The Oil Drum: Campfire

Discussions about Energy and Our Future

From Cubicle Nerd to Cucumber Vendor: Learning Small Scale Farming in Mid-life

Posted by Jason Bradford on December 20, 2008 - 12:42pm in The Oil Drum: Campfire
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This is a guest post from Jim Dunlap (Wyoming) about his experience as a new farmer in Virginia and is part of our Wed pm/Sat pm TOD: Campfire series, where we will post articles more related to personal, local and social responses to our resource and environmental predicaments.

Like many posters on The Oil Drum (TOD) I find the subject of how we are going to feed ourselves in our future world of constrained energy supplies and climate change fascinating and complex. Partly by design and partly by happenstance I am living a version of the kind of life some believe will become not only the norm but required of large numbers of people in our future world. This post is an attempt to describe some of my experiences growing food on an 11 acre farm during 2008. Earlier TOD discussions, involving such posters as Jason Bradford, Wisdom from Pakistan and others on carrying capacity, minimum food requirements, production possibilities and other aspects of small scale agriculture, led me to think that a description of the effort and results of one farmer, at the small end of the farming spectrum, would be interesting information for many on TOD and might generate meaningful discussion. So here goes.

Background

Motivations

In a way you could describe my operation as an experiment. I am a retired engineer with a pension, some investments, no debt and a spouse with a full time career. I think working at meaningful and productive tasks is an obligation that lasts a lifetime and following my retirement from a highly stressful career I was looking for something to motivate me that was more relaxing. I think there is a lot that can be learned about future possibilities if we try sample solutions and see how hard they are to execute and whether they can satisfy reasonable objectives. What happens if the economy crumbles to the point that significant numbers of the populace are required to return to the land and grow food for the rest of us, in a resource constrained world? What percentage of the population will need to return to farming? Can citizens similar to myself make a go of it? What is the learning curve? What works and what just does not? Hopefully the information I present here will let others make judgments about what they could accomplish if put in similar circumstances.

The beginning

I started this experiment in 2007 so this is the end of my 2nd year. I am well into planning for year 3 and am strongly leaning towards evolving my operation into one which I could claim is "professional" in that a farmer could make a minimal living income from it. The real point that success needs to be measured at is where this scale of farming generates enough results that it is a sound choice for others. Not just a survival mode, but rather a reasonable family and financial choice for a segment of society that will contribute to the overall success of everyone else. If we don't figure out how to create such possibilities, as we wind down our "living beyond the worlds means", we will indeed find ourselves in that survival mode. My life experiences have taught me that Murphy was right (everything that can go wrong will go wrong – unless you plan for it). I am trying to plan for it.

I am not asking the question "Can this type of farming be profitable?" as the answer to that is clearly "Yes". There are many profitable small scale organic farms. But those farms are not being operated by people like me. I am not an expert organic vegetable farmer, they are. The question that I think I am trying to answer lies along the line of "Can a middle class middle aged cubicle nerd stand up, snap off the computer, walk out the door and successfully return to the land? Or will he fail, and a lot of us thereby starve?" It has been interesting so far! For reference, I am in my mid-50's, very fit and a life long workaholic. While my interest lies in determining if the cubicle nerd can adapt to this lifestyle that question does exactly fit me. My life experiences (work history, living conditions, skill sets and inclinations) are such that this activity is far easier for me to adapt to then all but a small percentage of the population. That being said, I think that what I learn and the issues that I run into will be relevant to many who might be interested in the subject or choose to try such an occupation.

Having a solid foundation in science I want to caveat what I present here. What follows is not a scientific work in any way. There is data, yes, but not rigorous data. Some is approximated and, in analytical terms, there are serious holes in it. But I am not trying to scientifically prove anything. This is just an example of what I have done and learned. If it generates a lot of interest and suggestions I will likely plan on a repeat posting in another year with more data and thoughts.

What are we talking about?

Many discussions of farming and production results often get sidetracked, to some extent, because the different posters are talking apples and oranges.

Not all soil is equal, not all areas receive the same amount of rainfall, sunshine, wind, frost free conditions, etc. What one farmer can accomplish at his location cannot necessarily be replicated at another farm. And a good farmer can grow rings around a bad one on the same piece of ground. This is true for farms quite close to each other and especially true for those separated by great distances. You cannot grow rice where I live now and you cannot grow most of the vegetables I produce in the land of my birth (Wyoming). Industrial grain farming or cattle operations are so different from what I do that it is almost impossible to compare them in any meaningful way.

