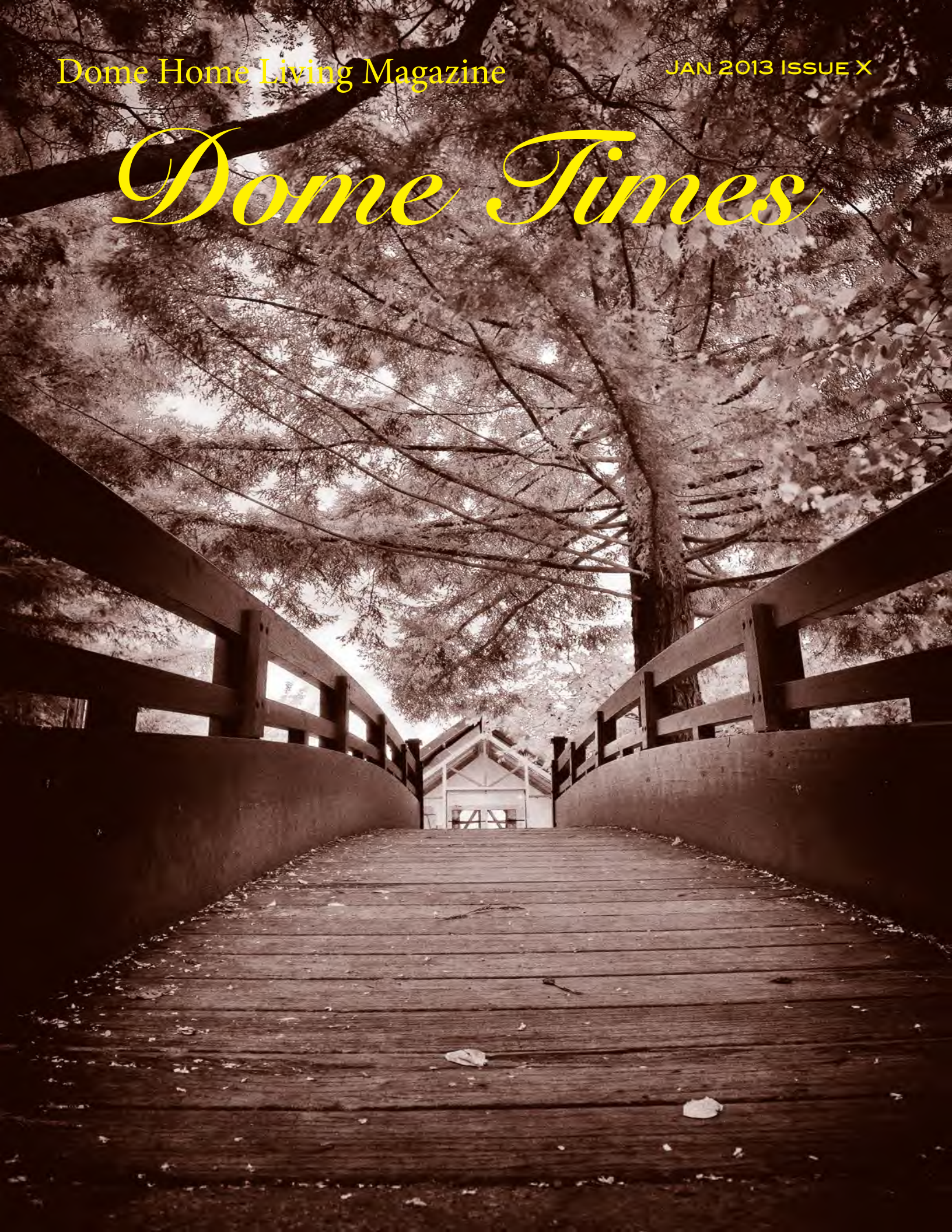


Dome Home Living Magazine

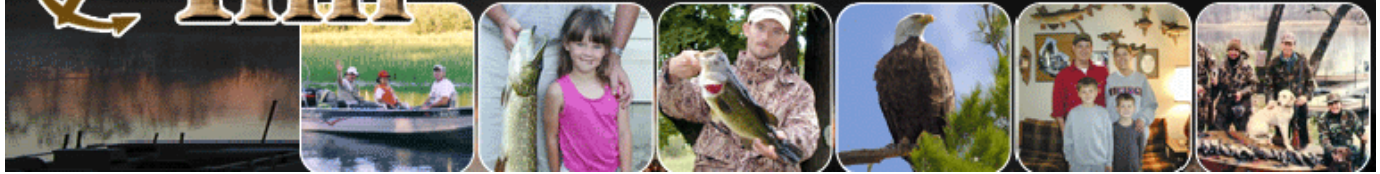
JAN 2013 ISSUE X

Dome Times



Anchor Inn

A Family Resort With Legendary Hospitality



 **Anchor Inn
Resort**
55960 County
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Spring Lake, MN 56680
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2718
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A vacation at Anchor Inn Resort, located on the shores of the Bowstring River near Spring Lake, Minnesota is like a breath of fresh air...literally! Located in the heart of the Chippewa National Forest Anchor Inn offers guests the opportunity to take a break from the pressures of everyday living and fish, hunt or just relax in the beauty of Minnesota's northwoods.

