

# **Breakthrough or Snake Oil: Un dialogue de vignerons autour de la Biodynamie**

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### **Introduction**

This paper on Biodynamics is the result of an active dialogue with my good friend Dominique Lafon, winegrower in Meursault. He began employing biodynamic principles in 1995; at Domaine Ostertag, we began in 1997.

From the start, we thought it would be helpful to exchange views and compare our experiences on this topic which, while in vogue, is difficult to define as well as to discuss in a clear and objective way without the clouds of ideology or ulterior marketing motives creeping in.

We soon realized that each of us was developing his experience and views of biodynamics through the prism of his “terroir” – not only “terroir” in the sense of climate, soil and varietal, but also in the context of cultural heritage, personal preferences and the dreams and visions we each have.

As a result, it may be that our viticultural approaches vary from one “domaine” to the other. Nevertheless, in spirit and substance, Dominique Lafon and I maintain the shared conviction that biodynamics offers a finer, broader and at the end of the day more human approach to the awesome craft of “vigneron.” The following discussion is but one way to interpret biodynamics. It is the fruit of a mere five first years of implementation at Domaine Ostertag.

Diesem Vortrag über biologisch-dynamischen Weinbau ging ein Gespräch zwischen mir und meinem Freund Dominique Lafon, Winzer in Meursault, voraus. Dominique Lafon begann 1995 mit biologisch-dynamischem Weinbau, auf der Domaine Ostertag rüsteten wir 1997 um.

Es schien uns interessant, unsere Erfahrungen und Ansichten über ein Thema auszutauschen, das zwar topaktuell, aber oft schwierig zu erfassen und vor allem klar, objektiv und fern von jeder Ideologie oder jedem Marketing-Hintergedanken zu artikulieren ist.

Wir bemerkten sehr bald, dass wir jeder unsere eigenen Erfahrungen mit dem biologisch-dynamischen Weinbau auf Grund unseres jeweiligen Terroirs gemacht haben, wobei Terroir nicht nur im Sinn von Klima, Boden und Rebsorte, sondern auch im Sinn des jeweiligen kulturellen Erbes, der persönlichen Empfindsamkeit bzw. der Träume und Visionen, die jeder von uns hat, zu verstehen ist.

In der Folge kann man sagen, dass bestimmte Weinbaupraktiken bei dem einen oder anderen zwar leicht divergieren, dass aber im Grunde Dominique Lafon und ich, was das Wesentliche anlangt, der Überzeugung sind, dass der biologisch-dynamische Weinbau einen subtileren, vielseitigeren und letztendlich menschlicheren Zugang zu diesem wunderbaren Metier des Winzers gestattet. Der folgende Vortrag ist nur eine Möglichkeit, den biodynamischen Weinbau darzustellen; er ist das Ergebnis von (nur!) fünf Anfangsjahren Praxis auf der Domaine Ostertag.

## 1. Basic Principles of Biodynamic Agriculture

The biodynamic method is based on 8 lectures given by Rudolf Steiner in 1924 to a group of farmers, the contents of which are collected in a work entitled *Spiritual Foundations for the Renewal of Agriculture* (1924) – now the “bible” of biodynamic agriculture.

Rudolf Steiner is known first and foremost as the father of anthroposophy, a broad-based philosophy relating education, health and the arts. Near the end of his life and preoccupied by the degeneration of the quality of foodstuffs – which he imputed to the increasing use of chemical fertilizers – Steiner laid out the precepts of a healthier and more sustainable form of agriculture including concrete suggestions on ways to revitalise soil, to grow plants in harmony with natural and cosmic forces and, ultimately, to produce high quality food.

He was most concerned with the following subjects:

- The influence of the entire solar system on plant growth;
- The importance of composting animal and vegetal waste as fertilizing elements;
- The use of plant based preparations, in conjunction with compost, to stimulate beneficial humus development;
- The spreading of preparations such as Horn Manure on the ground
- The spraying of powdered compounds such as Horn Silica on foliage.

Biodynamic methods take into account a global vision of agriculture integrating the macroenvironment (earth, cosmos) and the microenvironment (flora, fauna) with the human proprietor at the centre.

