

## PRO SILVA HELVETICA

### Portrait of the plenter forest of l'Envers at Couvet / NE

Harmonising *use* and *beauty* sustainably



Couvet, Division 1 113, May 2009.

*« This forest grows and functions because it remains as it is – alive and strong. It is beautiful and the forester managing it can enjoy the rare privilege of producing beauty in the search for the useful and working towards creating something beautiful... ».* \*

H. Biolley, 1920

## Location



**Forest of l'Envers.**  
(North-facing slope).

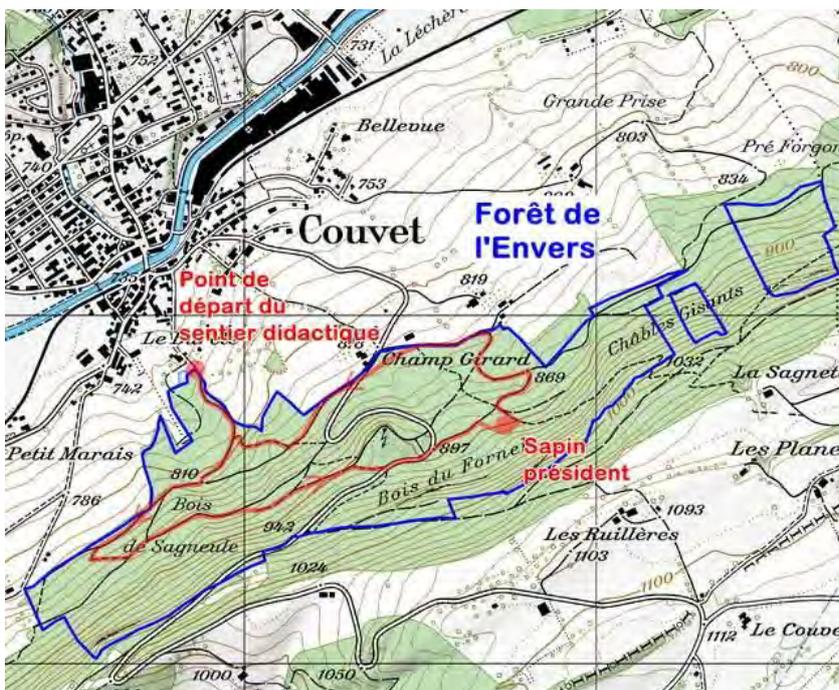


« A jewel for our mountains and security for our plains » \* *H. Biolley, 1901*



## Site location and description

The forest of l'Envers at Couvet is accessible by public transport and on foot. From the village center, follow the hiking trail signs to “Creux du Van”. The visitor can follow an educational trail with information on the principles of *close-to-nature silviculture*<sup>2</sup>, which aims to describe the *plenter forest* from different points of view.



Coordinates	539'300 / 196'600
Town	Couvet / NE
Area	78 ha (17 Divisions)
Altitude m a.s.l.	760 - 1020 m
Aspect	North - Northwest
Precipitation	1323 mm/year (Average 1973-1988)
Mean temperature	6,5°C in Couvet
Vegetation period	approx. 5 months
Slope	Lower part slightly inclined. Upper part steeper
Plant community	Beech-fir forest [Abieti-Fagetum]
Geology	<b>Lower part:</b> sandstone bench covered with alpine material (glacier) <b>Upper part:</b> Upper jurassic partially covered by limestone scree
Soil	Wet and carbonated altitude rendzine

## What is it: a plenter forest?

The first thing you notice about a plenter forest is that it is very much alive. In this respect, it differs fundamentally from a uniform high forest. It has a mixed and composed structure, and its growing stock is distributed all over the surface, and is not subject to strong fluctuations. The entire space is filled with leafy green, and regeneration is constant. All succession stages are present at the same time and on a single surface. This means you will find all ages, or rather all sizes, because the concept of age is banned from the plenter forest, ranging from seedlings up to old trees.

Definition, compiled from the works of Henry Biolley and from Walter Ammon.



Characteristic profile (top) and bird's eye view (bottom) of a plenter forest (according to J.Ph. Schütz, 1997).

