SO THAT THE EARTH MAY BE HEALED

Applied BIODYNAMICS©

Spring/Summer 2018 *Periodical of the Josephine Porter Institute • Floyd, Virginia* Issue No. 93

Global Climate Change in a Nutshell, and What You Can Do

Mike Biltonen

In 1925, the Industrial Revolution was less than a century old. The world was barely out of World War I. Agriculture, as we know it today, was only just beginning to unfold. Plus a significant proportion of the United States' population was still rural and depended on farming as its livelihood. Nevertheless, when Rudolf Steiner gave his agriculture lectures, he already foresaw the decline in environment, farming, food, and human health in a way that, only now, we are beginning to understand.

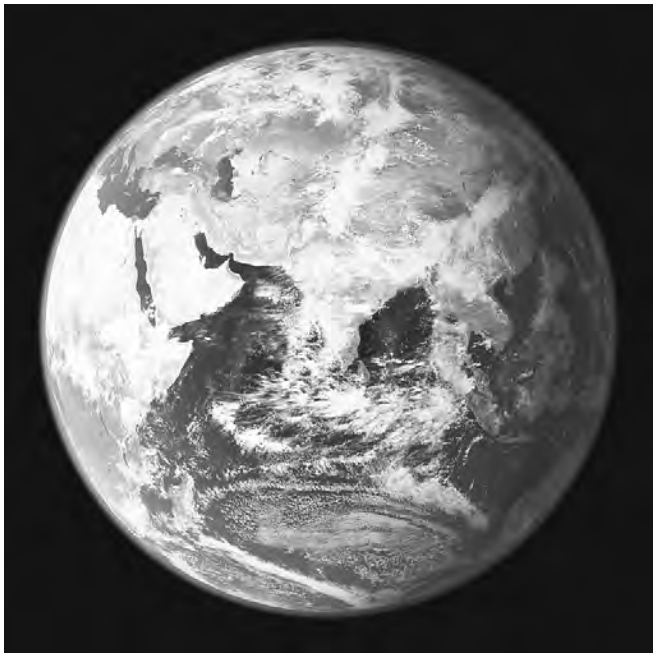
In the more than ninety years since the Agriculture lectures, we have experienced more wars, seen the advent of powerful chemical pesticide and fertilizer industries, witnessed a rise in the use of fossil fuels, observed desertification gobble large parts of the planet, and, at least in the United States, undergone a reduction in the number of people making their living from farming.

The result is reliance on industrial farming and food production that, we are told, is critical to feeding the world's populations. Such farming styles rely on fossil fuels. And it is precisely this reliance on fossil fuels and tillage agriculture that has triggered catastrophic changes in our global climate. But don't just think only about the magnitude of the problem; also consider the speed at which such changes are happening. The full force of climate change has yet to be seen, even though many areas of the world are experiencing more rapidly changing coastal environments than we are in the United States. Regardless of your sociopolitical leanings, the simple fact is that a changing climate affects us all and, more importantly, is something no one will be able to outrun or hide from. So, what to do?

Global Climate Change in a Nutshell

Many theories for the whys-and-wherefores of climate change exist. In fact, the rationale for change has and is placed at the feet of such possibilities as vast cosmic cycles, returning ice ages, too much carbon dioxide, and, well, even the fact that methane-making cows may be to blame. As humans, we always need a scapegoat, someone or something other than ourselves. My view is that global climate change has resulted from mostly man-made influences—human impact on the planet's ecosphere, particularly fossil fuel use, soil degradation, and diets too heavily influenced by industrial food production, especially meat.

Long referred to as global warming, global climate change involves much more than warming, although warming is the primary driver because of trapped greenhouse gases such



continued on page 3

From the Editor

Dear Reader,

Whether the words are spoken or not, here in the second decade of the twenty-first century, across the face of Mother Earth, everyone knows something significant is happening. Something isn't quite as it used to be. Something big has…well… changed. Walking into a local store for morning coffee, I pronounce something as cordial and innocuous as "wow, it's cold outside." This simple comment about the weather—remember when people used to say weather didn't matter because of computers' predictive abilities—elicits a comment from the sales person. "It's supposed to be warm this weekend," he says. And then, without urging, he adds, "it's been a strange winter. We haven't had much snow in the last few years. I remember when…" He says this wistfully, and he is likely no more than 25.

There are many who "remember when." Perhaps even some humans living 5,000 years ago at the beginning of the great age of agriculture might have contemplated the changes of their time, though I doubt they wistfully lamented the advent of warmer, more settled days. Change may be constant, but some change is more dramatic and requires both adaption and resilience for life to continue.

In this issue, Mike Biltonen brings you a summary of some of the science behind climate changes. His article also discusses biodynamic practices that can help farm resiliency.

Certainly, in spite of climate changes, we have opportunities to influence whatever environmental shifts are coming toward us. Already, as this issue shows, biodynamic farmers across the United States are putting Steiner's agricultural principles to the test through innovative changes, as he once suggested practitioners in times to come should do. Consider how these farmers responded to JPI's survey questions. If you also would like to respond, please answer the questions listed on page 14 of this issue and email your responses to m.maruca@verizon.net.

As climates change, many people who used to accept what they were told by apparently authoritative sources are asking their own questions and coming up with their own answers. Such is the experience of Mike Reisbord, who is learning to transform himself from backyard hobby gardener to journeyman biodynamic practitioner. His mentor is Jack McAndrew, the compost guru featured in the fall 2017 issue of *Applied Biodynamics.* Mike's journey illustrates the potential within everyone to learn and strengthen relationships to the land and to the communities around them—actions that can heal both.

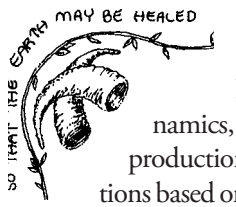
If you get a chance also, look into Dennis Klocek's book on climate as a response to cosmological forces. Some of his information may surprise you.

—Mary Maruca

Applied Biodynamics

Applied Biodynamics is a publication of the Josephine Porter Institute for Applied Bio-Dynamics Inc. (JPI). The subscription price of $30.00 ($20.00 on-line) per year helps support JPI research and development. Back issues are $7.50 each.

Managing Editor, *Applied Biodynamics*
Josephine Porter Institute, The Village Green,
201 East Main Street #14, Floyd, VA 24091
Phone: (540) 745-7030; Fax: (540) 745-7033
info@jpibiodynamics.org
www.jpibiodynamics.org



Mission

The mission of the Josephine Porter Institute for Applied Biodynamics, Inc. is to heal the earth through production of quality biodynamic preparations based on the spiritual scientific discoveries of Rudolf Steiner and to advance education and research in biodynamic agriculture.

continued from page 1

Global Climate Change in a Nutshell, and What You Can Do

as carbon dioxide, nitrous oxide, and methane in the upper atmosphere. Warming occurs when the sun's solar rays enter the Earth's stratosphere as shortwave radiation and then are trapped by our terrestrial and aqueous planet before being re-radiated back towards space as long wave radiation, where it is trapped by the greenhouse gases, thus increasing Earth's global temperatures. These increased global temperatures that have no place to go ultimately encourage melting polar icecaps, increased desertification due to perennial droughts, increased rainfall, and, more intense weather patterns, to name just a few. Of course, scientists have known about all this for a long time and many of us have heard about climate changes since we were children. Nevertheless, politicians and powerful corporations have urged and continue to urge the status quo, no matter the risk. Current governance in the United States not only denies climate change, but eliminates climate data, scientists, and science from further scrutiny.

By the Numbers

Earth's atmosphere has always been in a state of change. We know this from fossil and other prehistoric records. But at no time in recorded history has the global climate changed so quickly as it has in the last 150 years with the advent of industrialism. Global carbon dioxide concentration has increased by almost 50 percent since the mid-1800s—the beginning of the Industrial Revolution. At that time, the global carbon dioxide concentration was approximately 275 parts per million (ppm). By 1950, roughly 100 years after the discovery of oil, the global carbon dioxide concentration had risen to 300 ppm. As it stands, the increase in global carbon dioxide levels has resulted in a 1.7°F increase in temperature during the same period of time. The greatest percent of that increase has occurred in the last 35 years—since the mid-1980s. Ironically, the 1980s marked the time that large oil corporations buried information that could have helped us better understand and possibly avert the current crisis. Global powerhouse ExxonMobil had information nearly forty years ago that strongly suggested the significance of the global warming phenomenon, but squelched the research in favor of corporate profits and political power. Today, the global carbon dioxide level stands at 407.62 ppm[1] and rising. Many scientists consider 400 ppm as the point of no return.

The Point of No Return

Pieter Tans, lead scientist of NOAA's Global Greenhouse Gas Reference Network, released a statement[2] in 2016 stating that an atmosphere of 400 ppm carbon dioxide is dubbed the "carbon threshold," a point of no return. Levels this high throw the balance of the climate cycle into chaos, making it difficult to predict climate changes and causing sea level rise, severe tropical storms, drought, and flooding. When the carbon threshold was finally breached in October 2016, Tans said, "It's unlikely we'll ever see CO_2 below 400 ppm during our lifetime and probably much longer." Even if we stopped burning fossil fuels today, the carbon levels would continue to rise and be trapped for decades longer.

The year 2016 was the warmest year on record, with 10 of the 12 months also being the warmest for each respective month. March 2017 was 2°F warmer than the 20th century average. And even though the rest of the year was cooler, it still ranks as the third warmest year in recorded history—right after 2016 and 2015.

So what's the problem? Global warming impacts climate changes, which manifest themselves differently around the planet. They do this is a variety of ways that alter oceans, glacial ice sheets, snow cover, sea levels, extreme weather events (frequency and intensity), and more.

The Oceans

As atmospheric CO_2 rises, the oceans take up more CO_2 than is good from them. This increases ocean temperatures and acidification, all of which result in loss of life in the forms of coral reefs and phytoplankton that. . .you guessed it. . . release more CO_2 into the atmosphere.

