Biodynamics in the Wine Bottle

Is supernaturalism becoming the new worldwide fad in winemaking? Here is an examination of the biodynamic phenomenon, its origins, and its purported efficacy.

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Have you visited a wine store recently? Something strange is afoot. The new fad in the vineyards is a practice called "biodynamic (BD) farming": it's big and getting noticed in the bottle. Newspaper ads now extol biodynamically grown wine next to organic wines for sale in stores. Trade and industry groups organize tastings of exclusively biodynamic wines. And dozens of wineries around the world have been certified biodynamic by the umbrella "Demeter" certification bodies. These include famous names such as France's Zind-Humbrecht, Domaine Leroy, Coulée de Serrant, Château La Tour Figeac, Domaine Huët, and Chapoutier, as well as California's Benziger and Fetzer. Indeed, according to the most complete published account of the practice so far, "Over 10 percent of France's certified organic vineyard area is now Biodynamic" (Waldin 2004, p. 111).

In addition, two of the world's most influential wine writers, Robert Parker and Jancis Robinson, have weighed in in favor of these wines.[1] Although both should be held in the highest regard for their integrity and knowledge of wine, without doubt, neither of them is in any way an expert on the biodynamic movement. They have, at times, expressed the desire to remain neutral. But, at other times, they show themselves all too ready to accept its pretensions.

Parker, arguably the most powerful and influential wine critic alive today, is a man whose yearly reviews help set the prices of each Bordeaux vintage. In his most recent book, he refers with clear affection to wineries that utilize biodynamic practices. For example, he extols Catherine and Sophie Armenier, owners of a Rhône Domaine, as "following the astrological/homeopathic writings of the famed German professor Rudolf Steiner" (Parker 2005, p. 380). In this context, it is perhaps no surprise that Parker has also publicly declared that he is himself applying biodynamic methods to part of the Beaux-Frères vineyard in Oregon that he owns along with his brother-in-law.[2]

England's Robinson is one of the leading wine essayist of her generation. She is one of the few Masters of Wine in the world, with an armful of publication credits including the *Oxford Companion to Wine* and the *World Atlas of Wine*, dozens of awards, and hundreds of articles. She also has published claims that BD works (Robinson 2005).[3] Confronted with a skeptical rejoinder, she responded, "If producers are happy with, if mystified by, the results—why not let them continue? Perhaps you could explain what harm they do."[4]

Biodynamic winemaker Nicolas Joly holds a glass of "Clos de la Coulee de Serrant" January 17, 2006, as he stands beside a 16th-century wine press in Savennieres in the Anjou region of western France. Joly is seen as the patron saint of biodynamic winemaking. Photo credit: Frank Perry/AFP/Getty Images) [Photo via Newscom]

She asks a fair question. To start with, what exactly is biodynamics? It is a method of organic agriculture admixed with some odd extras. These additional methods include taking into account cycles of the moon and relative positions of the zodiacal constellations when farming, as well as applying different sorts of homeopathic or esoteric "preparations" to the vineyard soil. These and other similar pretensions are set against a complex background cosmogony that makes the whole process not unlike a quasi-religious movement.

Steiner's Fancies

Biodynamics began with a series of lectures in June of 1924 by the Austrian occult philosopher Rudolf Steiner. Steiner had a vitalist vision of the universe in which "ethereal" qualities infuse raw matter in order to give it life; this distinguishes living things from mere amalgamations of chemicals, however complex. The potential conflict with modern biochemistry should be clear. At any rate, he saw his program reintroducing "spiritual" elements into farming. Indeed, his ideas were to create an entire crank "Spiritual Science" that would illuminate the connections between such spiritual properties as the "ethereal" or the "astral" and chemical elements like oxygen, sulphur, carbon, and nitrogen.[5] For example, "the ethereal moves with the help of sulphur

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along paths of oxygen," (Steiner 2004, p. 46). Needless to say, no experimentation was done to discover these "facts." Throughout, Steiner used his favored methodology: armchair philosophizing and guesswork, which in his case he considered quite literally clairvoyant.

His agricultural lectures included a number of concrete suggestions for so-called preparations to be added to the field or compost, many done with one eye on the astrological star-charts. According to the present-day Demeter certification bodies, a farm can be labeled biodynamic simply by virtue of being organic and adding the preparations in sufficient quantities (Waldin 2004, p. 73). Hence, it would be good to return to the original treatise to investigate the preparations, and their accompanying justification, to see what they are and why they are prescribed.

