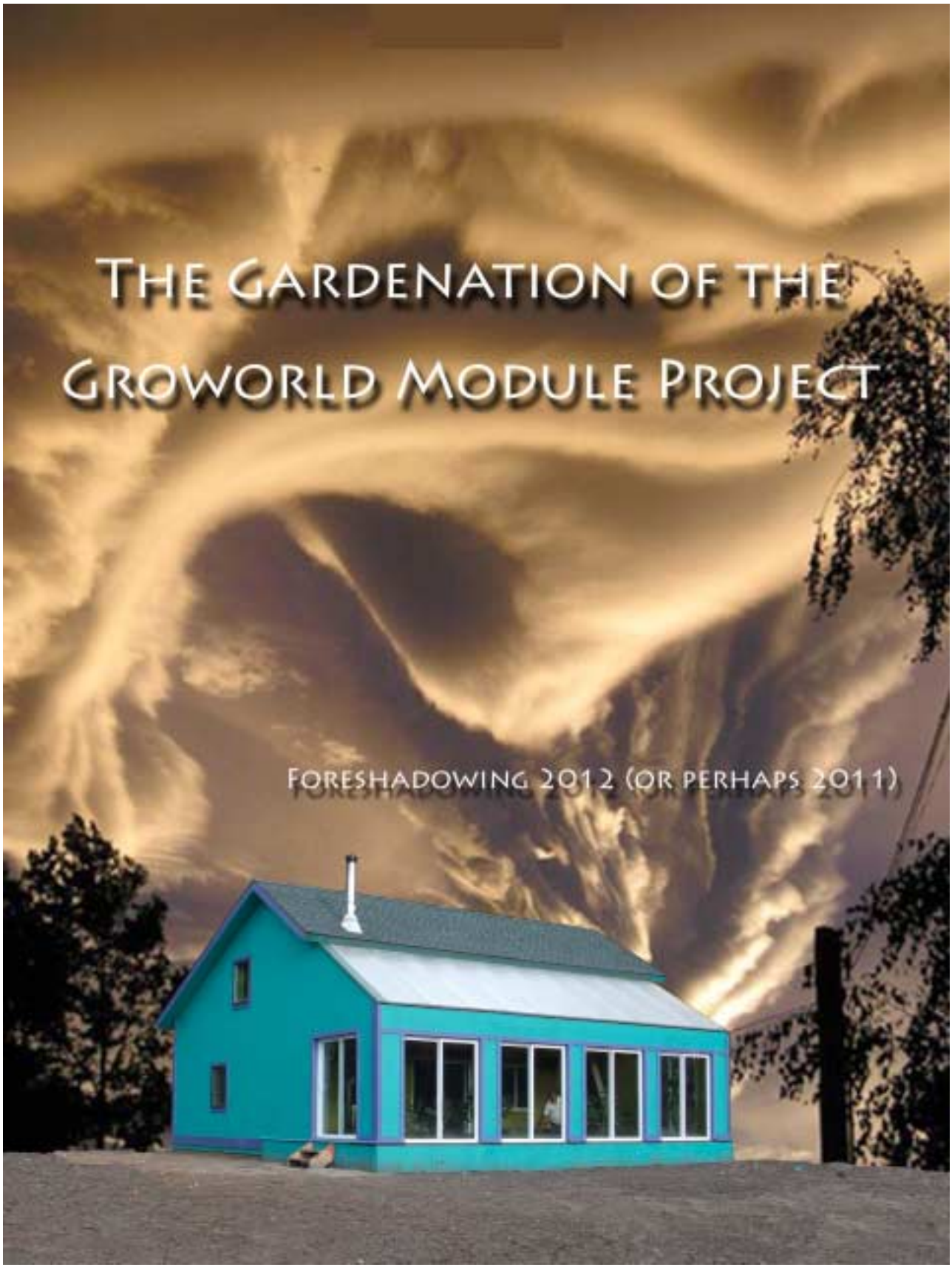

The Gardenation of the Groworld Module Project
Foreshadowing 2012 (or perhaps 2011)

The Groworld Module Project –

Rationale and Expectations

Decrying global warming in order to gain more control over the peoples' access to the economy is the least of our actual problems with a planet fast approaching a galactic/global cataclysm. Up to 90 % of the population may not survive the already noticeable shifts in the layers of the continental plates, the coming drastic movement of those plates around the globe, volcanoes along the plate edges and rifts blackening out the sun for a year or up to 25 years, and the 1,000 ft tsunamis scouring the shore and piling up the forests into a future coal pile.

In the docudated history of 170 pole shifts in the last 70 million years, continents also emerged and submerged, usually those close to poles and perhaps in North/South pole switching. Most may die this time not because of direct injury from the pole shift, but because of starvation, depression, illness resulting from poor nutrition or a depressed immune system, and injuries that lack medical attention.

It seems that, as geomagnetic adjustments are made incrementally in physical events until the abrupt completion of the shift, earthquakes now noticeable on the increase worldwide will come to cities well before the pole shift, dropping buildings into their foundations like the 9/11 hoax and bursting gas water and sewage mains, creating not only injury but a holocaust, all amid rubble and broken roadways that prevent escape. At this point, transportation (especially of food), electricity, and delivered fuel ceases.

The best the alien Zetas, who are all-knowing in this matter, can recommend is that "If you have the ability to move to a safe location where clean water is at hand and gardening skills can be gained, what are you waiting for? Disasters such as the California firestorm and the Tabasco floods can happen suddenly or be a steady state affair such as the rising water along the Louisiana coastline. Each area differs as to its vulnerability. But the message is clear. These problems will not go away, but will only increase."

The Zetas describe the Pole Shift as follows:

We have described the steps to the pole shift, which are:

1. **an increased wobble with consequent sloshing of oceans and violent winds**
2. **a lean to the left moving rapidly into**
3. **3 days of darkness and**
4. **6 days when the Sun seems to rise just west of the N pole**
5. **a few weeks of slowing rotation and then**
6. **5.9 days of rotation stoppage, followed by**

7. the hour of the pole shift.

After the shift, the melting poles and glaciers and rise of the oceans due to heat generated by the shifting crust will cause the oceans to rise to 675 feet above the current sea level. Aftershocks from the magnitude 9 quakes that occurred during the pole shift will continue for hundreds of years.

What then is a safe location? Patrick Geryl in his March 2007 book, **How to Survive 2012**, condensed to 23 pages in **Earth Without Polarity – Foreshadowing 2012**, thinks Africa the least likely to move, with altitudes possibly above the aerosol volcano dust (which may be regional, associated with the locations of volcanic activity and created tsunamis) and farthest he hopes from Japan and India's radioactivity which may make them inhospitable to life for millions of years. He suggests the shift will be such that the Equator is down the mid Pacific along the rift and only as it relates to North and South America tipped 90 degrees counter clockwise, through the Behring Strait and rounding the globe and back up along the 'West" coast of a 90° rotated Africa.

The Zetas predict the same possibility of the Equator down the mid Pacific along its volcanically active rift as it relates to North and South America, because that new Equator lays them on their side as it were with **the new North Pole in their reference located off the bulge of Brazil.** In the Zeta model of possibility, the large continent of Europe, Russia, China, Japan, and Indonesia is below the Equator opposite Alaska also below, Africa is rotated 90° and below the Equator somewhat opposite from Australia half submerged, with **India also submerged, its tip being the South Pole**. Antactica, abandoned by the Atlantaens in the 9,792 BC pole tilt, may reappear on the Equator along with a new adjacent continent.

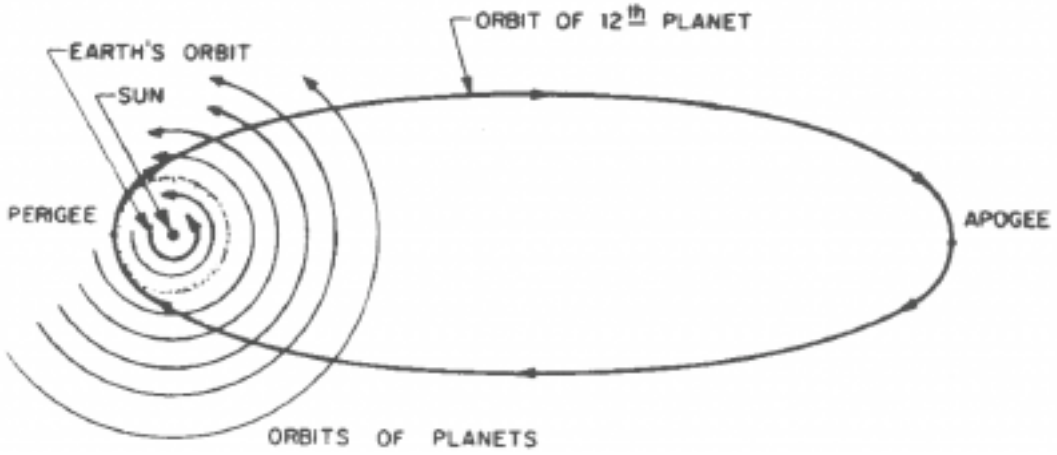
Green is above water, turquois submerged, blue is gone. India is submerged South Pole. Hard to visualize in a flat map.

Our continent seems expected by several sources to stay intact, including the relationship between North and South America, but washed out in the

middle, with the wide stretching apart at the Mississippi that is beginning to manifest in the North American Madrid Fault and an apparent big separation of the St Lawrence Seaway possible, along with erosion of the continent's lower or lowering fringes probable.

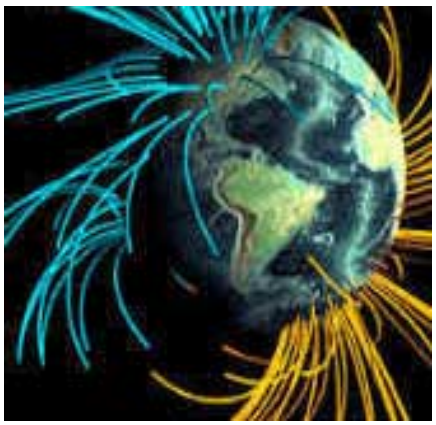
The Zetas say that the North American plate does not move, per se, but is diagonally stressed with New England pulled East while Mexico is pulled to the West. The stress on the North American plate will resolve by ripping the St Lawrence Seaway open, pulling the South East down into the crumbling Caribbean and into the widening Atlantic. The notable area of catastrophe during this is the Eastern half of the Continental United States from Houston to Chicago to New England. The Seaway widens as buckling occurs inland and afar. Pennsylvania is the point where land will bob up or be dragged down. The New England area will lift during the pole shift, due to the St Lawrence Seaway being ripped open and the detachment between NE and Quebec allowing the land to bob up. Florida and up along the East Coast as far as PA will be dragged down, a total of 150 ft by the time the pole shift is completed. PA has a lot of sinkholes and now is reporting quake swarms.

Al Bielek reported from 2137, where he time traveled from the Philadelphia Experiment in 1943, that the Mississippi was mostly 100 miles wide after the cataclysm, with the world's largest bridge over the narrowest part 30 miles long. The Zetas' map indeed confirms that stretching along the New Madrid Fault, with submersion of the south-eastern US.



This could be a representation of the path of Planet X or Nibiru as it has now rounded the sun and is accelerating outwards to pass Earth in a few years on its 3,600 year orb that caused the last 1,400 BC pole shift recorded in the Bible.

During the pole shift, the crust moves 90° within an hour. Visualize the bulge of Brazil pushed upwards toward the current location of the North Pole attempting to evade the magnetic press coming from the North Pole of passing Planet X. They state that the coming Pole Shift will occur towards the end of a magnetic trimester, which is either at the end of a December, an April, or an August. They decline to state which trimester will be involved, nor what year.



Right here in this North-Eastern pocket cleft between Mt Toby and Leverett Bedrock may come through without much geologic stress except for a good rattling.

See Zeta.com 88 pages on Safe Places for details and events by location.

How cold it will get is moot and the sun-dimming aerosol soot from volcanoes, probably distant, is unknown (aerosols are essentially weightless particles at the mercy of the medium within which they may stay aloft two or more years, like chemtrails do). Radiation from Vernon's nuke collapse is expectable.

Conversation with Peter Champoux, author of **Gaia Matrix – Arkhom and the Geometries of Destiny in the North American Landscape**, brought me to considering where South of Leverett is likely to be after the shift. It will be West of today with the possible post-tilt orientations of the globe discussed above. This is a serious Groworld design consideration. I know from 30 years of low-tech no-tech solar architecture calculations that the sun's location from the current 42nd Parallel is 22 degrees above the South horizon on December 21st. If we are situated a bit more like Canada in a future climate, with South where West now is located and the Equator some further away, that Dec 21st lowest sun azimuth might be more like only 19 degrees.

I chose an alignment for the Groworld 30 degrees South of West.)

It will not be easy to create a house that will survive in a colder climate without electricity, fuel and sustenance, and the technology we have become dependant upon, It's success will be dependant instead upon access to the energies of the sun, the most significant unknown. The design had to function well in the intervening years' off-alignment with South.

Groworld Module **Project Statement**

The possibility of extreme climate change, the disruption of all organized support for living, and a return to basic survival necessity and strategies is, at

a constantly accelerating pace, looming on Earth's horizon. Going far beyond 'greening' will probably suddenly be forced upon us, and having responded to the AlGoreithm will have just been blowing smoke. Cataclysmic predictions based upon recent scientific dating from 70 million years' 170 precisely-dated major pole shifts have us in Western MA potentially soon yanked closer to a colder climate if the pole were to move back to Hudson Bay, where it was 26,000 years ago, and to a very severe frigid climate for agricultural survival, or into a somewhat colder climate where the new North Pole could be off the bulge of Brazil, with India the submerged South Pole and the Equator down the Pacific from the Behring Straight parallel to the West coasts of a separated North and South America.

My four editions updated to April 2008 reference book, **Earth Without Polarity – Foreshadowing 2012** gathers oh so diverse contemporary voices from the past and future, and especially from aliens in Service-to-Others, all speaking their truth today when nothing but denial and deception, distraction and deceit is all that is injected into helpless humanity by an invisible government of malfeasance in complete control of all media, not to mention all monetary exchange. These diverse powerful brothers in harms have known and prepared for this catastrophe since 1953 at least, when they literally and figuratively went underground with Eisenhower and Kissinger's blessing, or curse.