Anchor Inn Resort has long been a fixture on the shores of the river that runs past its docks. Began in the early 1920s as a hunting lodge it has survived the decades with its history, peace and legendary service intact. Owned and operated today by the Kitterman family, it offers guests a variety of lodging choices including modern, clean and comfortable cottages, Bed and Breakfast rooms above the Lodge and a campground set up for RV camping or tent camping.

As one of the Best Fishing Resorts in Minnesota, Anchor Inn provides Fisherman with a wide variety of Minnesota fishing opportunities. The beautiful Bowstring River system includes Bowstring Lake, Sand Lake, Little Sand Lake and Rice Lake. Anglers find some of the best Minnesota walleye fishing around as well as great northern pike fishing, crappie fishing, largemouth bass fishing and bluegill fishing. In fact, the Anchor Inn bridge is well-known for the great fishing available from its walkway. It's not unusual to score buckets of bluegill or a stringer of walleye from the bridge or from the shore and docks at Anchor Inn Resort.

Hunters take notice! Anchor Inn Resort is located amid some of the finest public hunting ground in Minnesota. The black bear hunting, grouse hunting, deer hunting and duck hunting is excellent in the immediate vicinity of the resort and the Kittermans have hunted the area for generations and can give you great hunting tips to help ensure that you have a successful Minnesota hunting trip.

Anchor Inn Resort is also a great place to spend your Minnesota family vacation. With terrific fishing, fun resort activities, and interesting area attractions your family will enjoy time together in the great outdoors while making great memories.

Anchor Inn Resort is also a great place to spend your Minnesota family vacation. With terrific fishing, fun resort activities, and interesting area attractions your family will enjoy time together in the great outdoors while making great memories.

We invite you to experience our legendary hospitality and join the generations of sportsmen and families that call Anchor Inn Resort their home away from home.

Please contact us or call us at 1-888-798-2718 for more information.

"We have been going to Anchor Inn since 1988. Every year we look forward to the solitude and the restful surroundings of the area. You meet some of the nicest families there. We have never been "shut out" on our Minnesota fishing vacation. It is always so peaceful and relaxing and before you know it it's time to head home.

The Kitterman's make you feel like you are part of their family. So if you have the opportunity to go to Anchor Inn don't miss it. You'll never find a more relaxing place."

*Ed & Sandie
Milan, IL*

Dome Times
ISSUE X
Jan 2013



DOMETIMES

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www.dometimes.com



NEWS UNDER
THE SUNSET
The Solution is in the
Journey



DomeHeadZ,

This is the last issue until I complete my doctorate. Ten issues! The magazine has grown because of you readers..

I never counted the number of encouraging emails many of you sent...the compliments often pushed me for another issue. I can say the number of Dome Times subscribers grew too large for me to handle alone. I have mailed thousands upon thousands of issues. For those who had to remind me for an issue...thanks for your patience.

Instead of a dome on this issue's coverpage, I chose a picture that illustrates a path still uncovered. It seems appropriate that this issue has an article from a reader about dome retirement.

Again, thank you all. Please keep me in your thoughts, and when enough articles arrive my way, I may create additional issues, but a liesurely pace.

William Koonce

DOMETIMES (TM)

Editorial Director: W. Koonce

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Jack Chilla

JAN 2013 Issue X

Go to www.dometimes.com to order previous issues of this magazine.

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**Dome
Times**

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Dome Times Magazine



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Like the fragile leaves that fall to earth, a family's trip is done. Now it is time for another family to enjoy a beautiful dome home.

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Our Trip isn't Over,
Just Postponed

Eat Well and You Will Stay Well

The Super Food Lecithin *by Dr. Lee*

Hello DomeheadZ (as Mr. Koonce calls you all),

Today we continue our series on “superfoods.” Let’s discuss lecithin (pronounced less-i-thin). This is a fat-dissolving compound that is found in all cellular organisms (of which we are included) and is a major component of cell membranes that regulate the nutrients entering and exiting the cell. Any kind of physical over-activity can use up lecithin faster than it is replaced, thus, this leaves the individual tired and exhausted.

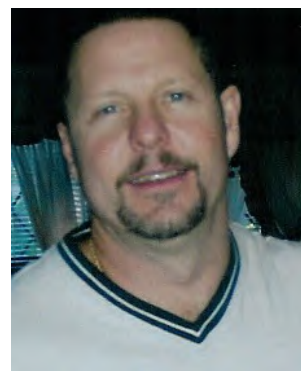
Being rich in choline (a water-soluble essential nutrient), inositol (found in the membranes surrounding each cell), and linoleic (an unsaturated omega-6 fatty acid), lecithin has the ability to break up



the fatty substance cholesterol into tiny particles, and to emulsify and keep cholesterol and fats in solution, thus, preventing these substance from building up in the wall of the arteries and veins.