Glacial Ice Sheets

NASA reports that arctic ice is being lost at the rate 13.2 percent each decade. In 2012, the arctic ice cover reached the lowest point ever recorded. Land ice (think of Antarctica) is

Biodynamic Preparations Legend

BD 500 – Horn Manure
BD 501 – Horn Silica

COMPOST PREPARATIONS
BD 502 – Yarrow (*Achillea millefolium*)
BD 503 – German Chamomile *(Matricaria chamomilla)*
BD 504 – Stinging Nettle *(Urtica dioica)*
BD 505 – Oak Bark *(Quercus alba)*
BD 506 – Dandelion *(Taraxacum officinale)*
BD 507 – Valerian *(Valeriana officinalis)*

BD 508 – Horsetail (*Equisetum arvense*)

being lost at the rate of 286 gigatonnes per year. To better illustrate, Iceland lost between 36 to 60 cubic miles of ice between 2002 and 2006. Antarctica lost a similar amount, and the arctic ice is almost completely gone. Not only is all of this melting ice going into the oceans and causing sea levels to rise,[3] it also is reducing ocean salinity and changing the course of the Atlantic Meridional Overturning Circulation, warm, northward flowing ocean currents in the Atlantic.

Extreme Weather Events

Due to the impact of global warming and associated events, we are experiencing increases in the extent and frequency of extraordinary weather.

- **Hurricanes** – In 2017 alone, three major hurricanes hit the U.S., causing flooding and devastation in Houston, Florida, and Puerto Rico.
- **Heavy Rainfall** – The Northeast and Midwest United States are both experiencing heavy rainfalls (defined as >2 inches of rain in 48 hours). The northeast has experienced a 71 percent increase in heavy rainfall events, while the Midwest and southeast are at 37 and 27 percent respectively.
- **Drought** – Depending on where you are in the world, drought can be an ongoing saga or an intermittent one. In the northeast, we have no lack of rainfall. However, the past few years have provided uneven rainfall with, for example, sufficient rain in the spring, followed by seriously hot, dry weather in the summer and early fall.
- **Heat Stress** – On average, the growing season is already eight days longer than normal, with an increase in heat stress days (temperatures >90°F) and milder winters. Horticultural crops stop functioning normally at around 85°F. Heat stress reduces the nutritional value of the food and the overall resiliency of the crop, two of Steiner's primary concerns in 1925.
- **Disease, Insects, and Weed Pests** – As the climate changes and temperatures increase, pests of all types stretch their geographic reach, extend their season, increase overwintering success, and increase their overall impact on food and farming. To combat this, pesticides and herbicides are used in commercial agriculture, increasing the risk of pesticide resistance and environmental damage. Other less well-understood impacts also occur, such as a loss of synchrony (called asynchrony) between certain organisms. For example, some pollinators may not be effective if the plant they are intended to pollinate does not bloom at the right time.
- **Freeze and Frost Risk** – This is a big one for fruit growers, since the potential for increased freeze and frost risks makes it likely that growers will need to employ frost and freeze abatement practices—not just because of the risk, but the uncertainty. We're having shorter winters, more variable temperatures, and periods of significant warming that cause crops to wake up earlier. Practices to combat these risks include the use of heaters [more fossil fuels], wind machines [more fossil fuels], nutritional sprays, and valerian (BD 507) and BD 500 sprays before and after predicted frost events. The use of valerian and BD 500 are biodynamic practices that have significant promise.

Regional and Local Effects on Farming

Regions around the globe likely will experience climate change differently. Since space and time do not allow proper coverage of each area, I will focus on my backyard here in central Finger Lakes, in the heart of upstate New York. As already discussed, the northeast is experiencing a 71 percent increase in heavy rains. But the impacts do not stop there. Apple and tree fruit growers do not know what to expect each year. Unlike annual crops, fruit trees are planted for the long term and so are perpetually exposed to whatever nature has to offer. Mid-winter warm-ups during a time of year when we should be experiencing "real winter" appear to be turning into a trend.

This is important because fruit trees require a certain amount of chilling units (CU) before they can begin to break dormancy. If they do not acquire the appropriate number before the true spring warm-up, then they do not develop properly, threatening not just the current year's crop, but future crops. Bear in mind that there are optimal temperatures where CUs are accumulated—and the possibility for it to be too warm or too cold is not just likely, but has been a reality this winter. However, if the trees have received enough CUs, then spring warm-ups can cause the trees to think it's spring, wake up, and start to grow, exposing them to any remaining winter freezes or early spring frosts that hit the farm. Farming is not for the faint of heart!

Check online for exceptional resources available to help farmers understand and manage their operations in the face of uncertainty. One of the best is Cornell's Climate Smart Farming Program (http://climatesmartfarming.org/changing-climate/).

Adaptation and Mitigation

The strict definitions of adaptation and mitigation are clear. Adaptation is "a change or the process of change by which an organism or species becomes better suited to its environment." Mitigation is "the action of reducing the severity, seriousness, or painfulness of something." The differences in the two definitions might seem minor, but, in fact, are very important and powerful.

Adaptation as climate change action is reactionary. It involves developing mechanisms that allow us—and other species—to withstand the impacts of what is currently happening and what we believe may come. It doesn't change reality, however. Mitigation, on the other hand, is action-based, where we attempt to change or alter the reality of what may be occurring. As a farmer and scientist, I believe that, if one has to make a choice, mitigation is the more important of the two. Good indications suggest that many places in the world, including the United States, will be unable to adequately adapt to changing environment.

That said, the effects of climate change are so advanced that it is already too late to mitigate the effects to any meaningful degree. That's why adaptation without mitigation is a fool's move. The two need to work hand-in-hand, and will truly be needed together as part of any meaningful strategy to reduce the impacts of climate change and ensure the survival of the planet and most—if not all—of its species. As we look for ways to mitigate and adapt during these changing times, we must seek out approaches to farming that give us the greatest return on our investment, whether that be time, money, resources, or some other form of capital. Most importantly, though we may have crossed the carbon threshold, we still can take significant steps to sequester carbon on our farms and gardens.

With adaptive practices, we seek to change the current circumstances under which we grow food, including the use of high tunnels, hail netting, soil drainage, irrigation, frost protection, or—the gods forbid—hydroponics. Each of these practices has an element of mitigation, though focused more on directly impacting how we farm in the face of climate change, and less on changing the trajectory and severity of climate change.

Highly mitigative practices, on the other hand, have a less direct impact on our everyday farming practices and more on dampening climate change's path. In a nutshell, these practices reduce the amount of fossil fuels used and seek to lock up the CO_2 already in the atmosphere. These practices include planting trees or other perennial crops, reducing reliance on fossil fuels,[4] eliminating concentrated animal feeding livestock operations, using the soil as carbon reserves by establishing a strong biological microbiome in the soil and building up organic matter for CO_2 capture. Of course, much farming, especially of annual crops, depends on the plowing and tilling of soils to improve the available nutrition and fertility for our crops. However, we don't need these practices to the extent they are currently practiced. There are numerous alternative practices including strip cropping, no-till, permaculture, and, of course, biodynamics.

Is Biodynamics the Salvation of the Earth?

Rudolf Steiner saw something nearly 100 years ago that few fathom even now. At the time of Steiner's agriculture lectures, no one knew where we were headed as a species or what our impact on the planet would be, yet here we are.

If we place Steiner's agriculture lectures in the light of his medical lectures we have a deeper understanding of biodynamic farming being about the health of the system—whether that be a plant or animal system. Overall, we need this approach today, focusing on the health of the entire farm system, viewing it as an organism, not just a jumble of parts individually "managed." Adopting a systems approach to farming is why biodynamics could be the single most important tool in our global battle against climate change.

Orchard Challenges

There are many challenges for orchardists that simply are not an issue in non-perennial fruit crops. The most critical, of course, is the potential for frosts and freezes during early spring warm-ups. These periods have become more difficult recently because of late winter warm-ups that cause a tree's reacclimation to become more susceptible to pre-bloom freezes and later-on frosts during bloom. Trees that are more resilient and perhaps less susceptible to these mid-winter heat waves then remain more resistant to early spring frosts and freezes. However, in the likely event that resiliency isn't enough, the use of biodynamic tree paste in both the fall and late winter can strengthen and help protect trees through winter extremes, as well as slow the warming of branches, resulting in later bud break when there is less risk of freezing. The use of BD 507 (valerian) in addition to BD 500 (horn manure), BD 501 (horn silica), and perhaps BD 502 (yarrow), can provide an extra layer of protection through these warming effects. They also help reduce the freezing point of water in cell cytoplasm, discourage the development of ice crystals on the surface of the plant, and increase the plasticity of cell walls and plant parts in terms of their ability to rebound from mild damage. A number of other plant biochemicals also are likely influenced by the use of biodynamic preparations.

Biological Cooperation

So, how can biodynamic practices work together to adaptively and mitigatively counteract the effects of climate change? They influence in the following ways.

Soil Health

Soil is what everything depends on and what provides the basis for healthy, nutrient dense foods. Without healthy soils, crops and other organisms don't thrive. With so much global farmland in degraded state, biodynamics, as regenerative farming, can help farmers bring their land back to vibrant health.

Soil is what everything depends on and what provides the basis for healthy, nutrient dense food. (Photo courtesy of Mike Reisbord)

- Steiner believed that the base of the crop plant was an extension of the soil and in order to enhance that connection, the preps – BD 500 and BD 501 in particular – provided biological, nutritional, and energetic connections between the plant, the soil, and the cosmos. For tree and vine crops, biodynamic tree paste is a more developed application of this concept. Apart from the crop plant itself, the preps benefit the entire soil food web by harnessing nutritional and energetic properties that build organic matter and base mineral nutrition, as well as improve biological diversity and increase soil water holding capacity.
- And the soil is precisely where massive amounts of carbon are stored, taken from the atmosphere and made available to all the various forms of organic life, continuing the cycle of life. It is through this process of carbon sequestration and cycling that many feel we can have a significant impact on climate change. A rule of thumb is that for every 2 percent increase in soil organic matter (SOM), we can sequester the equivalent of 15 ppm of carbon dioxide. Of course, it would take a global increase of 2 percent in SOM to take 15 ppm carbon dioxide out of the atmosphere and we could really use at least five times that amount in a very immediate way.
- As mentioned, BD 500 and BD 501 are perhaps the most important preps in the biodynamic realm. BD 501 is essentially coarse parent mineral silica, the very thing that soil is made of, given enough time and weathering. Quartz also helps enliven soils early in the season, through its warming influences, by enhancing root and plant health.