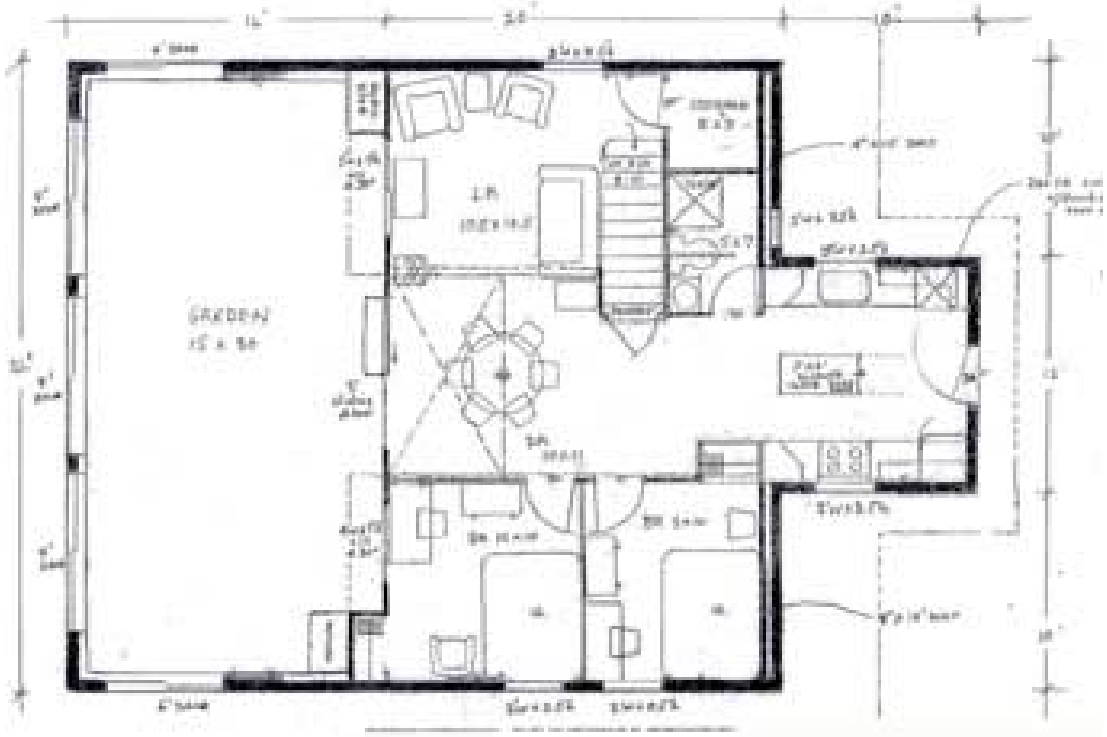
We need to take back our independent freedom to live informed and sustaining lives. Our intentions can save us from ourselves and, perhaps, from an abrupt Gaian soul free-fall to another try at life in this or other dimensions.

My 1980 2,400 ft sq double-envelope (house within a house) Torii House, with enclosed 16' x 16' garden in undisturbed earth with 27 ft high bamboo, still heats for just 1/2 cord of wood a year and the sun. Forty-or-so since more-simple designed and built houses and a Buddhist Temple with a low-tech anchor/battery of large insulated mass have been built in the intervening 29 years saving 1/2 to 1/3 of their heating expenses and carrying over excess summer heat for Fall use (details on Llanscaping.org).

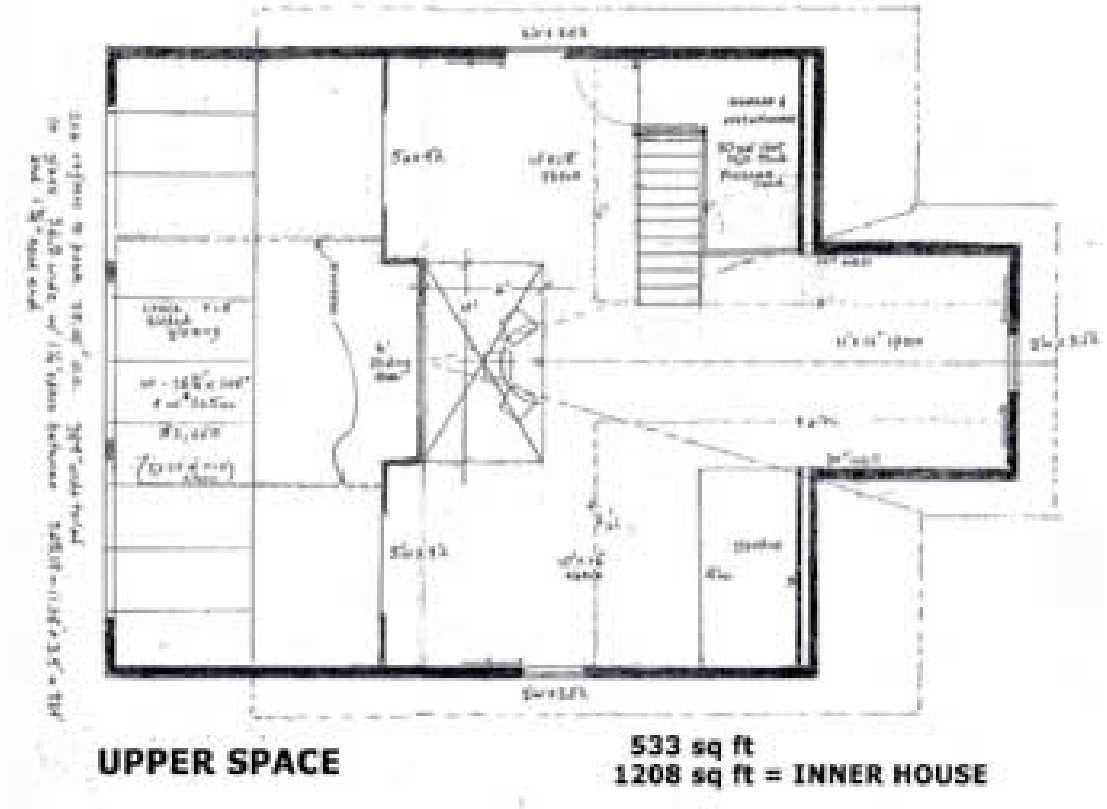
I want to combine these techniques in a 20' x 32' insulated for a more extreme climate inner house within a 36' x 32' envelope that can be energy and high-tech independent, situated on a 36' x 32' four foot deep thermal anchor the surface of which provides also a 16' x 30' bottom-heated full-sun Sept to March two-story growing bed. Hand well pumping and gravity feed, with water warming possibly variously affected by season. It would have a 52 degree cold cellar for food storage under the kitchen and a dumb-waiter 'refrigerator' that parks there (Smartwaiterefer). Located in an agricultural

field, probably especially sponsoring hardy chickens, it has access to a deep artesian aquifer with a pond and deep well, as well as locations where Peter has dowsed a 250 gal/min potential flow.

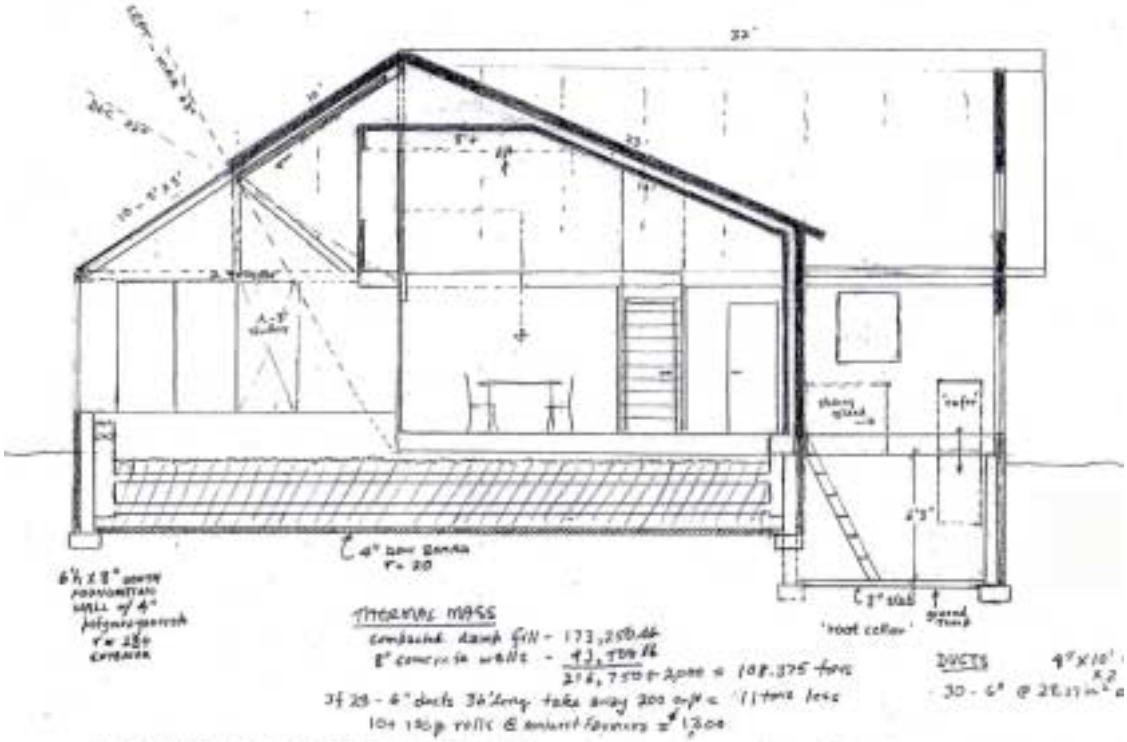
I have sought major sponsorship for this Demonstration Project, having borrowed heavily (I have only rental income, with my retirement from 25 years as Registrar at UMass in 1980, just before building adjacent Torii House, affording a handsome $5,500/yr) to live during and for the last year's spectacular Queen's Conch Project in Lake Pleasant – 9 levels, 9 rooms, on 9 posts, 999 ft sq, 36 colors inside 16 outside, small thermal anchor under trees (again, see Llanscaping.org). The $142,000 mortgage on Edgehouse I borrowed to build the Lake Pleasant demonstration sculpture is covered by Lake Pleasant rents, but then there's the $4500 I had to borrow at no interest to live on that started big interest in February. No sponsorship was forthcoming. I have become used to this, of course, as no government subsidy has ever been offered to my 30 years of solar building for no-tech low-tech solar – just money to facilitate sale of expensive energy enslaving technology.



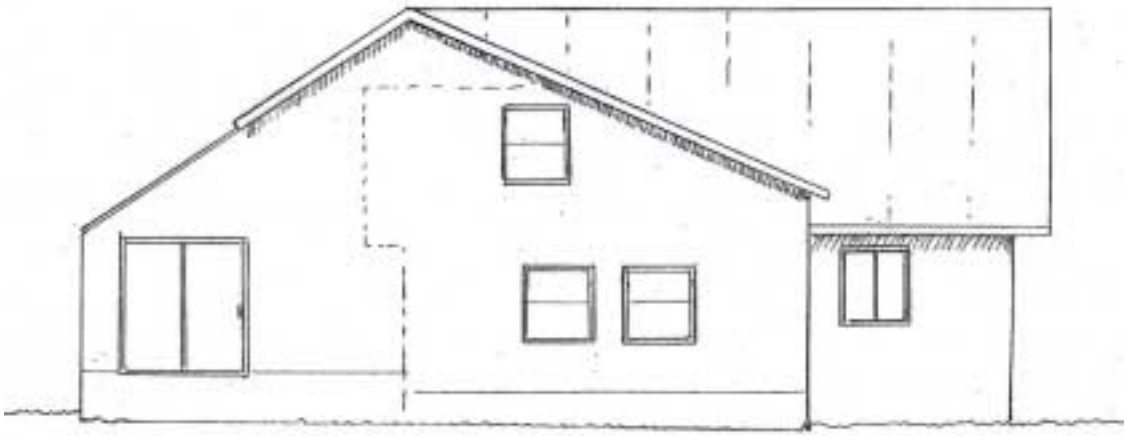
FIRST FLOOR **675 sq ft**



UPPER SPACE **533 sq ft**
1208 sq ft = INNER HOUSE



SOUTH-NORTH SECTION



EAST ELEVATION

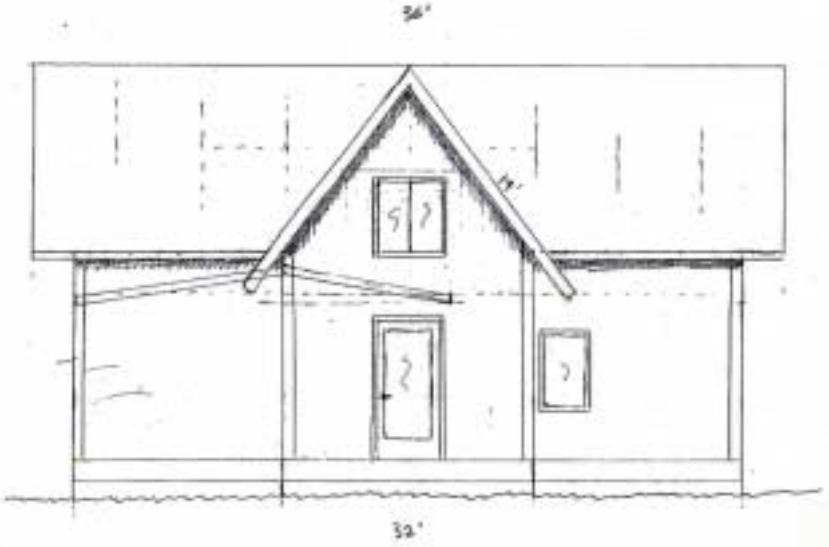
WINDOWS

1 - 3'-0" x 3'-6"

