stilts up to 35 meters high. The channel itself consisted of about 25,500 stems and it took Rupp and his crew a year and a half to construct it.⁵ In this channel timber was slid down with the help of water to a point where it was then transported to the lakes of Alpnach and Lucerne, and rafted to places such as Lucerne, Basel and even Paris⁶.

Such a channel to transport timber was not in itself an innovation as other similar constructions were reported in the late 18th century from the southern part of Switzerland⁷, and they were also known and in use in other parts of the world. But it was still spectacular enough that the local population believed that Rupp was in an alliance with the devil.⁸ The willingness to invest in this tremendous effort can only be explained by the combination of available technology for transportation and high demand for the resource in the distant population centers. However, political turbulences set limits to the access of distant markets and the channel was in use only for a few years.⁹ By 1812, a critical report was published about the merits of the channel for the community of Alpnach. The author stated that the geology of the region was extremely unstable and that the removal of the protective forest cover would eventually result in serious erosion threatening Alpnach and the whole valley below.¹⁰

But, the wooden channel was only the first chapter of the story of timber exploitation in the Schlierentäler. In the 1830s, some brooks were dammed and timber was floated down the valley by releasing the water and the timber in a huge splash—causing severe damage to the banks of the ravines. Moreover, a road 12 km long was built to transport the timber by horse and wagon down into the valley.¹¹ It is estimated that in the 25 years between 1811 and 1836, several hundred hectares of forest were logged. Despite concessions that included the condition that young trees should be protected, the logging resulted more or less in clear-cutting entire stands. The remaining trees were damaged by the felling and transportation of the timber, and no measures for regeneration were taken.

In the 1870s, the next bold construction followed: wooden tracks were laid in a remote part of the valley to transport the timber in small cars to the upper station of a cable car, which crossed the valley with a more than two km-long cable.¹² The market for the timber was again outside the region. After having



SOURCE: FANKHAUSER, FRANZ, 1872.

Cable for timber transportation in the Kleine Schlierental (1870s).

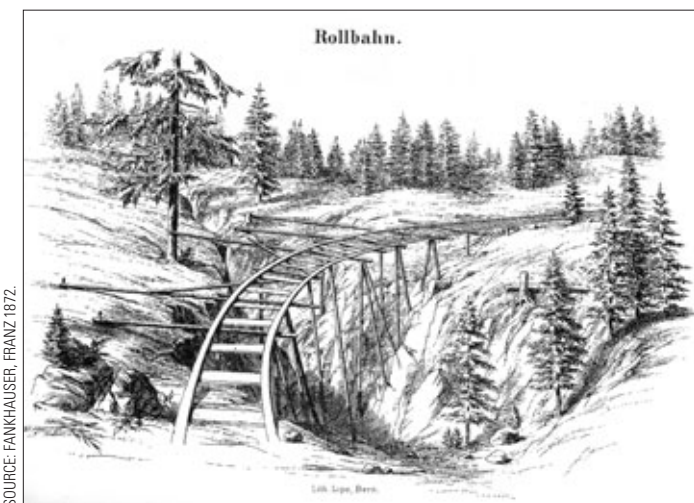
been transported to Lucerne on the lake, it was reloaded on railroads and brought to its final destination. Both the changes to the local transportation system and the spread of the railroads made it more convenient to haul timber to distant markets.

PROBLEMS WITH FLOODS AND DEBRIS

By the mid 1800s there were increasing erosion problems and expensive damage to the village of Alpnach. Flooding caused by the waters of the Grosse Schliere and Kleine Schliere flowing down from the Schlierentäler was no new phenomenon—after all, Alpnach is located on an alluvial fan! During the 17th and 18th centuries, the torrent streams had reportedly threatened Alpnach several times.¹³

The second half of the nineteenth century brought erosion problems to many other parts of the Alps. The relative impact of deforestation and weather events on the severity of the floods continue to be debated. It is possible that the period of forest exploitation occurred concomitantly with a period of heavy precipitation.¹⁴ Additionally, it is difficult to determine, based on historic records alone, whether the severity of flooding actually increased. The spread of print-media, leading to an increase of historical information about local events, or the increase in population triggering the construction of houses in potentially flood-prone areas, must also be considered when searching for the causes of these reported floods and other natural disasters.

At the same time, the perception of these events also changed: in the course of the enlightenment, catastrophes were no longer interpreted as godly signs and wonders but increasingly as natural events. Therefore, floods were no longer interpreted as a rightful godly retaliation, and the affected people were no longer



SOURCE: FANKHAUSER, FRANZ, 1872.

Wooden tracks for timber transportation in the Kleine Schlierental (1870s).

seen as sinners, but as victims who deserved the aid and support of cantons and countrymen.¹⁵

Scholars also debate the extent to which political interests fostered an increase in the attention these events received by the media. However closely linked these catastrophes were to deforestation, the period of floods and landslides in the 1860s and 1870s convinced the Swiss Federal Council to commission the professors Karl Culmann and Elias Landolt, both professors since 1855 at the newly founded Swiss Federal Institute of Technology (ETH) in Zurich, to evaluate the state of mountain forests in Switzerland. Landolt, professor of forestry, submitted his report about the state of the forests in the alps in 1862 and Culmann, professor of engineering, submitted his report about the state of the wild waters in 1864.¹⁶ These reports finally led to the enactment of the first federal forestry law in 1876. In this law, which until 1897 was restricted to the mountainous regions of Switzerland, protected forests were specified and a further reduction of the forest area was banned. This law aimed at erosion control measures and was not enacted because of shortage of fuel wood or timber famine.¹⁷



in laws which respect both the needs of the forest and the needs of the people, and which waste no time in mistakes. Such legislation is respected because it is capable of being enforced.