If lecithin is taken before a meal, it has been found that the fats in the blood usually return to normal in a short time. In other words, lecithin helps body cells rid themselves of excess fats.

It has also been suggested that if enough lecithin is included in the diet, hardening of the arteries does not occur, as lecithin helps maintain normal body conditions in the average diet. Other claims



include:

- Cardiovascular health
- Liver and cell function
- Fat transport and fat metabolism
- Reproduction and child development
- Physical performance and muscle endurance
- Cell communication
- Memory, learning, and reaction improvement
- Arthritis relief
- Healthy hair

Lecithin is found in egg yolk, soybeans, grains, wheat germ, fish, legumes, yeast, and peanuts from which it can be extracted (highly filtered) in concentrated form to use as a dietary supplement.

Lecithin is available in granules, liquid, wafers, tablets, and capsules. It is relatively tasteless, so fussy eaters should have no difficulty taking a daily supply.

It can be used on cereals, in juices, or baked goods and the most economical form, liquid, can be taken by the spoonful as it comes from the bottle.

Three to six tablespoons daily of lecithin has been recommended as an aid in avoiding exhaustion and keeping cholesterol levels under control.



Eat well and you will stay well.

**Our life, exempt from public
haunt, finds tongues in trees,
books in the running brooks,
sermons in stones, and good
in everything.**

- William Shakespeare



Aging Can Be Beautiful, But It Can Mean Leaving Something Beautiful Behind

by Flip Young

Our dome sits on 6.51 acres just south of Chillicothe, OH, less than an hour south of Columbus. It is situated on a major thoroughfare (US 23), but is totally secluded and not visible from the highway. We live on top of a sizeable wooded hill, about 120 feet above the highway. The first 775 feet goes uphill at an average angle of about 19 degrees. At the top of the hill, the driveway splits to access two garages. One is an insulated 2 ½ car (conventional) garage; the other is a 30' x 50' x 12' high Butler Building (with steel girders).

The Butler Building houses 5 indoor/outdoor runs for large breed dogs. (We bred show Newfoundlands for over 35 years.) The kennel itself is heated and air conditioned. There is also a grooming area with a raised tub for bathing. A 26' x 40' metal roof provides shade when the dogs are outdoors.

The opposite side of the Butler Building has a 13' x 50' carport. Enough about that! You want to know about the dome we built. The Butler Building was erected in 1982. My former husband, Bill, and I partitioned and insulated the rear 20' and lived in it. Since we both held full time jobs, all work was done weekdays after 5pm and on the weekends.

We started the basement in June of 1983. We tried to hire a backhoe operator to dig a hole large enough to accommodate the 40' diameter dome we planned. Even though we had chalked the perimeter of the hole on the ground, we were unable to find anyone willing to accept the challenge at any price! So Bill rented a backhoe, learned how to operate it, and did the excavation himself.

The majority of the basement floor is 6" thick



and 12" around the perimeter. Before we installed the rebar, we laid out 1000 feet of 1" black water pipe. The idea was that someday we'd install collectors and pump heated water throughout the basement floor. See Figure 1.



Figure 1

It took until the end of September to finish the concrete work. All vertical walls are 8" thick. Our basement has 18 sides (an octadecagon). We poured three sides at a time. We also created a 10 foot wide, 60 foot long reinforced concrete ramp that goes

to the basement door.

We prepared four 14 inch by 20 foot steel I-beams by welding joist holders for the 2 x 12's that would form the first floor. Bill made a boom for the rear of our 27 ½ hp Kubota 4WD tractor that allowed him to place the I-beams singlehandedly. See Figure 2. The dome is designed so that both staircases are hexagons around the central core.

Before winter set in, we managed to finish installing the floor joists, placed the plywood floor,



Figure 2

and sealed it for the winter with rolled roofing. Once it was safely closed in, we installed the gas furnace (a high efficiency one that vented horizontally), installed a full bathroom, and moved from the Butler Building into the basement. Though we had a fully functioning furnace, it was rarely needed because we purchased a kachelofen from Germany. A kachelofen is an airtight, cast iron stove with a ceramic tile mantle. The tile mantle surrounds the firebox, leaving about an inch of airspace all around. Naturally, the heated air can escape only from the top of the stove. Since the stove was placed in the middle of the basement floor, once the dome would be built above it, heat would be



Kachelofen

disseminated throughout the house. Another advantage to a kachelofen is a ceramic mantle will never burn anyone who accidentally touches it.

The basic structural polygons we used were hexagons, pentagons, and triangles. There are three entrances on the main floor, each of which is in a pentagon. Between each pentagon sits two hexagons. So, on the first floor, the arrangement is (starting from any entrance) pentagon, hexagon, hexagon, pentagon, hexagon, hexagon, pentagon, hexagon, hexagon. Of course, with that arrangement, there also have to be triangles to fill in the gaps where a pentagon and a hexagon meet. Above the first floor, the arrangement is pentagon, hexagon, pentagon, hexagon, pentagon, hexagon. There is a hexagon at the very top of the dome. Every single triangle within its respective polygon type is an isosceles triangle. And all hexagons in the dome are identical, as are the pentagons.