Plant Health

Even though plant health is inextricably tied to soil health, plants also experience benefits from the preps that extend beyond the benefits to the soil. The preps also help grow stronger and healthier plants, creating the constituents necessary to combat insect and disease pressures. Using the preps helps trigger systemic resistance pathways in the plant as well.

- **BD 500** (horn manure) –Because of its strong biological components, BD 500 helps trigger a healthy biological food web in the soil, creating a stronger connection between the crop and the soil, unifying them biologically [as compared to conventional agriculture where farms are biological deserts]. As BD 500 is the prep with the strongest biological component, its regular use creates a competitive biological environment that makes it much more difficult for pathogens to get a foothold and populate in a way that causes extensive disease issues for plants. In addition, it helps build the carbon reserves in the soil through accumulation of organic matter.
- **BD 501** (horn silica) – This prep brings warming properties that can help reduce water stress during periods of excessive moisture, either by helping reduce disease

incidence or physiological stress to roots in saturated soils. This enlivens soils early in the season when they can be cold and wet after a long winter. Roots are just as much a part of the soil and anything else, and roots damaged from physiological stress contribute significantly to poor plant health.

- **BD 502** (*Achillea millefolium*) –Through its association with potassium and nitrogen, yarrow provides a strengthening, rejuvenating effect for crops. It can be applied to the manure compost and as a tea [fresh or fermented] can be applied directly to the crop plant. It also has a strong sulfur component, as do chamomile and stinging nettle and, as such, assists in the proper assimilation of nitrogen and the creation of nitrogenous substances, such as proteins, vitamins, and phytochemicals. Potassium is also strongly involved in cell water relations and helps the plant manage through periods of drought or excess water.

German Chamomile

- **BD 503** (*Matricaria chamomilla*) – Chamomile has a strong sulfur component and is also associated with potassium, but is equally associated with calcium. Calcium is also necessary for strong plant structure by building strong cell wall structure. Biodynamically, it influences calcium in a way that helps pull nitrogen into the soil. It stabilizes nitrogen and kindles a well-nourished astrality for the farm organism. This prep is used in making compost, as well as a spray to aid in the healing and strengthening of the plants.
- **BD 504** (*Urtica dioica*) – Stinging nettles have a strong astral energy, along with a strong affinity for iron and protein [nitrogen]. Iron is a central component in the chlorophyll molecule involved in photosynthesis and, without enough nitrogen, the quality of chlorophyll suffers, resulting in iron chlorosis. Because of nettles' strong affinity for nitrogen, earthworms and other soil dwelling organisms will devour your composting nettle. Nettles can help with both iron deficiency/toxicity, and energizing enzymes and minerals alike.

Stinging Nettle

- **BD 505** (*Quercus alba*) – Oak Bark brings a strong calcium influence to the farm, in addition to the energy imbued from the cow's skull and flowing water. Calcium, as discussed above, is critical in cell wall strength and integrity, as well as the physiological disease resistance of plants. In concert with the strong silica component of BD 501 and BD 508, BD 505 can help dampen conditions surrounding high levels of disease susceptibility.
- **BD 506** (*Taraxacum officinale*) – Dandelion is perhaps the most powerful of all the preps because of its strong cosmic influences and the way it brings the silica [cosmic] and potassium [earth] components into line. It also overcomes obstructions to the flow of forces on the farm. The dandelion prep can be applied as a spray but is more commonly used as a compost pile prep. The dandelion's taproot can scavenge deep nutrition for shallower-rooting plants, adding minerals and nitrogen to soil. It is also known to induce the release of ethylene gas that, in small quantities, is an important constituent of Induced Systemic Resistance [natural] pathways in plants and, in larger quantities, help fruits and vegetables to ripen.
- **BD 507** (*Valeriana officinalis*) – Valerian is strongly related to phosphorus and, this, in part, explains its warming influences. The valerian prep can be applied as a spray, as well as a compost prep. When sprayed, it imbues a warming effect on the plant and so is often used for frost protection in early spring.
- **BD 508** (*Equisetum arvense*) – Horsetail is very high

in silica and counteracts the moon's watery influences, helping the plant fight off disease by raising the cosmic influences through the plant. In many BD circles, this is a critical prep in controlling the etheric forces and, in effect, diseases and rank growth in plants.

After talking with and interviewing farmers, as well as reading a bunch about biodynamics and climate change, I've come to believe that there isn't one biodynamic preparation that singlehandedly and significantly battles the impacts of climate change but, collectively, along with good farming practices, they make a farm more resilent. And biodynamics, quite simply, is about good, sound farming practices, which we should be doing anyway. That, to me, is the beauty of biodynamics in a nutshell: simply good farming.

Notes

1) https://climate.nasa.gov/
2) http://research.noaa.gov/News/NewsArchive/LatestNews/TabId/684/ArtMID/1768/ArticleID/11900/Carbon-dioxide-levels-race-past-troubling-milestone.aspx
3) NASA estimates that sea levels will rise between 1–4 feet by the year 2100.
4) Reducing reliance on fossil fuels means a reduction in the use of synthetic fertilizers, pesticides, diesel fuel, and plastics. But it also means further nurturing a farming system that is local and doesn't rely on long-distance transport of equipment, supplies, and food. It depends on fostering a local farming system that means everything is local—and this goes against everything that large-scale commercial farming is all about right now.

The Good News

- A new analysis rules out the worst case scenario. But without radical change, we're still in plenty of danger. Bloomberg News. https://www.bloomberg.com/news/articles/2018-02-09/climate-change-just-got-a-little-less-terrible?wpisrc=nl_energy202&wpmm=1
- Biodynamics in the news. "This Fruit Geek is Disrupting Conventional Northeast Apple Growing and Cider Making", Mike Biltonen, consultant (and *Applied Biodynamics* writer) making a difference. https://www.ediblemanhattan.com/drink/a-fruit-geek-is-helping-ny-orchardists-and-cider-makers-go-biodynamic/

Remembrance Farms: How One Farmer Works With Change

Mike Biltonen

Nathaniel Thompson grew up in an intentional community called Claymont in Charles Town, West Virginia. Though farming wasn't a strict part of his upbringing, it was certainly a part of life at Claymont. He fell in love with farming while a student at Virginia Tech and never considered farming any way other than farming biodynamically. He started farming for real at his family's biodynamic farm in Amenia, New York, before heading upstate to the Finger Lakes. After 20 years of farming, he finally feels like he is beginning to understand it—as if he is finally at the beginning, ready to get started.

He and his wife, Emily, started Remembrance Farms in 2003 in Danby, outside of Ithaca, New York. Things really started growing in Trumansburg around 2007 when they found a piece of land to farm and soon acquired adjacent property, expanding the farm to 100 acres, including 90 acres of tillable ground.

Remembrance Farms is primarily a vegetable farm that includes some animals, but it is certainly not based as much on livestock as some biodynamic farms. The Thompsons grow salad greens, root vegetables, and much more as part of their overall strategy to focus on a few cash crops to sell direct to local restaurants, markets, and a local cooperative CSA called Full Plate Farm Collective. Today, Remembrance Farms is the only Demeter-certified biodynamic farm in the area.

My objective in interviewing Nathaniel was part of an investigation about how biodynamic farmers used biodynamics to combat climate change. Nathaniel admitted that, "It is hard to make a living at farming. The deck is really stacked against you." He noted that 2017 was as difficult as it gets, given the long wet spring that delayed planting and increased disease pressures above and below the soil line. His biggest issues have to do with maintaining high soil quality under conditions that require intensive soil management—an area where he feels more intensive focus can really benefit the farm's long-term sustainability. His approach to biodynamic farming is focused on three principles. The first is the farm as individual; the second is the use of the preps; and the third is the role of the farmer as conductor. I asked Nathaniel the following questions:

How do you incorporate the preps into your overall biodynamic practices? The preps are a baseline practice and an area I want to delve into more deeply. They are necessary for the health of the whole system and and I do get all of them out at least once a year. I use the field sprays and, whenever I put out BD 500, I also put out barrel compost to get the influence of all the preps on the field, but I don't usually have time to spray more than once a year. I have made some of my own preps, purchased some from JPI, and made some with the group in the Hudson Valley [Pfeiffer Center]. I've made horn manure more often than not. It's an active interest and one that I'd like to pursue more in the future.

A few years ago I got one of Hugh Lovell's cosmic pipes, and so I am putting out the preps that way through the year. And I have seen a decrease in certain insects like flea beetles. The preps have a harmonizing effect on the farm. Mixing and spraying the preps is an important part of connecting with the farm, so I still stir and spray the preps, in addition to using the cosmic pipe.

Nathaniel, Emily, and children at the farm

Since the weather seems to change from year to year, how do you feel biodynamics helps you deal with these changes? That's a question I have a hard time answering. Comparative studies usually find that biodynamic farming is more consistent from year to year than conventional farming. This means a biodynamic farm will demonstrate more resilience in the face of change. Weather extremes are the new normal, and biodynamics helps ameliorate those realities. Sequential spraying, for example, can attract rainstorms during a drought or help reduce wet conditions—this intrigues me, and I'd like to test these approaches more than I have.

Apart from the specifics of particular preps, Nathaniel believes the basic system he practices, including maintaining good soil health, alleviates a lot of the problems associated with climate change. Although a farmer can have good soil in an organic system, a biodynamic system offers something more, probably due to the energy that flows through the system. Not that biodynamic farming is bullet proof, but the benefits of a biodynamic system are obvious, especially in the face of global climate change and the challenges facing our ability to grow good, clean food. This year, Nathaniel and Emily plan to focus on improving their soil quality through more frequent use of the biodynamic preparations and more intensive cover cropping in between rotations, and paying closer attention to soil nutrition.