A plenter forest is the result of a silvicultural approach that respects the forest ecosystem. It is in a **state of equilibrium, which allows a maximum benefit** not only economically, but also from the perspective of other aspects (conservation, biodiversity, recreation, landscape ...):

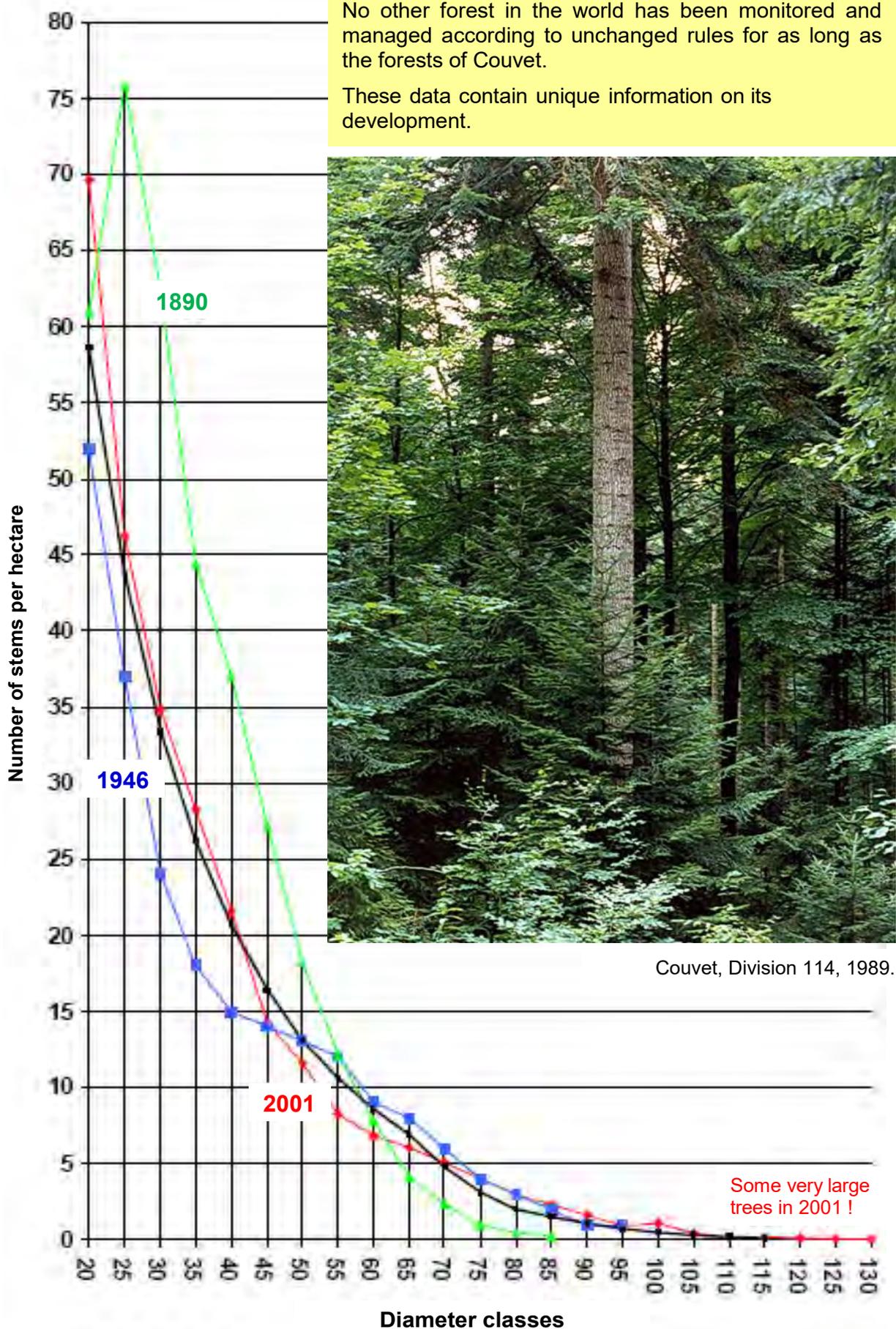
- It is a sociable forest, with a mixture of local tree species;
- it is a "forest family", with trees of all sizes;
- it is a forest where regeneration occurs naturally and constantly;
- it is a forest that functions in such a way that safeguards its protection, soil fixation, water regulation, air purification and biodiversity conservation services efficiently;
- it is a forest that continually produces an optimum volume of high quality wood even though the cost of maintaining it is very low ...