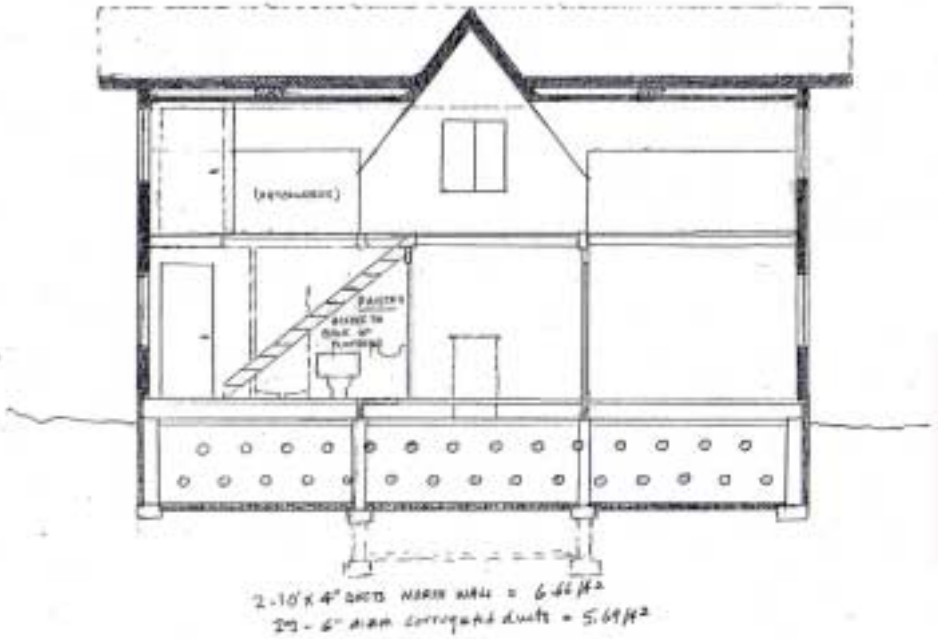
1 - 2'-0" x 3'-6"

DOOR

1 - 36"

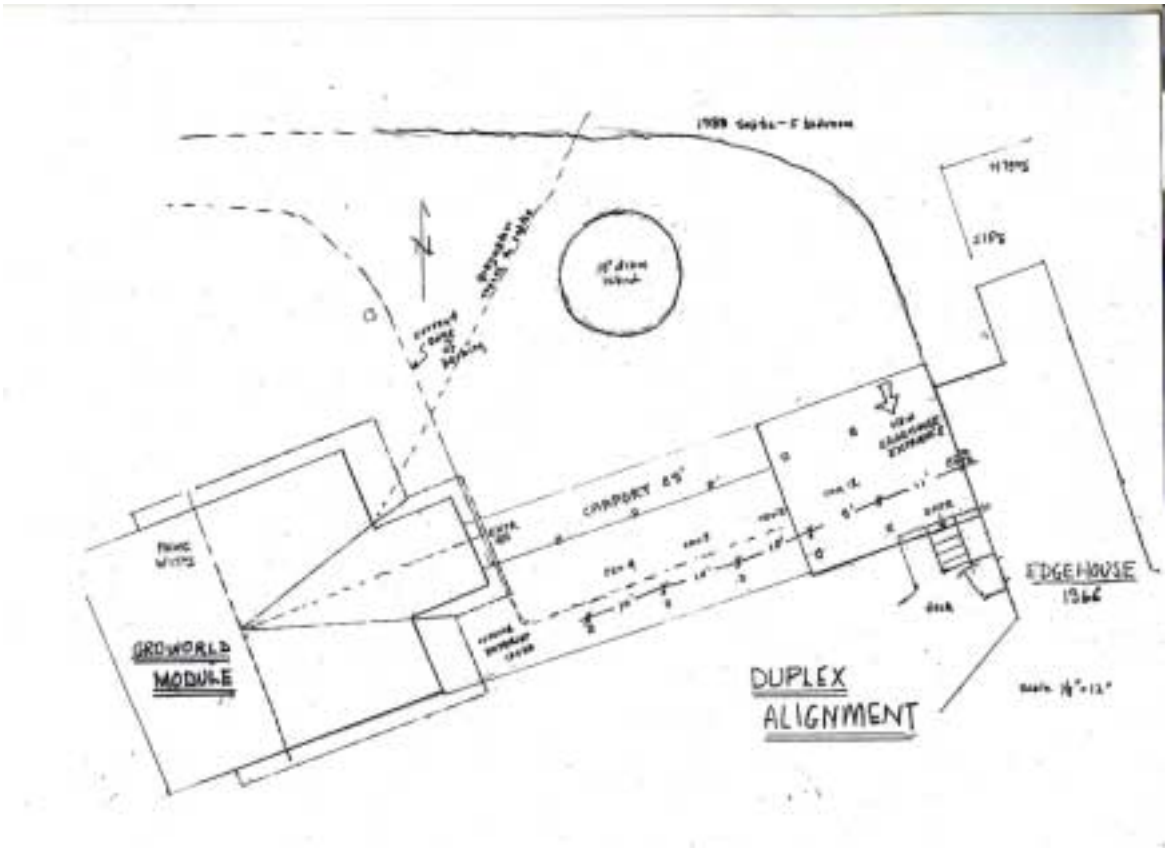


NORTH ELEVATION



WEST-EAST SECTION **FROM SOUTH**

AT 6" CEILING ABOVE



Duplex alignment of Groworld with Edgehouse

The Groworld Module solves the double-envelope labor-intensive difficulty and expense by using Structural Insulated Panels for all outer walls, and roofs. Most everything but the floors, trestles, and inner walls and of course the $10K glazing, was $30,000 – necessary labor being a crane and three men at a $15,000 cost to fine-tune and erect outside walls and double roofs on a house that, like a post-and-beam, had to be built with inner structure and support trestles preceding the walls and roof. My usual sculptural aesthetics still prevail midst extreme practicality.

Edgehouse six carports and the Groworld

Kitchen, from entrance and back view

“Unfinished attic” where 6 to 8 persons could live when need be

Counter slides, step down to Cold Cellar at 52 degrees

Smartwaiterefer that lives in the Cold Cellar

Groworld - Report on its Gardenation

Even without sun, the Groworld Module's 187 tons of thermal mass should hold it above freezing a very long time. (Mushrooms grow without sun and might be considered initially in trays on top of the storage battery under the inner house. Cancel that, not nutritive, though some are cognitive.) After having figured the insulated box storage battery of the concrete walls, insulated r=28 outside and sheathed with 1/2" pressure-treated plywood, and the fill, insulated from Earth's 50 degree influence four feet down underneath @ r=28, at a total of 187 tons, I began to consider this differently isolated fill as part of a sort of aquifer, held in its 'pool liner' of 6 mil poly walls and bottom. What I was forgetting with the aquifer thing was that the fill medium will probably balance out its moisture and that it will evaporatively release moisture through the 16 x 30 gardenation floor. The damp or moist fill had been wet down and tamped in three layers of insertion that stratify the 29 thirty-foot 6" ducts' displacement of 6 cubic ft of fill. We also had three inches of rain after the liner was set and before covering. The combined ducts through the fill's congregate diameters exactly match the square inches of the two 4" x 10' ducts descending 31 feet from the peak of the gardenation between the two roofs and down the north walls in order to enhance convection, as well as the two plenums that distribute the pipes from under the ducts to fan out on two levels to find two plenums 30 ft away that span the entire south wall, opening under four 6 ft 'south' sliders for convection to move the air upwards behind vertical glass and high into the garden space. The ducts are spaced two feet apart in all directions because the conductivity influence of the fill is one foot with a solar day's distributed input.

The evaluation of the performance of this pioneering gardenation has begun mid-January to mid-February 2009. Design concerns can now be evaluated, primarily those involving the **convection of heated air without fans** from high in the two-story cat-walked upper growing space to wrap over the r=19 SIP ceiling/roof of the insulated inner house, pulled over sixty-one feet down and back-under in consistently-sized ducts by the gravity of difference in temperatures, as the colder air always stratifies within a house, but especially in the vertical 13 foot six-square-feet containment stacks of the 'north' wall's two descending 4" x 10' ten-foot duct drivers.

Early vindication of successful convection without fan assist was found when a thermometer mounted ductside of the bathroom's inner wall window recorded temperatures in the 70s, up from the stable 58 degrees F stored in the thermal anchor when the Groworld was closed in, or thermally sealed, in the Fall. **Charging the thermal anchor is most desirably done when cooling in August to achieve a storage above 70 degrees.** In winter, the structure draws upon its reserve and a give and take relationship between the inside/outside Delta-T, sunny days, and any woodstove supplement. These variables constantly affect especially the areas of storage

near the conduction exchange, the **est 1400 ft sq shared inner transfer surface of the 29 six-inch corrugated tubes. The exchange of heat is very, very slow AND most importantly, continuous.** Heat moves and cold recedes in either direction through the three-layered 3 1/2 ft of fine sand then coarse sand fill storage **only at the rate of one foot of distance in a solar day,** its rate dependent on Delta-T**. It's expressions of movement are in the stratification of the vapors in the vertical 'driver' ducts and the interpenetrating of mediums of different conductance.**

Over all, the almost insulated box of the Groworld is **always seeking to completely equalize its heat energy**. The walls between the inner house and the two-story gardenation are not insulated, in recognition of both spaces' bottom-line temperature being the continually-realized same temperature as **the pulse of the thermal anchor**. Similarly, the twenty feet width of the two 'north' inner house walls inwards of the descending 10 ft ducts are un-insulated and take out some heat by conduction, influencing inner temperatures quite markedly, from data. Ever-adjusting itself in the mediums of activity, the pulse has been hard to measure without activity ceasing, including the climate, after it was closed in and brought to the stable at 58° fair hen height last Fall.

Heat data is now recorded daily by talking or (optionally) mute amazing $9.00 micro-chipped thermometers, with one sensor in that descending duct and one in the kitchen keeping track of the highs and lows of each area of participation as well as when these occurred in the current 24 hour monitoring. (getting to most-high around here is at about 3:15 pm in winter as the sun squares with the Groworld, pointed to 30 degrees South of the current West.) Such a second thermometer also thinks that 'outside' is the center of one of the 29 six-inch evenly distributed corrugated ducts feeding the 'south' plenum after crossing the thirty feet between the buried end connecting plenum boxes that, willingly albeit slowly not their fault, move colder air in luscious demo of convection's downpressing and degrading function. These colder thermal difference-seekers are all primal Delta-T sisters. **They migrate between mediums without high-tech's intervention, conversion, and - most importantly in no-tech - reduction thereby in the energy pulse**. The more different they are, the more they want to get involved and go steady.

So, a thermometer in the handle of the sliding door 3 ft above the catwalk gets sunny day readings of 83 to 105°. With flat-topped (for cooking and because it's a great stove) TruTemper wood stove boosting, which runs easily 24 hrs with 2 fills, the thermometer registers perhaps 15° higher, and on sunless days, as we have continued to raise the temperatures of the storage in the dead of winter. This will not be done next winter, when the thermal anchor should be more 70 degreeish, especially because the vegetables did not appreciate the higher temperatures. That thermometer station on the catwalk is measuring an uplifting and moving stratification level or continuum of light-headed air following down-pulled air lazily up around between envelopes such

that it is clear the thermal battery is attracting in its conductive way AND is spreading the Delta-T energy stream to merge into the current thermal balance. All my other thermally anchored houses had 11 watt axial fans on thermometer to assist convection.

BALANCED DELTA-T

The expression of the laws of conductance and insulation and condensation all relates to the differences in temperature in the design that are in contention, usually outside and inside temperatures, called Delta-T. The generic Structural Insulated Panels of the walls and roofs have surprising variation in insulating value depending on Delta-T. The 8 1/2" EPS cored SIP for the outside walls and roof have an r-value of 29.77 @ 75° F, but r = 32.28 @ 40° F and r = 33.46 @ 25° F, a 12% increase with a Delta-T span of 50 degrees between inside and outside.

Within this self-sufficient Groworld environ, all Delta-T within is diminished, balanced, and dealt with. If the thermal anchor/battery is 70°, 80° moist Groworld air can't change state and condense when passing through in a conductive Delta-T relationship to it. Not enough Delta-T for moisture condensation, mold and such. It only passes heat into storage at a rate dependant on Delta-T.

The ‘post and beam’ inner structure provides support trestles for the roofs and attachment of outer walls. The ‘south’ face and inner walls are stick built. The $45,000 for the SIP roofs and outer walls replaces the labor and materials budget for much of the structure.

Evaluation of the Groworld’s creative relationship to its Delta-T dance with climate continues, with these givens:

All walls and outer roofs are of 8 1/2” thick Structural Insulated Panels of 1/2” non-gassing oriented strand board surfaces and 7 3/8” of molded expanded polystyrene insulation and are structurally completely sealed. The inner and outer walls, ceilings, and exterior have been spray painted primed and finished by Renaissance Painters last Fall, blocking if-any out-gassing,

which the manufacturer says does not occur with these newer oriented strand board surfaces. These panels have an r-value of 33.5 @ 25° F. The **roof/ceiling of the inner house** has an r-value of 19 at 70°, with the sloped two ten-foot-wide 21 ft ducts above it's 13 foot plunge at the 'north' walls, moving air in Delta-T relationship to the r=33.5 outer roof above and the r=19 inner house roof below: ye envelope.

The exterior entire of the envelope is broken only, as planned, by the sloped and vertical gardenation glazing. The 31 degree sloped 9 ft by 30 ft (270 ft2) glazing consists of ten 3 ft by 9 ft triple-celled polycarbonate greenhouse glazing (100 times the impact strength of glass) panels with r=1.79 and the ability to transmit light energy arriving to meet it from any direction and intensity (no refraction index). It transmits 76% of the light energy. The glass glazing in the adjacent 1980 Torii House double envelope had to be sloped most carefully South to maximize gain from the zenith of the mid-winter sun at 42 degrees Latitude.

Under the sloping polycarbonate panels are light-weight pulley-lifted down-gliding 2" polyisocyanurate foil-faced 3/4" x 2" wood-framed panels, their 9 ft wooden sides sliding smoothly wood on wood on under-the-rafter ledges. These have an r-value of 15. Hauling up the light-weight nine panels and cleating their ropes on the wall takes about five minutes at around 10:30am. Letting them loose to insul/bumper down takes only a couple of minutes when the sun sets.

I am learning how to interpret the spread of the sun's ray dispersal through the triple celled polycarbonate glazing. On one day, at noon, the line was straight across, regardless of where it was viewed from within, and the angle off the South East wall of the gardination was from about 35° West of 90°, not 90° to the wall and glazing, which is significantly sloped in relationship to receiving the solar arc of this time of Spring's arrival. As the sun moves further West and descends later in the day, it reaches 90° to the 'south' face of the gardination, displaying as an arc with center it's actual orientation to the structure elevated appropriate to its descent towards the sun's setting.

The six 6-ft r=3 argon glass sliding doors (234 ft2), needing as vertical walls less insulation than sloped overhead glazing, are without insulating panels, which would interfere with agriculture. This is our primary heat loser. I anticipate storing under the inner house enough r=15 polyisocyanurate panels for future need.