Steiner's agricultural lectures are, to put it mildly, not an easy read. They are marked by clear falsehoods, digressions, and odd fantasies. He recommends such techniques as combating parasites "by means of concentration, or the like" (Steiner 2004, p. 84). He says that certain insect pests are spontaneously created by "cosmic influences" (p. 115) and that eating potatoes "is one of the factors that have made men and animals materialistic" (p. 149). He tells us, "most of our illnesses arise" when our "astral body" is "connected more intensely with the physical (or with any one of its organs) than it should normally be" (pp. 116–17). In contrast, "in the true sense of the word a plant cannot be diseased"; plants only appear to be diseased when "Moon-influences in the soil . . . become too strong" (pp. 117–18). He also describes baroque fantasies of a human history that spanned "epochs . . . on the earth when such things were known and applied in the widest sense"[6] (p. 120). And on and on, *ad nauseam*. It is good to keep this material in the back of our minds when considering his forays into agriculture.

Steiner proposes his "preparations" in lectures four and five: various small constructions to be added to the field or compost at various times of the year, such as the burial of a cow's horn filled with manure (now called Preparation 500) or filled with powdered quartz (Preparation 501), burial of yarrow flowers in a stag's bladder (502), chamomile in a cow's intestine (503), oak bark in the skull of a domestic animal (505), or dandelions in a "bovine mesentery" (506) (Steiner 2004, pp. 72–99).

Adding the preparations can be a labor-intensive process, especially since some preparations must be done in quantity, depending on the size of one's fields. Farmers may well wonder: why go to all the effort? What sort of justification does Steiner provide? Let us take the case of Preparation 502. Yarrow is used because, "Its homeopathic sulphur-content . . . enables the yarrow to ray out its influences to a greater distance and through large masses." As for why we should put it in a stag's bladder, Steiner gets to the heart of his discussion here:

> The bladder of the stag is connected . . . with the forces of the Cosmos. Nay, it is almost the image of the Cosmos. We thereby give the yarrow the power quite essentially to enhance the forces it already possesses, to combine the sulphur with the other substances. (Steiner 2004, p.93)

Why the concern about sulphur in particular? We are expected to remember that "the ethereal moves with the help of sulphur along paths of oxygen" and the like. In other words, sulphur is a key ingredient for receipt of ethereal forces. Or so the story goes. But, at any rate, we don't need to test the reader's patience with a complete exegesis to make clear that Steiner has given no justification whatever for this practice. Indeed, Preparation 502 is actually one of the better examples, since many of his others are simply stated without the slightest attempt at explication or justification. But it is all of a piece: in the preface to the book of agricultural lectures, written by one of Steiner's pupils, we find the surprising claim that "In 1923 Rudolf Steiner described for the first time how to make the bio-dynamic compost preparations, simply giving the recipe without any sort of explanation—just 'do this and then that'" (p. 5). Apparently the explanations, such as they were, came later.

If these "preparations" are intended to fertilize the soil, other suggested biodynamic rituals are meant to rid the fields of pests and diseases. For weeds, insects, and rodent pests Steiner suggests the practice now referred to as "ashing." Let us say we have a biodynamic farm and are plagued with field mice. Steiner directs us to "catch a fairly young mouse and skin it . . . at a time when Venus is in the sign of Scorpio" (p. 113). Then we are told to burn the skin and scatter the ash over our fields. Steiner assures us that "Henceforth, your mice will avoid the field." Insects and weeds are treated in similar fashion, except that one does not need to skin (shell?) the insect: only "where there is spinal marrow, you must first skin the animal," he sagely tells us (p. 121). Steiner doesn't ever clarify what the spinal marrow has to do with anything.

To rid biodynamic fields of plant diseases such as rot and mildew (or, since Steiner does not believe plants can be diseased, to rid them of his so-called Moon influence), Steiner suggests "a homeopathic dose" of horse tail (equisetum arvense) infused into water, diluted, and sprayed over the fields (p. 118).

With this list of practices, best described as rituals of a sort of agricultural voodoo, we are at the heart of biodynamics. For although they have been extended a bit by more modern believers, the practices still retain much of the flavor that Steiner intended. We encounter the same esoteric rituals intermixed with homeopathic dilutions and astrology when reading present-day accounts of biodynamics (Waldin 2004, Joly 1999, and Thun 2000). Indeed, if anything, biodynamic practices have gotten even more esoteric. Now we can also read about using "standing stones" to do "geo-acupuncture" in order to "restore the cosmo-telluric balance" of a vineyard, directed by "a specialist with the aid of a pendulum" (Chapoutier 2006).