The results of it are so large, it is so surely a part of the future, that the friends of forestry in America ought to work for it with the steady vigor of men who know they are going to win".¹⁹

Yet today, forest history research in Switzerland tends to question the

Elias Landolt (1821–1896). From 1855 he acted as the first professor of forestry in Switzerland and one of the main forces behind the enactment of the first federal forestry law in 1876.

intent of forest officials' quest for forest legislation. Certainly, the enforcement of the new legislation in Switzerland was fostered by the fact that it formed the legal basis for federal subsidies of erosion control measures.

In the above mentioned report by Landolt from 1862, the Schlierentäler are explicitly mentioned—no longer as untouched wilderness, but as example of how an area can be devastated by exploitation. Landolt assumed that it would never again be possible to harvest the same amount of timber that was exported from these valleys in the first third of the nineteenth century. The harvesting operations had significantly changed the landscape of the Schlierentäler during the first decades of the nineteenth century.

A series of floods in 1874, 1877 and 1880, fostered projects to tame the creeks and to build protective dams for Alpnach. In 1878, an investigation was conducted to assess the need for measures along the Kleine Schliere. This project, conducted from 1879 to 1887, was one of the first erosion control projects supported by federal subsidies based on the new legislation. Maps, photographs, and descriptions show the extent of this ambiguous undertaking.²⁰ In 1897, a similar project started along the Grosse Schliere. But soon after, in 1903, a flood destroyed most of the construction work.²¹ During the first decades of the 20th century, new efforts had to be taken to protect Alpnach and the valley from high water and debris. A combination of measures in and along the drainages with afforestations in the catchment area was seen as the best way to achieve a high level of protection.

CONCLUSIONS

The idea of a frontier in the Schlierentäler came from Germany. A closer look at the situation reveals that such a frontier situation did not exist by the nineteenth century. Exaggerating the remoteness and inaccessibility of the valleys under study stressed the wildness of these alpine valleys and at the same time called attention to the boldness of the entrepreneurs who dared to exploit the

Gifford Pinchot obviously was impressed, not only by Landolt, who he later described as a "...great Swiss forester...full of the wise moderation of a man conscious of the dignity of his work" but also by the law.

On his trip to Europe 1889 to 1891, Gifford Pinchot spent a month in Zurich, meeting Landolt several times.¹⁸ He obviously was impressed, not only by Landolt, whom he later described as a "...great Swiss forester...full of the wise moderation of a man conscious of the dignity of his work" but also by the law:

"The spirit of the recent Swiss forest legislation is one which must permeate our own coming forest laws if they are to win that acceptance with the people without which they must be worse than useless. ... Successful forest reform, here as there, must be a growth from the education of the people, finding its expression



Erosion control measure on the Kleine Schliere (1880s).

forests of the Schlierentäler. This boldness was encouraged not only by a rising demand for timber, but also by the development of timber harvest technology. Voices of caution, raised at the same time, did not receive much attention. In the second half of the nineteenth century, the combined effects of increased precipitation and harvesting caused erosion problems throughout the Alps. As a counter measure, foresters pushed for legal instruments, leading to the enactment of the first federal forestry law in 1876. The image of the entrepreneur cutting down remote forests had been replaced in a few decades by the grandeur of the foresters determined to limit uncontrolled harvesting. Cultural landscapes throughout the world are shaped by the balance of exploitation and protection. The development in the region of the Schlierentäler shows how the interaction of topography, technology, and demand for timber determined the pace of exploitation that caused profound landscape changes and made protective measures necessary within a short period of time. □

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NOTES

1. Rupp, Johannes. 1854/56. Johannes Rupp. *Monatsschrift für das württembergische Forstwesen* 4:277–282; based on a text from 1812; translated by the authors. The German original reads: “Seit Jahrtausenden bedeckten undurchdringliche Wälder die schroffen Felswände und Klüfte dieses

Berges, kaum dem verwegenen Fusse des Gemsjägers erreichbar, von Felsvorsprüngen und Abgründen so umgeben, dass die Thalbewohner nie eine Axt dahin brachten, sondern die Urwaldung, sich selber überlassen, emporwuchs, niedersank, und sich wieder erneuerte, ohne dass die Natur in ihrem Geschäfte je wäre gestört worden.”

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3. Escher von der Linth, L. (prob. Hans Conrad) 1873. *Etwas über die Holzleitung am Pilatusberg*. Schweizerische Zeitschrift für Forstwesen 24:82–86. based on a text from 1812.
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5. Rupp, Johannes. 1854/56.
6. *Annales forestières et métallurgiques*, tome quatorzième, Paris 1855, 83–84.
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9. Rupp, Johannes 1854/56.
10. Escher von der Linth, L. (prob. Hans Conrad) 1873.
11. Küchler, Melchior. 1878. *Die Wälder von Alpnacht und das neue Forstgesetz oder Vollziehungsverordnung in Obwalden*. Altdorf. In: Wallimann, Martin. (ed.) 1988. *Die Wälder von Alpnacht*. Alpnach, 19–34.
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16. Landolt, Elias. 1862. *Bericht an den hohen schweizerischen Bundesrath über die Untersuchung der schweiz. Hochgebirgswaldungen*. Bern. 367 - Culmann, Karl. 1864. *Bericht an den hohen schweizerischen Bundesrath über die Untersuchung der schweiz. Wildbäche*. Zürich. 650.
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