I inserted a six-inch stick/dial thermometer into the middle of the stove-side 4" x 10 ft thirty-one ft duct's descent over the stairs to learn more about how the convecting air loses or tries to keep the Delta-T continuum between the top of the gardenation and the plenum bottom of a shaft of stratified air on the move downwards and, further, horizontally eddying through 29 passages

with cooler walls (storing) or slightly warmer walls (fueling). Here's some data to interpret from five sunny days with the wood stove amping the heat some days from the first week and a half of February.

DATE	Catwalk Hi Temp	Bath down duct low @	Bath down duct hi @	InHouse low @	InHouse high @
1/31	105°		84.2° @3:45pm		74.6°
2/1	103° @3:24pm	65° am	84.7° @3:24pm	65° am	78.45° @4:16pm
2/4	99°	57.3° @10:am	81.1° @3:34pm	60.6° @10:57am	78.4° @3:27pm
2/7		65.8° @7:26am	75.9° @3:59pm	61.7° @10:15am	66.7° @3:26pm
2/8	100°	B duct @4:45pm = 82.7° S plenum out @4:45 69.5° = 13.2 ° left in? At 3:15pm, E plenum 82.9°, W plenum 80°			
2/10	104°	63.3° @8:51am	77.7° @3:40	above stair duct Temp 92° @ 4:20pm 83.8° @4:20	
2/15	83°	60° @9:44am	75.5° @4:15pm	62.5° am	70.5° @4:15pm

The highest temperatures in the convection ducting are tending to be at about four o'clock, as the day is lengthening. Also, it seems, that this is the time when the four six-ft vertical glass sliders let the low sun bathe fully across the floor of the gardenation.

On February 8th, at 3:15pm, when the temperature with sun and woodstove on the catwalk was 100°, warmer air was convecting down in the vertical duct at the bathroom window at 82.7°, pulled by ever-cooling air below, that emerged at the garden space end of the ducting at 69.5 degrees. The storage was apparently unable to store any more than a 13.2° pulse into the storage which may have started the over-night day at nine am or so in the morning with around 63.3° estimated, perhaps measuring colder than the storage in the ducts above it, as colder air settles in those shafts by definition (see how hard it is to know battery pulse temperature?). And until the air in the ducts is the same temperature as the static thermal storage surrounding the ducts in the storage, the latest temperature of its 1400 ft sq transferring edges fluctuates as deep as Delta-T's urgency reflects and continues to process the more recent thermal transactions. By morning, the storage stabilizes, with the vertical ducts still stratifying colder at their bottoms.

Some seasonal expectations:

Summer's downwards sun will pass or glance off the 6 vertical sliders completely. Rays on glass at 45° reflect 50% and transmit half the radiation, effectively screening from heating. The four sliders facing W 30° S should reflect off more than half to all of the pulse April to September. When it is overhead, the sun missed the sliders completely. The 2 vertical side sliders are already 60° off South to the West, putting the slider at the stove facing N 30° W quite shaded at the end of the day, and the opposite slider, facing S 30° E, is only exposed to weak early morning sun. So, for most of the current summer, the vertical glazing should not be the excellent gainer it is when the sun is low in the winter.

The sloped glazing, admitting 76% of the sun's down-pouring can regulate this by closing some of the underneath panels, with the reflective foil r=15 in repulsion. The 3 1/2" space between may heat up considerably, though the foil should send back [re-pulse?] in radiant energy much of what it receives. If the shutters top and bottom seals are opened/gapped, it will allow a pre-heated air flow above the shutters to move up into being stored in the thermal anchor for later use.

After warmer and dryer April days when plants in the gardination showed stress from too much warmth, air could finally blow through the Groworld to reduce for a time the rather steady 68% humidity generated by the growing things and to move them about to their benefit. Tomatoes need shaking to facilitate their self-pollination, as example. It also became apparent that two louvered vents could be cut in the side walls at each end of the catwalk for seasonal venting of heat that convection was unable to ameliorate by storage.

This year, **outside food production** will receive a lot of attention, somewhat based on the enthusiasm of participants becoming committed to hands on (hands off hasn't worked at all well, especially financially) involvement in the Center's aims and the developing community of consciousness. A lot needs to be learned and applied to making the available soils supportive. Will probably need a new protocol of tilling/mixing lightening/porosity enriching and balancing the black moisture-grabbing clay loam soil that is 3 ft thick near Edgehouse and one foot thick where the garden area is, on the sandy underlayment peneplane of this cleft on the Main Connecticut Border Rift from the Long Plain that runs up between the bedrock of Leverett and Mt Toby. Tilling up the 42 years that I have witnessed of that pasture root mat into the thin soil overlay of the sandy peneplane may be the route for outside veggie/grain production. The large clay re-loamed surrounds of the Groworld seem to call for grain enrichment /loosening and exploration of grains/seed production. 5 lb of Buckwheat seed are wondering if they have more of a future than sprouting for salad green.

Groworlder Robin Marie Ward and my son Jon Burgess are becoming attuned to the complex challenges of the surrounding matted hay field and

what, in other days, might have been thought of as a clay loam lawn. Investigation is focusing on companion plantings of vegetables whose space above and below ground and differing maturation rates can make four different vegetables friendly in proximity. Both of these entities have extensive developmental and creative experience with a variety of crops. We've got to grow root crops that store at 52 degrees. And slow growing beans for drying, especially soy beans. Rediscovering sunflower has been a direction of investigation in the seed, grain, even insect control direction, especially because of its oil. Unaddressed til now in my thinking about lighting without electricity and technology, gets me today to a $185 hand mill to extract 3 oz of oil from 1 lb of dry hard un-shelled black sunflower seeds expelling edible press cake for chickens. Next we're on to oil lamps. I was thinking oats might be a soil loosener cover grain that can be easily hand milled for a flour, unlike hard shelled buckwheat, an early contender for its salad sprouts. Or wheat which is hard to process.

About Sunflowers

Sunflowers are excellent attractors of predatory insects because their large supplies of pollen attract pollinators that serve as predator food.

Two to four sunflower plants per 100 ft sq bed will probably suffice to provide complete insect control for that healing plot of food.

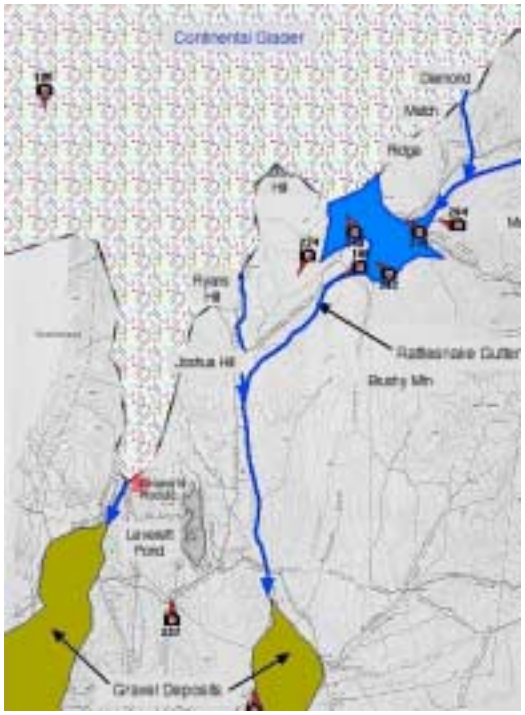
Sunflowers, cukes, and winter squash are companion plants. We want lots of black seeded sunflowers with climbing (pickling) cukes and sprawling winter (cold cellar keeping) squash.

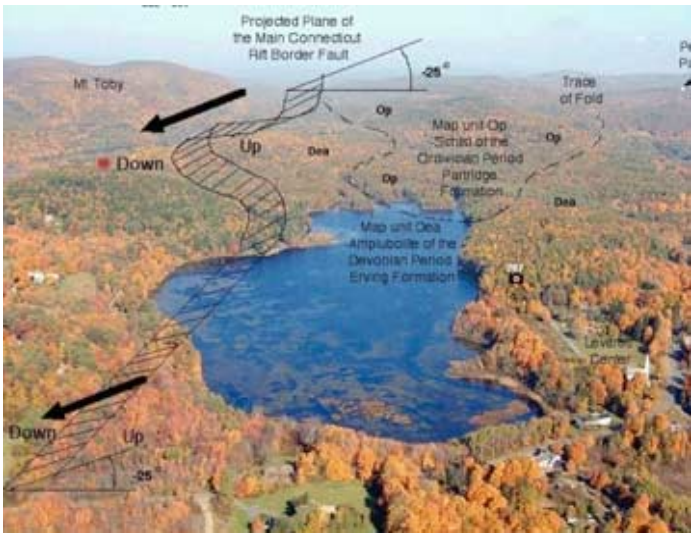
Sunflower is the answer to the best of cooking oils and a fuel that can be used for lighting. A manual continuous expelling screw press costing $139.95 with an extraction rate of up to 84%, can provide 13.4 oz of sunflower oil from a pound of well-dried seed.

Recent Location Discovery

While that deep cleft between Leverett bedrock and Mt Toby rises only 50 ft for the 2 1/2 miles to Cranberry Pond, the Rift that would sunder Toby from Leverett doesn't go that far, however, but stops/ends in the other widened area a mile North where the pond was behind Alia's former house in Toby Dell. North of there, bedrock relationships are tight and unyielding.

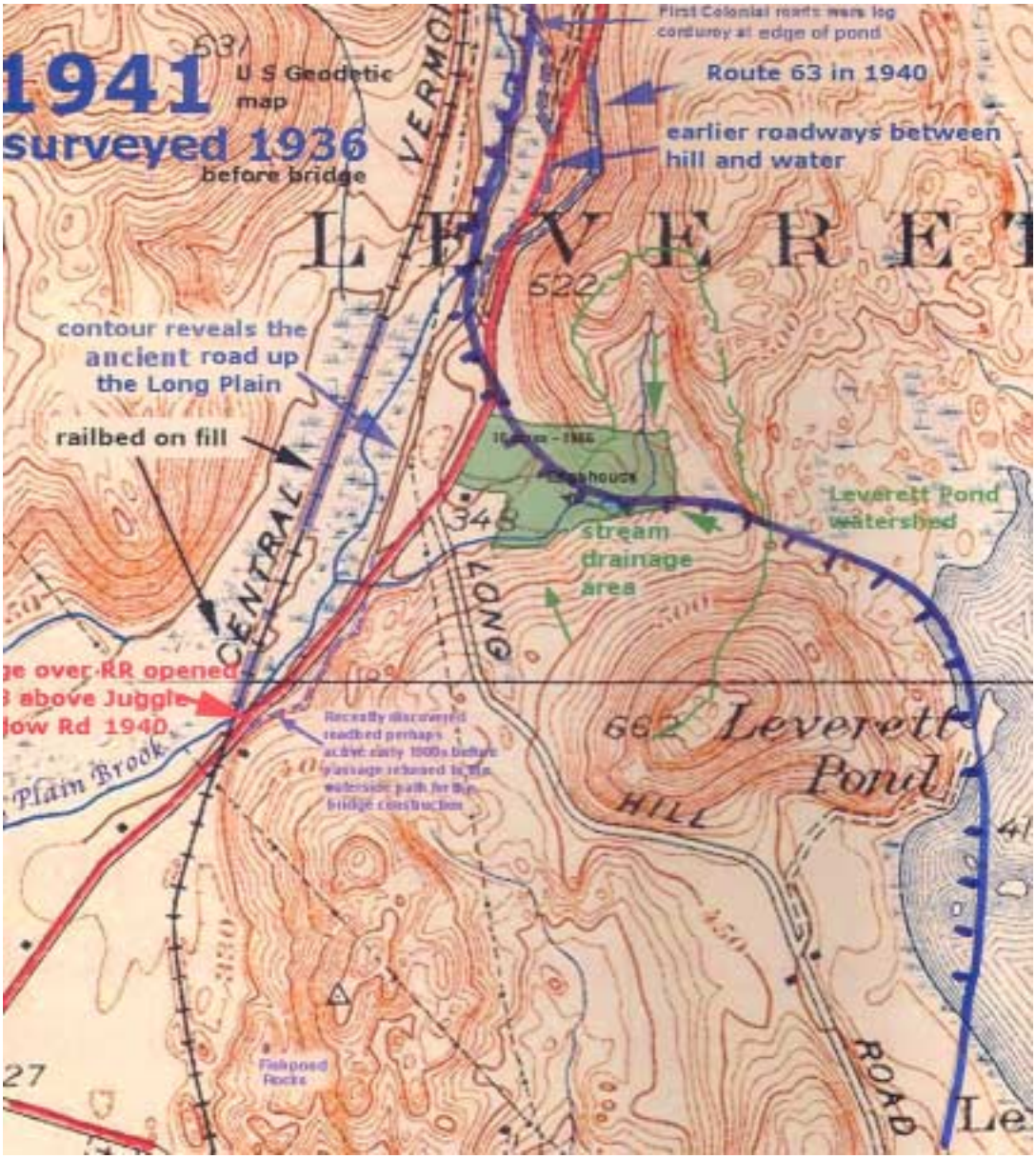
My conclusion is that, just as the retreating Continental Glacier was stopped dead by the adjacent deeply cleft Thermopylae passage between Long Hill and South Toby, with another very narrow steep both sided passage just above Fields', near that 50 ft waterfall down a tumbled rock conglomerate Toby face, this layered continental plate is very connected below this fissure, and the great force of the Continental Glacier could only Lever it apart on its surface. Red spot below gives Groworld location.





Now there's been a new development at fault. In the opening of the 26 minutes so far of the Groworld Module Project film (with everything but its completion on tape ready to edit), I included an aerial view looking North over Leverett Pond with Long Hill and Toby at the left and with a graphic overlay of the **Projected Plane of the Main Connecticut Rift Border Fault**. Above said Rift is a band of rock edge tilted down 25° and crossing the West side of Leverett Pond and curling around the base of Long Hill and out North up the Long Plain Brook cleft. The 25° slope might be that expressed from the top of the West side of the hill above Edgehouse that Andrew was once interested in – opposite the 50 ft waterfall. Following that contour down and wrapping it into the bedrock bowl behind Edgehouse, and thinking of it continuing down under ground a distance of at least the 50 ft or so to the depth of the bottom

of the Fields' gravel pit embedded in the Long Plain Brook, and envisioning Long Hill also continuing down under, we could be sitting above a cracked bowl of in- and back-washed tumbled rocks and coarse sands absolutely flat before the outwash dug deeper in the cleft's course next to Toby. It was simple to see this remaining peneplane that surfaced when we skimmed off the accumulated centuries of loam coming down from the hillsides behind Edgehouse,as the light brown tumbled small rocks and mostly gravel from under the glacier back then had filled our cirque as they were spewing finer sands out through the Thermopylae in a Delta that would fill out the long plain, with the 'brook's' bed in that same peneplane eventually lowering as the juggling meadow settled.