Before I started my current farming activities I was far more knowledgeable of cattle operations than any other type of agriculture. I will go into a fairly detailed description of my place in order to allow those reading this post to take into account the specific local conditions at my farm when they compare my experiences with theirs.

Description of 2008 on Wyoming's Farm

Methods of farming

I farm organically and use no pesticides, herbicides, fungicides or synthetic fertilizers. I use natural soil amendments, composted manures and vegetable matter, green manures, etc. Pest control is primarily conducted through companion planting, designed to ward off bad insects and attract beneficial insects, and crop rotations designed to disrupt pest cycles. On rare occasions I have used OMRI certified materials to treat severe pest problems or have purchased beneficial insects (lady bugs) and loosed them on the pests. Weed control is via cultivation, mulching and crop rotation. I chose to use organic methods because I think that we have far more to learn about what can be accomplished in small scale farming by using organic methods than there is to learn using chemical based methods. In the future I believe that it is conceivable that widespread use of pesticides and herbicides will not be available to the non-industrial farmer. Such things being reserved for those involved in growing massive amounts of product via monocropping. While I believe that, in the future, farmers growing food for sale will likely be first in priority for fuels, I expect that the large industrial farms will first among equals on that account as well.

Weather

My farm receives some 40 inches of moisture a year that is fairly evenly distributed with no month averaging less than 2+ inches and the max month being less than 4 inches. Spring can often be very wet, making planting with heavy machinery (not an issue of mine) problematic. If the soil gets really wet it takes a significant period of time to dry out. During drought conditions the ground becomes rocklike hard and heavy rains mostly run off until the ground re-hydrates to an appropriate amount. While winter, spring and fall rains often tend to be slow and steady, summer rains are often violent and fast. We receive minimal snow during the winter with an average season totaling about 20 inches. The last 3 years, however, have seen less than 10 inches of snow. This area of the United States has fairly hot and humid summers. Mid-summer highs are commonly above 90 degrees F and occasionally reach 100 F. Last frost averages 24 April and first frost averages 24 October. This gives us 183 days of growing season, not counting what can be added via the use of high tunnels and row covers.

Geography

My farm (a giant 11 acres) is located in Northern Virginia in an area called the Piedmont at about 39 degrees latitude. My land is on the foothills of the easternmost ridge of the Blue Ridge Mountains and mostly slopes gently to the east. The soils here are loam or silt-loam, which have a natural pH between 5 and 6. The land here can be very rocky and, even though this property has been farmed since the 1780's, I still harvest my share of rocks. I have a large spring fed pond that I use for irrigation purposes and, in even the driest of times, I will not want for water. Not all farmers in this area have that advantage. Using well water for irrigation is not possible for many farmers in this region as wells often do not have significant capacity, due to the lack of underground aquifers and the high cost of drilling as deep as 750 feet through granite. In this area most "agricultural" land is not being used for agriculture at all, but rather to provide a nice place for all the pet horses to run around. There are a few cattle and other livestock operations in the area, but they are dwindling over time as development pressures (taxes and greed) overwhelm them.

Inputs

As mentioned above, the natural soil pH here is too low for ideal growing conditions and frequent liming is required. My primary liming material is ashes from burned hard wood trees. As I heat

my house mostly with wood from the surrounding forests I wanted to use the ashes in a productive way and wood ash is a good liming material that also has many micronutrients in it. However, using wood ash requires great care as a small amount can dramatically raise pH and the effects are not predictable. I also use calcium carbonate from a nearby quarry for liming. The bottom land soil type on the farm is often deficient in boron and requires supplements. Other than liming and boron requirements I have not yet needed to add anything beyond what arrives naturally via the composts and manures. I have never purchased prepared organic fertilizers or potting mixes preferring to manufacture my own on site.