In the middle photo above, you can see the east and west entryways. The three windows (one on top and two on the bottom) just to the left of the east entrance are in three of the hexagon's triangles. Similarly, the three windows just to the right of the west entrance are in three of that hexagon's triangles. The upper middle window, of course, is in one of the connecting triangles.

Starting in January of 1985, we fabricated the steel hub elements that would be used to erect the dome. We started with 20' sections of 1/4" x 4" steel plate.



Ramp View

We cut the plate into pieces that would comprise the three-piece hub element bracket. After pre-drilling the holes, we welded each element together. There were only five main types of individual connections to be made. One type connected a radius of a hexagon to an adjacent radius of a hexagon. These were marked RH-RH. Another type connected an RH to a side of a hexagon. These were marked RH-SH. A third type connected the side of a hexagon to the side of a pentagon (marked SH-SP). The fourth type connected two radii of a pentagon. These were marked RP-RP. And finally, there was one that joined a radius of a pentagon to the side of the pentagon. (RP-SP). There were a few other oddballs needed at the bottom of the dome.



Steel Hub

We also pre-cut and pre-drilled the 2 x 8's that would be used for the structure. As you can see, we relied on the bolted-together individual elements of the hub to provide structural integrity as opposed to tapering the ends of each 2 x 8.

We worked erecting the dome every day after we got home from work at 5pm. We worked all day

Saturday, and by late Sunday morning, the entire dome was erected. Whenever I think about it, I'm amazed how perfectly the top element fit in! It slipped into place instantaneously with absolutely no adjustments required!

We devised a system of bracing each triangle with two things in mind. One, of course, was to provide additional rigidity. The second was to divide the triangles in such a manner as to provide nailing



East / West Entryways



First Floor

points for the 5/8" plywood that would sheath the dome. Each triangle of a hexagon and each standalone triangle was divided into four separate areas; pentagons had only three. We designed the bracing in such a manner that when we cut the plywood pieces, less than 4% of the plywood was wasted. In the photo to the right, you can see a pentagon in the center of the photo. Flanking the pentagon on each side is a hexagon.

We knew we could not use standard (at the time) 3-tab shingles, not only because it would be visually appalling when the slots between the tabs would not be in neat columns, but also because some nails from the course below would invariably be exposed in the slot. At the time, the best thing we could find was an Owens Corning shingle whose tabs were varying lengths and widths. Though they did have visible slots (unlike today's dimensional shingles), we were careful to cover any nail that was visible in a slot.

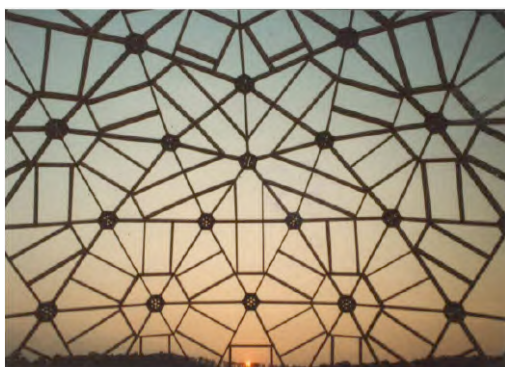
In 2005, an exceptionally severe hailstorm damaged the shingles on all sides of the dome. What a blessing! State Farm totally re-roofed our dome with modern 50-year dimensional shingles that have no slots to allow nail heads to be exposed to the elements. That same hailstorm broke the seals of all seven triangular windows (but not the window itself). These, too, were replaced with argon-filled, ultra-low Solar Heat Gain Coefficient (SHGC) windows.

Several years ago, we installed a 900 foot long, 6-rail, 5 foot high wood fence that fully encloses the house and the kennel part of the Butler Building. We mow about two acres of grass; the rest of the 6 1/2

acres is wooded. We do all our mowing with our 27 1/2 horsepower, 4WD Kubota tractor. That's also what keeps the driveway crowned in summer and passable in the winter. As you can imagine, keeping the hill clear can be a challenge, especially in winter.

We love our dome, and it has served us well over the years. But now my husband is almost 72 and I'll soon be 68, and we're getting a little tired. So we're interested in selling our dome (to a family that will appreciate it) and moving to a retirement community where the community does all the mowing and landscaping and gets rid of the snow.

Though it looks tiny from the outside, there are actually 3,200 square feet of living space. The lower level has a home theater, a computer room, a full bathroom, a second (tiny) kitchen-like area, a utility room, a family room, and a giant walk-in closet. The first floor has a very large kitchen with an island and an eating area. There's a large open space for the formal dining room and the living room. The



Pentagon in the Center

master bedroom with an en suite and plenty of closet space is also on the first floor. At each end of the great room is an entrance to a multi-level wraparound deck.

All the doors, molding and kitchen cabinets are oak, and a Brazilian Cherry engineered hardwood floor recently replaced the carpeting in the great room and on both flights of stairs.