## Development of the forest of l'Envers

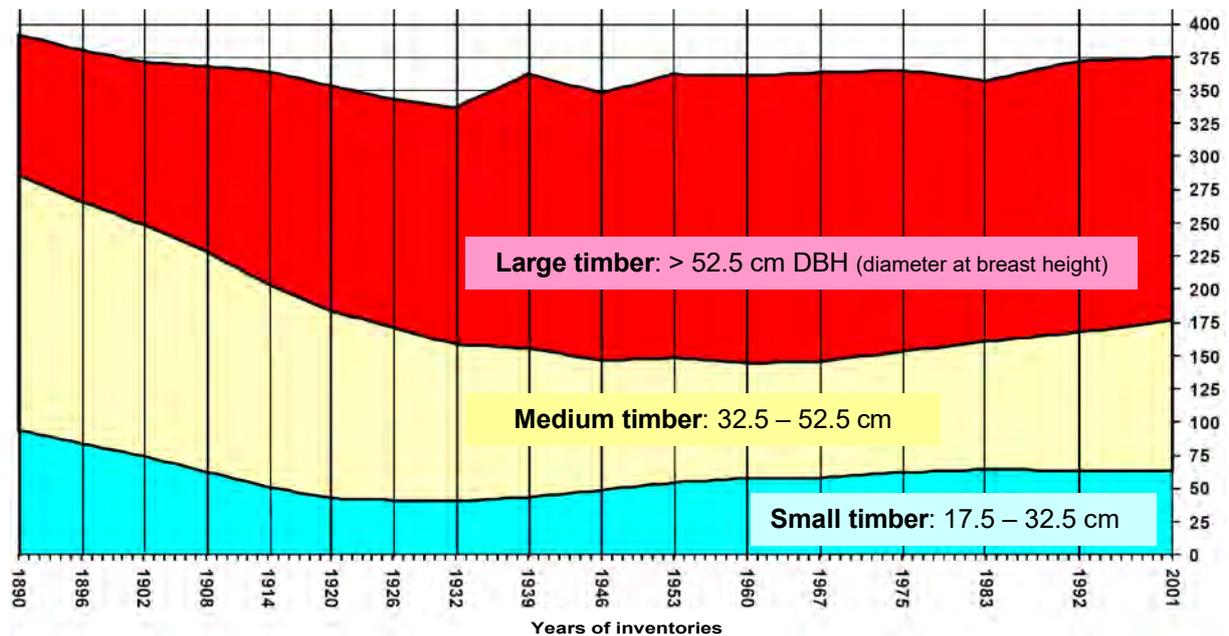
No other forest in the world has been monitored and managed according to unchanged rules for as long as the forests of Couvet.

These data contain unique information on its development.



Development of the diameter distribution in 1890, 1946 and 2001.

The first inventory in 1890 recorded a growing stock of 392 sv/ha<sup>3</sup>. This had to be reduced to allow it to be converted into a plenter forest, i.e. to let light through to the forest floor. Today silvicultural experts think that 360 sv/ha would be the optimal volume for the Forest of l'Envers.



Development of the growing stock from 1890 until 2001 in sv/ha.

Species (mixture in %)	In little more than a century, the proportional volume of silver fir / Norway spruce / broadleaves developed from 67/33/0% to 55/30/15%.
Growing stock 2001	375 sv/ha.
Increment	The increment during the period 1891–2001 (111 years) was, on average, <b>9.7 sv/ha/year</b> .

## Silvicultural aim

The forest in 1890 was a mosaic of conifer stands, with varying degrees of uniformity and often with different layering. Because the stands were overly dense, they tended to develop into stands with regular structures.

**Silvicultural aim:** To convert this forest with its varying appearance into a plenter forest. Within a century, this objective has been fully achieved, but must be locally refined. The broadleaves, which were poorly represented at the beginning, have been constantly promoted. The natural regeneration in layered groups developed magnificently until 1970. Since then, the fir and sycamore regeneration has been decimated through browsing, the result of a forest-hunting imbalance.