Time to notice. We may be sitting on a fault. One that probably isn't going anywhere soon. But we are floating on the littoral of a glacial out wash. A shock absorber. No wonder we hit 7 springs digging a pond right in a fault!

Or earlier hit an artesian well spring drilling not very far down. Or that Peter Champoux dowsed four vortexes at the back of the property. Shouldn't have any problem getting deep waters after the after. The vortex back of the field at the foot of Long Hill near the old apple tree he dowsed at 250 gallons a minute, to his astonishment last Spring. **Peter says**
"The creativity presenting itself at Edghouse and in Leverett in general is likely the result of this vortexing fault fuel of this spirit of place. All the fault in this area are stable. You knew how to pick-em".

I come back to my 36-year old carved Japanese haiku hanging in the screen house by the pond perched above the re-routed drainage stream of a square mile or more from all around the edges of this bowl located over the saddle from Leverett Pond. It says, again, "***The sky is crystal clear; still ignorant of winter gushes the well spring"***. How's that for a fit over a fault that knows not the seasons?

INSECT MANAGEMENT

I have turned, as I knew I would, to Anna Edy, who built the Ark Solviva on Martha's Vineyard 3 years after I was building Torii House in 1979-80, even as I've had experience with some kind of heated greenhouse structure for over forty years. Two of my kids lived summers at her place and I knew her. I will quote and adapt her book, **SOLVIVA – How to Grow $500,000 on one Acre & Peace on Earth** in considering how insects will dwell in a biofarm. No matter how well you manage the greenhouse, insects will be there to a greater or lesser extent. My own experience is that the 'adult' insects are in my observation usually primarily killing only the tips of plants or convene to dine where the plant had given up on some section of its extension. Ninety-nine percent of insects, that make up half of the 1.4 million species life-forms, are considered beneficial to mankind. Not only that, I would add, most are pretty contented with a number of different incarnations, possibly serially clonally and perhaps without an overt sexual component distracting their continued physical evolvement. They eat harmful insects, pollinate flowers, and aerate the soil. They make compost out of dead plants and animals, which in turn breaks down minerals in the soil, making them available as nutrients. Insects make silk, honey, wax, shellac and honeydew. They provide food for birds and fish and each other.

Anna tried organic controls, recognizing that different stages of an insect can be beneficial. (it's not exactly the ladybug that eats aphids,, the little alligator stage you never saw eats more). She planted 'biological islands' with flowers and herbs, imported beneficial insects from producers, and spot sprayed least toxic, like insecticidal soap. But as she observed the various harmful and beneficial insects in close interaction with each other, she increasingly felt that they themselves had the balance all figured out. She stopped spraying and **now considers the zero-spray approach to be one of the most important keys to successful insect management**. She put all efforts into a comprehensive program of harmonious management

techniques and learned to introduce appropriate beneficial insects long before the situation became critical.

An encapsulated environ, starting from new, needs to be inoculated, perhaps, with both pest and pursuer.

I can't resist putting in two paragraphs from her insectoscopeism:

"I marvel at the delicate sea-green beauty of the lacewing as it flits around with rapidly moving wings, like a little fairy. Or the syrphid fly, hovering like a hummingbird as it seeks nectar in tiny flowers. Its plump little larva sits on a leaf gobbling up an aphid like a sea lion feasting on a fish. A tiny orange Aphideletes aphidimyza caterpillar siphons the body fluids from an aphid, reducing it to a shriveled white husk.

I watch in utter fascination as dozens of tiny braconid caterpillars emerge out of the sides of the dying body of a much larger leaf-eating caterpillar. The little braconids perform belly dance gyrations as they each immediately spin themselves a cocoon. The cocoons remain piggybacked in a cluster on the host caterpillar for a few days as it slowly crawls along, no longer a threat to the plants. A couple of days later as I watch the little bundle of cocoons, a tiny hatch suddenly opens at the end of one of them and out comes an adult braconid wasp, 1/8" long. After a few moments of waving its antennae and preening its wings, it flies off to begin a new cycle of feeding on nectar and mating and finding an egg or larva or adult vegetarian insect in which to lay its own eggs."

It is to be noted that the Ark was open to the outside farm in season and the insect world exchanged energies with the out-of-doors. While this is assumed not probable after the tilt, the first years of the Groworld will probably allow a balanced interchange of native insects for its harmonious inoculation.

Solviva's "**13 Golden Guidelines for Minimizing Pest Problems**" can well be a philosophy for the Groworld Module Project.

1) KEEP THE SOIL ENRICHED WITH COMPOST AND A GREAT DIVERSITY OF LIVING ORGANISMS.
2) WATER THE PLANTS JUST RIGHT.
3) MAINTAIN GOOD LEVELS OF HUMIDITY AND AIR CIRCULATION.
4) MAINTAIN HIGH LEVELS OF CARBON DIOXIDE.
5) MAINTAIN TEMPERATURES AS CLOSE TO IDEAL AS POSSIBLE.
6) PROVIDE THE BEST POSSIBLE LIGHT.
7) GROW A MULTITUDE OF SMALL NECTAR-PRODUCING FLOWERS.
8) GROW NASTURTIUMS AND OTHER FLAVORED HOST PLANTS FOR THE VEGETARIAN INSECTS.
9) INTRODUCE AND ENCOURAGE A GREAT DIVERSITY OF BENEFICIAL INSECTS.
10) LEAVE SOME INSECT-INFESTED PLANTS STANDING.
11) DO SOME TRAPPING AND HANDPICKING.
12) MONITOR IN ORDER TO KNOW WHAT IS GOING ON.
13) TRUST THAT HARMONY WILL PREVAIL.

PEST: Aphids (Myzus persicae), to about 1/8". Sucking leaf juice from nasturtium; giving birth to live young; growing wings to fly to less populated area.

BENEFICIAL: Ladybugs (Hippodamia convergens). Larvae hatching from a cluster of orange eggs, 1/8"; pupae; larvae (up to 1/2"), eating an aphid; adult, about 1/4". Larva and adult also eat many other pest insects.

Note ladybug larva that does most of the work

PEST: Whiteflies (Trialeurodes vaporariorum), about 1/16". Sucking leaf juice from sweet pepper plant; laying eggs; white larvae.

BENEFICIAL: Encarsia formosa, about 1/30". Lay eggs in whitefly larva, which then turn black.

In order to sustain the beneficials, the bad guys can't be obiterated

PEST: Two-spotted spider mite (Tetranychus urticae), about 1/50", sucking leaf juice from tomato plant. Tiny yellow eggs. Mites spin webs when crowded.

BENEFICIAL: Predatory mite (Phytoseiulus persimilis), about 1/25". Tiny white eggs. Adults eat spider mites.

PEST: Leaf miner (Liriomyza), about 1/4", on French sorrel. Adults lay eggs between the upper and lower layers of leaves. Larvae make tunnels, eating as they go.

BENEFICIALS: Trichogramma, Chalcid and Braconid wasps, 1/10-1/8", lay eggs in various stages of leaf miners.

PESTS: Aphids sucking the leaf juice from pea plant.

BENEFICIALS: Flower fly (Syrphidae) 1/3 to 1/2", eggs, pupa, larva.

Brown lacewing (Hemerobiidae), about 1/2".

Green lacewing (Chrysopidae) adult, about 3/4", cluster of eggs elevated on thin stalks, pupa and larvae.

PEST: Thrips (Thripidae), about 1/8", eating chard.

BENEFICIAL: 1/8" hopping bug, identity uncertain.

I sent specimens for identification to the 2 top entomologists in North America. One said it was beneficial, the other said it was a pest. In my experience this bug is beneficial, always appearing within 2 weeks of arrival of thrips, and soon brought them under control.

Insect pests are controlled by 13 Golden Guidelines, including beneficial insects. No toxic pesticides are used, not even those that are considered safe by normal organic standards, such as rotenone, pyrethrin or insecticidal soap. After all, they are meant to kill, and will certainly do harm also to the beneficial insects and to the whole ecosystem.

Flowering plants are essential for providing habitat, pollen and nectar for beneficial insects. Here are dill, pineapple sage, marjoram, rosemary, Johnny-jump-up, cilantro, fennel, borage, miscellaneous crucifera

and nasturtiums

The soil is kept fertile and alive with additions of compost made from the bedding of the resident chickens, rabbits and sheep. This ensures conditions that promote an abundance of different life forms that contribute to controlling pest insects and diseases. This contrasts with the sterile soil conditions that are maintained in most other greenhouses.

Click beetle and its larva the wireworm (Limonius agonus)

An earwig (Forficula auricularia) caring for her eggs.

Earthworms aerating and fertilizing the soil.

Ground beetle (Calosoma scrutator)

Rove beetle (Staphylinidae)

Sowbugs

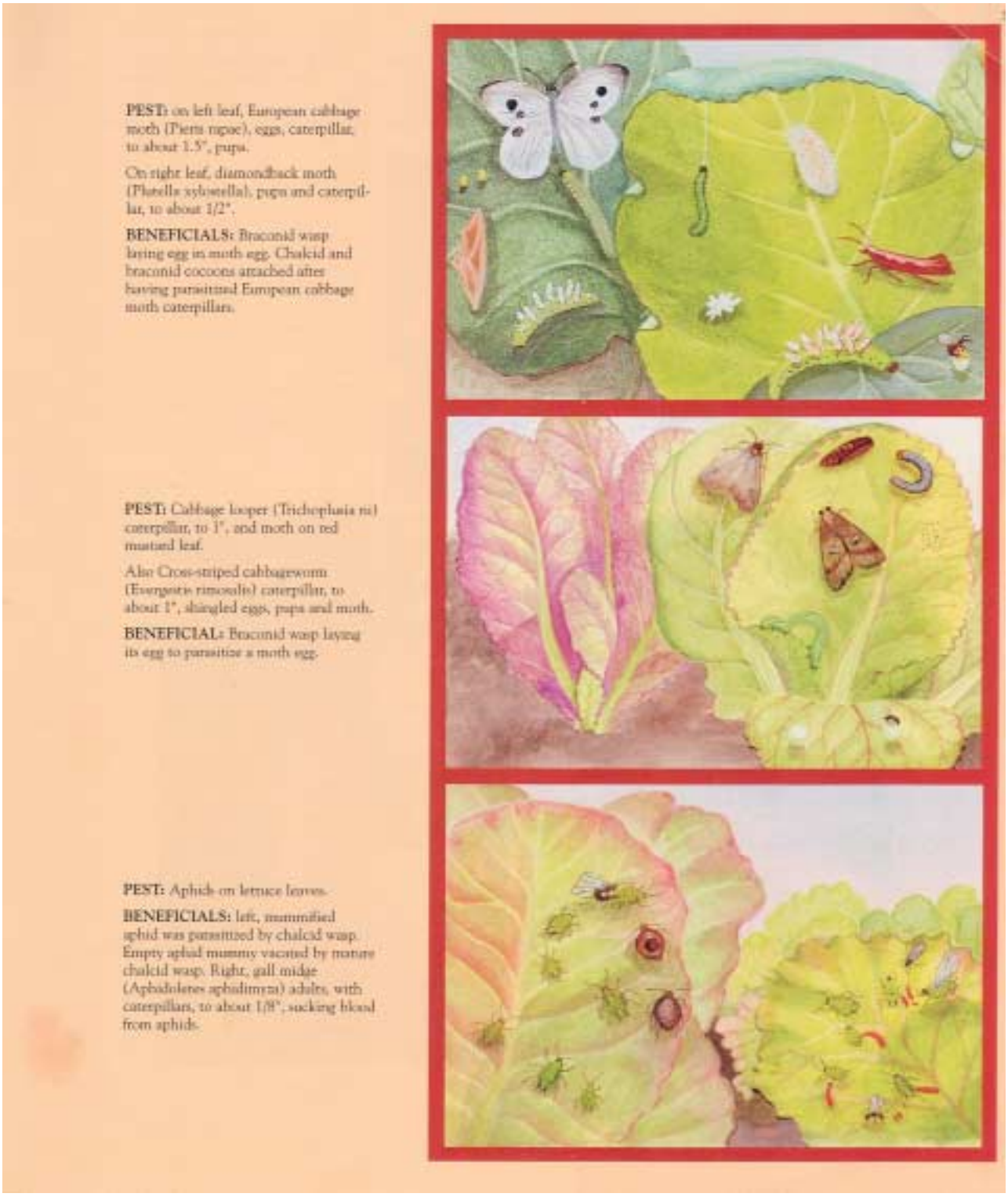
Nematodes, actomycetes, molds, bacteria, rotifera, protozoa (some visible under a 10x lense, others only under far greater magnification)

Slugs (Mylus gagetes)

Centipede (Chilopoda)

Millipede (Diplopoda)

From Anna Edey's book *SOLVIVA How to Grow $500,000 on one Acre & Peace on Earth*



PEST: on left leaf, European cabbage moth (Pieris rapae), eggs, caterpillar, to about 1.5", pupa.

On right leaf, diamondback moth (Plutella xylostella), pupa and caterpillar, to about 1/2".

BENEFICIALS: Braconid wasp laying egg in moth egg. Chalcid and braconid cocoons attached after having parasitized European cabbage moth caterpillars.

PEST: Cabbage looper (Trichoplusia ni) caterpillar, to 1", and moth on red mustard leaf.

Also Cross-striped cabbageworm (Evergestis rimosalis) caterpillar, to about 1", shingled eggs, pupa and moth.

BENEFICIAL: Braconid wasp laying its egg to parasitize a moth egg.

PEST: Aphids on lettuce leaves.

BENEFICIALS: left, mummified aphid was parasitized by chalcid wasp. Empty aphid mummy vacated by mature chalcid wasp. Right, gall midge (Aphidoletes aphidimyza) adults, with caterpillars, to about 1/8", sucking blood from aphids.