While part of the larger organic agriculture movement, biodynamics follows its own prescribed regimens as laid out and certified by the DEMETER organization. These practices prohibit any synthetic or manufactured chemical treatments in favour of the use of specialized organic and mineral compounds (e.g. 500, 501 etc.) as well as cultural practices which take into account the natural rhythms of earth and cosmos.

Relative to the last point, an important tool is Maria Thun’s annual planting calendar which guides the timing of agricultural work. This calendar links the four elements of antiquity to individual organs of the plant – Earth to roots, Water to foliage, Air to flower, Fire to fruit and seeds – and divides the year into favourable periods as defined by the position of the moon, the constellations of the zodiac and the planets.

## 2. Biodynamic Practices at Domaine Ostertag

### *Background and motivation*

At Domaine Ostertag, the move to biodynamic farming was a natural, step-by-step evolution.

At age 20, I encountered some of Steiner's ideas during a trip to the Goethenaum in Dornach, Switzerland – home to the anthroposophic movement. At the time, I must honestly say, the ideas seemed obscure and esoteric. My first attempts to read Steiner's lectures were a complete failure; I didn't understand a thing and was never really engaged.

Meanwhile from 1980 to 1990 at Domaine Ostertag, we progressively moved away from fertilizers and defoliant. At first, we kept natural ground cover and later we re-started a more active ploughing regimen. Following this path, we became “organic” without fully realizing it or planning it that way.

Having visited frequently with Dominique Lafon, I also knew his vineyards well. Dominique began biodynamic farming in 1995 after seeing the results of similar practices employed by his neighbour, Anne Claude Leflaive. I must admit that the results were spectacular. I remember in particular an ancient Volnay Santenots vine, close to death and severely weakened by *court-noué*, that came back to life. It was very impressive. At that point, I became convinced that there was something to biodynamics. In 1997, I began trials on a 1.5 ha parcel. In 1998, we converted the entire Domaine to biodynamic farming.

#### *Principal practices and methods*

Biodynamic farming is a complex practice. Two compounds, however, form the base of the programme: Horn Manure (500) and Horn Silica (501)

#### **Compound 500: Horn Manure.**

Prepared from cow manure buried over the winter in the shell of a cow's horn, Compound 500 is used for soil treatments. It encourages microbial activity and the formation of humus, thereby stimulating root growth especially vertical growth. For a vineyard, this vertical growth helps establish the plant more firmly in its native soil or “terroir.”

Dosage: 120 g/ha in solution spread on the basis of 40 l/ha (3g/l). The solution must be activated (see below) for one hour and be spread no later than 4 hours thereafter.

#### **Compound 501: Horn Silica.**

Prepared from finely ground silica buried from early summer to late autumn in the shell of a cow's horn, Compound 501 is used on the plant itself. This compound reinforces photosynthesis, balances vigour and improves the taste and aroma of the fruit. Up to 3 applications are made in spring before flowering on specified days and only from sunrise to 8:00 GMT. After harvest, compound 501 may be applied to green leaves in the morning and coloured leaves in the afternoon.

Dosage: 4g/ha in a solution spread on the basis of 40 l/ha (0.1g/ha). The solution must be activated (see below) for one hour and be spread no later than 3 hours thereafter.

#### **Dynamisation/Activation**

The effectiveness of the biodynamic treatments noted above rests on the principle of water's “memory” and its ability to transmit information or impulses to living systems –

much as homeopathy does – in the form of highly diluted solutions. As such, these solutions require activation or dynamisation. Several scientific research papers have been given on this subject, most notably by Jacques Benveniste (highly diluted solutions) in France and Dr. Lorenzen (micro-cluster water) in the United States. To activate solutions, we use a “dynamiseur” consisting of a small tank with rotating paddles which turn in alternating directions. At each change of direction, the active ingredients are whirled into a “chaos” which oxygenates and activates them.