**An attractive and varied forest, which is welcoming and full of life**

**... made up of high quality timber.**

**The fir with a blue band on the left of the stump will, perhaps, be “le Président” of the forest in 2150!**

Couvet, Division 112, May 2009.

## Tree marking – a very important task

Tree marking involves selecting and marking those trees to be harvested by loggers. This task goes beyond the mere harvesting of wood resources as it involves a silvicultural assessment of the forest as a whole. The forest is not only a biological production system but also the keeper of different values. It takes artistic skills and good intuition to ensure enough light reaches the ground to enable the continuous renewal and maintainance of the forest.

By restricting management interventions to those that are strictly necessary and taking into account both the development of each stem as well as the entire balance of the forest ecosystem, we can reach a true symbiosis with the forest. This is not only advantageous for society, but also for the environment.

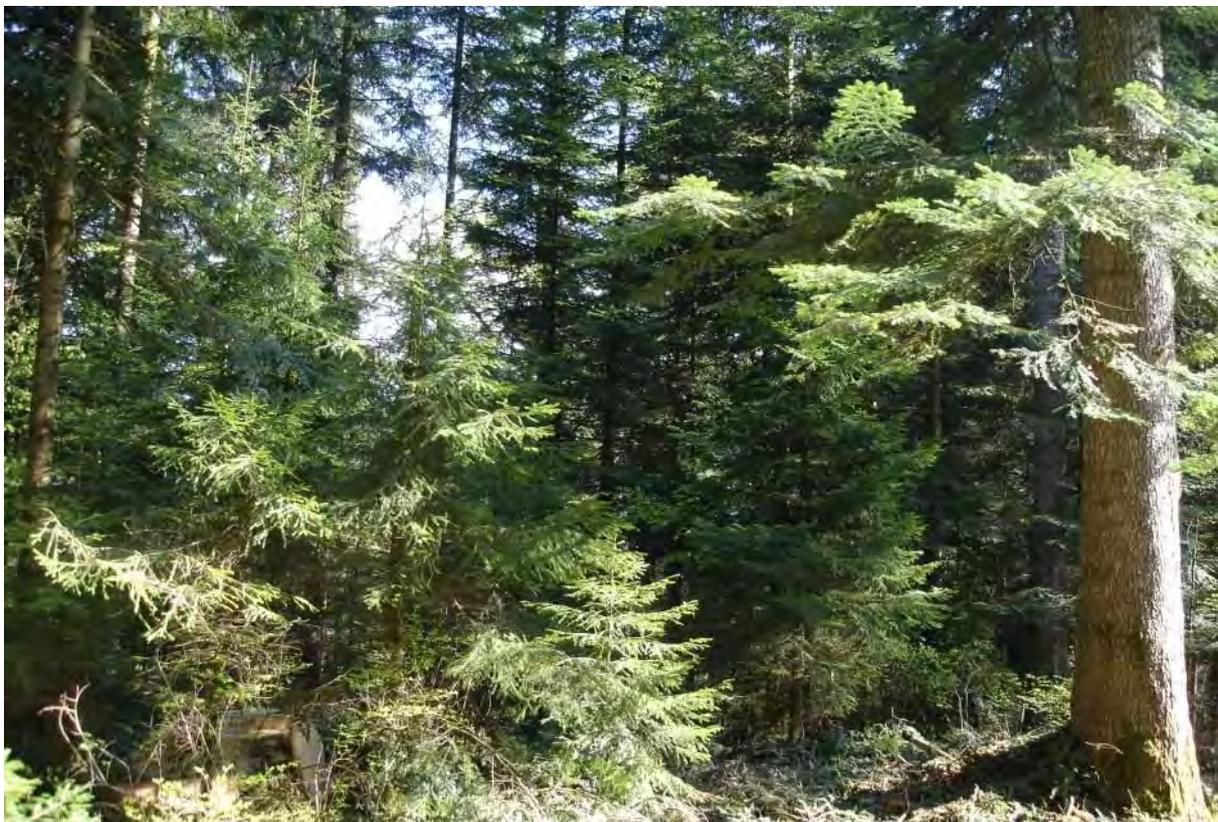


« A plenter forest represents an extraordinary condensation of all development stages of the other types of forest within a very small area. » \*