The upstairs has two bedrooms, a full bath, and lots of storage. There is a walkway that connects the two bedrooms and overlooks the great room.

If anyone wants further information, please contact Kris Anderson or Judy Conklin at Kear Realty. Their phone number is 740.774.1123 or visit <http://www.kear-realty.com>. Select the "Virtual Tour" tab and then enter "167938" in the "Listing #" field. Alternatively, go to www.realtor.com. Enter that same listing number in the MLS field. Check us out.



Gardendome

LIFE IS OFTEN THE BEST TEACHER

by Ernie Aiken

William, thanks for inviting me to write a story in your fine magazine, I got some of the back issues and was very impressed with the quality.

Any story about my dome building must necessarily be a mini autobiography. It begins with me reading the *WHOLE EARTH CATALOG* as a kid, following after 4 older siblings. I must have had more time to absorb its pages, as a 7 or 8 year old. I loved the stories, pictures and info. The part on alternate shelters, dwellings and homes [incl. domes] must have made a big impression. I made a conceptual dome home plan later and had classes in architectural drawing in high school. I loved art and drawing and that favorite past time lasted another 30 or so years or actually to the present time, as I continue to do geo dome work.

As a young man I needed a car, so I became a mechanic, and with the help of a friend, repaired hand-me-down vehicles, such as the '67 Volkswagen, my first ride--exciting! After college I became a draftsman and technical art was my new career. I knew how things got screwed/welded/latched/bolted together, that was a big help. About 18 years later...my girlfriend, Julie, and I perused a 2nd hand store--a favorite activity of ours. I asked her if this one item would be a good deal, and if I should I get it. The next day I returned to make the purchase- it was a Sears Craftsman digital radial arm saw! I had never seen/much less used, such an animal--very interesting possibilities. It got put in the garage with Volkswagen and Porsche parts and my junque collection.

It was my first saw or power tool other than a vacuum cleaner of any kind. My job as a desk jockey kept me sheltered in a non-physically demanding environment. For five years, I was an artist doing technical illustrations; working at a F-16 factory. Ahhh...but now, I had a new [pre-owned] saw, and a book for "backyard projects"

Funny how Jurisprudence sends you down these life 'tangents'. I made a 2x6, 8 ft picnic table. Turned out very nice and used it for many years.

I made a nice bonger by using an empty Co2 tank, cutting the bottom off, and hanging an iron pan inside. I did this by putting a grinder blade on the saw to accomplish this feat! It took a couple of hours and many sparks, but it was a success. My new digital saw was a capable tool and well worth it.

Once when perusing used bookstores, I come across *The Domebuilder's Handbook* by John Prenis. The challenge was on. I made plywood plate hubs for an 18 ft. 2v, 2x4 dome, using plans in the book, and put it together in the back yard. With a tarp cover, it housed work tools and was a great dome experiment. The plate hubs, attached with a carriage bolt, washer, and nut, would twist out of place, without a rigid plywood cover, so a revised method was needed.

My next dome experiment was a 3v octahedral dome, 16 ft diameter, made with 2x2 struts. I used cylindrical connector hubs, with fasteners into the board ends, through holes in the hubs matching a radial pattern made by the face angles. PVC worked well for the hubs for my small 3v Octa Dome.

I did another dome in the backyard- a 20 ft 2x4/3v Icosa dome--much to the surprise of my girlfriend Julie, and the curious neighbors. It was the "3/8" type. Then it got lifted up, set on blocks, and got 15 base triangles, to become a "5/8" dome in the common terminology. Next it got the empirical stress test, an experiment to observe its strength. It was surprising- all those triangles joined in a 3-way interlocking grid. It held up to the weight of several hundred lbs. of concrete blocks and bricks hanging from the hubs and 2x4 struts for several weeks. My new dome construction system was a success.

I used to go to the public library [in Ft. Worth] to study books, magazines and newspapers. They had Edward Popko's Geodesics, Fuller's Synergetics, and one by geometer Father Magnus Wenninger, Spherical Models, his paper model builder's handbook. There was a section on domes that was very intriguing, and about different dome systems and terminologies [class1, 2, 3]. Also making domes from new polyhedral, something other than the icosahedron, octahedron, and tetrahedron. I had new shapes and forms to play with.

I developed a "tetra-dome" using the spherical tetrahedron and great circles that show the cuboctahedron [cube] patterns. Then I made a 1x 2 wood, 6 ft, star sphere based on the dodecahedron and great circle pattern that reveals the stars.

That was cool and became a new dome type. Yet another was the icosahedron dome that also produced a new 'star dome'; I made the 20 ft, 2x4 version in the back yard.

I was most excited about the rhombicuboctahedron dome. It has 8 square pyramids on the bottom, 4 on the top [all identical], and 4 equilateral triangles [that can have shallow pyramids]; 4 between the square pyramids. Building it with 8' x 8' square pyramids, diameter is around 21 ft., and with height around 13 ft. it's a relatively tall dome. I have sold many of those kits -[I call it the RCO-S over the years [photo]]. It is the best efficient dome in the 20 ft size, for covering 2 triangle sizes with 4x8 ft sheets and 8 ft lumber, 2x4 or 2x6.

