

Interview

This man says he can eliminate your Pierce's Disease...

by [Mick Winter](#)

Aug 2000 Issue of Wine Business Monthly

In this issue, we've done something unusual for WBM. We've published a very long interview with the head of one particular company whose vineyard management methods are controversial. Agri-Synthesis, Inc. claims that it can help growers eliminate the problem of Pierce's Disease and the glassy-winged sharpshooter. In a climate where there is near-unanimity that there is no cure for Pierce's Disease, this verges on heresy.

But Pierce's Disease and the GWSS represent what many feel is the greatest crisis California's wine industry has ever faced. All possibilities, no matter how slim, of dealing with this problem must be carefully examined. If some viticulturists have discovered through their own direct experience that certain techniques are effective, we believe it is our responsibility to report on them, no matter how unconventional these techniques might seem.

We hope you agree and find the information stimulating, challenging, and worthy of further research and experimentation.

California winegrape growers barely had time to enjoy the luxury of post-Phylloxera battle fatigue before they prepared to take on the next vineyard foe--Pierce's Disease and its own Typhoid Mary, the Glassy Winged Sharpshooter. And as if that weren't enough, there's always Eutypa, leaf roll, and a host of other diseases and insects ready to attack their vines, their wines and their profits, should they drop their guard for even a few moments.

The traditional response has been to counterattack with chemicals. This ongoing, take-no-prisoners viticultural battle is based on the belief that disease and insects are forces that must be destroyed. But is there a better way to approach the problem.



Greg Willis

Greg Willis, founder of the Napa-based company **Agri-Synthesis, Inc.**, says there is. "We can cure any insect, disease, yield or quality problem on any crop, anywhere."

That's what we read when we encountered the Agri-Synthesis web page. Agri-Synthesis says it is a "farm and vineyard management company devoted to using the latest Biodynamic preparations and techniques to maximize production and eliminate plant disease."

Any disease? Everyone knows there's no cure yet for Pierce's Disease. State and federal governments have allocated millions of dollars to deal with the problem. Physical inspection of incoming plants is being used to try to control migration of the GWSS, quarantines are being discussed, and in some counties ground spraying has begun. Aerial spraying has not been written out, although the environmental backlash could be politically disastrous to the industry. Environmental groups are much more litigiously skilled now than they were in California's Medfly days of the 1970s.

Actually Agri-Synthesis does not exactly claim to have cures. They just claim they can get rid of the problems. Which should be sufficient for most growers. And they do it with techniques based on a different philosophy than the chemical-based adversarial warfare most farming has engaged in over the past 100 years.

Greg Willis started Agri-Synthesis in 1994. Willis is a former Hospital Administrator, a college biology major with a masters degree in health care administration. Although he is not a viticulturist or agronomist, he has had a lifetime interest in gardening, has been studying plants and horticulture for 35 years, and is the author of a number of books on gardening. Already a recognized expert in organic gardening, he discovered Rudolph Steiner's Biodynamic theories and techniques in 1980 and began looking for places to apply them.

Willis says he chose viticulture as his initial target for three reasons: It was the area of agriculture most concerned with quality; it had excellent financial potential; and in 130 years no one had cured a single viticultural disease.

Says Willis: "Somebody asked Steiner what Biodynamics would have been able to do back in the 1880's for the vineyards in France if they had used his methods, and he said the Phylloxera problem would have been solved--instantly. And I thought--'Wow!' I'd studied a lot of Steiner at that point, and I knew that if Steiner had said that, there must be something to it, because I'd already tried very hard to prove Steiner wrong on other things and had never been able to."

Austrian philosopher Ru-dolph Steiner is still a subject of controversy more than 70 years after his death. His system of Waldorf Education is highly regarded by many educators (and found lacking by others), and Waldorf schools have been established around the world. His agricultural theory, Biodynamics, is used on millions of acres throughout the world, particularly in Europe, Australia and New Zealand.

Proponents of Biodynamic winemaking include renowned French wineries such as the Rhône Valley's **House of Chapoutier**, Burgundy's **Domaine Leflaive** and **Domaine de la Romanée-Conti**, and the Loire Valley's well-known Biodynamic advocate and author, **Nicolas Joly**. In California, **Jim Fetzer**, former president of **Fetzer Vineyards**, has over 150 Biodynamic acres of grapes, and **Frey Vineyards** is totally Biodynamic, as is **Oregon's Cooper Mountain Vineyards**.

Rudolph Steiner never actually cured Phylloxera because he died before he had a chance to put the theories into practice that he had presented in his 1924 agriculture lectures. But his ideas have survived and been experimented with by re-searchers ever since.