J.-Ph. Schütz, 1997

**A silver fir in Division 111 marked in 2008.** The reasons for marking this stem for felling were to:

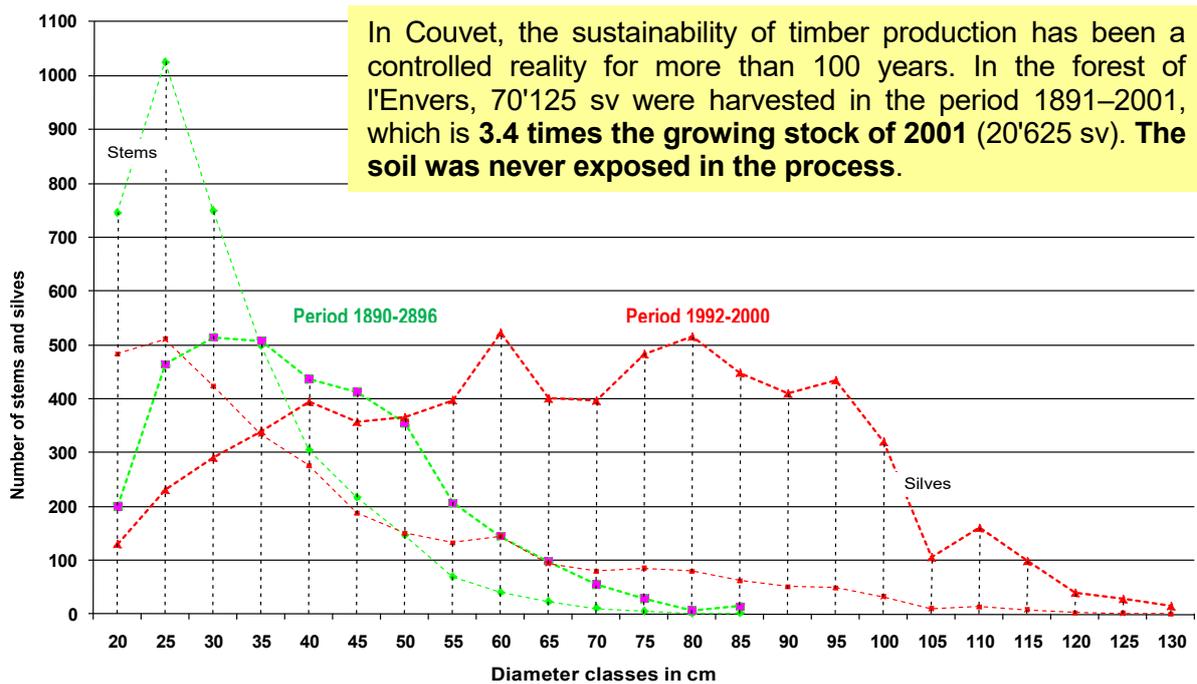
- **Harvest** a mature timber product;
- **Select** and promote neighboring crowns;
- **Release natural regeneration.**



**Spontaneous regeneration, which occurs constantly and continuously over the entire area, counterbalances harvesting.**

Couvet, Division 111, May 2009 immediately after harvesting.