Climate Change On Biodynamic Farms: Survey Responses

In response to a simple survey, biodynamic farmers in various regions of the United States shared their insights about the impacts of unpredictable and extreme weather, and how they are adapting biodynamic principles to meet those challenges. This is not to say that adaptation has been easy. Some farms struggle—especially with water supply—but biodynamic principles continue to be a strong framework with which to maintain healthy farm organisms and healthy communities. Read on and, if you are interested in contributing your thoughts in a future issue, please respond to the same survey questions at the end of this article and forward to m.maruca@verizon.net.

Mid-Atlantic – Lia Babitch, Turtle Tree Seed, Copake, New York

- **Background**: We farm in Copake, just a few miles into New York, west of the Connecticut/Massachusetts border. Our total farm in about 630 acres, mostly wooded, with 3 acres of vegetable and flower seed production in three fields, as well as 5 acres of vegetable production, 3 acres of herb and flower production, about 130 acres of dairy/beef farm, with pigs, goats, sheep, chickens and cows, a small orchard (1.5 acres), and maple syrup and firewood production from our extensive woodlands. We have been making and using the preps for more than 50 years on this land. We use all the compost preps (BD 502–507), BD 500, BD 501, Barrel Compost, and the Three Kings prep. We put the compost preps into our compost piles each time they are turned. Usually we spray BD 500 about 6 to 8 times a year, BD 501 about 3 to 5 times annually, barrel compost (with the 500, but sometimes also on its own), and the Three Kings prep once a year (for more than 9 years). We sometimes use equisetum tea, valerian spray (BD 507), and nettle and/or comfrey fermented teas.
- **Weather extremes:** In the last few years, temperatures have become seasonably more unpredictable, rising or dropping as much as 70 degrees in one 24-hour period. This has impacted fruit production, since trees will break bud and then be frozen out. Ours is a traditional fruit growing area, where cold winters have been predictable, and freezing and thawing historically less extreme. We've seen that change. Also, flooding has become an issue in many of our gardens, as rain is more intense: what used to fall over 3 or 5 hours in a storm now may fall in an hour, leaving nowhere for all that water to go except to rush through our gardens and into the nearest stream. This washes away soil and small plants, especially just after planting time when young roots are not firmly established, but recently we find it also has taken out some more mature plants with significant root systems, which in the past would have been able to withstand normal storm activity.
- **Changes to farming practices:** Working our soil has changed—we can no longer count on the spring thaw and then a drying time before working our soil; some years this never comes, meaning a lot more hand work, which can be very difficult since labor is finite. I haven't noticed a marked increase in pests or diseases, although some years remain worse than others. The timing of everything has just become more unpredictable.
- **Changes in prep use:** We have been using barrel compost more often (especially after the Fukoshima disaster—not necessarily related to climate change), as well as valerian to buffer our tender crops in spring when temperatures can change suddenly and extremely. This seems to work well on the garden plants, but we haven't established a control to be sure.

- **Differences in farm resilience compared to conventional farms:** We haven't had time to visit conventional farms in the area much, so don't have a good comparison. However, on newly organic farms in the area, water (both drought and flood) seems to be even more of a problem than it is for us, even though it can be a major issue for us too.

Mid-Atlantic – Stewart Lundy, Perennial Roots Farm, Virginia

- **Background:** We are located on 50 acres on the eastern shore of Virginia and have been farming since 2010. We have been using biodynamic preparations since 2013. We first used the Pfeiffer Field Spray from JPI. Since then, we've progressed to using 500XP (pre-potentized 500, plus all compost preps) several times a year. We use Barrel Compost (BC) every time we cultivate new beds. We also try to use BC weekly behind our livestock rotation to stimulate regrowth. It also helps decrease odors [and flies].
- **Weather extremes:** Most people don't stay in one place long enough to experience climate change in a meaningful way. But our neighbor has lived here 40 years and has tracked rainfall every day. He remembers when the Chesapeake Bay would freeze over solid and you could drive an automobile over the ice! No such world exists anymore. One day, out of the blue, a storm grew out of nothing on the radar and dumped 10 inches in less than four hours. That same neighbor declared, "Stewart, this once would have been the storm of a century. This is soon going to be the storm of the *decade."*
- **Changes to farming practices:** We always transplant in the evening, capitalizing on the "etheric in-breathing" period of the earth. As soil cools, it contracts; as it contracts, it pulls roots into the soil and grounds them securely. We cultivate around plants in the morning, if they are too wet; if they are too dry, we hoe around the plants in the evening so the soil can "breathe in" the night dew. Biodynamics is more relevant with climate change than ever. Biodynamics is about reconnecting the Earth to the cosmos—our greater environment. Unfortunately, we are having to think about water. On the plus side, we have been forced to innovate. With my work with Richard Kirby at Agrinomics, we are imprinting crystals with etheric formative forces that transmute well water *into rainwater* complete with homeopathic mercury, arsenic, and lead (per Steiner's indications in GA327).
- **Changes in prep use:** We now use remote broadcasting and new specialized times to maximize the effect of the biodynamic preparations. The old ways are not enough anymore. And we're part of the wave of creating new ways.
- **Differences in farm resilience compared to conventional farms:** The general vitality of our farm is significantly better than our neighbors. It only takes eyes. The first difference you'll notice on an organic (or biodynamic) farm is that the morning fog lifts off earlier on living soils because the plants are photosynthesizing and breathing out oxygen that lifts the fog up. On deadened fields, the fog lingers until the sun bakes it off. There is no "lift" on the dead field —Alan Chadwick called this *élevé*—the dynamic upward lift of life in the soil. You can see it if you know what you're looking for. There's nothing mystical about it!

Midwest – Dewane Morgan, The Secret Garden, Minnesota

- **Background:** My farm is located in north central Minnesota in Hubbard County, 8 miles southwest of Park Rapids. We have 440 acres, with 280 used for the farm and the rest woodland. We have been farming since 1972 and using all the BD preps since 1976—I use prepared 500, and try to apply it spring and summer, sprayed twice.
- **Weather extremes:** Yes. Longer periods of drought during the summer growing months. Also, the frost-free period has increased from 110 days to 125 to 130 days. On a 30-year average, during the months of November through February, we have had a 5.9-degree average annual increase in winter temperature. Even though on a 30-year average, the entire state of Minnesota has had a slight increase in annual precipitation, my personal daily weather records, which I write on the Kimberton Hills planting calendar, show that our farm has received less average annual precipitation during these 30 years—a decrease from 26 inches to 23 inches per year. I attribute our decrease to living on loamy sand outwash soils that are used extensively for the United States' largest production of potatoes under center pivot irrigation, which creates a local and unique heat island effect, pushing summer storms to the north and south. Other than for the garden, I do not use irrigation on my farmland.
- **Changes to farming practices:** Yes. A longer frost-free period in the fall means we've used less valerian for frost protection on sensitive garden plants. From mid-July to the end of August, the soil has become too dry to till or spray prepared BD 500. When there is available moisture, I have used a method of sheet composting to

trap as much moisture as possible in the soil until the fall rains come again. I have not noticed any changes in plant diseases or pest infestation, but I have noticed red oak and birch trees, which require higher moisture, are dying at a very fast rate. In the garden, several weeds common to southern Minnesota are now appearing in our northern garden.

- **Changes in prep use:** When making the stinging nettle preparation, we have to periodically water the area where the bundle is buried, since I leave it in the ground for a full year cycle. I also found that, in the pit where BD 500 horns are buried, I sometimes have had to add water to the powder-dry, humus-rich soil.
- **Differences in farm resilience compared to conventional farms:** My pastures' carrying capacity and hay fields provide above average production as compared to other farms in the area. Hay fields and pastures are always green during the growing season. I attribute this to the systematic planting of large, long field windbreaks that trap blowing snow in the winter and modify hot winds in the summer. Also, the years of using prepared BD 500 in conjunction with a crop rotation heavy in forage plants (for pasture and hay) has dramatically increased topsoil depth.

In a conclusion, I have felt it very rewarding to be able to adapt, improvise, and overcome the challenges of climate change. I really enjoy putting up hay with the longer periods of dry weather. It's made haying much easier, and I have noticed no decrease in quality or yields. I figure I am working as a co-creator with the elemental/angelic world in moving the natural landscape on our farm, which would have been a naturally forested area, to a prairie-savannah type vegetation that can thrive with decreased annual precipitation. I use the farm, with the grazing, haying, and heavy emphasis on warm-season prairie grass pastures, as a carbon sink to clean the air.

Southwest – Caren von Gontard, Viva La Vita, Paonia, Colorado

- **Background:** I farm on about 30 acres in the North Fork of the Gunnison River Valley in Colorado. I've been using BD practices for 25 years or more in Scotland, Australia, and now here in Colorado. I first applied them to the farm in Paonia in 2007 but, in 2013, I began studying with Enzo Nastati and learned how to potentize the preps, as well as make them stronger and more effective. So in 2013, I began to use biodynamic practices differently. The results were huge! Since then we have continued to learn and have evolved to use his farming method known as Trinium Agriculture—all firmly grounded in biodynamics and Steiner's indications in such lectures as *Occult Science* and the medical lectures.
- **Weather extremes:** During the past few years our climate has been perfect for farming. We live in the arid west, where drought, heat, and calcium soils are always a challenge. But since 2013, we've had 4 years of great rains and good production. This year (winter 2017–2018), however, we have had little snow and may be facing drought conditions this summer.
- **Changes in farming practices:** We are working with ways to increase the vitality of water and its "wetting capability," through the use of water vitalizer devices. If we do have a drought this year, it will test the efficacy of these devices. Climate change is definitely a concern the world over, but the arid west suffers already from heat and low water. We'll see how things develop.
- **Changes in prep use:** I've changed the way I use BD preps, using homeopathy to potentize them, for example.
- **Differences in farm resilience compared to conventional farms:** My farm has had dramatic results from our work during the past 4 years. Even though potentizing the preps isn't strictly BD stuff, we have seen production reach unbelievable levels for our fruits and vegetables, as well as our dairy output.