Willis is one of those researchers. He says he came up with the preparations and techniques necessary to deal with Phylloxera. "We cured vines of Phylloxera," says Willis. "Not all of them, but most of them. Over 80 percent on average, in any given field." Now Willis says he's ready to take on Pierce's Disease.

WBM: Growers in California's North Coast just spent hundreds of millions of dollars on replanting due to Phylloxera, yet you claim you have a cure rate of 80 percent. How do you deal with Phylloxera?

GW: "Instead of trying to kill disease, we use George Washington Carver's approach. We think of the disease in terms of what it's trying to tell us is wrong with the vine and the vineyard. With Phylloxera it's primarily a depletion of the soil, not the vine. There's not enough food in that field to sustain the vine. By adding humus and organic matter back into the soil, we can create a much healthier environment for that vine and that helps bring it back to life. Then we add a series of Biodynamic remedies, Biodynamic compost and cover crops. But they're all related to depletion of the soil.

We want to get the content of organic matter or humus content up to 15 percent in a three-foot diameter circle around the vine. When you consider that here in the Napa Valley the content is only 1-2 percent at the most, 15 percent is quite a leap. It's not necessary for the whole field, just around the vine, but you can't do it overnight; it takes a while to build it up.

If we start a program any time in the fall or spring, by June we'll know which vines are going to make it and which are not. We pull out the ones that aren't going to make it and do what we can to save the rest.

Depletion of the soil is one factor; the other factor related to Phylloxera is sunlight. In the Biodynamic view, silica is related to *light*, warmth and the regeneration forces that cause plants to flower, fruit and bear seeds. Calcium is related to *dark*, the earth, water and formation forces that cause the plant to grow and thrive. The root louse stays in the ground, in the darkness. If you look at soils that are loamy sand or sandy loam, such as in the Lodi-Woodbridge area of California's Sacramento Valley, you'll see that the occurrence of Phylloxera is considerably less than what it is here in clay soils. So we experimented with adding silica. If we can bring more "light"--more silica influence--down into the soil, we can create an environment in which the Phylloxera doesn't thrive.

I hesitate to use the word "light" because then you get into these long discussions of physical science versus classical Greek science. Most scientists today start rolling their eyes when you talk about the four elements of earth, water, air and fire. And well they should, because they don't translate to our times well. So when I say light, I'm referring to the silica element.

Steiner identified the two most important elements in plant growth as being calcium and silica. Silica affects the upright growth of the plant--rice is a classic example of a plant that's high in silica. Calcium affects the fleshy prostrate growth of a plant, as typified by by most cacti. Every plant, of course, is a combination of the two.

What you want to achieve is a balance of the calcium and silica elements, what are called "influences" in Biodynamics. The two influences are highly polarized. Silica works more in the reproductive area of the plant--the "regenerative forces," while calcium works more in the formation of the plant, the "formative forces". If it's tall and thin, its predominantly silica. Short and fat, it's calcium.

So it's a matter of understanding how these forces in nature work and utilizing that knowledge to create a farming system that will be perfect for that particular plant.

So, to increase the silica influence we obviously can't just dump sand on the field. It's expensive and will ruin the soil. So we came up with a silica paste that we paint on the vine itself. It allows the silica element to drip down and go into the soil.

WBM: So the problem isn't that the vine has a low resistance but that the soil is depleted and needs more silica?

GW: Correct. Our first experiment was with some phylloxerated Napa Gamay and Char-donnay in Glen Ellen in Sonoma County that was managed by **Michael Topolos of Topolos at Russian River Vineyards**. We treated the field and ended up with an average 500 percent increase in yield. We were so astounded that we got overconfident and changed the system the next year. It dropped down close to the original yield.

So we learned what worked, and what didn't. We discovered that, unless a field has been heavily phylloxerated for five or six years and the vines are pretty much dead, we can bring back 80 percent or more of the vines. And we've now done that in three different blocks.

Next we worked with a ten-acre block of Chardonnay Clone 2A at **Wente Vineyards** in Livermore. We started in October and by the following June it was clear that we had a system that could be repeated successfully.

Then we did two three-acre blocks, also in Glen Ellen. These were classic Phylloxera blocks, with blotchy holes scattered throughout the field. They all came around and produced the 500 percent increase in yield I mentioned earlier.

Once we figured out how to treat Phylloxera, we moved on to other things, because Agri-Synthesis, Inc. is set up primarily for research and development, not vineyard management.

Before we came in, Topolos was replanting everything. Topolos no longer has any problem with Phylloxera. We saved 80 percent of the vines and they replanted the rest. When we started this five or ten years ago, we didn't have this knowledge. If we'd had, we could have saved North Coast growers a billion dollars. But we have it now.

WBM: The American Vineyard Foundation has started a five-year research project on Eutypa, its effect on vines and the best way to deal with it. Have you discovered anything about Eutypa?