## Timber harvesting



**Harvest:** number of stems and volume according to diameter classes. Couvet, Forest of l'Envers.

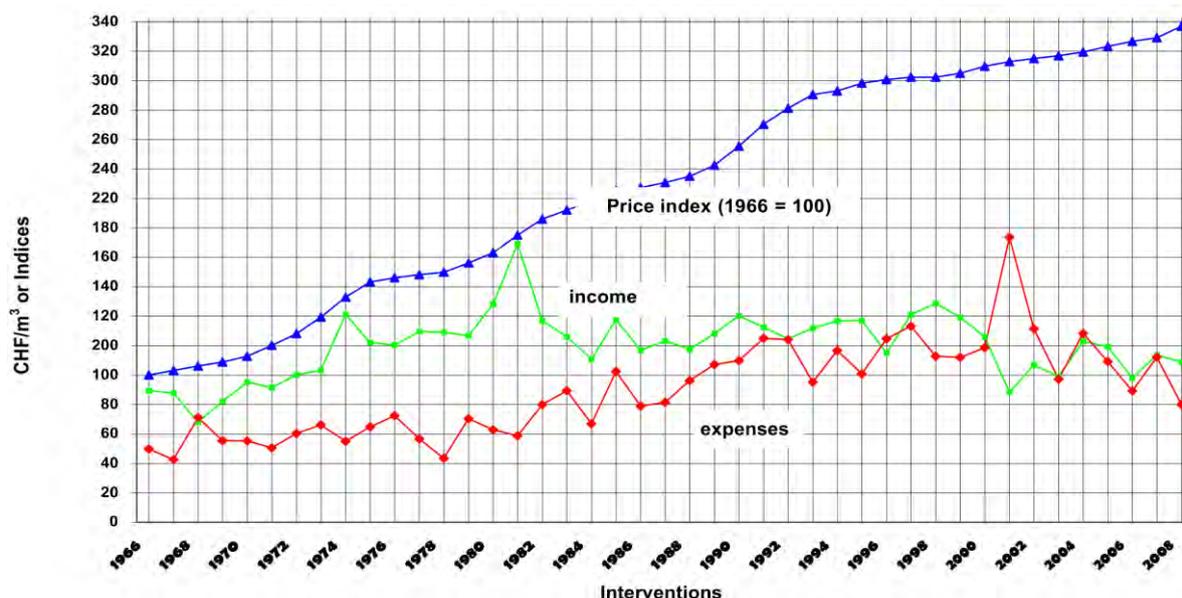
In the Forest of l'Envers 24'084 sv were harvested **within 35 years** (1974–2008), which corresponds to **the growing stock** of 1975 (24'661 sv). At the same time, the growing stock increased significantly from 365 to 381 sv / ha. This all took place amidst the absolute silence of the peaceful forest.



**Where trees are harvested, more light, warmth and rain reaches the soil, seeds germinate and the existing regeneration obtains the necessary energy to develop further.**

Couvet, Division 111, May 2009.

## Aspects financiers



### Development of the financial revenue in CHF pro m<sup>3</sup>.

The above graph shows the progressive worsening of the financial return of Couvet forests since 1981. This unfortunate development is the result of declining sales prices for wood products and the increase in spending as a result of rising labor costs in forestry.

In the last 20 years, from 1989 until 2008, the average net profit was:

	CHF/year	CHF/m <sup>3</sup>	CHF/ha
GROSS PROCEEDS	163'626.-	128.-	963.-
TOTAL EXPENSES	152'740.-	119.-	898.-
<b>NET PROFIT</b>	<b>10'886.-</b>	<b>9.-</b>	<b>64.-</b>

Area: 170 ha (Endroit + Envers).  
Harvest: 1'280 m<sup>3</sup>/year.

**Total value** of the services provided by the plenter forest of l'Envers in Couvet (78 ha), according to P. Alfter, 1998 and W. Ott & M. Baur, 2005.

		Value per year	per hectare	per head of population	
		[in 1000 CHF]	[CHF]	[CHF]	
<b>Goods</b>	Timber	<b>75</b> <sup>1)</sup>	960	27	
	Non-Timber	<b>5</b> <sup>1)</sup>	70	2	
<b>Services</b>	Environment	Protecting soil	<b>246</b> <sup>2)</sup>	3'160	89
		Reducing CO <sub>2</sub>	<b>70</b> <sup>2)</sup>	900	25
		Cleaning Air	<b>27</b> <sup>2)</sup>	350	10
		Protecting water	<b>15</b> <sup>2)</sup>	190	5
		Biodiversity	<b>3</b> <sup>2)</sup>		1
	Society	Recreation	<b>37</b> <sup>2)</sup>	470	13
	<b>Annual profit</b>		<b>479</b>	<b>6'140</b>	<b>172</b>

<sup>1</sup> Real market value

<sup>2</sup> Theoretical replacement value



The plenter forest combines respect for nature with an optimal productivity ... without counting the **significant values of the services that benefit society.**

Trees of all sizes grow within the same area with constant regeneration in time and in space. The appearance of the forest remains unchanged.