### **Compost**

Compost is another fundamental element in biodynamic agriculture since carefully attended humus is central to sustainability of soils. Biodynamic compost ensues from the fermentation of vegetal and animal waste (manure) which has been augmented with six specific preparations (valerian, dandelion, oak bark, nettles, yarrow, and camomile). Compost production begins ideally in the spring and the compost, itself, is spread in November at a rate of approximately 3-5 tons/ha.

### **Other Compounds**

- *Maria Thun's manure compost (MT)* aids and promotes decomposition and the formation of argilo-humic compounds. MT is applied in autumn and winter – 240gr/ha – after 20 minutes of activation. MT retains its effectiveness for 3 days.
- *500 Urticae* for weak vines and low vigour situations is composed of fresh nettles macerated 24 hours in water brought to a boil. Spread at a rate of 120-480 g/ha after one hour of activation

### **Diseases and Pests**

- *Fungal diseases.* Our strategy combines rapid and frequent applications of weak concentrations of active materials with preventive application of organic “teas” (see below). For mildew, we use copper (copper hydroxide or Bordeaux mixture). For *oidium*, we use sulphur in either powder or spray applications.
- *Pests.* In Alsace the only significant worry is various caterpillars (*cochylis*, *eudemis*, *eulia*). Our strategy is based on BT (*Bacillus Thuringiensis*); a bacterial parasite which produces a protein that disrupts the pest's digestive system. We spray the protein upon the observation of the larval hatch.

For other animal parasites, the biodynamic approach involves spraying a highly diluted solution (10 parts per thousand million) of the ashes of the pest – obtained by incinerating the animal. Both the incineration and the spraying are best done on favourable days in the cosmic calendar.

- *Teas.* Biodynamic agriculture uses a number of plant based teas. In viticulture the most frequently used are:
  - a. \*Nettle Tea: regulates and stimulates growth and provides a preventive treatment against mildew. 1kg/ha infused for 20 minutes.

- b. \*Horsetail tea: preventive treatment against mildew and other fungal diseases especially near the full moon. 100 gr. dried plant material/ha infused in 5 l of water under low heat and then diluted into 50 l.

### **Soil maintenance**

We work 2/3 of each parcel, in other words 1 out of every 2 rows plus the earth between the vines. We deep till in autumn and break up the surface soil again in spring followed by a few maintenance passes of the tractor until mid-July. The unworked row has a cover crop of grass which we mow regularly in spring and summer.

### **Training and trellising**

Human hands play a big role in the vineyard. Suckering, debudding and canopy management are all done manually. We train on raised wires, including several passes to monitor the canes. We wait as long as possible before trimming and topping, and sometimes skip these steps since we look for low vigour.

### *Planning and organisation*

### **Human resources and equipment needs**

Biodynamic agriculture involves a different approach to vineyard work; each worker must have a much higher level of personal engagement and responsibility. Keen observation and attention to the health and condition of each vine is essential in anticipating and preventing problems. Our approach also requires a rigorous amount of planning to attempt to coordinate in advance with the planetary calendar. In addition to conventional tractors and soil working attachments, the only specialised equipment required are a “dynamiseur”, a hand carried spray rig for compounds 500 and MT and a mechanical sprayer for compound 501. The real investment is in human resources, since biodynamic agriculture requires more personnel with a higher level of training than conventional approaches.

### **Annual calendar**

#### Winter

- Pruning (beginning in January)
- “Eau d’enduit” (eutypa prevention)
- Maria Thun’s manure compost

#### Spring

- Soil preparation
- Horn Manure
- Horn Silica
- Preventive treatments (mildew, *oidium*, parasites)
- Training and trellising (suckering, canopy formation)

#### Summer

- Antifungal and antiparasite treatments
- Training and trellising (canopy management, leaf pulling, trimming)
- Soil management

Autumn

Harvest

Horn Silica

Disking

Compost additions

### **3. Initial Results – The first years**

*Our observations*

#### **On ourselves**

Most notably, biodynamics has required us to evolve and refine our attention to the vineyard. It opened our eyes to subtleties and details we had not noticed previously. Today we are both more aware and more vigilant. First and foremost biodynamic agriculture has changed us.