Next year I am going to experiment with the use of commercial organic fertilizers in order to compare its effect on production to the methods I have been using to date. I am pretty sure that I will see significant improvement. Those who are more expert at building high quality compost might find that commercial organic fertilizers are not worth the extra expense. I only know one farmer who is generating all composts/fertilizers on site and they achieve excellent results. This farm has 180 acres to utilize and very expensive and large equipment to turn over the windrows of compost they are making. They manufacture about 250-300 tons of compost a year. They are very knowledgeable and committed. And they have put a lot of money into the effort. I am not sure that they have saved any money over just purchasing the inputs, but they are very self-sufficient. There are equipment issues to take into account that effect any judgments one might make about their decisions.

In 2007 I trucked in about 40 yards of a compost made from horse manure and bedding material that I used during the 2008 year. I purchased greensand, rock phosphate, blood meal, sand and peat moss for use in making my potting mix. I understand that a highly efficient and very knowledgeable farmer could probably/possibly, take this farm and run it without bringing in outside inputs. But I am just not there yet.

Fields

I am currently growing on 5400 feet of 4 foot wide raised beds. This sounds like a lot but it is actually only ½ acre of actual planted square footage. In normal farming terms one would say that I am growing on about an acre as everyone counts the aisles between the beds and a border around the actual area one is growing on when they state their acreage. Like I said, I am working on the small end of the scale. I wanted to give an exact amount as I think that this will allow those reading to be able to make more accurate comparisons to their own data. The beds are broken up into 4 separate gardens located in sort of a semi-circle around the pond. These gardens are on 3 different types of soils. A complication that I am not yet expert enough to take into account when making farming decisions.

I also have a small number of peach, cherry, and pear trees that I harvest the fruit from for sale at the markets. I have a total of 40 trees, but most are young and not yet in production. I have about 150 feet of blackberry bushes in production. For 2009 we are adding in another acre of gardens and will add about 100 feet of blackberry bushes. We will replace any fruit trees which do not survive the winter or the deer. All the garden areas are enclosed by deer fencing and electric wire as deer predation in this area is severe due to their out of control population and it is not possible to vegetable farm on any scale without fencing the deer out. Even home gardeners have to have deer fence in our area (an interesting issue for those contemplating suburban gardening). I also have to deal with significant populations of ground hogs, raccoons and rabbits. We have 2 bee hives that we started this spring and they are doing well. Barring problems, we should be able to start harvesting honey in 2009.

Equipment

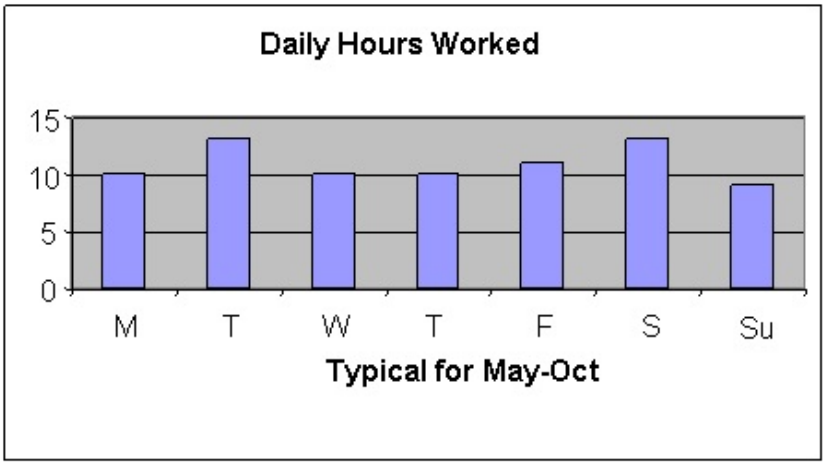
My tractor is a BCS 853 two-wheeled (walk behind) tractor with an 11 hp diesel engine. Tractor implements consist of a tiller, rotary plow and flail mower. I use an Earthway seeder when appropriate and hand seed as well. All transplanting is done by hand. I have various hand tools for cultivating and other farm work. I have a Pacer irrigation pump and sand filter which pressurizes