GW: Yes. When we see a field that has Eutypa, we conclude that the field doesn't have the carrying capacity necessary for the number of vines that are there. So we work to increase the fertility of the soil. You don't do that with fertilizers because although they produce a short-term increase in yield, they tend to deplete the soil over time. So we have specific compost remedies that are specific for Eutypa. But we also work on the field to improve the general fertility of the field itself.

Growers Using Biodynamic Methods

Donald Harms (Napa Valley)

"We had a block of two acres of Syrah that was not ripening. Two weeks before we hoped to harvest, it was still at 15 brix. The winemaker rejected it. Agri-Synthesis came in and brought the grapes up to 24 brix. The winemaker changed his mind. Was he surprised? Yes."

Patricia Damery (Napa Valley)

"We had a severe botrytis infection on seven acres this spring. It showed up early. At Greg Willis' recommendation we used copper sulfate. It killed the botrytis, but the vines and leaves were still turning yellow. Greg started Biodynamic treatment and within three days the leaves turned green and within a week everything looked fine. You begin to see everything as a whole, the total environment. It's not just the Biodynamic preparations, it's the cover crop and the other plants and trees that we planted along the edge of the vineyards."

Ross Hall (Napa Valley), Vineyard Manager

"We're about to start with five or six acres and see how it goes. Based on what we've seen in other vineyards, we expect to expand usage. We have old Syrah that is heavily virused with leaf fold. These vines have exceptional quality and we want to save them. We expect Greg will be able to improve our yield considerably over the next two to three years.

"Each year 5 percent of our vines show up with Pierce's Disease even though we spray and take all precautions. We're hoping that Agri-Synthesis can eliminate Pierce's and even recover many of the currently infected vines. We watched what happened at Topolos and saw dramatic results over 3-4 years. Even over six months we could see definite improvement.

"I know some people think it's all snake oil, smoke and mirrors. It's hard for some people to accept that you take cow manure, bury it in a cow's horn, stir it up in water and go out and spray. It was hard for me too initially, until I saw the results."

Ralph Riva Vice-President, Agricultural Operations Wente Vineyards (Livermore Valley)

"We had Agri-Synthesis work on some old virused Wente clone Chardonnay. We had leaf roll in both the trial block and the control block. Greg Willis said when we started that the treatment would delay the symptoms of that virus for at least a week to ten days in the spring and fall. He turned out to be absolutely right.

"We also noticed in the spring that we actually had had warmer soil temperatures in late winter and early spring, indicating that there was probably greater biological activity in the soil at those times. It was about two degrees warmer than normal. That's significant when you're looking for root activity.

"If you follow the directions right to the letter, everything works well. You can see it in the general appearance and health change on the vines. There's no question in my mind that there are subtle, but very powerful, energies working there. I have nothing but praise for the system."

Michael Topolos

Topolos at Russian River Vineyards (Sonoma County)

[Editor's Note: Mr. Topolos recently became an investor in Agri-Synthesis]

"Greg came to me five years ago and told me about Biodynamics. Being a normal, intelligent person I was skeptical. He gave me some rosemary that was biodynamically grown, and I was impressed. Its aroma and flavor was five times as intense as normal rosemary.

"Then I tried a Biodynamic apple at the Golden Hooves orchard in Mendocino county. It was as if I'd never had a real apple before. It filled those spots in me that had never been filled. I thought that if I could get this magic in my wine, the world would be at my feet.

"I could. It is. My wines are filled with life, with vitality. By building up and balancing the soil, we've been able to rejuvenate old vineyards, so we can continue to benefit from their maturity and complexity.

"We can speed up or slow down the growing process. Last year we had some old Charbono vines in Napa Valley that weren't maturing. In October the sugar was still in the teens--18 Brix. I told Greg to heat up one part of the vineyard. Six days later we picked that vineyard at 22.7. The control side had dropped down to 18 and its grapes were never picked. The birds ended up getting them. I don't need any more proof.

"I've been farming 30 years and last year we had our greatest growth ever on a plot of land that is the worst ground we own. What we added was two shovels of Biodynamic compost at each vine site.

"We have great riparian habitat for Pierce's Disease but it's Darwinian. The weak vines, undermined by chemicals, will be more attractive to the insects and the bacterium. Our Biodynamic vineyards are so healthy and vital, I'm not concerned about them.

"Even a couple of sprays can bring a property into balance. We spray sulfur two or three times compared to eight or ten times for our neighbors. What we're doing here is important. I've never been more at peace and more committed to farming.

"We had leaf roll here on some Chardonnay. It was planted in 1973 and we had had problems ever since it had matured. I was told from early on that leaf roll is in the wood and that once you have it, you'll always have it. Greg eliminated it. Out of 2500 vines, every symptom disappeared. With one spray. After just two days.