Southwest – Pat Frazier, Peace & Plenty Farm, Hotchkiss, Colorado

- **Background:** My 30-acre farm is located in western Colorado at 6,800 feet elevation. I use eight of these acres for fruit trees, veggies, dairy cows, and free-range poultry. I have been at this location for 15 years, and have used BD preps at this and other locations since 1992. I use and make all my BD preps and apply preps of some sort monthly to my property.
- **Weather extremes:** Climate change has affected mostly my fruit production and seasonal water availability. Late frosts have significantly decreased fruit production. Water supplies have been much more unstable, demonstrating a tendency toward drought conditions. Summers are hotter and water use is higher.
- **Changes to farming practices:** I have had to be prepared to cultivate soil earlier in the season for annual crops and then apply season extension to protect against late frosts. Harvests are unaffected, except for fruit yields. I am planting later blooming varieties of fruit trees when I need to replace or add to my fruit production. Water is very unstable (both usage that is increased in drought conditions and seasonal runoff irrigation). No increase in disease or pests.

- **Changes in prep use:** I have increased my usage of all preparations to increase water-holding capacity of my pastures. I also have increased sequential spraying to balance drought conditions, spraying an acre on average one to two times per month in a season, using the sequential spray technique to increase moisture. I also have increased valerian use in late spring for frost protections and in late fall for frost protection on late season vegetables.
- **Differences in farm resilience compared to conventional farms:** Absolutely! Valerian is almost a necessity for late spring frosts in most orchards in our area if we want to have any production, and has worked very well. Water holding capacity on my farm compared to my neighbors on the same mesa is much better and for longer into the season.

West – Gloria & Stephen Decater, Live Power Community Farm, Covelo, California

- **Background:** We are located in a mountain valley in northern California at an elevation of 1400 feet. The land has been biodynamically farmed since 1986 using BD 500, 501, and the compost preps. The garden fields receive BD 500 two or three times a year, BD 501 approximately five times during the growing season, and the compost preps inserted annually into about eight piles that are thirty feet long.
- **Weather extremes:** Irregular weather patterns have been confusing the timing of when we plant. We have also seen longer periods of extreme heat (100–110 degrees), which depress and stress plant growth—heat spikes are bad for cool weather crops.
- **Changes to farming practices:** Irregular moisture patterns with excessive moisture in wet years and more drought in dry years interrupts our normal soil preparation and requires more irrigation work in summer. We have seen terrible gopher damage overall, as well as some slug increase, and very bad ground squirrel and deer incursion in summer and fall.
- **Changes in prep use:** We are trying to use BD 500 more and as much compost as possible.
- **Differences in farm resilience compared to conventional farms:** We have better soil quality and more resilience than adjacent lands.

West – Gena Nonini, Marian Farms, Central Valley, Fresno, California

- **Background:** I have been farming biodynamically since 1992, starting on 60 acres and growing to the current 140 acres. The primary crops are almonds, grapes and citrus. Products include Demeter-certified raisins, almonds, compost, and alcohol (Brandy, Pisco, and Curacao distilled on farm), with plans to press our own almond oil and mill our own almond flour. All cropland receives three applications of BD 500 and Barrel Compost, applied together. The first application is right after harvest, the second mid-season, and the third pre-growth. The sprays are applied seasonally according to the crop cycle, rather than spring and fall in four season climates. For instance, the citrus season is from November until harvest in March. Both valerian (BD 507) and equisetum (BD 508 – plant silica) are used several times as a foliar spray pre-season on all crops: before blossoming to promote warmth, for frost protection during budding and flowering, and to retard mildew. I have never had to use a commercial fungicide with this plant spray routine. Equisetum also helps set and retain fruit set. BD 501 (horn silica) is used three times after fruit set.
- **Weather extremes:** Historically we have been affected by extremes of the El Nina and El Nino cycles. During the five years of drought we had to use more water. Last year we had twelve inches of rain in contrast to the pre-drought average of eight inches, and we were able to harvest more water while it was flowing. The soil soaked it right up, but it was not enough to compensate for the years of drought. This is the driest winter in my memory, so we need spring rains. Since 1998, I noticed that the intensity of the sun has increased and the tilt of the earth is pitched farther to the north, giving us longer days in the summer and shorter days in the winter. In the last two to three years, we have had unseasonably warm weather earlier in the year. The almonds are blooming two to three weeks earlier, which exposes them to more fluctuating temperatures, frosts, and rains while they are blooming. As a whole though, the economy, industrial organics, and imported organics are having a greater impact on us than the weather. Water ownership, use, and distribution are big issues here that has compounded with increased population and building, and especially foreign investors from India and other countries buying up land for the water rights.
- **Changes to farming practices:** No, other than the timing of spraying preps to prevent frost.
- **Changes in prep use:** I will be using all of the preparations more frequently because of increasing weather variability. Also, I believe the planetary forces are having difficulty reaching the earth with all the space junk, satellites, and electro-magnetic pollution surrounding the earth. The life forces on the planet are diminishing and more preps are needed just to stay even.

- **Differences in farm resilience compared to conventional farms:** The main difference is the water-holding capacity of our soil. Depending on the crop, and the year, we use 25 to 40 percent less water than neighboring conventional farms. Also the keeping quality (and taste) of our crops is better.

Add Your Experience

If you would like to add your observations to our review of farmers' response to climate changes, please reply to the following questions and email your experiences to m.maruca@verizon.net. We look forward to hearing from you.

1) Provide some history/background: Where are you located and how many acres do you farm or garden? How long have you been farming? Animals? How long have you been using the biodynamic preps? Which ones? All of them? How frequently?
2) Has climate change and weather extremes affected your farm? In what way?
3) Have you had to change your routine farming/gardening practices (e.g., timing of working the soil? planting? harvest? what you plant? water usage? any increase in disease or pest infestation?)
4) Have you increased or changed your use of the biodynamic preparations to compensate? How and what ones?
5) Have you noticed any differences in resilience on your farm when compared to conventional farms nearby and in your region?

Did You Know?

- "**We could sequester more than 100% of current annual CO_2 emissions** with a switch to widely available and inexpensive organic management practices," such as cover crops, residue mulching, composting, and crop rotation advises Rodale Institute. Such practices could potentially capture more than 40% of annual emissions. Managing global pasture this same way could capture an additional 71% *(https://rodaleinstitute.org/reversing-climate-change-achievable-by-farming-organically/).*
- **The world's cultivated soils have lost between 50 and 70% of their original carbon capacity** due to agricultural processes exposing the soil to air, reports Ohio State University's Carbon Management and Sequestration Center. Root (mycorrhizal) fungi act as a connector, enabling plants to transfer up to 15% more carbon to soil than their non-mycorrhizal counterparts, a problem if soil is exposed. Researchers also found that plants linked with fruiting, or mushroom-type, fungi stored 70% more carbon per unit of nitrogen in soil *(https://e360.yale.edu/features/soil_as_carbon_storehouse_new_weapon_in_climate_fight)*
- **Soil from organic farms had 26% more potential for long-term carbon storage** than soils from conventional farms, according to a new study from Northeastern University and its nonprofit partner organization, The Organic. This finding resulted from analysis of soil samples from more than 700 conventional farms in 48 states, which had little or no decomposing plant and animal matter, a major component of healthy soil *(https://civileats.com/2017/09/11/new-study-shows-organic-farming-traps-carbon-in-soil-to-combat-climate-change/)*.
- **An estimated 70% of the world's grasslands** have been degraded, according to the Savoy Institute. This 70% represents ⅓ of the planet's land surface (https://www.savory.global).
- **Sufficient food production** to feed the global population requires stable climate. Assuming a stable climate, food production would have to increase 50% by 2050 *(Millennium Ecosystem Assessment, 2005)*.
- **One-third of all food grown globally is wasted in the United States,** with 40 percent thrown out by consumers. Food waste leaves a huge carbon footprint: 3.3 billion tons of carbon equivalent *(https://www.nytimes.com/2017/12/12/climate/food-waste-emissions.html).*

From Backyard Hobby Gardening to a New Passion for a Healthy Earth—An Education in Awareness

Mike Reisbord

"Growing food is a relatively new passion for me. I am savoring the unique joy that comes with each lesson, and I am drawn to agricultural practices that enhance the nutritive, medicinal, and spiritual qualities of food." – Mike Reisbord

How Our Gardening Story Began

In 2001 my wife, Michelle, became pregnant with our third child. To accommodate our growing family, we purchased a home in Southern California's San Fernando Valley. Our home, located on a 16,000 square foot lot, had a couple of citrus trees and a grassy lawn. Through the years, my wife tirelessly transformed our yard into a lush landscape of native wildflowers. She gathered a small library of popular gardening and landscaping books and took classes at a local arboretum. Under-informed on the dangers of pesticides, she occasionally used common chemical gardening products to "protect" the flowers from damaging insects and diseases.

As the years went by, we added a few more fruit trees and eventually a four-foot by ten-foot raised garden bed filled with soil and vegetable starts purchased at a big-box retail store. We enjoyed growing vegetables, but with hit-and-miss success—and added a second raised bed the following year.

In 2005, at the age of 37, Michelle was diagnosed with young-onset Parkinson's disease. As we learned about this debilitating condition, we discovered that some scientists believe a link exists between pesticide exposure and Parkinson's. We stopped spraying all synthetic chemicals, but still continued to wonder if exposure to these chemicals triggered her disease.

