Living Energy Farm

November - December 2016 Newsletter

LEF in The Atlantic!

Living Energy Farm will be discussed in an article online in The Atlantic in the next few days. Check out TheAtlantic.com

Upcoming Workshops at LEF (Please Post/ Forward)

Pruning Fruit Trees and Orchard Maintenance

Two Dates, Two Locations

The workshop will start with a *brief* overview of orchard planning, what grows well in Virginia and what does not. We will then talk more in-depth about pruning and orchard maintenance. You will have a chance for some hands-on pruning of fruit trees. Fee is \$25, but no one turned away for lack of funds. First location and date, Sat, Feb 4, 1 PM, at 217 Fredericksburg Ave, Louisa VA, 23093. Date does NOT cancel in bad weather.

Second location and date, Sat, Feb 11, 1 PM, at 912 Woodfolk Drive, Charlottesville VA, 23093. If it snows even a little bit, this date will cancel and we will convene Sat, Feb 25, 1 PM.

Orchard Planning

We are pleased to announce the **Michael McConkey of Edible Lanscaping** will be co-leading this workshop. Michael has been running Edible Landscaping for 35 years, a successful nursery that focuses on "less care" plants that don't need pesticides to thrive.

Want to learn how to grow food on trees in the Mid Atlantic, with no spray and minimum effort? There are numerous varieties of fruits and nuts that will produce prodigious quantities of tasty food without toxic chemical sprays. Many of these plants thrive on neglect, and tolerate drought and mediocre soil. For the most part, they are not the kinds of fruits you buy in the grocery store. If you want your own productive orchard, you can't just buy trees from commercial nurseries. You have to know what to plant! Cost is \$30, but not one turned away for lack of funds.

Sat, March 11, 9 AM to 4 PM, 217 Fredericksburg Ave, Louisa VA, 23093. If it snows, then this event will happen Sat, March 18.

Fruit Tree Propagation and Grafting

Want to learn how to propagate any fruiting plant? This is one of our most popular workshops, an allday intensive that will teach you how to propagate any plant. We will talk about growing from seed, rooting cuttings, and layering. We will discuss, demonstrate, and practice several grafting techniques. (This year there we are charging less for the workshop. Rootstock will be available for \$3 - \$5 each, not provided as part of the registration fee.) Cost is \$30. Pre-registration required, email tradelocally [at] yahoo [dotcom]

Sat, March 25, 9 AM to 4 PM, 217 Fredericksburg Ave, Louisa VA, 23093.

An Off-Grid Immersive Experience -- Are You Interested?

Would you be interested in spending 3 days living off grid, and learning about how it's done? We are considering offering off-grid immersives starting later this year. You would spend 3 days helping with cooking, cleaning, gardening, and running the farm (to the extent you are able). You would attend workshops each day to learn about the tools and technologies that support a modest and comfortable off-grid lifestyle. We would probably charge \$50 or so. You would stay at LEF or a nearby

house. These immersives would be accessible for people who have limited mobility or cannot do heavy physical labor. We are NOT scheduling immersives vet, but we would like to see how many people might be interested. Shoot us an email or a letter if you think this is something you might want to do. (Contact information is at the address at the end of newsletter.)

Woodgas at LEF

December 12, 2016 was a momentous day at Living Energy Farm. We have been living and earning our living without fossil fuel for a while now, with the exception of the gasoline tractor that is the backbone of our farming operation. On December 12th, we finally started driving around the tractor on woodgas! That was an exciting event for us. I

have wanted to set up woodgas since I was a child.

Woodgas Tractor!

Melted Woodgas Reactor, ooops....

I had dreams about tractors that night. That was fun.

The following days were less fun. An engine under full load uses a lot more energy, and fuel, than a engine just puttering about. We hooked the bush hog to the tractor and took it into the cover crop from last summer. That stuff needs to be mowed before spring, and the bush hog loads the tractor engine down hard, so it seemed like a good time to power test the gasifier. We had done some work early on with homemade gasifiers, and then spent several thousand dollars on a manufactured gasifier. We spoke at length with the supplier, and they were sure their gasifier would handle our 35 horsepower tractor. When we power tested it, the gasifier heated up quite a bit. After cool-down, we checked it over. There's no pretty way to say it. We melted it. Not the whole thing mind you, but the stainless reactor in the bottom of the gasifier was all but gone.

There is a vahoo woodgas list. Consulting the various opinions, we have come to the conclusion that the gasifier we spent so much time and money on simply cannot handle a 35 hp engine under load. Our plan has been to have two tractors on the farm. The 35 hp tractor to handle the heavy tillage, and a little one-row tractor to do the planting and cultivating. The cultivating tractor is half the horsepower of our "big" 35 hp tractor (which is very small by modern standards). So now we have rebuilt the melted reactor and we are putting the gasifier on the small cultivating tractor. We can, if we have to, run the whole farm with just the small cultivating tractor.