"We had a Zinfandel block planted in 1972 propagated from vines originally brought to Sonoma County by Count Haraszthy in the 1860's. It was close to crush and the vines were virused with Mosaic. They were spotty, with their leaves hanging down. Greg sprayed and the next morning the vines had repositioned themselves. The leaves had turned so they could open up and receive the light."

Hugh Lovel (Georgia)

A recognized expert and consultant on Biodynamic farming with over 25 years experience, and a six-acre market vegetable garden outside Atlanta, Georgia. Author of "A Biodynamic Farm".

"Greg Willis made a real breakthrough in Biodynamics with his methods of making Horn Clay. It's transformed everything in my garden. I'm able to plant my corn twice as densely as before and yet get outstanding quality. He's an innovator who has taken Biodynamics to entirely new levels."

Another thing is that when you have fungus in a field, you have death in that field. Something's dying. Fungi are attracted to decaying material and their role in nature is to break down that decaying material and, in effect, bring it back to life in a new form. So we don't say the fungus kills the vine. We say the vine dies and the fungus moves in to perform its natural function.

Now *Eutypa* is spread by ascospores floating into wounds, usually pruning wounds that are a moist environment that's perfect for the spores. So we go through the field a few days after pruning and spray with Horn Quartz and Equisetum tea, which is another biodynamic preparation that is extremely high in silica. This lands on the wounds and dries them out almost overnight. So now we've eliminated

the *spread* of Eutypa. Incidentally, Horn Quartz and Equisetum tea work for powdery mildew too. Because the tea is organic and made from plants, it's not toxic. You can even spray it right up to harvest.

So now we've improved the soil and prevented the spread of spores. The third step is to treat the vine itself. Contrary to common practice, we don't cut off the dead wood first. We know that 90 percent of the time Biodynamic systems work from the inside out. If there's still life in the vine, that life can be encouraged to spread throughout the entire vine.

For Eutypa we spray the vine with Equisetum tea. The tea is very high in silica--about 94 percent. We actually soak the trunk, the canes, the shoots, everything. This changes the environment from one in which the fungus can thrive to one in which it cannot thrive. We don't kill the fungus; we simply change the environment and it dies on its own. We also use a special compost and Biodynamic solutions or "preparations" that cause the plant to become more resistant.

WBM: You've actually regenerated vines that showed Eutypa dieback symptoms?

GW: Yes. In the Chardonnay block that I mentioned in Glen Ellen, one end had Phylloxera and the other was loaded with Eutypa. There were 20 or 30 vines that were infected with Eutypa, all right next to each other. We cured all but two or three of them.

We didn't need to treat the entire block; just the ones we thought had Eutypa. They grew a whole set of new canes out of the middle. It took about three years to get canes large enough so that we had new cordons. You don't get one-inch thick cordons the first year. But the very first year we had shoots that were long enough and 3/8 to a half an inch in diameter that we could actually bend over and create new cordons. By the end of three years, we were back in full production again.

Previously, none of those vines were producing at all. Almost every one of them had lost both cordons and the only thing that was left was the center. When we first went in there, the vines were about three feet to the cordon, maybe 40 inches. And then we were originally getting one and two-foot shoots off of that. Now we get shoots that are eight to ten feet tall.

WBM: Everyone is gearing up to battle the glassy winged sharpshooter, which is the most threatening vector to carry Pierce's Disease. Some people believe this can be economically much worse for the vineyards than Phylloxera. How have you dealt with Pierce's Disease so far? What can vineyardists do now to prepare, and later to deal with it?

GW: We already have some Pierce's Disease here in the Napa Valley but the vector carrying it--the blue-green sharpshooter--has a very limited range--mainly near creeks and streams. From our point of view, the glassy winged sharpshooter is Mother Nature's way of saying, "Hey, you didn't listen to me the first time, so now I'm going to hit you with a 2x4 between the eyes. If you continue managing your fields this way, this is what's going to happen."

I emphasize management because that's what this is all about. Managing. We're either going to manage in harmony with nature, or we're going to fight nature. And in any fight with nature, Mother Nature always wins, sooner or later.

So with Pierce's Disease we have a problem that is much, much more complicated than Phylloxera or Eutypa or powdery mildew, or any of the others. This is a multidimensional problem, especially now with the glassy winged sharpshooter. So it requires a multidimensional, multidisciplinary approach to solving the problem. There is no one thing that we or anyone else can do to solve the problem.

Simply coming up with a vine that is genetically resistant to it is not going to keep it from happening. I guarantee it, though I'm also sure there are a thousand people out there who will disagree with me. It won't work any more than AxR-1 did for Phylloxera. Just as the Phylloxera bug mutated, so will the Pierce's Disease bacterium *Xylella fastidiosa* mutate. Any time you get a field that's weak, it's going to show up with insect or disease problems.