Around 1995 I began studying dome related patents after hours when I worked at the F-16 factory, Lockheed Martin Tactical Aircraft Systems in Ft. Worth. I decided to apply for a patent and spent many Sunday afternoons researching at the Federal Patent Library in the public library in Dallas. I learned a lot

from the original Fuller patent, and what seemed like hundreds of dome patents that came after Fuller's. (1954) None was exactly like mine, and I hired a 'patent agent' to help with research and patent application work.

A U.S. utility Patent was issued in 1998 for my innovative dome construction method. The special features of my patent were the new connector system that was based on a cylindrical section made from round pipe, with fastener holes strategically placed for dome type and wood strut size used. It was a new method that could have not only 4, 5, or 6 struts at a vertex, but 7, 8, 9, or more were possible. I made many connectors with 10 struts coming together, for pentagonal vertices with their pentagon perpendicular bisector struts joining in. 6-way and 12-way connectors were used, and once I made an 8-way hub, with 8 more in-between, for a total of 16 struts- for my



unique "Octagram Dome" design.

My dome Connector hubs were often made from sch. 40 high pressure pvc, and the sch. 80 type for larger/ stronger domes, and aluminum or steel for larger domes that will have a heavy permanent roof cover.

In 1986 I started doing computer work at Lockheed Martin (then General Dynamics) and began applying what I learned to my geodesic domes. The company paid for tuition and so I took some Autocad classes and begin to learn on Version 13. Around 1990. I was layed off from my job along with another 20,000 or so workers and was glad to leave- I had a new company to run.

I got a computer and scanner for photos,

learned some Photoshop techniques, got a host and domain name, and gardendome.com was born. Making web pages was fun and I “went to town” with photos, dome descriptions, links and new pages; using the now outdated Netscape Navigator, but it was not too difficult and did not require a genius. The pages are same as they were about 14 years ago for the most part, and need some updating (warning).

I was not good at math and it took a while [years] for me to learn geodesic central angles, axial angles, chord factors, dihedrals, etc. At one point I had to resort to trigonometry tables to build my domes. Then I learned some 3D design programs that helped and that made everything easier.

The free Dome 4.6 program helped in making 3D wireframe Icosa, octa, and tetrahedral domes--skeletal frames I could work with. At a temporary job as a Contractor I had plenty of spare time--(oddly enough no work assigned yet) to study and learn Autocad 14 and the new 3D solid models. That worked great for dome models in 3D virtual space. I could confirm angles, lengths, and quantities of struts and connector hubs, using the 3D models, as well as design alternate domes and connector possibilities. I’ve used it since then, but migrated to TurboCad Professional, which I consider equal if not better in many ways.

The 3D models can show colors, materials, also lighting and virtual environments. Photos or screenshots of these model ‘renderings’ were added to web the pages. They helped with making the dome



instruction/assembly manual for the DIY Garden Domes kits.

I made many slide show screensavers using the “Step3” program, using photos and 3D model renderings, and sold them on a CD with paper model plans and samples of Edomes [CD offer discontinued].

3D models also became a new feature for garden dome clients. I convert them “Edomes” [electronic domes] viewable in the Solidworks Edraw viewer available for Windows and Mac systems, for no cost downloading at solidorks.com. Some of the new Edomes can be downloaded at garden dome.com/edome.html and all of my customers get one of their dome for their own use.

They are a great way to visualize their own dome in a 3D interactive virtual environment. Parts are color matched, and layers can be turned on/off for clarity.

E domes - exclusively by gardendome.com, are samples of 3D CAD models in a special Edraw 3D viewer. To view the Edomes, you can download the latest Edraw viewer for Windows or Mac systems from Solidworks at <http://www.solidworks.com>

Run the program and open the files in the viewer. You can navigate (pan, zoom, rotate) with mouse buttons and scroll wheel, hide and show layers in the layers menu located on the left side of the viewer window. You can print the model in color, or black and white by clicking the “Shaded” button to turn off colors. Also you can print to Adobe pdf, if you have a pdf printer option on your computer. Some other options are under the tool menu. None of the Edomes have animation



applied. There are no preset views except “home” and no perspective view option. You are not required to register the program to use it.

The “solid models” are nice--as virtual parts, weight, mass, center of gravity and other characteristics can be applied, and can be used if needed to apply loads and stress (representing snow and wind for example), any analyzed for engineering data. “Boolean” operations can be used in the design process- merge, subtract, interference, etc. Which cannot be done with the Google type modeling as I understand it; which are surface models.