Starting up the gardenation, we moved a dozen or so large plants from the Greenhouse in Edgehouse that were just coming in after their summer vacation in the yard into the Groworld. Hibiscus, fig, banana, and an odd tree tomato that was covered with aphids. The few thin-waisted black wasps that had started a home high in the gardenation fed hard on the aphids, but they never stopped. Finally, the offending plant was heaved out

into the snow and, with newer learning about how we intended to have one plant that was home to one pest, the adjacent hibiscus became aphid home. Aphids reduced somewhat, as we began to notice some mating lady bugs that produced eggs on the nearby sliding door glass that we watched hatch into the larval alligator guy that eats aphids. Also there were some small fly-like insects there that we identified from Ana's picture as gall midges that land on aphids and parasitize them (bottom right of previous panel). The infected tree tomato brought them with it. Not only that, but checking back in the greenhouse in Edgehouse, the remaining *solandra maxima*, the other aphid host, had both aphids and these tiny gall midges in well balanced stasis, which we anticipate to prevail here in time.

WATER

This site is ideal in its relation to safe and available water. Perhaps a square mile of the Leverett bedrock bowl embracing this site on the East drains across the southern edge of the land, including all the run off from most of the north side of Long Hill and from the saddle north west of Leverett Pond. This has made this 5-acre plain above 35 ft of glacial tumbled residue rich with humus near its edges (3 ft at Edgehouse, yet only 4-5" out in the field). The 40 ft across 8 ft deep pond we dug in the now diverted stream bed in 1970 has 7 springs out of the bedrock which could provide water by gravity if the 180 ft deep well cannot be accessed by the hydraulic Real Goods hand pump with the 3 ft handle that can lift water from even deeper and put it into a tank at 100 psi pressure. Plumbing is moving towards completion by early March. The 100 ft long 1" pipe, sheathed in 3" of foam and, for assurance, with taped electrical heat wire, is straightening in the warmth of the Groworld after several weeks of deep chill, and will be placed in the middle of a foot-square box of polyisocyanurate blocks to insulate from freezing that is just under the roof of the 50 ft open carport. It will connect both with the current electrical well output to Edgehouse, but also have the parallel self-draining hydraulic hand pump over the artesian well shaft that does not need an insulating shelter.

Cold fresh water fish species should be reintroduced to the pond (years ago 6" brown trout reached 14" before someone or some animal disappeared them one winter). Sunfish seem to come and go in decadeish cycles (biggest 6" are toothy and boneable, but they think pubic hairs are worms). I wonder if this water of deep origin isn't too cold for them. This aquaculture outside of the Groworld needs to be developed and expanded in the next years. Knowing that the water is from a deep source explains why it is so cold (basically never rising above 72 degrees even in mid-Summer). Of course the pond receives some run-off from adjacent Long Hill, but most of the run off from the large drainage area is routed by the pond on the other side of the screen house.

Also important, growing on the edge of the field almost in the course of the sometimes voluminous run-off are a wild native apple and pear that are perhaps 50 years old and copious producers of semi-sweet somewhat mushy fruit. These will be pruned and enhanced this year to be brought into the food production cycle. Too late to plant other fruit bearing trees.

Moving up the base of Long Hill from the edge of the field and the run-off below it 100 ft or more, my land there embraces a half acre of dense small-diameter hardwoods perfect for fuel, as well as some tapable small sugar maples. Boundaries after the cataclysm may not matter, of course, and that whole hillside is perfect for wood fuel that does not need to be split.

LIQUID FERTILIZER

Composting generates carbon dioxide. This is facilitated by the addition of urine. Urine alone is primarily a fertilizer. It is diluted 10 to 1 and sprinkled onto well aerated soil and not on the plants, where the aerobic microbes complete the oxidation (nitrification) process. Urine is 'stored' (accumulated) for several days.

For a couple of years before starting to produce vegetables to sell, Anna Edy used no fertilizer other than diluted urine and ashes from the woodstove with great success. The Groworld has a wood-burning stove for supplementary heat and, especially cooking. Ashes, on the alkaline side of the pH scale, balance out the pH of urine, which tends to be slightly acidic in order to avoid urinary infections. The ph actually changes quite a bit during the day. I tested mine and found the typical pH of 5 on arising, pH 6 an hour later, and pH 7 later in the morning. With multiple days collected in a plastic gallon bottle, some beneficial aging occurs, I believe, but don't know about that yet. The alkaline ashes also help precipitate out the salts in the urine, so they do not accumulate to harmful levels in the soil. In addition, ashes provide extra potassium as a plant nutrient and are 31% Calcium.

Urine contains by dry weight

15 to 19% Nitrogen (far higher than animal manure)	average = 17%
2.5 to 5% Phosphorus	average = 3.75%
3 to 4.5% Potassium	average = 3.75%
and	
4.5 to 6% Calcium	

Providing a 17:3.75:3.75 N P K ratio, augmented by 0:1:3 more K from wood ashes to about a 17:5:7 ratio.

URINE is usually sterile, unlike fecal matter, which needs to be sterilized by higher temperatures and always contains many kinds of harmful pathogens even from a healthy person, and can be used safely for growing your own food. But urine does not provide the soil with the organic 'roughage' so essential for water holding capacity and microscopic surface areas that enable earthworms and other visible and microscopic creatures to flourish. These essential creatures aerate the soil, and their life and death cycles break down the minerals in the soil and thus make them available as nutrients for the plants. In other words, urine acts more like a chemical fertilizer, feeding not the soil but the plants directly. For these reasons Anna decided to route the urine to her compost bin instead, which speeded up the decomposition and sterilization process, and then to use this nitrogen enriched compost to feed both the soil and the plants. I haven't started an in-gardenation composting yet, having much still outside and recognizing that as long as this houseosphere can do what it has been designed for, sterile container mix with wicking and draining properties is available and the basis of our growing medium, plus lobster compost. And we're not going for microscopic aerating creatures in a soilless mix.

FOOD NOW, AND THEN

It becomes more and more clear that this project will need to be producing food year-round even this year, as food shortages of the world's most basic rice and grains are driving prices up, the world's poorest are unable to feed themselves, and as distribution will falter, with economics and commerce in collapse from overpopulation and earth changes. Initially there will be some electrical assist to pump water, but the design concentrates on the pre-industrial non-technologies of nurture and survival. The major considerations next to be examined are the composition and interaction of humus and organic compost with chosen soils, and the combining of urine fertilizers with worm and microbial soil components.

If SOIL is the growing medium, it should have sufficient lime to counteract sourness; sufficient organic matter to ensure high bacterial activity and humus production; sufficient plant nutrients both major and minor to ensure vigorous and healthy growth, flowering and fruiting; sufficient free draining to prevent water-logging of topsoil; soil texture of medium loam with few or no stones; soil structure crumbly, with crumbs ranging from lentil to pea sized – both large and small pores present. This does not describe the century's accumulated 3 ft deep organic downwash from the hillsides, which very black, and the surface with much clay hardens when wet and is wet all the way down. This clayey loam has not grown vegetables well at all.

RAISED BEDS could isolate and control the medium on top of the thermal

anchor. 'Double dug' beds usually have 10" of medium silt loam, with the bottom forked in with bone meal, compost, or manure. Lime is usually applied 1 1/2 lb/yd2 on acidic loam to neutralize sourness, bring beneficial bacteria and earthworm life to the soil, provide calcium as a plant food, and set free humus elements needed for healthy plant growth, discouraging especially soil pests like slugs, leather jackets, and wire worms. Lime is not applied within one month of manures. Regular feeding is vital for greenhouse vegetables such as tomatoes, potatoes, cucumbers, and aubergines, but they do not want lime.

TUB BEDS: Above is fine information for soil culture, but $5 and $9 plastic tubs from China become, with a 1 1/2" raised 1/2" mesh corner reservoir fed by an 1 1/2" ABS tube screwed to the corner and filled with **prepared soiless container mix**, an 'earth box', and those are our 'raised beds' today. Urine, fish and seaweed fertilizer is poured down the tubes perhaps four cups at a time and the side drain hole 3/4" off the bottom tells you the entire bed will draw on that only to maintain even moisture throughout. When the top begins to dry it's probably time for a supplement.

The medium in the tubs and tubes is

1 - 2.5 ft sq bag of Container Mix
1 - 1 ft sq bag of Lobster Compost
1/2 cup Rock Phosphate
1/2 cup Garden Lime
1/2 cup Green Sand

The bottom reservoir can be checked with a dipstick. Putting hands in the top 'soil' tells of the state of the wicking of the 12 – 14 inch deep medium in bringing water and added nutrients to the tub surface. Water is used much faster than ever I expected, and since the entire current vegetable plant population is 'growing on' with minimal photosynthesis which would utilize carbon dioxide and generate oxygen, CO2 and high humidity are major byproducts right now.

The medium seems to work very effectively in the tubs, but in the 3" depth of the tubes it hardens over on top and will need some change in the formula for tube culture.

The starting growing medium fertilization formula is:

20 cups of H2O (5 quarts)
1 cup of Urine - 17:3.75:3.75
1Tblsp Fish and Seaweed - 2:3:1
1 Tblsp Fish Fertilizer - 5:1:1
wood ash water

WOOD ASH 5-10% K2O Potash is a quick acting source for 'lime'. Young wood is best. Keep dry. Wood ash is the inorganic and organic residue remaining after the combustion of wood or unbleached wood fiber. The physical and chemical properties of wood ash vary significantly depending on many factors. Hardwoods usually produce more ash than softwoods and the bark and leaves generally produce more ash than the inner woody parts of the tree. On the average, the burning of wood results in about 6-10% ashes. Ash is composed of many major and minor elements needed by the tree for plant growth (Table below). Since most of these elements are extracted from the soil and atmosphere during the tree's growth cycle, they are elements that are common in our environment and are also essential elements in the production of crops and forages. **Calcium is the most abundant element in wood ash and gives the ash properties that are similar to agricultural lime.** Ash is also a good source of potassium, phosphorus, magnesium, and aluminum. In terms of commercial fertilizer, average wood ash would probably be about 0-1-3 (N-P-K). In addition to these macronutrients, wood ash is also a good source of many micronutrients that are needed in trace amounts for adequate plant growth. It has been shown that wood ash has a liming effect of between 8 and 90% of the total neutralizing power of lime and **can increase plant growth up to 45% over traditional limestone.**

Range in elemental composition of industrial wood ash samples and ground limestone.

Element	Wood Ash*	Limestone
Macroelements	**Concentration in %**	
Calcium	15 (2.5-33)	31
Potassium	2.6 (0.1-13)	0.13
Aluminum	1.6 (0.5-3.2)	0.25
Magnesium	1.0 (0.1-2.5)	5.1
Iron	0.84 (0.2-2.1)	0.29
Phosphorus	0.53 (0.1-1.4)	0.06
Manganese	0.41 (0-1.3)	0.05
Sodium	0.19 (0-0.54)	0.07
Nitrogen	0.15 (0.02-0.77)	0.01
Microelements	**Concentration in mg/kg**	
Arsenic	6 (3-10)	-
Boron	123 (14-290)	-
Cadmium	3 (0.2-26)	0.7
Chromium	57 (7-368)	6.0
Copper	70 (37-207)	10
Lead	65 (16-137)	55
Mercury	1.9 (0-5)	-
Molybdenum	19 (0-123)	-
Nickel	20 (0-63)	20

Selenium	0.9 (0-11)	-
Zinc	233 (35-1250)	113

Other Chemical Properties

CaCO3 Equivalent	43% (22-92%)	100%
pH	10.4 (9-13.5)	9.9
% Total solids	75 (31-100)	100

* Mean and (Range) taken from analysis of 37 ash samples

UREA is a quick-acting Nitrogen source, typically applied to Spring crops 1/2 oz/yd2. It is the major nitrogenous end product of protein metabolism and the chief nitrogenous component of the urine of mammals, also called *carbamide*. The adult human body discharges almost 50g (1.8 oz) of urea daily. After application to the soil in water solution, it gradually undergoes hydrolysis to ammonia (or ammonia ion) and *carbonate* (or carbon dioxide).

CHICKENS have arrived, more for their eggs than for the shit they give you, but DRIED and composted POULTRY MANURE is 4% N 3% P 2%K and is slow to fairly quick acting. It is used 2 oz to 8 oz/ydf2 as a base dressing (high rate) or top dressing (low rate).

The nesting box is in the corner of the gardination for easy egg picking. When the lid is open a full view of the hens is available.

CARBON DIOXIDE O=C=O

Now these here plants give off some moisture and oxygen, even some CO2 when not in growth stages, which we like. An actively growing space should generate quite a lot of oxygen and humidity. In general, carbon dioxide is exhaled by animals and utilized by plants *during photosynthesis*, when they absorb CO2 from the air and, together with water, react it to form carbohydrates. Additional carbon dioxide is created by the combustion of fossil fuels or vegetative matter, among other chemical processes. **Carbon dioxide is an important environmental greenhouse gas because it absorbs in the infrared, and because of its atmospheric lifetime**. Due to this, and the role it plays in the respiration of plant, **it is a major component of the carbon cycle.**

Plants need carbon dioxide (O=C=O) and increasing its pressure is shown to significantly encourage growth. Plants can potentially 'grow on' up to 50% faster in concentrations of 1,000 ppm CO2, when compared to ambient conditions, which vary between 300 ppm and 600 ppm. As long as plants have the opportunity to take in CO2 at all times from air that is over 200 ppm CO2 the plants will have the minimal required nutrients for photosynthesis. **Plants emit CO2 during respiration, so it is only during growth stages that plants are net absorbers. Plants remove carbon dioxide from the atmosphere in photosynthesis**, also called carbon assimilation, which uses light energy to produce organic plant materials by combining carbon dioxide and water. Free oxygen is released as gas from the decomposition of water molecules, while the hydrogen is split into its protons and electrons and used to generate chemical energy via **photophosphorylation.** This energy is required for the fixation of carbon dioxide in the Calvin cycle to form sugars. These sugars can then be used for growth within the plant through respiration. CO2 must be introduced into the Groworld to maintain plant growth. A plant with adequate CO2 is not a host for whiteflies and mites.

Reading the above, I wonder now if a balance between respiring growth plants and photosynthesizing flowering/fruiting plants wouldn't provide the balance of nature's usual carbon dioxide cycle.

SOURCES OF CARBON DIOXIDE

An average person's respiration is approximately 4.5% CO2 and generates approximately 450 liters (roughly 900 grams) of carbon dioxide per day. All aerobic organisms produce CO2 when they oxidize carbohydrates, fatty acids,

and protein in the mitochondria of cells. Plants absorb CO2 from the air and, together with water, react it to form carbohydrates.