There are lots of different things we have to think about when we look at Pierce's Disease. Not just the role of bacteria, not just the role of the insect vector, not just the management practices. And we can't say with a problem like this, that this vineyard can be fixed without considering the effect on it from other

nearby vineyards. You have to look at it from both a microcosmic point of view and a macrocosmic point of view.

The first thing we do when we go into a field that has Pierce's Disease is we work to somehow isolate that field from the other fields. We do that a number of different ways. We use the Biodynamic remedies. We do barrier planting all around the field. Some of those plants will be to enhance the flavor of the wine; some will be to enhance the resistance of the vines--this is called companion planting. And some of it will be plants that send up a fragrance in the air that tends to confuse the insects coming in.

There's been a tremendous amount of research done on why insects are attracted to a certain plant and it has been discovered that the antennae on insects pick up a certain odor or chemical signal, a certain frequency, if you will, and that odor only occurs in a plant when that plant becomes weak. So it's Mother Nature's way of saying, "Ah, a weak plant. Kill it."

So if you have insects coming into your vineyard, it's because the vines are attracting the insect, not the other way around. It's not the insect looking for a meal. That insect has a role to play in nature. And in this case the role is to eliminate the weaklings. To cull the herd.

In Biodynamics, almost everything we look at is from the opposite point of view of standard practices. And it gives us very interesting and very successful results. We do everything in a way from general to specific, not specific to general. So the first thing we're going to do is look at the whole vineyard. What's going on here? How can we protect the vineyard from the outside first?

One of our key preparations is Horn Clay, made by putting bentonite clay into a cow's horn and burying it for six to twelve months. One of the clay's effects is particularly interesting. What happens is that after you apply Horn Clay, the field goes "internal". It appears to stop growing for two or three days.

That scared me to death the first time I saw it happen. I thought, "Oh, no, I've killed the vines." So I spent three real bad days, and then the vines started to grow again. Needless to say, I was very relieved.

So first, we use Horn Clay to create this protective area around the vineyard. At the very same time, we're trying to bring life back into those vines and trying to get them to evolve into a plant that doesn't "need" to be attacked by a sharpshooter, and doesn't "need" to experience a disease--in this case a bacterial infection.

WBM: So getting back to Pierce's. You do barrier planting, you do Horn Clay.

GW: We do a full Biodynamic program in the field, which means we do the Biodynamic field sprays; we do the Biodynamic compost, as we normally would; we do the companion planting and cover cropping as we normally would. To this we add two additional sprays done in the springtime, the formula for which is proprietary.

WBM: Can you tell us what the effects of that spray are?

GW: It counters the effect of the bacteria. It does this by giving the plant what it needs to throw off the infection. It's a spray that goes on the vine itself. It doesn't go into the ground.

We spray twice. Once before bud break, and once after bud break. And then we do it the same times the following year. And it takes 18 months to lock in the system. The first year we can stabilize the vines. The second year we cure them and the disease doesn't come back again unless the vines grow weak. By that time we can also stabilize the environment around the vineyard. Unless it's a really bad problem, then it may take a little longer. We look at our Pierce's Disease program as taking 18 months from start to finish. Then, as long as you continue with the program, you'll never get it.

WBM: But you wouldn't initiate the Pierce's Disease program until you saw signs of Pierce's?

GW: No. Although of course we'd recommend a standard Biodynamic program just for the health of the vineyard.

The first thing we do when we go into a field is the VER--the Vineyard Evaluation Report. Part of that report is a five-year history. Another essential part is a pathology report. We need to know what diseases

are in there. We don't want to start treating for something that's not there, and we don't want to miss something that is there. So we want to know if Pierce's Disease is already in the field.

There's a seven-acre field off Dry Creek Road in Napa with a stream running next to it and we think there's Pierce's Disease in there. I'm not a viticulturist, so we hire viticulturists. And one identified some vines he thought had Pierce's Disease. I know what it looks like, of course, but I'm no expert, so we want to make sure. So we'll have some experts come in and do a thorough analysis. I haven't found a single vineyard that didn't have at least two or three problems going on.

WBM: What would it cost a grower to treat an acre that has Pierce's Disease?

GW: Well, we're dealing with both labor and material costs. If you're talking in terms of the material costs, the biodynamic preparations cost about \$75 per acre per year. Cover crops and companion plants cost about \$150 per acre the first year, about \$95 per acre per year thereafter. Biodynamic compost will cost a minimum of \$300 per year. More if the field is really deficient. Labor runs around \$325 per acre the first year and falls to about \$175 by the third year.

WBM: So they can do it themselves?

GW: Oh, yes. Once they know what to do.