**The plenter forest is dependent on excellent loggers who are able to fell the largest stems next to the future trees safely.**

**Neuchâtel was the first Swiss canton to introduce an apprenticeship for loggers in 1926.**

Couvet, Division 106, May 2003.



**Timber is harvested throughout the whole stand. It requires not only highly skilled workers who love the forest, but also a very good network of forest roads.**

Couvet, Divisions 111 and 112, May 2009.



**Measurements in March 2005 of the biggest silver fir in Couvet:**

<b>Height:</b>	55.40 m
<b>Diameter:</b>	1.32 m (D.B.H., on 1.3 m)
<b>Circumference:</b>	4.15 m
<b>Age:</b>	approx. 260 years
<b>Volume:</b>	approx. 24 m <sup>3</sup>

The circumference of this venerable tree increased during the period 1992–2005 by 14 mm a year on average (mean annual diameter increment 4.6 mm).

Couvet, Division 113, May 2009.

## Another ... very strong ... giant



**A silent, incomprehensible power ...**

Couvet, Division 113, May 2009.

*« ... we only have a vague idea ... of all the slow, steady and persistent efforts that a tree embodies and of the patience it has shown in trying circumstances ... » \**

H. Biolley, 1901

## Henry Biolley, a legendary personality

A gentle approach to silviculture that produces harmony in the plenter forest requires excellent foresters. They have not only to be very competent but also to love their jobs. The forest of Couvet was managed by Henry Biolley from 1890, and was the first to benefit from careful and continuous stand treatment. This forest has the privilege of being regarded as the cradle of controlled selective-plentering<sup>4</sup>.

This silvicultural approach follows the principles of sustainable development at an early stage. It takes place in the context of a global vision promoting the quality of living together.



The forester Henry Biolley was the real promoter of the plenter forest and of a form of forest management that respects the laws and rhythms of nature. Appointed in 1880 as head of the forest district of Val-de-Travers, he put his beliefs into practice. Thanks to its results but also thanks to his remarkable personal qualities, his work has received international recognition and acclaim. His articles on the plenter forest and the control method<sup>5</sup>, have been translated into several languages, and are works that are still highly respected today.

Couvet, Division 113, May 2009.

## Special features

One disturbing phenomenon not only in the forest of Couvet but also in almost in all European forests are the overly high ungulate wildlife populations, i.e. the forest-game imbalance. Since the 1970s, young silver fir and sycamore have been excessively browsed by the large number of roe deer. This situation is worrying because it weakens the self-regulation system of the forest and thus weakens plentering. The legal principles for establishing a forest-game balance are available, but their practical implementation requires considerable expenditure. The Forest Service would have to inform and lobby the authorities, the public and the hunters.



**Young silver fir, repeatedly browsed by the game.**

The current excessively large roe deer population interferes with the natural regeneration of silver fir.

If this development is not stopped, the majestic structure of the forest of l'Envers may well be seriously affected.

Couvet, Division 112, May 2009.

## Picture gallery



**Within 100 years, 1000 cubic meters per hectare of timber were harvested. But the most important aspect is not what was harvested, but what remains.**

Couvet, Division 109, May 2009.



**An atmosphere of power, of perfection and of continuity. An enchanted forest...**

Couvet, Division 111, May 2009 immediately after harvesting.

*« The annual production of the forest cannot be used straightaway. The value increases with time, i.e. as trees with sufficiently large volumes accumulate. » \**

H. Biolley, 1901



**The greatest production possible of high quality wood, goods and well-being ... with a minimum of care.**

Couvet, Division 112, May 2009.

## Summary

In essence, a plenter forest involves a constant and continuously dynamic process. It is productive and aesthetically pleasing, representing a real manifestation of the principle of sustainability.

## For further reading ...

Biolley, H., 1901 : Le traitement naturel de la forêt. Bulletin de la société neuchâteloise des sciences naturelles. Tome XXIX-Année 1900-1901.

Trepp, W., 1974 : La forêt jardinée. Informations HESPA N°66, Lucerne.  
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Favre, L.-A., Fondation Sophie et Karl Binding, Bâle 1989 : L'évolution des forêts au Val-de-Travers – De l'exploitation abusive à la sylviculture naturelle.