Anna Edy had chickens and rabbits for manure and CO2 production, and especially for heat, in her Ark. After 3 years the ammonia from the chickens killed the 3 yr old cascading tomato plants among other plants, and she had to separate the livestock apart with a water bag wall between creatures in back and the growing space. We have chickens, mostly outside as birds can better tolerate cold. In the smaller house she's building now, Anna will include chickens but no rabbits.

Pot growers add CO2 to increase yield, "30-100% yields increases through CO2 enrichment". Most, because of "the hassle, expense, SPACE, danger, and time involved can make constant or near constant venting a desirable alternative to enrichment." Constant air circulation or using the output of heating combustion for CO2 is not a Groworld Module possibility with severe deficit conditions (though there will be a woodstove). If some plants are growing on they need CO2, but with pot I expect they give off CO2 after the day shortens to 12 hours, fertilization balance changes, and flowering and photophosphorylation becomes the cultural mission.

What are ways to generate CO2 and how much would a big space need?

I estimate the garden space at 7200 ft3. There may be composting going on w/input of urine and vegetative detritus into the process (below, **by what chemical process does urine react on sodium bicarbonate?**). Is there a simple device for measuring ppm CO2 – perhaps an aspect of the CO2 checking devices we have to install? (2/24/09 being tested)

One way to generate CO2 is vinegar on sodium bicarbonate ($13 for 50 lb at Agway). If 7200 ft3 had 200 ppm CO2 that would be XCO2 lbs. How much cheap vinegar (or other home fermentation product?) would mix and match generate XCO2 lbs? If, arbitrarily today, 1/10th of that available each day were absorbed (and O2 released) would that need to be a daily process? Should sodium bicarbonate and vinegar be stocked? To last how long?

"A much cheaper way to provide CO2 is 2 oz sugar in 2 liters of water in a bottle (sterilized 1st with bleach and water, then rinsed) plus a few cc urine. Add a *brewing yeast*, shake up and keep at ~70 F." "Over the next 2 weeks or so it will brew up about 1/2 oz CO2 for every oz sugar used. Keep a few going at once, starting a new one every 3 days or so. With added CO2 growth is phenomenal!" What's this pot-growing route like magnified? Should sugar be stocked? (probably yes, for many reasons.)

Measuring Carbon Dioxide

In a standard greenhouse the plants have depleted most of the available supply of **CO2 building blocks** by about 11 am, and when there is not enough CO2, plant growth stops. Transpiration may continue and thus the absorption of water and nutrients through the roots, but the result is plants puffed up with water and undigested nitrate. As stated earlier, it is not good for people to consume food too high in nitrate, because this reduces the oxygen exchange capacity of our blood.

Conversely, if CO2 levels in the greenhouse are increased above the normal outdoor level of 350 ppm, to a level of some 1,400 ppm, thereby increasing the number and density of carbon building blocks in the air available for the leaves to absorb, the result is increased plant productivity, increased dry matter ration and decreased nitrate levels in the crops**.** ***Increased CO2 compensates tremendously for low light levels of Northern mid-winters***, as more and better growth can take place within each hour of daylight. This results in higher productivity and healthier plants better able to resist insects.

With the new CO2 meter, I started recording closely spaced longitudinal data that maybe Peter can easily put into graphic representation to understand the interrelatedness of three variables with the solar day. The data is in sequence: time of reading, humidity in %, temperature 5 ft above floor of gardination, parts per million of CO2, and comments:

Friday	11:37	77%	64°	860 ppm	it was 7xx when I raised
	3:05	62%	78°	939 ppm	shutters an hour ago.
	3:50	54%	82°	915 ppm	
	3:55	53%	82°	974 ppm	was 87° on catwalk
	6:45	50%	71°	**1027 ppm**	
Saturday	12:30	71%	71°	669 ppm	shutters up at 10:30
	1:20	69%	73°	708 ppm	
	1:35	66%	75°	706 ppm	

1:45	65%	77°	713 ppm	
2:30	65%	78°	732 ppm	
2:45	58%	89°	732 ppm	
3:06	59%	82°	801 ppm	
3:10	59%	82°	796 ppm	no change in sun intensity all afternoon
3:20	55%	82°	779 ppm	moving up to 783 in 2 minutes because of my breath?

I observe that I am recording now 8 ft away from the sensor which is on the back of the device, but perhaps not experiencing any data affects from my exhalation. Then I remembered that when I sat down I was 8 ft away from it, but I decided to listen to my body's direction to unloosen it a while in the chair's balancing support and I had moved to 6 ft from it to do maybe 20 minutes of intentional body rattling healing which focused on the lumbar node both straight on and twisted to each side, which vibration and focus surprisingly moved up higher in the left scapula and thence to the spinal column, causing two strong thoracic vertebrae snaps to jar each wave of full body motion (the first time the upper spine showed its willingness to get back the back into motion and fluidity). This was accompanied by prolonged intentional exhales, the return exchange of which sent out ahead of me higher CO2 content with force directed in the general direction of the meter, accompanied by vocal complaint/appreciation.

I then decide to examine my CO2 power with two 5-breath contributions to the meter 6 ft away spaced a minute apart as the ppm rose in 4 minutes from 779 to 854 ppm. Then in ten more minutes without my CO2 bellowing or nearer breathing, humidity is 53%, temperature 5 ft off the gardination floor is 84° and CO2 is momentarily back to 778 ppm. On the two days reported above, temperatures reached 82° mid afternoon at the peak of the solar day for this Groworld orientation to the sun, with humidity averaging 60%.

Later in the day, at 5:15pm with 61% humidity and 75°, I notice the 617 ppm CO2 is rising and I contribute 5 deep exhales from 8 ft away to watch the ppm rise to 638 in 12 minutes as in the previous test. I followed that with a double deep herbal exhale blow job from 6 ft steadily raising the ppm in a half hour to a high of 687 ppm, which then descended to a steady 628 ppm at 61% humidity and 73° for at least 5 minutes, before rising in another half hour to 660 ppm. Thoughout this late afternoon testing, humidity stayed at 61 to 62% and temperatures started at 75° descending in 1 1/2 hours only to 71°. **Three subsequent days show stabilizing at around the 4pm solar maximum, as the lower sun comes full into the**

6 West-facing sliding doors, at low 700s ppm, with 52% humidity and 82° unstratified air throughout the gardination levels.

Possible conclusions here are that, with the data that an average, though no Groworlder is average, person's respiration is approximately 4.5% CO2 and generates approximately 450 liters (roughly 900 grams) of CO2 per day, long held herbal lungscapes may contribute more CO2 on exhale than does usual respiration. And plant's' minimal requirements for photosynthesis are 200 ppm, outside averages 400 ppm, and plants can potentially grow 50% faster at concentrations above 1000 ppm. And our breathing does make a contribution to the gardination**. At the current stage of plant development, growing on, moving into photophosphorylation, CO2 ppm is in the 600 – 700 ppm range, but can move into the 900s under conditions not yet identified.**

Further Analysis of Flow and Storage

Here's March 6th data, one of the last days when the woodstove was being phased out for Spring and especially because more storage in the heat anchor is not needed now and the lettuce and other veggies don't like these high temperatures:

At 4:15pm, Output at the plenum was 76.5° above the plenum at the base of the 6 ft sliders and 68.1° rising from the inner wall of the plenum.
Duct temperature at the Bathroom window was 78.3°. While inside house temperature was 72.6°
There was a medium fire at noon, the shutters were closed at 4 pm, the sun having been obscured by clouds 3:15 – 3:30pm. It was 40° outside.

What was new, was discovering that basically too much heat was being produced and the thermal anchor couldn't absorb it fast enough so that the air within the gardination was no longer strartified and even the duct over the stairway was the same temperature as the gardination space: desk downstairs 82°, catwalk above 82°, and duct over stair 83°, with the air at the bathroom window 78.3. AND, the air coming out of the ducts from storage was 68.1° at 4:15 pm.

Two conditions were unexpected by me today. The 187 ton insulated thermal anchor storage, with its conduction agent the aggregate 1400 ft sq walls of the 29 - 6" ABS corrugated 30 ft ducts, was slowly trying to deal with a prolonged passage of air around 80°, above its estimated 64.5° stasis balance, and just couldn't absorb at that steady rate any energy above 68.4

degrees, which air was returned to rise and thwart convection flow, with the other unusual condition this day in our time: from my desk up 8 ft to the catwalk, then over half way descending in the ducts between the roofs, 82° was throughout. No stratification was occurring even with the active return of unaccepted energy to the pool of convective potential. Or because of it.

At 5 pm, the outflow is 67.9°, .5° lower, and the bath duct is 77.5°, down .8°, but still 10° apart for conduction and 3.5° above what I calculate the sleeping thermal anchor balances out to. At 5:15 pm, the unstratified air is 80° desk, 80° catwalk, 81° stair duct, with bath duct lowered to 76.9° and 74° below the sliders, AND the plenum output air has risen to 68.5°, so the conduction edge of the storage must be at least that temperature, needing conduction time within the storage to even out this day's capture of energy. Shirley, we've gotta be cranking up that thermal battery!

Of significance is the mid-morning lowest temperature points of both the air in the vertical duct and within the inner house. This day with wood heat running, the inner house dropped from a high of 70.8° at 5:34 pm the day before, down to 65.5° at 10:34 am. When the all-night subdued wood stove's heat began influencing its ambient temperature. The duct temperatures at the bathroom window half-way above the bottom/storage in the down duct, that were 4:41 pm the day before 'pulsing' at 82.8°, fell – always influencing and influenced by the basal temperature of the storage – guessed to be about 63° that day, to a low temperature of 68.5° at 930 am, rising at 3:45 pm to 83.8°. This is clearly the overnight influence of the wood stove with duct temperatures 5.5° higher than the storage before the vapors ascend along the 'south' sliding door wall again.

When convection ceases, when the Delta-T in the stratified two 13 ft down-pulling ducts and laterally in the multiple ducting also six feet square from the 4 in x 10 ft stacks doesn't interest the 1,400 ft sq congregate surfaces of those 29 - 6 in ducts for any thermal conduction, then convection ceases. This is not to say some air warmer than the low radiation shimmering surface of the 187 ton thermal anchor is not in it's course, BUT the Delta-T is not high enough in its influence on the radiant transfer membrane over the full 30 ft of the ducts to induce a convective flow.

FERMENTATION

I have to learn a lot more about fermentation, both in composting where CO2 and humus production is the goal, and in food processing. Just as large areas of the world use night soil for fertilization and insects in their various life stages for protein, fermented food is prominent in diets just as fermented beverages and vinegars have been ubiquitous since antiquity. Microorganisms enhance food flavors for better nutritional and preservative qualities.

For food, I think particularly of the wide array of products from soy beans, which can be groworlded. An example is tempeh, quoted in "Creative Ferment – Biotechnology: the Resourceful Gene":

"The third type of fermentation, solid substrate fermentation, can be seen in the creation of soybean tempeh, a fermented product consumed as a staple food in Indonesia and other countries in Southeast Asia

Tempeh manufacture involves a two-step fermentation process. In the first stage, soybeans are soaked in tap water for twelve to twenty-four hours during which an acid fermentation develops. After soaking, the soybeans are boiled in water, drained, cooled and then arranged in trays for the second fermentation, which is conducted with the fungus Rhizopus oligosporus. A mixed culture of bacteria and fungi occur, with the bacteria being very important in improving the nutritional content, in particular enhancing vitamin B12. {*source of essential cyanocobalamin and its cobalt*}

In Indonesia, tempeh is eaten by all sectors of the population and is often used as a substitute for meat among many low income groups as it is an excellent high protein food that can be preserved without the need for expensive refrigeration. It is also becoming increasingly popular among vegetarians in Western countries in the form of tempeh burgers.

Many indigenous fermented foods are produced on a very small scale either in homes or in small-scale cottage industries in villages. In these situations, the microbial cultures are often traditional and highly variable. For example, some types of tempeh in Indonesia are produced by wrapping the soaked soybeans **in a hibiscus leaf, which provides the natural flora for inoculation.**

Perhaps one of those hibiscus in my greenroom that hardly ever blooms might warrant inclusion in the Groworld for its 'natural flora'! What's clear is that the whole subject of vinegars (acetic acid) and beverages and especially ongoing starter/inoculation brews must be researched and developed in the next years. There'll be no milk for cheeses or meat for proteins – eggs, probably, and sprouts are a good source. Seeds will be very important to stock and collect on-goingly big time.

The Seed as Physician

This Manual would not be complete without the revelation of the seed as physician from ancient and contemporary times, when Man dwells in God expressed in Nature. Multiply-referenced in the Old Testament, the role of cedar trees in Man's health, nurture, and well-being leads today to an enlightened entity living deep in the Siberian taiga under a 550 year old cedar and influencing all of Russian food production, named Anastasia. There are 8 books about her in the *Ringing Cedars Series* now translated to English, which have been influencing Russian agriculture for twenty years or so. What we in the West don't realize is that **Russia grows 70% of its food in small family gardens called dachas**, and the Ringing Cedars movement is instigating the country-wide development of 1 hectare plots deeded to families and their kin in perpetuity for lives of what we call permaculture. As well, Anastasia has been assisting **dachniks** for decades telepathically in a program that includes cultivation of Siberian cedar for its health giving and youthing properties and its world trade value in their subsidy. "Even in one tiny piece of cedar there is more energy beneficial to Man than in all the man-made energy installations taken together." Cedar nut oil made using wooden presses in many villages of the Siberian taiga fetches on the London market up to $500 per Kilogram.

In Moscow - as I learned years ago after experiencing the Schraebergaerten outside Frankfurt when I was there mopping up WW Too in 1952-54 that still surrounded that German city 40 years later when I returned - seventy percent of the city population has a dacha within 70 Km of the city approached by bicycle or public transportation. This is true of Russia everywhere, as that country and Canada already demonstrate the pattern of living after the cataclysm Al Bielek reported seeing in 2187, and the Zetas describe also: congregate self-sufficient dwelling edged with agriculture and vast spaces between 'cities'.

Vladimir Megre', Anastasia's chosen promulgator of her natural wisdom, writes in the first Anastasia *Ringing Cedars* book,

"What Anastasia went on to propose the dachniks do will probably contradict the principles of plant science – and certainly will contradict the commonly accepted methods of planting and cultivating various garden-plot crops. Her affirmations, however, are so colossal that it seems to me they would be worth trying out for anyone with the opportunity to do so – maybe not throughout their whole plot, but at least in one small section of it, especially since nothing harmful and only good could come of it. Besides, much of what she has told me has already been confirmed by the experiments of the biological science expert Mikhail Prokhorov."