WBM: But if they hire you to take care of their PD problem, what would it cost them? Would the costs be minimal?

GW: No, because we put in the whole program. Remember, there's no silver bullet. This is a difficult problem to solve. It's one of the more difficult disease problems that there is in the vineyards.

The cost for us to do it would be between two and four thousand dollars an acre above normal maintenance costs. The alternative of course is to replant the entire vineyard and lose yield for several years. With our system, they continue to get yields and income during the transition period. But we'll teach them what we're doing so that after we're done, they can continue doing it. For PD we write a two-year contract. After that, they will have everything they need to know to continue with the basic system.

WBM: So you could teach them on just one section of their vineyard?

GW: Yes. We usually start with small sections and they can do the rest on their own. It's far cheaper than replanting, and they can continue to harvest grapes.

WBM: What exactly is Biodynamic agriculture, and specifically Biodynamic viticulture?

GW: Biodynamic agriculture, of which Biodynamic viticulture is just a part, seeks to bring a field or a farm back into balance and harmony with nature. So that you use the natural forces that are out there in such a way that you can create abundance and make a good living doing it. You try and create everything from the inside out, including your own fertilizers and such, so that you have a farm that is healthy in every way, shape and form.

One of our overriding principles is that we don't want to bring death into a vineyard. If we have plants that aren't just sick but are dying, we take them out. We don't use chemicals to kill things. We don't do anything to stress the vines. We do just the opposite. We want to make the vines reach their fullest potential; what Dr. Carl Jung called their "archetypal form". For grapevines, that means maximum taste and maximum yield.

When we encounter a problem, we don't go after the disease itself. Our approach is, disease is good in the sense that it tells us what we're doing wrong in our management of the vineyard. All we have to do then is make an adjustment in our management practices and the disease goes away because it's not needed any more.

Conventional systems tend to be created more along industrial manufacturing lines. You calculate your inputs and you calculate your outputs. If you add this, then you get that. What we do Biodynamically is a much more holistic approach. And in doing it, we get yields that are as good or better than conventional. But it's a little more complicated, and a little different, and you've got to know more in order to make it

work. You can't just go in blindly and add ammonium nitrate and expect everything to get green. Sure, you can add ammonium nitrate and then it will get green, but everything else is going to be affected by it, too. We consider the fact that every single thing we do is going to affect everything else. It's kind of like pulling on a spider's web. You pull one small piece and the whole web moves. That's the Biodynamic approach.

WBM: It sounds like it's more complicated, more expensive, and harder work. Is that the case?

GW: No, it is more complicated in the sense that you have to learn new techniques that are different than conventional techniques. But I would say that if you were to take our system and compare it, our system is 80 percent conventional--very boring stuff. Ten percent is a little unconventional. And another ten percent is really unconventional.

We do most of the same things everyone else does; we just do them at different times. For example, we'll leave our cover crop on until after the vines flower. We want as many flowers in that field as possible to attract as many bees as possible to the vineyard, so that the bees can help in the fertilization of the flowers of vines, rather than our just relying on wind or whatever. Consequently, we get higher yields because we get virtually one hundred percent fertilization of the flowers.

Then we mow the cover crop; we don't turn it in immediately. We know that if we turned it in, we'd get a huge amount of nitrogen released into the soil available to the vines. This would result in a lessening of the quality of the grapes, and an increase in the growth of the *shoots* and not enough energy put into the development of the *grapes*. So we just mow it and let it break down naturally. Our cover crop is 85 percent legumes. It contains 10-15 different kinds of legumes, out of 24 different species of plants. Once they're mowed, they slowly release the nitrogen they've accumulated, at a rate that's best for the plants.

WBM: So you provide your own special cover crop too?

GW: Oh yes. Red flowers for red grapes, and white flowers for white grapes, among other things. We have a special Phylloxera mix, for example. Just as we have specialized composts for specific problems.

We're very sophisticated with our composting, by the way. We do pre-composting in certain cases. Where we want the compost to produce a certain kind of result, we'll create one kind of compost and then add that to the other kind of compost in the same way that food engineers manufacture different kinds of food products. We do the same thing with our companion plants. Everything's chosen for a reason. We work to create what I call "biocomplexity" in the field, not just "biodiversity."

WBM; Isn't this more labor-intensive than conventional vineyard maintenance?

GW: Not overall, because we'll be able to do certain things using our system that will cause us not to have to do other things. For example, many people do deleafing late in the season. And they do it for two reasons, sometimes three. One is to get more sunlight into the grape cluster and the second is to allow more wind into the cluster. The third reason for some people is they don't want the leaves touching the grapes because there may be a chance that there's some fungus moving from a leaf to the grape bunch itself.