It is perhaps superfluous to go through the arguments contradicting the effectiveness of such practices as homeopathy, astrology, or manipulations of esoteric energy fields. They have been debunked many times long before now. However, it does at least bear repeating that homeopathic doses are generally diluted by water until not a single molecule of the original material persists in solution. In other words, a "homeopathic dose" is most likely nothing but water. Although originally suggested as a cure for disease, extensive testing has shown that homeopathic cures perform no better than a placebo in humans (Ernst 2002 and Shang et al. 2005). And, while water may be of some obvious

benefit to plants, it is unlikely to provide much of a cure for rot and mildew, Moon influence or no.

Research Findings

In reviewing the founding documents of biodynamics, one is not particularly reassured as to its bona fides. Biodynamics was not developed from any sort of trial-and-error experimentation or expert guidance. Indeed, the theory is barely comprehensible, relying as it does on a variety of strange, clearly false, and anti-scientific claims. However, even so, the practice might work. The only way to know for sure is to do the actual research. Fortunately, such research has been carried out at a number of universities and laboratories around the world. Unfortunately, much of it is sloppily done, and published in not particularly well-regarded or even peer-reviewed journals.

Also unfortunately, many of the studies contrast biodynamic agricultural practices with standard, nonorganic agriculture. They go on to show that biodynamic agriculture does better than standard agriculture on some measures of soil fertility or biodiversity. These experiments prove nothing, since, as we have already seen, biodynamic agriculture must at least be organic. And it is uncontroversial that organic agriculture (shunning powerful artificial fungicides, pesticides, and herbicides) yields higher soil fertility and biodiversity than conventional agriculture.[7] What we need is a clear comparison of biodynamic and organic agriculture.

Such a test was carried out by a Swiss group, in one of the most famous biodynamic studies ever performed (Mäder et al. 2002). This was a twenty-one-year study in which biodynamic agriculture appeared to edge out even organic agriculture on a small number of measures of soil fertility and biodiversity. However, the study was not without its problems: buried in the supplementary material—available online but not in the paper itself—are a number of caveats. Certain chemical treatments were added to the organic farms that were not added to the biodynamic ones. And these were only the "main differences." We aren't told what the other differences might have been. So the test appears to have been poorly designed. It does not provide us with any principled answer as to whether the biodynamic treatments were truly effective, or, rather, whether the chemical additives (or something else that wasn't deemed a "main difference") caused the organic plots to perform somewhat more poorly. The article was also criticized by one University of California at Davis microbiologist because it "looks at an 'incredibly narrow' range of ecological niches," raising the question of whether they were cherry-picked to yield the desired result (Stokstad 2002).

Lynne Carpenter-Boggs and her thesis advisor, John Reganold, both at Washington State University, have done what is perhaps the most highly regarded scientific work on biodynamics. Reganold is a sometime biodynamic consultant to the California wine industry as well as a researcher on the subject. However, even he and his former student have been unable to unearth any real differences between organic and biodynamic practices. Indeed, Carpenter-Boggs has researched precisely the question of whether composts with biodynamic preparations improve soils to which they are added. The results? "No differences were found between soils fertilized with biodynamic vs. nonbiodynamic compost" (Carpenter-Boggs 2000).[8] Reganold has said as much in a 2003 interview: research "didn't distinguish biodynamic from organic" (Darlington 2003). It could hardly be clearer.

What harm does it do if a farmer or winemaker follows such practices? The easy answer is that it is a waste of time, money, and effort.

A six-year study from the Washington State lab in 2005 was the first published in a peer-reviewed journal comparing biodynamic and organic agriculture with respect to wine grapes in particular. They found nothing. "No consistent significant differences were found between the biodynamically treated and untreated plots for any of the physical, chemical, or biological parameters tested" (Reeve et al. 2005, p. 371). Further, when they looked at the grape vines, "Analysis of leaves showed no differences between treatments. . . . There were no differences in yield, cluster count, cluster weight, and berry weight" (p. 373).[9] So, careful research demonstrates that the labor-intensive biodynamic "preparations" are simply ineffective. Yet, according to the biodynamic certification body itself, they are the heart of the practice.

One may well ask whether a properly controlled test has been done to compare biodynamic versus nonbiodynamic wines themselves. However, it will not suffice to simply pull bottles off the shelf of each sort and put them into a lineup. There are too many variables between different finished wines. Even neighboring wineries may have quite different soil and subsoil, different microclimates, and use different farming techniques in the vineyards such as vine training, leaf pulling, and so on. Different winemakers will also tend to use different techniques to process their grapes into wine and store them in different manners, for example in different kinds of barrels or stainless steel, and so on. As a result, any such test would have to be done very carefully, being sure that the soils, grapes, and wines tested were equivalent in all other controllable respects except for the additional biodynamic preparations and techniques. This would, out of necessity, consist of a test between wines produced from organically farmed grapes.