Küchli, Ch., Chevalier, J., Chapuis, J.-B., 1992 : La Forêt Suisse. Ses racines, ses visages, son avenir. Edité à l'occasion du 150<sup>e</sup> anniversaire de la Société forestière suisse. Lausanne, Payot, 214 pages.

Favre, L.-A., 1992 : Forêts communales de Couvet – Guide d'excursion à l'intention des visiteurs professionnels – Sentiers didactiques forêt jardinée. (Ce texte technique peut être obtenu sur demande auprès du SFFN, section forêts - arrondissement du Val-de-Travers à Fleurier, ainsi qu'à l'Hôtel de Ville de Couvet.)

Ammon, W., 1995 : Das Plenterprinzip in der Waldwirtschaft: Folgerungen aus 40 Jahren schweizerischer Praxis. 4. Aufl. Bern: P. Haupt. 172 S.

Schütz, J.-Ph., 1997 : Sylviculture 2 : la gestion des forêts irrégulières et mélangées. PPUR presses polytechniques.

Alfter, P., 1998 : Recherche sur les biens et services non-bois de la forêt suisse. Quantification et essai de valorisation dans le cadre d'un projet de l'OFEFP. Schweiz. Z. Forstwes., 149, pp. 87-104.

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[www.ne.ch/fne](http://www.ne.ch/fne).

[www.prosilvaeurope.org](http://www.prosilvaeurope.org)

PRO SILVA HELVETICA is a Swiss foundation established in 1945 to promote plentering or a *multifunctional silviculture*<sup>6</sup>, while respecting the rhythms and laws of nature.

Founded by Walter Ammon, chief forester of the forest district of Wimmis (1906–1912) and Thun (1912–1944), PRO SILVA HELVETICA has not stopped investing its modest resources in promoting the ideas and benefits of this form of silviculture, with its great respect for nature.

We have published several portraits of plenter forests from all over Switzerland on the Internet to give students of forestry and the general public an opportunity to find out more about this fantastic approach to forest management and feel inspired by it. Plentering is a sound and modern approach, which respects the whole ecosystem and guarantees sustainability ... combining economics harmoniously with ecology.

PRO SILVA HELVETICA's bank account number is:

UBS Privatkonto CHF

**CH54 0024 2242 5000 3040 L**

Pro Silva Helvetica

We are very grateful for any support in developing the plenter idea.

A big thank you to all those who contributed to producing this portrait.

Cortailod, 4 May 2010

P. Junod, for the foundation PRO SILVA HELVETICA

Translation (in German): Andreas Zingg

Translation (in English): Silvia Dingwall

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<sup>1</sup> *Division*: In Canton Neuchâtel's forests the division is the unit of land to which all data collections refers (Inventory, increment calculation and timber harvesting).

<sup>2</sup> *Silviculture close-to-nature or near-natural* s.: Technique of forest management based on the laws of forest ecology, Taking into account the forests integrity, vitality and diversity, as well as its regeneration

<sup>3</sup> *Silve* [sv]: unit of measurement for the standing volume of a tree or a stand, calculated with a tariff.

<sup>4</sup> *Plentering*, French *Jardinage*: Note: ! This French term has no relation to horticulture; it is a technical term in forestry. The Larousse dictionary gives the following definition:

*Jardiner*, German *plentern*, [English *to plenter*]: Harvesting trees of a forest individually or in groups in such a way that the soil is exposed as little as possible and trees of all ages (mainly fir and spruce) can live side by side.

*Jardinage*, German *Plenterung*, [English: *plentering*]: activity to plenter a forest.

Specifically it refers to the silvicultural activity in a plenter forest, which combines the following silvicultural aspects in a treatment:

- Regeneration
- Regulation of the mixture
- Improvement of the structure
- Selection
- Education
- Harvest
- Sanitation cuts and forced felling.

<sup>5</sup> *Control method*: Method of permanent monitoring and silvicultural guidance on the basis of:

- Delimitation and maintenance of the Divisions
- Periodical inventories
- Increment calculations
- Definition of the allowable cut and the annual control of the harvest.

<sup>6</sup> *Multifunctional silviculture*: Silviculture, which aims to harvest of material and immaterial resources of the forest as efficiently as possible.