In the summer of 2013, as our kids grew into teenagers, my wife and I decided to move about 20 miles west to the less densely populated Conejo Valley. Our new home, where we still live, is situated on ¾ of an acre, with a driveway lined by a dozen citrus and stone fruit trees. Our neighborhood is zoned for livestock and horses, uncommon in Los Angeles County. This home's previous owners let the adjacent neighbor's goats and alpaca graze and relax in the backyard, and I had visions of a bigger vegetable garden from the very first moment we laid eyes on the property. Shortly after we moved in, we measured off a forty-foot by forty-foot garden plot and stepped up our food growing.

We call our backyard "Rancho Reiso" (Reiso is my nickname), and it is a happy space, with two African pygmy goat sisters, Alice and Charlotte, who add to the spirit and soul of our micro farm.

Alice and Charlotte playing near Rancho Reiso garden

Rancho Reiso jam

During our first gardening years, we amended the loamy native ground with organic soil purchased, again, from big box retail stores, and planted vegetable starts from garden centers. We began focusing on heirloom varieties not commonly found in grocery stores and, occasionally, started our crops from seeds ordered online. When it made sense, we saved seeds from successful vegetables and began a seed collection. We also began making compost, using garden cuttings, leaves, kitchen scraps, and the straw or hay blends from our goats' bedding and feed waste. About this time we also started filming our garden as a kind of video journal.

Taking the Next Step

As our organic gardening hobby blossomed, my wife and I began to watch documentaries on genetically modified foods and industrial agriculture. Much of this was new to us and deeply alarming. It became obvious that deception was rampant and institutionalized in our food system. We realized that big corporations regularly promote their products as healthy when they're nothing short of poisonous. Sadly, they often use slick, catchy advertising campaigns targeted at children or underserved communities, knowing these are not the most informed consumers.

Armed with, and alarmed by, this new knowledge, we eliminated GMOs and heavily processed foods from our grocery shopping lists and started frequenting farmers markets. We met people who grew food on small farms. As we learned about the loosening and questionable USDA organic standards, we recognized that higher standards also existed, which could produce healthier crops. The amateur garden videos I made began to include words of concern over conventionally grown produce, and our search for truly nutritious and responsibly grown foods evolved.

I work in Malibu, about 12 miles from our home via a scenic pass through the Santa Monica Mountains National Recreation Area. A couple of the better supermarkets in Malibu carry produce from One Gun Ranch just south of my office on the Malibu coast. A little over a year ago I started following their social media accounts and learned about their volunteer program. I signed up to work a few hours.

I had wanted to do some volunteer work for a few years but hadn't found a cause that spoke to me. Volunteering at One Gun sounded like a win/win opportunity—a chance to make a positive contribution at a local farm where I also might learn skills I could take home. A quick internet search on One Gun before my first visit showed me that they were a Demeter-certified biodynamic farm. At the time I hadn't heard of biodynamics, so I got a quick introduction via the internet before showing up the next day.

Upon arrival, I was blown away by the beautiful grounds. Directed to a flat strip of land nestled along the chaparral covered hillside, I saw where One Gun maintained a few-hundred raised garden beds, each one filled with two tons of compost. The pathways between beds were covered in white granite pebbles, and the entire raised bed and seed-starting was enclosed with netting to prevent wildlife from eating the crops.

I had never seen so many raised beds with such healthy, vibrant looking food crops. I had many questions about the ranch and biodynamics that day that I addressed to the young lady working with me. She told me that a gentleman they referred to as "Farmer Jack" was the biodynamic expert. Jack was not there every day but, as fate would have it, he showed up as we were planting seeds in starter cells filled with the compost he made on site.

Jack McAndrew is every bit the wise elder-farmer. He infectiously inspires children and adults alike. Soft spoken, with a kind and humble demeanor, he patiently answered my flow of basic biodynamic questions. After each answer Jack concluded with, "but you should read Rudolf Steiner's book called *Agriculture*, because the concept is more thoroughly explained."

At the conclusion of my first day volunteering, Jack said it was a shame they would probably never see me again because volunteers almost always come once and never return. I did come back a few more times, however, eventually purchasing a few bags of their "Superior Soil" BD compost, which I have since learned is made under Jack's guidance. During my last few visits, I didn't get another glimpse of Jack.

I was so enamored by the One Gun gardens, and admittedly by Jack too, that I did buy Rudolf Steiner's *Agriculture* course and began to read it. It's a demanding book on many levels, and I was unfamiliar with much of the terminology and context. At home, in addition to making our "house blend" of compost, we began to buy BD compost for our garden, as opposed to cheap soils and amendments.

Fortunately, my normal route to work takes me past a farm in Malibu located off Pacific Coast Highway near Point Dume, previously known as Vital Zuman, (an organic farm that had been operated by the same family for nearly 60 years). I had been a long-time farm-stand customer, but noticed that for several months it hadn't been open.

Curious about the farm-stand closure, I pulled into the driveway last spring and met the new curator, Kerry Clasby. She explained that she wanted to convert the newly named "The Farm at Malibu" from organic to biodynamic with the help of farmer Jack McAndrew. I told her I had met him a few months earlier and, after some conversation that touched on astrology, healthy food, farming, gardening and protecting the local environment, I offered to volunteer. Over the last couple of seasons I have spent time nearly every week at the Farm at Malibu, learning from Jack. As I slowly made my way through Steiner's *Agriculture* lectures, I had frequent questions. Jack helped clarify many of the more esoteric concepts that I struggled with. He has advised me to reread the book over and over, and while I have yet to take my second pass at it, I understand why he makes that recommendation.

At our home garden in recent years we had controlled pests by spraying organic products such as neem oil. However, biodynamics has taught me healthy soil, with a diversified mix of complementary crops, has less need to control insects. So we now tend to let nature run its course, with birds, lizards, and what we would call beneficial insects keeping bugs in balance. That said, occasionally we intervene when our garden crops are suffering. Jack taught me how to make a biodynamic preparation by soaking the insects I hoped to control (my first was earwigs) in rainwater from one full moon to the next full moon. I spread that fermented liquid across our garden and have yet to see an infestation of that kind return. This past spring we also added four hens to our backyard livestock of ladies, and they also play a role in pest control.

We keep a copy of Maria Thun's biodynamic planting calendar in the Rancho Reiso shed, and nearly every morning we look at it to learn which plants would be best served that day. Living a coastal lifestyle, I was already familiar with how the moon influences the tides, so its draw on plants was an easy concept for me to grasp. I like that the calendar also provides a framework that rotates focus to different crops on different days, spreading our consciousness and energies across the garden and trees. Now we pay more attention to the cycles of the moon, the equinoxes, and other significant astronomical events. That awareness deepens our connection to even the most distant heavenly bodies and acknowledges the interconnectedness between the microscopic and grandiose.

Mike with his mentor Jack McAndrew

At the Bottom of Everything. . . Is Compost

I have had the privilege of watching, and participating, when Jack applies Pfeiffer's biodynamic compost starter to the Malibu farm fields when we till in past crops (I even made a video and posted it online as a first attempt to share Jack's lessons with a broader audience). At the Farm at Malibu, we have also been using the compost starter in an approximately 40-ton "holding" compost pile of farm cuttings, organic produce waste, and some old on-site stockpiled horse manure.

This past November, Jack began making a "teaching" compost pile. He had bales of organic alfalfa hay and 20 tons of organic dairy-cow manure delivered to the farm. We ran irrigation lines to moisten the pile with well water. Each week since then, I have helped make compost, sometimes with other volunteers or farm employees, and occasionally just with Jack. Each week Jack has additional lessons or insights to share from his repertoire of techniques, like feathering to ensure even moisture, and use of the "holding pile compost" (defined by Jack as a pile holding farm waste before the biodynamic components are added and native soil to inoculate the BD compost pile). These have all been golden nuggets of knowledge. I have come to appreciate the meditation that the process offers also. And I am filming our

Jack instructs apprentices in the art of making compost

Farm at Malibu compost making sessions with the goal of putting together a video to share some of Jack's knowledge with anyone who wants to learn these lessons

My compost lessons at the Farm at Malibu have influenced how I make compost at home as well. Every time I whip up a batch of Pfeiffer's compost starter or field spray, I feel like I'm spreading the magic! And while I don't yet use a toilet brush as my magic wand the way Jack does, my practices are evolving. This fall we ordered the BD 502 through BD 507 compost preparations from the Josephine Porter Institute and, for the first time, we added them to our backyard pile. I am eager to spread the finished compost around our property in the spring, and observe its influence.

I joined a biodynamic group on Facebook and regularly read articles, testimonials, and follow the discussions of experienced BD practicing farmers and gardeners. Currently I am reading Alan Chadwick's book, *Obedience, Reverence And The Silent Garden.* Exposure to biodynamic principles has heightened my awareness of the interconnectedness of both the seen and unseen forces that range from the smallest microbes in our soil to the moon and sun and stars in the sky.

Looking to the Future

I am still a new student to gardening, farming, and biodynamic practices. I hope to continue to listen, watch, and learn from teachers, like Jack, who make new students feel welcome and valuable. And as I learn, I too hope to share the joy of growing food.

When our last child is off to college (just a couple of years from now), we may consider moving to a property where we can manage a small farm. Perhaps our current incarnation of Rancho Reiso is a beta version before we go big. Of course I'll have to guarantee my wife is comfortable with the plan, as we are a team effort. After all, she planted the first seeds of our shared gardening passion.

I dream of a farm with abundant clean well water, an orchard of mixed fruit trees, a small vineyard, and a big red barn with a vintage tractor. Throw in a flock of heritage breed poultry, a herd of pygmy goats for weed control, and of course a few majestic dairy cows to round out the livestock mix. And since it's my big Rancho Reiso dream, I'd like a pair of miniature donkeys to love and groom and pull a little chuck wagon for farm tours! Hey, it's my dream, right?

I envision a gathering place for us and our grown children, and hopefully one day, in the not too near future, grandchildren and their friends. I wish to share such a place with underprivileged and underserved school children. I would love to send each visitor away with a beautiful farm box filled with the fruit and vegetables they personally harvested.

Or… perhaps we will stay right here in our current home, content with an intensively planted backyard vegetable garden, a dozen or so fruit trees, and a few goats and chickens. So long as we can share the joy of growing food with others, and live more closely connected to the rhythm of nature, I would consider it a life well lived.