What Harm?

To return to the question posed earlier—what harm does it do if a farmer or winemaker follows such practices? The easy answer is that it is a waste of time, money, and effort. Indeed, one reason that biodynamics has caught on in the wine industry, and

practically nowhere else, is that wine is perhaps the agricultural product with the largest sales markup. Most agricultural products are commodities that roughly sell at their price of production. However, if a winemaker can convince the public that the wine he or she makes is some of the best stuff out there, he or she can charge upwards of $50 or $100 for a bottle of what is, in essence, fermented grape juice. Such a markup can pay for the onerous biodynamic overhead of labor, assuming that the marketing is done properly. But, still and all, it appears to be wasted effort, and those who persist in it appear more and more as New Age acolytes.

That said, our critical attitude toward the esoteric aspects of biodynamics does not interfere with our appreciation of many of its wines. Many biodynamic winemakers are indeed talented. The problem resides in the extension of disbelief in empirical technique, and in substituting for it beliefs in unscientific practices like astrology and homeopathy, as well as voodoo-style rituals and even "geo-acupuncture." We must confront this problem, not just as wine lovers and wine writers, but also as citizens who do not wish to live in, nor present to our children, a society in which pseudoscience and esoteric fantasies are considered reality. Irrational thinking, or reliance on mystical gurus with claims of clairvoyant intuition, does great harm to society. The best research studies to date have not found any distinction between biodynamics and the organic agriculture of which it is a part. The esoterica, it seems, add nothing. And we, as supporters of clarity and rationalism, are dismayed by the disconnect between belief and research. Our hope is that one day, under the clear light of understanding, better-grounded winemakers will dispense with biodynamics for good. Let us raise a glass to reason, and to that day.

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Notes

1. In fact, three have. Matt Kramer has also recently written in favor of biodynamics in his regular column for *Wine Spectator* magazine, the largest circulation wine publication in the world. (See Kramer 2006:42).

2. Available at http://dat.erobertparker.com/bboard/showthread.php?t=62593&page=2. Parker does not like to mention his vineyard in public to reduce any appearance of conflict of interest. In this case, he resorts to coy punctuation symbols. Note that the standard abbreviation for biodynamics is "BD." "We [who] use BD on a part of @%^&# with the balance farmed organically . . . tend to agree with those who argue that it is not some clever marketing tool but rather a farmer's quest for producing better and healthier fruit and hopefully better wine . . . many top estates in the world actually operate their vineyards in similar fashion but just don't get too carried away in boasting about it. . . ."

3. The article, written for a publication in Spain, includes such claims as: "they have determined that biodynamics 'works,'" "these practices . . . procure excellent enological results."

4. E-mail communication, December 24, 2005. A similar rejoinder was made by Robert Carroll of the *Skeptic's Dictionary* when asked for help in confronting biodynamic practices, on May 2, 2000. See http://skepdic.com/comments/mooncom.html: "Frankly, if they make good wine, I don't care if they use astrology or consult James Van Praagh for advice."

5. Steiner's attempts at creating a "Spiritual Science" should remind some of us of the excesses displayed in the recent intelligent design (ID) controversy. E.g., "It is ID's project to change the ground rules of science to include the supernatural" (Kitzmiller 2005:30).

6. Steiner actually constructed an entire historical fantasy of early humanity, including the so-called Atlantean and Lemurian races, and an account of the division into the sexes. (According to Steiner, humanity began as a sexless species.) Material from this history was supposedly secret and channeled "on the basis of direct spiritual perception" which he considered more reliable than "historical documentation" or "external evidence" (Steiner 1959). See, e.g., http://wn.rsarchive.org/Books/GA011/CM/GA011_c02.html.

7. There is also a side issue as to whether it is possible for a conventional farm to use artificial treatments judiciously enough that it could be indistinguishable from organic on all the same measures.

8. Carpenter-Boggs also wrote: "These data support earlier findings that organic fertilization rapidly benefits microbial biomass and activity, but provide few indications that the biodynamic compost and field sprays [that is, the 'preparations'] further affect soil microbial mass, community structure, or activity in the long term."

9. Their group actually went to some trouble to find variables in which the biodynamic grapes came out ahead. For example, they claimed to find evidence that the nonbiodynamic grapes were "overcropped" (producing too much fruit). Their choice of citation for this data is a highly questionable and nonpeer-reviewed Web page; other peer-reviewed documents fail to support their contention that a yield to pruning weight of 5:1 to 6:1 is appropriate. (See, e.g., Moulton et al. 2005, p. 11.) At any rate, they do in the final analysis conclude that "The differences observed were small and of doubtful practical significance" (Reeve et al., 2005:374).

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