I do not want to get into dome home building. Seems there are enough of those already. Many have come and gone over the years. Too much expense and liability, and I did not want to hire people. Nevertheless, a few people have taken on the challenge for more permanent shelter and ‘cabin’ domes, but my domes are mostly used for garden green/hot houses, and are great for that purpose. Coverings for them are most often our special 3-layer UV light protected, woven polyethylene “Super Poly” translucent 11 mil thick ‘poly tarp’ that is hot-melt glued and fastened securely with rustproof Monel staples. It will not tear but can be cut with a knife, is strong and will last up to 10 years (typically about 5 years in direct sunlight before deterioration shows). It’s a great product, relatively inexpensive, and used for many applications other than dome frames.

The better insulating twin wall polycarbonate glazing is also used. These are more expensive, and require a special cover pattern plan, but are best to grow plants in cold seasons. Panels are screwed on and sealed to make a cozy, water proof dome.

We took on a special “Art in Public Places” project for the city of West Palm Beach. It was a big new challenge and a 12ft. 4 frequency conventional geodesic, open frame to resist hurricane winds; abstractly representing a golf ball, mounted on a steel, concrete reinforced base. Construction was all aluminum 1-½” square tubes, with outer and inner connector plates attached by 1/4 inch rivets. It was a very strong structure, and a terrific sculpture piece placed in front of the PGA headquarters. Famous golf great Gary Player came to announce and reveal the “Geosphere” to the public and extol the virtues of golf for the world. This was before the rise and fall of Tiger Woods.

I started making emt tube domes and spheres around 1999. One special one was a 6 ft icosadodeca

star sphere that was shipped to Hawaii in pieces, Assembled and hung from a tree in the jungle, one can see the sphere looking down 100ft from a world famous jungle tree house.

We have made several star spheres over the years, ranging from 3 to 12 feet. [photo]. Another memorable one we did for Ned Kahn, architect ‘sculptor-artist. It was a 10ft, icosadodeca star sphere, made from 2/4” emt.

We were commissioned by Father Wenninger of Saint John’s Abbey, Collegeville, MN, to do a metal version of his “Order in Chaos” paper model sphere. The result was a 3D CAD study, Edome model, and experiment with brass sheet material. I wanted to do a 1/20th partial sphere test section first. My machinist cut pieces and drilled holes. They went together perfect in an overlapping over/under pattern, screwed together with brass screws and hex nuts. That went well and I ordered the remaining 300 or so brass plate parts and screws. Father Wenninger assembled this terrific 3 ft. sphere (sized to fit through a door) with awesome results and a terrific display of spherical



geometry. It is a model of a planned future version in bronze. [see model rendering]

Another Dome we make is the Stretched Octa Dome. It is an Octahedral dome, divided it in half with Extensions to make a roundhouse shape. The 4-way octahedral symmetry makes this a natural, logical design progression. We built a 20 ft, 5 ft. Octa-Dome, with four, four ft. extensions. With 16 ft added, it became 20 x 36 ft. With a riser wall and “pointy top” modification to help shed rain and snow, height became 18 ft. Super Poly and four windows in the base were added to make a terrific, spacious, controlled environment Garden Dome.

Ana Henton of MASS architecture, Los Angeles, commissioned us for a special job in an office space in downtown, L.A. Offices were to use geodesic dome sections to make walls for dividers. This required a new concept and thinking outside the ‘dome box’ that I had been working in for over 10 years. I studied 13, 14, 15, 16 frequency domes with radii off 75-150 ft., then sized the 2 lower rows of triangles to fit in the ceiling height. Aluminum hubs were designed that would allow inserting std. size hinged doors. Many had welded parts, to allow 90 degree door corners. I made 3D models of what would work. Using 4’ x 8’ sheets was a parameter for cover panels. The result was 8ft wide triangles, mirrored to make them all identical, with perpendicular bisectors. The 4, ft 90 degree right triangles could be used. This made efficient use of walnut veneer plywood triangles. One

wall group was constructed following the same concepts, but turned 90 degrees, for a 12 ft height.

I flew to L.A. to assist with the “geodesic walls”, and to make sure everything went together well. It went together great and repeated identical triangles became a new construction method.

I designed a new small dome, based on the 3 frequency tetrahedron, oriented for a hexagon on top, simplified and shortened for a level base with 6 equal lower triangles. With only 13 connectors [vertices] and 30 edges [struts] it rivals the Icosa [1v] dome for simplicity, but its advantage is 6 vertical nase triangles; x8x8 ft in the 16 ft diameter size. So doors and windows can be added easily. I named it the Teta-Dome 3 HZ (for hexagon zenith) and it has been a very popular small dome for DIY builders. It may be the only dome with a regular [equal sides] hexagon base

Another dome I developed is the Hepta-Dome. Built from seven bottom edges and seven lower triangles, it is another simple, unique, geodesic structure. One was made for Burning Man, built with 8 ft, 2x4 lumber for ease and efficiency/economy, diameter is 18ft and height about 14 ft.