Climate Change Debate; Can We Turn Down the Heat?

Dennis Klocek

Scientist, researcher, biodynamic practitioner, and author, Dennis Klocek is well known in the biodynamic community. His books are studied in depth by students of biodynamics, and his web site, New Alchemy, *contains older articles he has completed and posted there, though he no longer keeps the website active. The following excerpt, dated July 14, 2016, comes from that site. It lays out some of the complexity of focusing on climate change depending on which side of the political aisle a person stands on. The article includes case studies that show a correlation between planetary alignment, especially Jupiter and Saturn, and historic surges in temperature during the past century. For those interested, the remainder of the article can be read on the* New Alchemy *site. He also has a complex but fabulous book available through JPI (jpibiodynamics.org), titled* Climate: Soul of the Earth, *mentioned elsewhere in this issue.*

There are many ways to think about the climate change debate and almost all of them lead to paradox and polarization. At the physical level of the debate, there are those who say that "greenhouse" gases have increased dramatically since the beginning of the Industrial Revolution. Greenhouse gasses are gasses that trap warmth in the atmosphere. These gasses are produced both through natural processes and through human activity. Researchers who voice the "green" position link the rise in the greenhouse gasses, particularly carbon dioxide produced by human technologies, with the recent rise of global temperatures. The " climate skeptics" concede that there is a calculable rise in carbon dioxide but that the science that links this rise to an anomalous rise in global temperatures is not rigorous. The primary skeptic objection is that most of the predictions made for temperature enhancement are flawed because of the inability of computer modeling techniques to reliably produce realistic climate analogs. A second objection is that even if there is a rise in global temperatures it is an error to attribute it to human activities.

These polarities have lead to posturing by leading proponents on both sides of the issue. This polarized level of communication obscures advances being made towards possible technology options that might be used in coming decades to stabilize atmospheric CO_2 concentrations. Some of these new advances include increased efficiency in wind and solar energy technologies, biomass fuels as a way to both generate power and sequester carbon already in the atmosphere, and sustainable agricultural practices. The list also includes such exotic "green" studies as bio-mimicry where scientists study how to mimic naturally occurring carbon sequestering chains in nature and enhance their output. New applications of fungi and their host plants are being studied as a way to detoxify atmospheric pollutants. However due to the uncertainty that rests in the public domain on these issues these hopeful and creative solutions are minimized in the polarized debate that dominates the current scientific community.

We could ask the question, do the polarizations that surround the response to the problem of climate change come out of the physics of the issues or does the polarization phenomenon have roots in another dimension such as a fundamental challenge in the human soul itself? Contrary to the current empirical basis for science the alchemists and Rosicrucian adepts who studied the natural world in times past understood that the life of nature was a metaphor for the life of the human soul. Their outlook was that the human being was the cosmos writ small and that issues in nature were irresistibly linked to issues in the human soul. As below so above, as above so below, was the mantra that most typified this insight. Seen from the perspective that the symptoms of climate change are representative of a soul problem, the American tendency towards politicizing scientific debate and the misuse of facts to create a climate of uncertainty is troubling on more than just a physical level. Unfortunately, the misuse of facts is something that is happening on both sides of the issue due to a mind set towards fundamentalism as the basis for human consciousness globally.

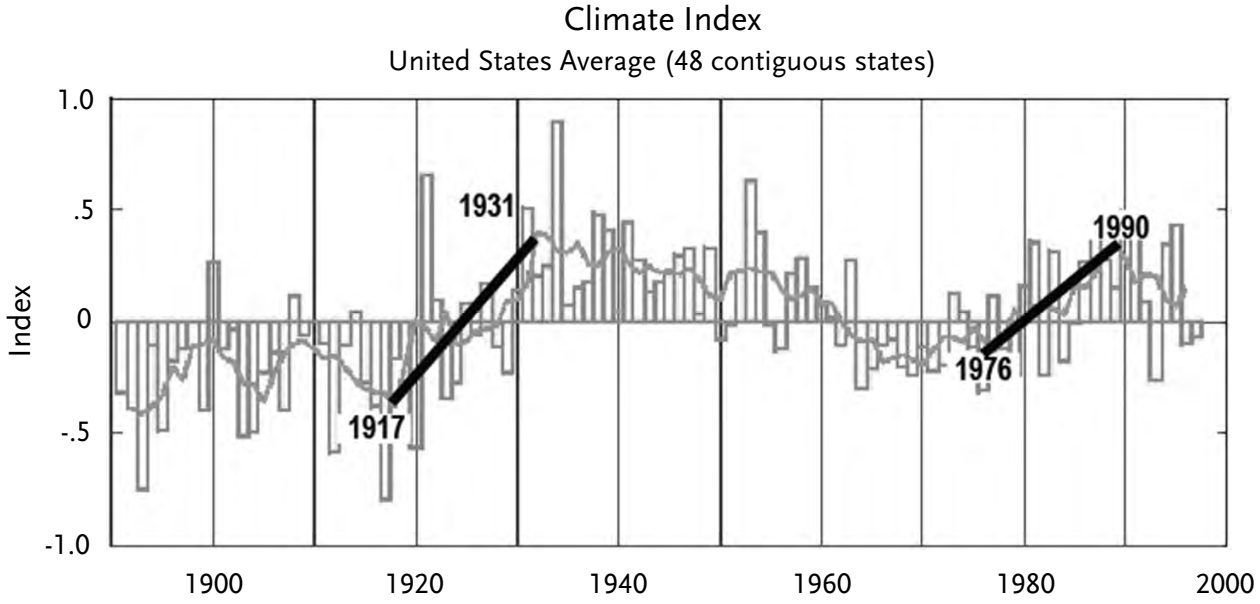
These phenomena point to the need for considering a higher perspective for the climate change debate. Would the scientific issues change if a spiritual perspective that focused on the cosmological relationship between human beings and the life of nature was the basis for a research approach? Along these lines we could also ask that if the spirit in nature is really linked to the spirit in the human being what is the true nature of that linkage? From an esoteric viewpoint these questions about climate debate are actually at the root of many teachings about spiritual renewal and personal soul transformation. Native Americans understood that humans came from the stars and needed to live in Nature in a sacred manner because as star beings they had a debt to the creator to oversee the Creation. At this level, the spiritual biography of human beings as a whole is intimately linked to the spiritual biography of the Earth as a living being. We are star beings who at the same time

are children of Nature. Native peoples often called themselves "the people." In this worldview, humans were the spirit people that came from the stars and would return to the stars when their bodies of flesh went back to the Earth. The Earth, in turn, was a spiritual being who supported this human sojourn into flesh through self-sacrifice. Many indigenous religions were based on this fundamental insight of the destiny issues arising between the Spirit of the Earth and the human being as a spiritual entity. This kind of spiritual perspective is glaringly missing in the current debate on global warming that is primarily being waged through statistical argument.

Understandably, for contemporary analytical science seeing the Earth as a spiritual being seems naïve at best and alarmingly deceitful at worst. However it is possible to take a scientific approach to the study of the Spirit of the Earth by looking at climate patterns in the context of the motions of the planets. By linking planetary motions with the information gathered by climate analysis it is possible to form models that illustrate how the rhythms of climate patterns are linked to the Spirit of the Earth.

The following case studies* describe several historic rapid atmospheric warming trends of the past century that were coincident with a remarkable series of planetary alignments. The intent is not to say that anthropogenic influences cited in [the] current climate change debate are invalid. The intent is merely to illustrate that there are potential benefits from studying long term planetary sequences in the context of long-term climatic events.

*For case studies and several charts (such as the one below) go to https://dennisklocek.com/climate-change-debate-can-we-turn-down-the-heat/)



Climate: Soul of the Earth, by Dennis Klocek

Reviewed by Mary Maruca

A book by Dennis Klocek is not for the faint of heart. Like Rudolf Steiner's own lectures, the work of Klocek requires focus and commitment. It is science based and thorough, but also projects the tone of excitement proper to a scientific inquiry that has revealed something unmistakably interesting. I first found this book when one of Klocek's students mentioned it. He told me it would be a challenge but the title convinced me that it was a book I needed to read. Who would not be interested in a book seeming to equate climate and soul, when soul refers to the being who mythology has long personified as Earth.

In fact, Klocek opens his book with a discussion of the word "atmosphere," which he notes that the Greeks regarded not only as wind, but also breath, soul, air, and vital principle. Later, during the Middle Ages, he continues, soul was known as "the air body" where consciousness dwelled. To simply express the complex principles the book eventually explicates, Klocek says, "The idea behind this book is that

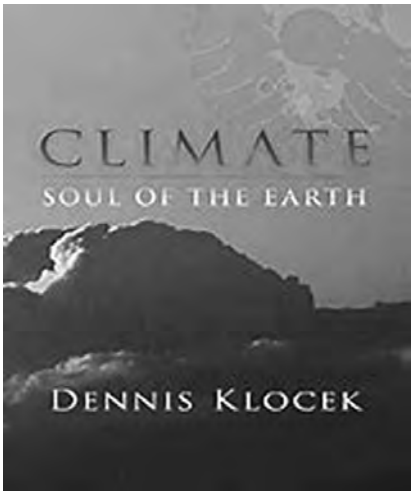
Earth, as a living being, also remembers. Events remembered by the Earth form a time series…the events that Earth remembers are the significant relationships that arise and dissolve with other planets in the solar system. They register in the Earth's soul as climate and weather patterns."

Many thoughts may be generated just from reading this initial chapter of Klocek's book. What follows it is an analysis of weather patterns using 30 years of climate calculations and a profound knowledge of the movements of the planets—an analysis that makes the reader wish people responsible for predicting and translating weather patterns into useful terms for the public were working closely with Klocek.