#### **On the soil**

Soil structure has improved and floral diversity has increased – evidence of an improved biotope. We have also become more conscious of the impact our tractors and machines have on soil density. Excessive compacting suffocates root systems and inhibits plant growth. We have re-thought our approach to the number of tractor passes.

#### **On the vine**

Our vines seem more balanced. Growth is more vertical (toward the light) and the leaf and canopy structure more uniform; each of which has improved photosynthesis and aeration. The growth cycle also appears to have improved. Bud break is often later than for conventionally farmed vines, but “aoutement” starts a week earlier and we often don’t need to consider topping.

#### **On yields and maturity**

Dominique Lafon noted a revitalisation of his old vines which has translated into better yields and quality. At Domaine Ostertag we have observed an increase in alcohol degrees (+0.5 to 1.0) without modifying our harvest dates and without reduction in yield.

*Limitations and risks*

#### **Diseases**

Both fungal disease and parasites are a constant concern, especially given the fragmentation of parcels and proximity to neighbouring parcels employing more conventional techniques – and therefore often more prone to pests and diseases. For example, we are now battling a more resistant form of *oidium* which may be the result of ill-considered overuse of IBS by our neighbours.

## **Copper**

Excessive use of copper for mildew treatment may be toxic to healthy soil life. A limitation of 4kg/ha per year – if taken on the basis of a five-year moving average – seems reasonable. Over the last five years we have used the following amounts of copper:

1998	3.0kg/ha over 9 treatments
1999	7.9kg/ha over 12 treatments
2000	1.4kg/ha over 10 treatments
2001	3.5kg/ha over 10 treatments

These quantities average to 3.95kg/ha over the last four years, putting us well below the European Union's organic agriculture thresholds of 6kg/ha per year beginning in 2006 and today's limit of 8kg/ha per year.

## **Abuses and limitations**

Without sufficient forethought, biodynamic agriculture can have negative influences on plant life. For example, too much 501 can hinder vine development. Similarly, overuse of nettle tea or of 500 can lead to excessive vigour and its ensuing complications.

Biodynamic farming must be approached on a parcel by parcel basis. There are no universal recipes; instead biodynamics involves a constant taking of risks and responsibilities. The farmer must be prepared to adapt quickly to changing circumstances.

## **Break-even points**

Biodynamic agriculture requires high levels of attention and of human involvement. As such it can be considered a “luxury” or high-end form of viticulture with a break-even cost that should be carefully analysed by its practitioners. It also can put high physical and mental demands on the “domaine” owner who should therefore consider his or her own personal break-even analysis in terms of stress tolerance. After all, harmony and good working conditions must be considered.

## *Overall assessment*

Biodynamic agriculture reinforces the influence of “terroir” by stimulating deeper root growth and improving the vine's capacity for assimilating the energy of its surroundings. The global approach required by biodynamics increases the vitality of the biotope and stimulates the vine's immune system and, therefore, places it in a position of renewed independence. In contrast, traditional agriculture creates a form of chemical dependence which displaces the vine from its “terroir”. Put another way, biodynamic agriculture optimises the potential of each vine without outside influences, thereby promoting its most natural yield.

Finally, biodynamic farming promotes a more “artistic” approach centred on man and not on industrial notions of economic profit and loss. This approach helps to develop the intuition and sensitivity that are essential to the crafting of a great wine. Moreover,

biodynamics reconnects thinking and spirit to action, allowing all persons working the vine to become primary players who take conscious pride in their work.

#### **4. Conclusion**

Biodynamic agriculture is not a commercial or marketing act; it is a new approach to life which centers on respect for the living. It is the approach of a winegrower who is most conscious of his environment and has a strong desire to take the concept of “terroir” to its limits while ensuring its sustainability.

In future years it would be interesting to explore further the digestive properties of biodynamic wines, for we should not forget that food quality was one of Steiner’s primary motivations. Similarly, we still need to demonstrate more conclusively that “biodynamic quality” exists on an organoleptic level.

Whatever the case, it is certain that biodynamic thinking has opened the floodgates to reconsidering current practices and to questioning how we think about viticulture.

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