With our simple experiments thus far, it is clear that woodgas has its headaches. Just getting decent sized chips without an industrial chipper is slow. So far it takes us close to an hour to process fuel to run the tractor for an hour. There are numerous designs for homemade "chunkers" to make woodgas chips. We may build one of those. The whole question of what level of technology is actually sustainable is a complex one. The reality is, for all the idealistic banter around various kinds of



farming, we all live on industrial grains. We are trying to produce such grains on a modest scale with sustainable technologies. As with all forms of renewable energy, decreasing demand is by far the biggest issue. Given that our tillage needs are modest, even an annoying fuel source is probably worth it so we don't need fossil fuels. In the coming months, we will see how that comes together, and just how much annoyance is involved....

Enjoying the Warmth of a Solar House

Though our woodgas clearly needs some development, other aspects of the project are going fantastically well. The glory of a solar house is truly fantastic. The hum of the 180 volt solar blowers during the day is such a comforting sound. We know it means we don't have to cut firewood, blow a lot

of woodsmoke into the air, or pay a utility bill! When the sun shines, the house is comfortable even in bitter cold temperatures. We build fires when it is cold and cloudy for days on end. The amount of firewood we burn for heating is very small, so we do not need to invest in expensive woodburning equipment. The house is also not complete. It is clear that most of our heat loss at this point is out the doors and windows. Once we get thermal curtains on them, the thermal performance will likely be much better.



Reclaimed Tile World Mosaic

Nickel Iron Testing

The Nickel-Iron (NiFe) battery testing has been all but miraculous. The marriage of old technologies (NiFe batteries) and new technologies (modern DC LEDs and photovoltaic electricity) is absolutely amazing. We had used lead-acid batteries until we could get the NiFes hooked up. Output



The Miracle of DC LEDs, 24 Watts Lights a Large Living Room

from lead-acid batteries is like a river headed for a waterfall. As long as you are at the top, life is good. When the voltage collapses, you're done.

The NiFes are very different. The NiFes are expensive, bulky, and heavy. Their nominal output (rated in amp-hours) is poor compared to lead-acid. But actual performance could not be more different. Our goal in testing the NiFes is to see how many houses in a village (or how many rooms in a cooperative house) we could light up with LEDs, and how many cell phones we could charge. We had a set of 500 watt panels charging the lead-acid batteries. We didn't have a charge controller large enough to handle the output of those panels. So we brought a smaller set of PV panels we had been using for irrigation pumps up to the house and tied them to a smaller charge controller and the NiFe batteries. The problem was that we did all that in the early fall. All of our permanently mounted PV panels are up high so they don't get shaded. But as the sun has fallen toward the horizon this winter, these "new" panels ended up in the shade. By December, the charge meter said we were only putting about 10 amp-hours into the batteries. Converting that to incandescent light-bulbs, we were collecting enough electricity to light up two 60 watt bulbs for one hour. That's all. I sighed, expecting the NiFes to discharge, and made plans for what to do next. We have been lighting the house and the kitchen, and charging cell phones and personal devices without restriction. And then the miracle. The Nifes didn't discharge. They discharge current in a whole different way than lead-acid batteries. We have never seen voltages below 12.2 V coming from the NiFes, even with weak input. The LEDs are good down to 9 volts. The discharge current from the NiFes is steady and strong, each decimal down. No waterfall.

Now we have swapped equipment around again, and are now charging the NiFes from a panel on the roof. We have learned a few things. A very modest (100 amp-hour) NiFe set will power a lot of LED's. A modest PV panel is all that is needed to keep them charged. We still don't know the maximum output of a 100 amp-hour NiFe set because we are so far away from actually "maxing out" the current system. It is clear that we can support numerous houses in a village with DC LEDs, a couple hundred watts input, and a modest set of NiFe batteries. Somewhere between "numerous" and dozens. We'll see.

Solar Boiler

We haven been working a bit on the solar boiler as well. Not much to say about it just yet, other than we have set a few pieces of paper on fire in front of our large satellite dish that we set up to use as a collector. We have started experimenting with solar troughs as well (not starting from scratch, mostly using other people's designs). In thinking about taking LEF's ideas around the world, we realized that a setup with a trough instead of a dish might be easier and cheaper. Our warm-climate trough design is MUCH simpler than the cold-climate design. No tracking, no pumps (maybe). Stay tuned.

Growing Food on Trees at LEF

Growing food on trees is by some measures the most benign form of agriculture. Trees have huge root systems compared to annual plants. Orchards sequester carbon, build soil and have no

erosion. And fruits and nuts taste good! Since we started LEF, we have been trying to build or capacity to grow food on trees, and to figure out what works and what does not. We realized that a lot of the plants we wanted to grow will not work in the new age of polar vortex oscillation. We have shifted to more cold resilient trees. We have also struggled to do so many things at once. Now we have an orchard intern, Conner, who brings a most welcome energetic approach to life at LEF. Welcome Conner, We look forward to harvesting fruit this year!