Klocek notes that the ancients developed means to precisely determine where and when certain planets would dominate the sky. If this were not significant, he asks, why would they spend the time and effort and mental vitality to accomplish it? Beyond this, Klocek postulates: "How can we track the relationship between planetary movements and an El Nino in a mathematically rigorous way? To do this requires . . . a rational, mathematical, and reproducible system of projection…and some sort of empirical, phenomenological, data-rich information source." For his information Klocek had the internet, something unavailable to those who first correlated the relationships between Earth and its companion planets.

It is interesting to observe how the complex movements of planets align with climate activities in a reproducible manner. Writes Klocek, "The lunar orbit is a rhythmic phenomenon. The migration of air masses is also a rhythmic phenomenon. The juxtaposition of the movements of the Moon with abrupt shifts in stable air masses makes it possible to track the movements of the Moon by watching the atmosphere over the northern hemisphere." Similarly, but in more complex ways, Saturn, Uranus, Mercury, Mars, Neptune and Jupiter play a part in the build-up and diminishment of El Nino and La Nina events in the Pacific.

Klocek's book amply illustrates these relationships and, though not specifically stated, points inherently to the value



of a cosmological perspective when attempting to read the weather patterns of the Earth, both for now and for times to come. As Klocek's research illustrates, Earth's climate patterns are woven in relationship with all the planets. And to take that one step further, with the actions of those that call Earth home. As above so below—the ancients knew this well and lived by it.

And so Klocek takes his analysis of climate a step further:

> "At the center of this book is the idea that the climate crisis is a co-crisis shared by humans and the Earth as part of our mutual evolution into higher states of consciousness. Not only is Earth the source of our body, but the Earth also depends now on our efforts to shift our consciousness toward goals higher than self-satisfaction, entertainment and consumption. Climate is the interface in which the results of our efforts to attain higher consciousness are displayed for all of the cosmos to see and evaluate."

May such awareness grow and expand in all of us, until Earth receives the respect that is her due.

Available for $35.00 from JPI at www.jpibiodynamics.org.

Introducing Our Newest Board Member: Pamela Sophiajohn

Although she is not a farmer, Pamela Sophiajohn has been a member of the Biodynamic Association since 2009 because she believes that biodynamic agriculture is a sacred practice that is healing to the Earth as well as to human beings. She also believes that the regenerative agricultural movement offers fertile ground for helping to bring the ideals of a threefold society and associative economy into the world.

Pamela learned about the biodynamic movement in 1998 through the Anthroposophical Society and her study of Rudolf Steiner. And before she became a JPI board member in October 2017, Pamela served JPI as a consultant on a variety of projects from July 2015 through January 2017.

Sophiajohn is an independent consultant, serving nonprofits across the country since 2009. Her service areas include grant writing, organizational and project planning, and fundraising and marketing communications. And as

a certified fund raising executive, she has helped to raise more than $14,000,000 in grant awards and campaign gifts for different organizations during this time.

Working in a variety of positions, Pamela has served more than 40 nonprofits, both large and small, during the past 20 years. Examples include the Institute of American Indian Arts (Santa Fe, NM), American Bar Association (Chicago, IL), C. G. Jung Institute (Chicago, IL), Grand Lake St. Marys Restoration Commission (Celina, OH), CHOICES Center for Domestic Violence (Columbus, OH), Mercer County Chamber of Commerce (Celina, OH), and SIREN Baroque (New York, NY). In addition, her experience includes assistance to anthroposophically inspired organizations such as the Camphill Foundation, Spikenard Farm Honeybee Sanctuary, and the Biodynamic Farm & Garden Association.

Call for Board Members

The JPI Board of Directors is seeking additional members interested in serving JPI's mission of distribution, education and research of the biodynamic preparations. Board terms are three years in length, with a term limit of two consecutive terms. Members commit to approximately five to ten hours per month while serving on the board. Board meetings occur monthly and are conducted by conference call. An annual in-person meeting in Floyd, Virginia, at the JPI headquarters is also required. Expertise in preparation making is not a critical qualification for membership but is certainly valued. Experience in non-profit board membership in similar organizations or in biodynamic or regenerative agriculture is preferred. Please contact JPI at jpiadmin@jpibiodynamics.org, using "Board Membership" as the subject line if you are interested in serving.

Save the Date

March 11: Promise of Biodynamics
Part 1 of a two-part intensive workshop series for biodynamic orchards and vineyards with Mike Biltonen, to be held at Fingerlakes Cider House, Interlaken, NY. http://knowyouroots.com/orchard-classes2.html.

March 15–18: Soil: Ground of Existence—Encountering the Science, Art, and Sacredness of Soil
A workshop to be held at Emerson College, Sussex, England. https://www.biodynamics.com/event/soil-ground-existence-encountering-science-art-sacredness-soil-workshop/2018-03-15t000000-2018-03-17t000000.

March 16: Principles and Practices of Biodynamic Beekeeping at Spikenard Farm Honeybee Sanctuary, Floyd, Virginia
https://spikenardfarm.org/calendar/action~month/exact_date~1519880400/request_format~json/.

March 16–18: The Next Step—Biodynamics as a Science of Initiation and the Evolution of Form
With Enzo Nastati and Frank Church at Hawthorne Valley Waldorf School, Harlemville, New York. steinerbooks.org.

March 23–27: Man's Journey from Creature to Creator: An Initiation Path
Seminar with Enzo Nastati at Viva la Vita, Panonia, Colorado. http://www.vivalavidafoundation.org/seminars-workshops.html.

April 3–5: Our Farms, Our Future Conference
St. Louis, Missouri. www.ssawg.org/january-2018-conference/

May 6–7: International Biodynamic Wine Conference
At the Golden Gate Club, San Francisco. http://www.demeter-usa.org/international-biodynamic-wine-conference/. https://eco-farm.org/conference

August 11: Bio-Intensive Orchards and Vineyards
Part 2 of a two-part intensive workshop series for biodynamic orchards and vineyards with Mike Biltonen, to be held at Fingerlakes Cider House, Interlaken, NY. http://knowyouroots.com/orchard-classes2.html.

November 14–18: North American Biodynamic Conference
Portland, Oregon. https://www.biodynamics.com/conference.

May 2018–July 2019: Sustainable Biodynamic Beekeeper Training
Two year program at Spikenard Farm Honeybee Sanctuary, Floyd, Virginia. https://spikenardfarm.org/store/sbbt_2018-2019/.

September 11–13, 2018: National Heirloom Expo
Santa Rosa, California. http://theheirloomexpo.com.

For additional listings of events, classes and workshops see the Biodynamic Association calendar at www.biodynamics.com/calendar.

ONGOING

Biodynamic Association Webinar Series
For a small fee, the Biodynamic Association offers ongoing webinars on pertinent topics. https://www.biodynamics.com/webinars

Chesapeake Biodynamic Network (CBDN), College Park, MD
Meetings held monthly on Saturdays at the Christian Community Garden Grounds in College Park, MD. Contact Michael Judge for info, mjudge2000@gmail.com.

The Pfeiffer Center, Chestnut Ridge, New York
Workshops and trainings. http://www.pfeiffercenter.org

Spikenard Farm Honeybee Sanctuary, Floyd, VA
Classes in sustainable beekeeping and biodynamics. Apprenticeship/internship opportunities. Please visit www. spikenardfarm.org

The Triangle Biodynamic Network, Hillsborough, North Carolina
Second Saturday of the month. Contact Jon Lyerly at Jelyerly2@gmail.com.

White Rose Farm, Taneytown, Maryland
Educational food and farm events, festivals, celebrations and biodynamic farm days. www.whiterosefarm.com.

Reminders

- Associative Contracts are due by or before March 31, 2018, to qualify for a discount. For more information and to access the contract, go to: www.jpibiodynamics.org/associative-contracts/.
- Time to renew *Applied Biodynamics.* Annual subscription is $30.00 (print) or $20.00 (pdf): www.jpibiodynamics.org/applied-biodynamics-jpi-periodical/

World Biodynamic Farming Day

Over a 24-hour period this spring (date TBA), groups and individuals around the world will be spraying biodynamic preparations, creating a wave of healing energy encircling the planet. There will be community gatherings with music, poetry, eurythmy, and prayer in celebration and gratitude to accompany the stirring and spraying of the preparations.

At JPI, we encourage you to take this opportunity to spray all of the preparations out during this powerful synchronized event. Barrel Compost (which contains all six of the compost preps) could be added to the horn manure during the last twenty minutes of stirring and sprayed out together in the evening. The following morning, Equisetum tea (BD 508) could be added to the horn silica during the last twenty minutes of stirring and sprayed out together at sunrise.

The JPI "Sequential Spray Kit" contains all of the preps needed for this activity. We encourage you to participate in this coordinated event wherever you are, knowing that others around the world are in coherence with this intention of healing the Earth.

Please share news of World Biodynamic Farming Day. The more people who participate, the more powerful and pervasive the biodynamic healing influence will be. For more information and to connect with others who are participating, visit www.worldbiodynamicfarmingday.org/

Dandelion Blossoms Sought

JPI welcomes your contributions of dandelions, chamomile, and yarrow for our preparations. Now is the season to collect dandelions! Your efforts ensure an adequate supply of BD 506. Thank you to all who have contributed in the past. Would you like to harvest dandelion or other preparation materials for JPI? If so, please contact JPI for collecting and drying information.

"All things in Nature are in mutual interaction...when we trace these intimate relationships in Nature, we gain insight into the essence of what is harmful...It is no true economy to exploit the surface of the earth to such an extent as to rid ourselves of all the things I have here mentioned [forest, orchards and shrubbery, and meadow-lands with their natural growth of fungi] in the hope of increasing our crops...You cannot truly engage in a pursuit so intimately connected with Nature as farming is, unless you have insight into these mutual relationships of Nature's husbandry."

Rudolf Steiner, *Agriculture Course,* (Adams translation), p. 132–133

SO THAT THE EARTH MAY BE HEALED

The Josephine Porter Institute
for
Applied Bio-Dynamics, Inc.
201 East Main Street #14
Floyd, VA 24091

Non-Profit
Organization
US Postage
PAID
Floyd VA
24091
PERMIT NO 33