The Seed as Physician

Anastasia stated:

"Every seed you plant contains within itself an enormous amount of information about the Universe. Nothing made by human hands can compare with this information either in size or accuracy. Through the help of these data the seed knows the exact time, down to the millisecond, when it is to come alive, grow – what juices it is to take from the earth, how to make use of the rays of the celestial bodies – the Sun, Moon and stars, what it is to grow into, what fruit to bring forth. These fruits are designed to sustain Man's life. More powerfully and effectively than any manufactured drugs of the present or the future, these fruits are capable of counteracting and withstanding any disease of the human body. But to this end the seed must know about the human condition. So that during the maturation process it can satiate its fruit with the right correlation of substances to heal a specific individual of his disease, if indeed he has it or is prone to it.

"In order for the seed of a cucumber, tomato or any other plant grown in one's plot to have such information, the following steps are necessary:

"Before planting, put into your mouth one or more little seeds, hold them in your mouth, under the tongue, for at least nine minutes.

"Then place the seed between the palms of your hands and hold it there for about thirty seconds. During this time it is important that you be standing barefoot on the spot of earth where you will later be planting it.

"Open your hands, and carefully raise the seed which you are holding in your mouth. Then blow on it lightly, warming it with your breath, and the wee little seed will know everything that is within you.

"Then you need to hold it with your hands open another thirty seconds, presenting the seed to the celestial bodies. And the seed will determine the moment of its awakening. The planets will help it! And will give the sprouts the light they need to produce fruit especially for you.

"After that you may plant the seed in the ground. In no case should you water it right off, so as not to wash away the saliva which is now covering it,

along with other information about you that the seed will take in. It can be watered three days after planting.

"The planting must be done on days appropriate to each vegetable (people already know this, from the lunar calendar). In the absence of watering, a premature planting is not as harmful as an overdue planting.

"It is not a good idea to pull up all weeds growing in the vicinity of the sprouts. At least one of each kind should be left in place. The weeds can be cut back…"

According to Anastasia, the seed is thus able to take in information about the person who plants it, and then during the cultivation of its fruit it will pick up from the Universe and the Earth the optimum blend of energies needed for a given Man. The weeds should not be disposed of completely, as they have their own appointed function. Some weeds serve to protect the plant from disease while others give supplemental information. During the cultivation time it is vital to communicate with the plant – at least once during its growth period. And it is desirable to approach it and touch it during the full moon.

Anastasia maintains that the fruit cultivated from the seed in this manner, and consumed by the individual who cultivated it, is capable not only of curing him of any diseases of the flesh whatsoever but also of significantly retarding the aging process, rescuing him from harmful habits, tremendously increasing his mental abilities and giving him a sense of inner peace. The fruit will have the most effective influence when consumed no later than three days after harvesting.

The above-mentioned steps should be taken with a variety of plant species in the garden plot.

It is not necessary to plant a whole row of cucumbers, tomatoes, etc., in this manner; just a few plants each is enough.

The fruit of plants grown like this will be distinguished from other plants of the same species not only in taste. If analyzed, it will be seen that they are also distinct in terms of the substances they contain.

When planting the seedlings, it is important to soften the dirt in the excavated hole with one's fingers and bare toes, and spit into the hole.

Responding to my question "Why the feet?", Anastasia explained that through perspiration from one's feet come substances (toxins no doubt) containing information about bodily diseases. This information is taken in by the seedlings. They transmit it to the fruit, which will thus be enabled to counteract diseases. Anastasia recommended walking around the plot barefoot from time to time.

"What kind of plants should one cultivate?"

Anastasia replied:

"The same variety that exists in most garden plots is quite sufficient: raspberries, currents, gooseberries, cucumbers, tomatoes, wild strawberries, any kind of apple tree. Sweet or sour cherries and flowers would be very good too. It does not make any difference how many plants of each kind there are or how big their area of cultivation is.

"There are a few 'definites', without which it would be difficult to imagine a full energy microclimate: one of them is sunflowers (at least one plant). There should also be one-and-a-half or two square meters of cereal grains (rye or wheat for example) and be sure to leave an 'island' of at least two square meters for wild-growing herbs – ones that are not planted manually. If you have not left any of them growing around your dacha, you can bring in some turf from the forest and thereby create an island of natural growth."

I asked Anastasia if it were necessary to plant these 'definites' directly in the plot, if there were already some wild growing herbs close by – say, just beyond the fence – and this is how she responded:

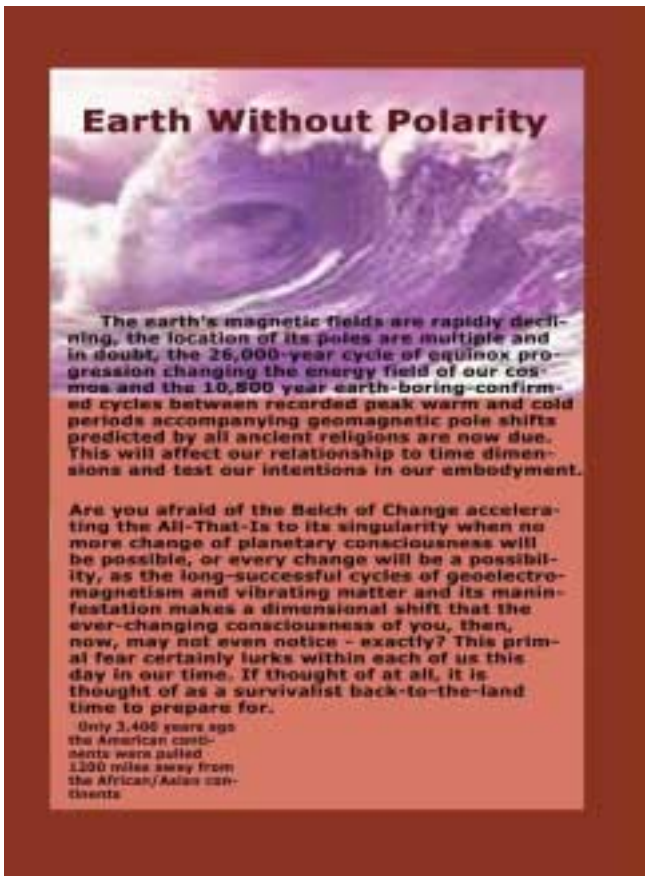
"It is not just the variety of the plants that is significant, but also how they are planted – the direct communication with them allows them to take in information they need. I have already told you about one of the methods of planting – that is the basic one. The important thing is to infuse the little patch of nature surrounding you with information about yourself. Only then will the healing effect and the life-giving support of your body be significantly higher that from the fruit alone. Out in the natural 'wilds' (as you call them) – and Nature really is not wild, it is just unfamiliar to you – there are a great many plants that can help us cure all – and I mean ***all*** – existing diseases. These plants have been designed for that purpose, but man has lost, or almost lost, the ability to identify them."

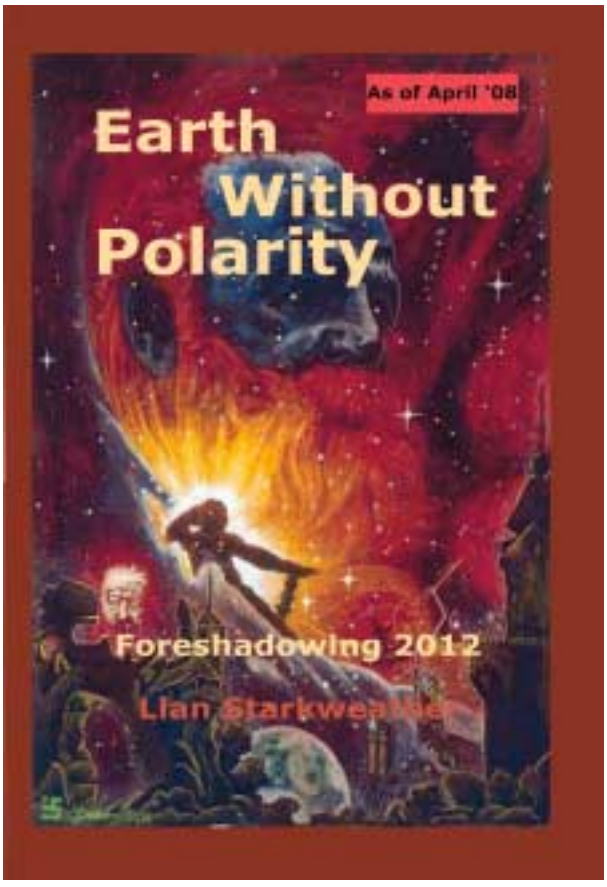
I told Anastasia that we already have many specialized pharmacies which deal in healing herbs, just as there are many physicians and medicine man who make a profession out of herb treatments, and she replied:

"The chief physician is your own body. Right from the start it was endowed with the ability to know which herb should be used and when. How to eat and breathe. It is capable of warding off disease even before its outward manifestation. And nobody else can replace your body, for this is your personal physician, given individually to you by God, and personal only to you. I am telling you how to provide it with the opportunity to act beneficially on your behalf.

"If you make connections with the plants in your garden-plot, they will take care of you and cure you. They will make the right diagnoses all by themselves and prepare the most affective medicine especially designed for you."

On the new moon, April 24, 2009, Groworlders are starting the Outworld 50' x 80' gardenation with Anastasia seedling. We think you will want to try it too….





276 pg Reference volume to the galactic realities of 3rd Density Earth and convincing testimony to what is underway in accepting our contemporary and long time co-existence with more intelligent aliens on a planet destined for 4th Density Service-to-Other cohabitation.

Author Groworlder
Llan Starkweather
Pictured at the desk
in the Gardination

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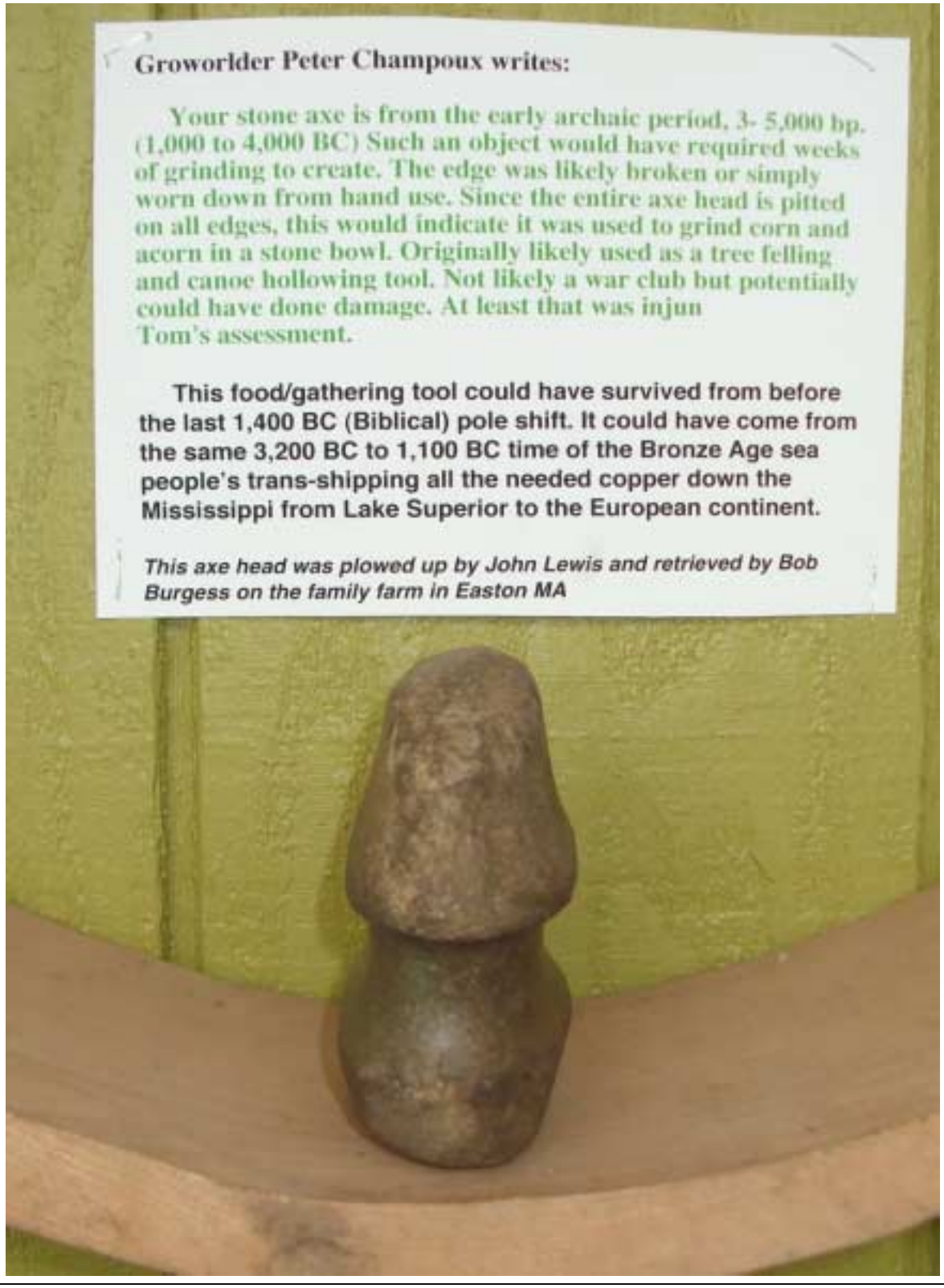
Groworlder Peter Champoux writes:
Your stone axe is from the early archaic period, 3- 5,000 bp. (1,000 to 4,000 BC) Such an object would have required weeks of grinding to create. The edge was likely broken or simply worn down from hand use. Since the entire axe head is pitted on all edges, this would indicate it was used to grind corn and acorn in a stone bowl. Originally likely used as a tree felling and canoe hollowing tool. Not likely a war club but potentially could have done damage. At least that was injun Tom's assessment.
This food/gathering tool could have survived from before the last 1,400 BC (Biblical) pole shift. It could have come from the same 3,200 BC to 1,100 BC time of the Bronze Age sea people's trans-shipping all the needed copper down the Mississippi from Lake Superior to the European continent.
This axe head was plowed up by John Lewis and retrieved by Bob Burgess on the family farm in Easton MA

Notice the alien face discovered after publication of this Safari cloud photo?