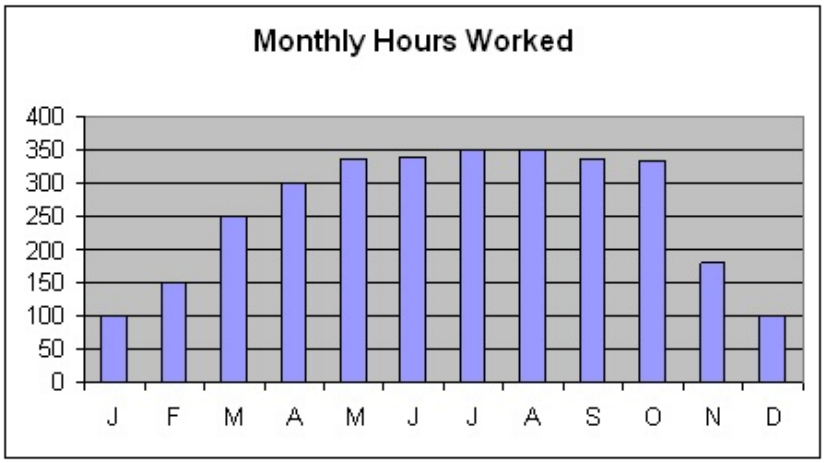
a trickle irrigation network that reaches all growing areas as well as many of the fruit trees. There is also a catchments system I installed that collects rain water from a large equipment building and funnels it into a 1550 gal storage tank. This water is used to irrigate the remaining trees and berry bushes. I have an old garden tractor with no mower deck that I use to pull a utility wagon. I use a push mulching mower to mow between my raised beds, a weed eater for obvious reasons and a riding mower to mow areas around the fields. I use a 1994 Chevy 4X4 pickup around the farm and for transporting my produce to farmers markets. I have a 10 by 20 foot greenhouse that I use to grow transplants for the gardens and potted plants for sale at the markets. I heat the greenhouse via a kerosene heater (yes I know that this is sub-optimal but I already owned it and am being cheap) and supplement it on very cold nights with electric heat. The greenhouse is portable (depending on your definition of portable) and I set it up in front of an equipment shed on an asphalt pad. At this location there is excellent wind protection provided by the building and the black asphalt helps with heat retention during cold periods.

I really need more greenhouse space and figure on adding 10x20 feet next year. Through barter and just neighborly relationships with nearby farmers I have access to a large variety of tractors (34-100 hp) and implements. I have little need for this equipment except on the occasions when I need to plow, disk or bushhog large areas. The fuel for use of borrowed equipment is included in the below energy use descriptions. For 2009 I plan to add dual wheels to the BCS tractor for more traction, extra wheel weights, axle extensions, a bed shaper, a plastic mulch/drip tape layer, a root digger and a cultivator toolbar. Though I do not have any high tunnels I do make use of cloches/low tunnels (hoop supported) or just row covers placed right on top of the plants.

Hours worked

While the year is not yet finished I believe that I can say with a fair degree of accuracy that I will have worked at least 3000 hours at various tasks that are part and parcel of running the farm. I am not counting hours that are typical home maintenance like house painting or mowing the lawn. December and January are the lightest months in terms of work load and are when most of the “office” work of planning and ordering are performed. Outside work during Dec/Jan mostly consists of fencing, building/modifying farm buildings/equipment, maintenance of equipment, trimming trees and the like. Late January I start the first trays of seedlings and the tasks associated with growing crops slowly build. Starting about the first of March I began working 7 days a week and this lasted until the first week of Nov. By sometime in mid April all days average about 10 hours and during periods of May-Sept there are many weeks of 80 hours. Market days can be as long as 14 hours. For those of you not familiar with this type of farming the above workload is not unusual and I know small scale mixed vegetable farmers (less than 50 acres) who work much harder than I do. The farm needs more work put into it, but I am in my mid-50’s and don’t seem to have the energy that I used too. There is no hired help used on my farm operation though the wife keeps asking for money. I’m holding out so far. She contributes a small amount of time to the operation as she has a more than full time off-farm job. Her total contribution would be about 300 hours/yr. This gives a farm total of 3300 hours for the year.





Production results

Unlike some operations I do not count bushels or weigh everything. I know that I should as it would be very helpful, over the long haul, in judging the productivity of the various gardens/beds/farm, but I never seem to have the time or inclination to perform this additional task. I grew 23 different vegetables this year and for many of them I grew multiple varieties; for example, 9 kinds of tomatoes, 5 of beans, 3 of summer squash, 3 of winter squash, etc. In terms of gross sales tomatoes were naturally first as they are for almost all farmers who sell at farmers markets (I sold at 3 different markets each week). To arrive at the amount of produce I grew I based my estimate on the weight of the different vegetables I sold and the prices per pound that I charged, an estimate of waste (that which ended up in the compost pile or ground hog stomach), donations to the hungry, what we consumed/canned, and what was left in the field at the end of the year. I arrive at a number of 6500 lbs of produce and about 500 lbs of fruit. Using data from an old TOD post by WisdomfromPakistan I calculate that I grew approximately 1 million calories of vegetables and fruit. This works out to the equivalent in calories of enough food to feed one person for 500 days at 2000 calories per day for the average human. I note that a farmer working as hard as I do would starve on 2000 calories a day.