What we do instead is use the Horn Quartz or Equisetum Tea in one or two sprays and go through that field in ten minutes to achieve the same result that it would take four men three hours to do.

WBM: You don't have to thin the canopy?

GW: No. One of the compost preparations that Steiner created was said to make the plant more "intelligent" so that it grows the way it's supposed to grow and produces the grapes it's supposed to produce without any problems.

We've seen this in the fields with head-pruned Zinfandel. This example is so clear. It's not like vertical trellising. In the head-pruned Zinfandel, we get canes that are six to eight feet tall and off of the head, and they grow straight up; they hardly bend over at all. Until around June, when they begin to come down and they stop growing--so we don't have to do any tip pruning at all, because they stop on their own--and as the summer gets hotter, they come down and cover up the grapes so they don't get sunburned.

Michael Topolos gave me this explanation because I'd never seen it before. He said "You won't believe what's happening" and he took me out in the field and showed me.

And I said I wasn't surprised. Because we gave the plant what it needed so that it could do what *it* needed to do. It's fulfilling its goal of service; to make it as easy as possible for us to grow grapes.

WBM: What are the "Horn" Preparations?

GW: Agri-Synthesis primarily uses three types of "horn" preparations in its treatment of fields. Horn Quartz, Horn Manure and Horn Clay.

Horn Quartz is referred to as Horn *Silica* by most Biodynamic practitioners but we prefer to call it by its source, rather than its component. We use it to add the silica element to the soil and the vines.

Horn Manure activates the calcium needed by vines. Of all the barnyard manures, cow manure has the highest amount of calcium. Because it passes through four stomachs in the cow, it's also fully digested before being excreted. Steiner considered it the finest manure available.

Horn Clay is bentonite clay in powder form. We add a little water to it, stuff it in a cow horn and bury it in the ground at different times of the year for different lengths of time. We make four different kinds: Two are buried for a year and two are buried for six months. Full year horns are buried spring-to-spring or fall-to-fall, six months horns are fall-to-spring or spring-to-fall.

The clays are always sprayed after you spray the others. When you spray the Horn Manure, it enlivens the life forces and calcium in the soil, and when you spray the Horn Quartz it enlivens the life forces in the leaves, the stems and the shoots of the vines. When you spray the Horn Clay, it "connects" the energies of the other two preparations.

Steiner said that the life force from the cosmos goes deep into the earth where it's stored in siliceous rock. It's then released and drawn into the calcium near the surface of the soil and then back out through the plants and up into the cosmos. He said the clay acts to connect those forces between the silica deep in the ground--thousands and thousands of feet deep--and the limestone element, the calcium element, up near the surface. It's like connecting two electric cords together.

Now we also spray Horn Sulfur, which speeds up the process even more. But that's very specialized.

WBM: Hugh Lovel, an authority on Biodynamics and the author of "A Biodynamic Farm", says that your biggest breakthrough was in developing Horn Clay. What did Steiner say about Horn Clay and what did you do that hadn't been done before?

GW: Steiner said that the clay acted to "mediate" between calcium and silica and that he would indicate at another time how to make it and how much to use. But he died before he could do it.

What did I do differently? I don't really know precisely what others did. I know that some people tried it in England and some others in Virginia. What I did do was go through the reasoning process and recognized that we're dealing with two different kinds of conditions. The Horn Manure is made in the wintertime when the life force energy goes out of the plants and down into the earth. Horn Quartz is made in the summertime when the life force energy comes out of the soil and up into the plants.

Two separate kinds of energy. So I reasoned that if you had *both* of those factors in the clay, then it would be more in tune with both the life in the soil and the life in the plants. So if we're going to be spraying Horn Manure and Horn Quartz in the springtime, we need clay that was buried from spring-to-spring. Because it would then be "in sympathy" with the two. If we spray in the fall, we use the fall-to-fall clay.

That's the first application. The second time we only use the six-month clays. And then we do it twice in the year. Let's say we spray in the springtime with the twelve-month clay, we spray in the fall with the six-month clay, so it would be fall to spring, and spring to fall, and so on.

It's attuned to what's happening in the soil, what's happening in the plants, and what those two other preparations have been created to accomplish and what they've drawn into themselves.

My reasoning made perfect sense to me so I started actually doing it. After a few years I talked it over with Hugh Lovel and some other people, and then put it out on the Internet, and everybody who has actually ever worked with this clay thought it made perfect sense to them, too.

The difference was, I made the four kinds of clay, they all had tried to make just one kind.

But they didn't use the right kind of clay, either. They were using local Georgia clay or whatever they had, which has entirely different properties than bentonite clay. Bentonite clay is like plain vanilla ice cream. It works everywhere on all crops.

WBM: Can you help someone who has an average producing vineyard increase its yield?