Conner, our new Orchard Intern

Our DC Economy Continues To Grow

We have been enormously pleased at our ability to do all manner of work with high-voltage, direct-drive DC power. We added two new DC tools this month, electrifying our grain grinder and setting up a compressor with a DC motor. We run these tools when the sun is out -- no inverters, no fancy electronics.



Direct-Drive DC Compressor



Direct-Drive DC Grain Grinder

Agricultural Choices at LEF

Now we're in the final stages of finishing the house, which is an exciting time. We've been postponing other projects until basic infrastructure was done. Once the house is done we can hopefully build a few other smaller buildings we need (shop, greenhouse, root cellar). We hope to improve our food self-sufficiency. And we are working to connect with other groups to spread LEF's ideas to other villages around the world.

Part of our expansion of food production will include bringing in a few farm animals. We've had more than a few visitors come out to the farm and ask (not in these exact words), "If you're a farm, where are the animals?" Diets based around animal foods are so deeply ingrained in American culture that many people see farming as mostly about raising animals, without much thought about the plants that support them. At LEF, we believe that buying industrial GMO grain at the feed store and feeding it to animals isn't a whole lot better than eating GMO grain ourselves (environmentally, it's worse). We do like eating eggs, so we have been wanting to get some poultry; but first we needed to grow the grain to feed them. And we did, last year, grow a bumper crop of Florianni flint heirloom corn. We've been eating a lot of it, and we'll use some of it to feed a small flock of ducks that we plan to get this year to supply us with eggs, meat, fertilizer and entertainment.

But what about grass-fed ruminants? We don't plan to incorporate these animals into our farm any time soon, for two reasons. The first is that we don't have much grass. Our land is a mixed hardwood and pine forest that was clearcut 6 years ago and is just starting to recover. (We did experiment with feeding goats out in the recovering forest, but the project consumed much more time than it was worth.) Clearing land for pasture and hay fields would be difficult and energy intensive, and we barely have enough cleared for annual crops and orchards, which take much less space than pasture and hay. The second and more important reason is we want to demonstrate farming techniques that can feed people sustainably with less land. For us this means growing food on trees, annual crops, and small scale poultry. We recognize that agricultural choices are always local, and grazing animals will always be an indispensable part of food production in lands marginal for agriculture, particularly for some indigenous cultures. But in land such as ours where rainfall and fertility are sufficient to support a plant-based diet, we believe it is better to feed people with less land instead of more. And while it is true that a well managed pasture can build fertility, well managed annually cropped farmland and orchards can do this as well with the use of cover crops, fallow periods and minimum tillage, with *much* more food produced per acre, and without the methane emissions of ruminant animals. Our goal at LEF is to create a model of sustainability that can be applied globally. The reality is that cattle, especially grassfed, can only be produced on a scale to feed the wealthy.

Our daughter, Rosa, is 5 years old and more than anything in the world, she loves wild animals. We have read her stacks of books about conservation and saving endangered species. Over and over the theme comes up of habitat loss. The sad reality is that animal life on earth, once stunning in its diversity, is now almost entirely made up of humans and our domestic animals. Globally today only 2-6% of terrestrial zoomass (weight of land animals) is wild; the rest is humans and our domestic animals, two thirds of which is cattle and other ruminants. The number one reason for loss of wild animals is land being converted to pasture and grainland to feed animals. Ninety percent of rainforest loss is directly attributable to expansions in animal agriculture, beef in particular. The planet Earth is now facing its sixth mass extinction in 4.5 billion years specifically because of our predilection to eat excessive amounts of meat. That is an incomprehensible theft from our children, from all future generations. So even though we eat wild animals sometimes at LEF (particularly the deer and rabbits who like to eat our vegetables and seed crops), when Rosa asks what we can do to help wild animals, we tell her that we eat mostly plants -- and encourage others to do the same -- so more land can be left wild.

Article about LEF in The Central Virginian http://www.livingenergyfarm.org/cvarticle.pdf LEF on CNN http://www.cnn.com/interactive/2015/09/us/communes-american-story/ Cville weekly in Charlottesville VA http://www.c-ville.com/off-grid-model-environmentalism-made-easy/#.VcHobF054yo First video on youtube https://www.youtube.com/watch?v=ppTBO8d6jhY Second video on youtube https://www.youtube.com/watch?v=wdSX_TIYkD4 Video on vimeo https://vimeo.com/128744981 Slideshow produced by Alexis a while ago https://www.youtube.com/watch?v=4x_C3iScoAw

Living Energy Farm is a project to build a demonstration farm, community, and education center in Louisa County that uses no fossil fuels. For more information see our website www.livingenergyfarm.org, or contact us at livingenergyfarm@gmail.com or Living Energy Farm, 1022 Bibb Store Rd, Louisa VA, 23093. Donations to the Living Energy Farm Education Fund are tax deductible.