Produce Type	cal/lb	lbs	calories
Vegetables	145	6500	942,500
Fruit	272	500	136,200
		Total cal	1,078,700

The above results are in line with the data that WisdomfromPakistan provided in his post and spreadsheets. According to his data 1 acre is needed to provide a balanced diet for one person for 1 year. Counting the area of my vegetable beds and the land occupied by the producing fruit trees

and berry bushes I am using approximately 5/8 of an acre of actual ground and about 1.25 acres of total ground to provide 1.4 yearly diet equivalents. While I did not grown any grains I did grow a very diverse set of crops including some 100 lbs of dry beans. With canning and preserving one could possibly have survived a year on what I grew. Earlier this year Jason Bradford indicated that the normal yearly consumption of fruit and vegetables was about 700 lbs per person. This would indicate that I grew enough fruit and vegetables to provide the yearly requirements for 10 people.

Planning Complexities

I would note that growing a large mix of vegetables for sale at farmers markets or through a CSA is a very complex undertaking. The planning requirements came as something of a shock to me. This is one area that will severely tax the beginner if they are not working with a mentor or directly for a farmer who is kind enough to teach them the ins and outs of such planning. I tried creating a number of spread sheets to help with my planning and work schedules and, even after 2 years, I am very unsatisfied with the results. I would recommend that a beginner to this type of farming purchase a set of the spread sheets for sale which have been created by one of the very experienced market farming/CSA operations. Among the items one must take into account in their planning are: crop rotations, bed preparation for the next crop, bed clean up and preparation for the following crop for 23 vegetables, greenhouse starts times for the thousands of transplants, tilling/cultivation requirements, multiple plantings of specific crops (beans 9 times, radishes 10+ times, tomatoes 4 times, squash 4 times, cucumbers 4 times, etc), harvest goals, seed requirements, crop rotations, cover crops, etc. The knowledge of biology and plant physiology that some farmers possess is staggering. Even after two years of practice and having consumed many books on the various farming subjects it is not hard for many of my acquaintances to be talking way above my head when discussing the intricacies of growing and taking care of 20-30 different kinds of vegetables at the same time.

Finances/Sales

I am not providing information on gross sales as I do not consider it particularly meaningful to this discussion. The mix of what you grow and where your markets are determine the gross sales. I live near some of the better farmers markets in the country so prices are good for the farmer around here. Expenses are somewhat higher as well of course. I am within commuting distance to Washington DC. This results in land prices which are exorbitant and taxes are very high. Hiring help is complicated by rents being far too high for any farm worker to afford. This leads to creative arrangements. I am paying for this as I go. I used a minimal amount of savings to get started and am basically expanding as the revenues come in. After two years I am fairly close to breaking even and expect to have paid for all of my equipment and covered expenses by the end of 2009. This is pretty good I think and it allows me to stick to the idea of seeing if it is possible for rank beginners to start in this business. If one started out by purchasing $50K worth of farming equipment it would sort of defeat the scenario of the future we are testing. I don't see the future world being one in which a beginning farmer will be able to obtain large amounts of credit to buy equipment. Start small, borrow nothing, pay as you go. That is the idea at this point. I do admit that a 30-40 hp tractor with a set of implements is pretty attractive. But not yet. Maybe a year from now.