GW: Yes...to a certain level. Everybody knows that if you put enough into a field, you'll get spectacular yields--for a period of time. So, yes, we could bump up some of the fields here in the Napa Valley to 20 tons an acre.

However, it's my theory that a vine will only produce a certain number of pounds of grapes in its lifetime. That's its potential, depending on variety, location and so on.

WBM: Just as some yoga systems say a human has only a certain number of allotted heartbeats in his or her life.

GW: Right. Of course it's only a theory, but let's just say that one vine will produce one-half a ton over its lifetime. It can either produce 20 pounds per year over 50 years or a larger number over fewer years. So yes, we can bump up anything. You can do it using chemical fertilizers, using organic fertilizers, compost and whatever. Is that what you want to do, no? Does it affect quality? Yes. With their way, not ours.

If you have to replant that field after 15 years because the vines are prematurely worn out, you don't get any income for three or four or five years. What good does that do? How much profit does that really make? What we're looking for is the highest *sustainable* yield that that vine, in that location, can produce. We're looking for a more sustainable yield, a more sustainable growth, a more sustainable income. Over a long period of time.

WBM: What about quality?

GW: The Biodynamic preparations on their own, with the Biodynamic compost, serve to release what Luther Burbank called the "potential" of the vine. Dr. Jung said every plant has its archetypal form somewhere, and that form is perfect. Biodynamic practices bring out that archetype. Biodynamic food is known worldwide for its superior quality. It's superior to every other grown food because, as Steiner said, it contains not just the physical elements, but the spiritual element as well.

Traditional Biodynamic practitioners in this country have tried to discount the spiritual part because they felt that nobody would understand it. I don't believe that at all. I believe there are many people these days that are totally open to that concept. So you have the spiritual plus all the flavors and aromas that are supposed to be there.

Naturally, the quality isn't going to come only from Biodynamics. You still have to manage the vineyard properly. Good pruning, proper trellising, adequate irrigation, correct rootstock and clone selection are all essential. At one vineyard, the owners got a little over three tons from two acres of Zinfandel last year. Michael Topolos and I did our magic this year, and it looks like we're going to get six or seven, maybe even eight tons. It was both Michael's pruning ability and our Biodynamics methods.

You have to be practical and you have to know your business or nothing's going to save you. If you prune it incorrectly, it's still going to produce a lousy crop, no matter how much Biodynamics you do. But good pruning and Biodynamics together are dynamite. At Wente, we came up with flower clusters that were twice the size, twice the length and with a canopy that was twice the size of a comparable vineyard managed "sustainably" rather than Biodynamically.

WBM: What effect does Biodynamics have on profit?

GW: We have figures based on five years' experience and over 300 acres. What we've found is that yield goes up, costs go down, quality goes up, income goes up.

Equipment needs are slightly lower than conventional. We need more equipment, but it's less expensive equipment. We use low-pressure sprayers as opposed to high-pressure sprayers. We use ATVs instead of heavier equipment.

Materials are a little lower. Labor is lower. We get an average of 1.5 tons of grapes per acre more than the vineyards were producing before. That's pure profit, because you're not doing any more work to get it. In fact, you're doing less. So our research so far shows an average of a three to four thousand dollar increase in income per acre. Net profit.

WBM: Rudolph Steiner is just one of the people you credit for your methods. Who are they and what do you believe was their key contribution to agriculture?

GW: George Washington Carver worked with the *multiple uses* of plants and their roles in nature. For example, he discovered over 200 uses for the sweet potato. And, of course, his work with the peanut saved the south from economic devastation.

Luther Burbank worked with the *potential* of plants. He was able to bring out everything each plant had to offer.

Rudolph Steiner worked with *healing* the earth and healing plants in a generalized way. He was not terribly concerned with yield.

What I do is combine the work of those three people and add a little of my own--working with specific disease problems and specific yield problems, as well as improving quality. I'm basically filling in the holes that Steiner left.

Equally important is that we live in a world where profit matters. If you don't make money, you're not in business next year. People are not going to switch to a system that doesn't make them money. Why would they? It would be lunacy. So, because of my business training, we've also focused on the economic aspect of it. We can show that our system is more profitable, produces higher quality and higher yields for less work, with less damage to the earth, than any other system out there. And we have specific ways of treating individual disease problems.

It's not just a new way of farming; it's a new way of thinking. Ultimately we're changing people's lives. We think it's a worthwhile thing to do. **wbm**

Websites on Biodynamics

Agri-Synthesis

www.agri-synthesis.com

American Biodynamics Association

www.biodynamics.org

Biodynamic Farming and Gardening Association

www.biodynamics.com

Biodynamic and Organic Gardening Resource Site

www.biodynamic.net

Josephine Porter Institute for Applied Biodynamics

www.igg.com/bdnow/jpi/