Energy use

The primary expense of this farming operation is fuel. In 2008 I estimate (I am guessing on the last 6 weeks of the year and adding to actual numbers through 17 Nov) that I will have consumed 950 gallons of gasoline, diesel and kerosene combined. The primary use of this fuel was in traveling to and from the farmers markets and secondarily to drive into the nearby towns for supplies and parts. I estimate that 750 gallons of the total were used by the truck. I have no way to account for the fuel usage of the delivery trucks which bring me the products I order via e-mail or telephone. Early in the year I walk more around the farm and carry the things I need. Later in the season I am tired and I use my little tractor and wagon to zip around in and haul my tools more frequently. This uses extra fuel. As we make ice, use some fluorescents as grow lights,

refrigerate picked produce, run tools, air compressors, use well water, use the computer and office equipment, etc as part of the farming operation we are clearly consuming a fair amount of electricity. A comparison of electric bills, from before we were farming to now, indicates that the farming is using about $30/month of electricity.

A significant increase in efficient use of fuel could be obtained by restructuring the farmers market part of the operation. If I could gain entry into one of the very large weekend markets further into the city I could replace both of my current weekend markets with the new market and actually sell more produce. It takes time to work your way into these markets. I am in much better markets this year than last and hopefully I can continue to work my way up the ladder so to speak. But the savings would not result in cutting fuel use in half as the inner city markets are much further away. Another way to cut my fuel usage would be to replace my mid-week market with a small CSA operation. One of my friends has done this successfully. However, depending on how the CSA is operated and where the drop off location is in relation to the customer residences a CSA probably results in increased overall fuel usage rather than less. CSA members are required to drive to a pickup location once a week to collect their vegetable shares. One of my goals for 2009 is to significantly reduce fuel usage in comparison to the amount of produce I market. On a gal per lb of produce basis over the course of 2008 the ratio was approximately 1 gal to 7.4 lbs of product.

Yield per gallon of fuel

Fuel (gal)	Lbs of Produce	lbs/gal
950	7000	7.4

Accounting for all energy inputs related to my farming operation could, of course, become very complicated depending on how one counts inputs. Should I count the fuel use of the delivery vehicles which bring me supplies and equipment? The fuel used in making those supplies and equipment? I think those are valid concerns and I would be very interested to know the answers. But I don't have the time or knowledge to figure these numbers out by myself.

Discussion

At this point in my little experiment I can still say that it is possible to take middle-aged, middle class people out of the office and recreate agriculture operations. But it is going to be HARD, both physically and mentally. There is a huge amount to learn and this takes up a lot of the non-daylight hours. The physical part of the work is far beyond that ever experienced by most people in our society. It eliminates most spare time (winter only) and leisure activities, unless you count reading books on farming as leisure time. Even the young are going to be tired, sore, beat up, frustrated and many other things. I was raised in a country where hard physical work was the norm and I experienced my share of it. I knew what I was getting into. None of this is a surprise to me. I don't doubt that large numbers of folks my age could do this if they had to. However the issue is probably more along the lines that we need people to choose to do this in significant numbers long before they have no choice. Farming on this scale is probably more suited for those younger than 50. The learning curve is steep and in addition to gardening/farming skills one needs to be a mechanic, a construction worker, an accountant and a few other things as well.

On the plus side, I am making a profit even at the scale I am at, but it is in between $1-2/hr at this point. I am expanding by 1 acre of gardens for 2009 and can add in as much as 2 more acres beyond that if I choose. I can also add at least 40 more fruit trees and 400 ft of berry bushes before I run out of room for crops. At that point I would have used up what I own unless I started plowing up lawn (we'll wait on that until times get a little rougher). I think that my expansion for 2009 will require me to hire outside help. If I can not find someone living locally I do have the option of rooming help in my house as it is a large farm house and our children are long into

adulthood. With increased acreage in production and hired help there is the possibility of a more meaningful income. As time goes on my skills and my soil should improve. Productivity should increase significantly.

I also have tremendous advantages over many who might contemplate living this lifestyle (or be required to). I own my property outright with no debt. It is an actual farm and not a converted xurban lawn. I have a 30x30 ft shop with 14 ft ceilings and commercial size door; a large equipment shed (combine size- 24 ft wide opening), a double stall non-attached garage that is 23x26 ft, four enclosed rooms that are 23x12 ft with concrete floors, a smoke house, a spring house, a strong year around spring, a creek which flows except during drought, a large pond, good soils, I have a huge pile of tools and access to affluent markets, via neighbors I have access to a wide variety of tractors and all possible types of implements. If I choose the CSA route I have neighbors within sight that want to be members and can probably fill all the shares that I could produce product for.

I am looking forward to your input and questions.

Wyoming

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