As a participant in the Dome Home List, an email discussion group, I learned a lot from more experienced builders. As the internet grew I saw dome builders and general interest in domes grow too. I learned of a new dome geometry system for the 3v system that made a flat dome base without the special manipulations described in Hugh Kenner’s Geodesic

Math. This was a long used method that is described in a little self published book by David Kruschke, The Dome Builder’s Cookbook of Geodesic Geometry. I did not understand the math very well, but a fellow dome builder “Gerry in Quebec” on the List Group did, and made an Excel Spreadsheet for the new Geometry. He gave me spherical coordinates, x,y,z locations from a central point, for constructing a CAD model. Applied to 3, 4, and 5 frequency domes, that was a great help.

Well that’s about all that I remember that I wanted to write about. Hope it wasn’t too long and presented food for thought, Happy dome building and play safe.



www.gardendome.com

*2x4 frame of the 20 ft. 5 frequency Octa
Dome greenhouse with center extensions;
length 36 ft. Height about 14 ft*

www.gardendome.com





Herbal Teas Making a Difference

Natural Healing

by Bonnie Lyson



Raspberry

label tisane have become a term applied to any non-caffeinated beverage made from the infusion or decoction of herbs and spices, but you predominantly hear about it when applied for medicinal benefit.

Herbs brewed as tisanes can remedy many ailments. Some herbs to try as tisanes are highlighted below. Herbal tisanes are referred to as either a decoction or infusion, depending on the preparation method and parts of the plant used. The recipes below are infusions, as tisanes are made as hot infusions.

A decoction is an herbal tisane that is prepared in water from the roots and rhizomes (mass root), seeds, bark, or berries of a plant. An infusion is prepared in water from the leaves, stems, and flowers.

Decoctions are gently simmered in the water while infusions are covered with boiling water and allowed to steep (remove the boiling water from the heat



Catnip

source and pour over the herbs and cover). Let steep for 5 to 15 minutes, depending on desired strength, then strain.

The following are some recipes for teas that my family have used for many years. Substitute 1 part of dried herbs in place of



Lemon Basil



Rosemary

2 parts of fresh herbs called for in each recipe.

FEMALE TEA

Serves as a relaxant during menstruation

- 1 - teaspoon fresh lemon basil**
- 1 - teaspoon fresh raspberry leaves**
- 1 and one-half cups of water**

HEADACHE TEA

Really good for tension headaches

- 2 - teaspoons fresh catnip**
- 1 and one-half cups water**

RELAXING TEA

Drink after a stressful day or before bedtime

- 2 - teaspoons fresh chamomile**
- 1 and one-half cups water**

JUST ABOUT EVERYTHING TEA

Just like its name says

- 1 - teaspoon fresh lemon balm**
- 1 - teaspoon fresh mint**
- 2 - teaspoons chamomile**
- 1 - teaspoons chopped rose hips**
- 2 and one-half cups water**

According to a study published in the Journal of Alternative and Complementary Medicine, herbal tea can relieve sore throat pain. For sore throats, try the following:

Ginger Licorice Tea for Sore Throat

- 2 quarts water
 - ¼ cup licorice root
 - 1 finger's length fresh ginger, sliced
- Fill a pot with 2 quarts of water. Add the licorice root and fresh ginger. Bring to a boil, then reduce heat and simmer for 10 minutes
- Pour tea through a small mesh strainer piping hot into mugs. Please note: leave skin on ginger for less work and more flavor.



My View of the World



And the Growing Pains

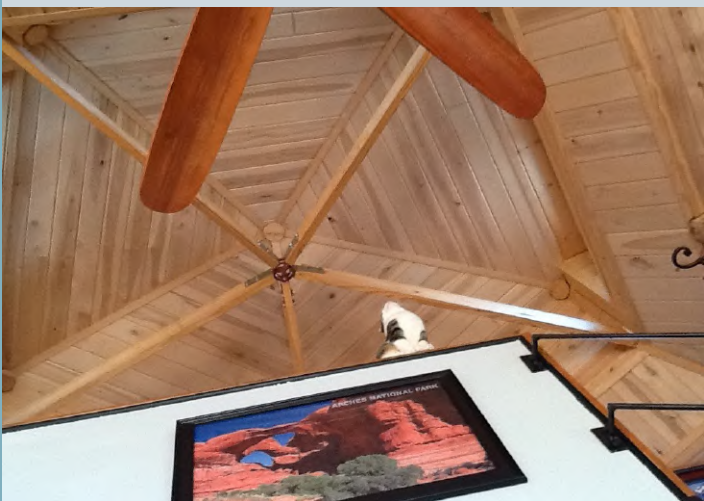
by Heidi

I moved into my brand new dome two years ago. Twenty-five months to be exact. So much has changed since then with the dome, my attitude, the home environment.

I fired my general contractor before the house was completed. He was so over budget and had missed the deadline that I told him to stop, put down his tools and walk away. I needed two things when I returned after a little surgery in Houston - a working toilet and an air conditioner. He delivered all my appliances and the cork flooring I had ordered. The sheetrock was up, but a few of the outer walls did not have the birch T&G panels.

That is where I started. Literally from the floor up. I did have someone come in and do all the icky trim work and finish the dome and I found a great young man to install the siding, but I have done some of the work myself. All the painting and staining. There is a boardwalk around half the dome and stone porches at the doors, so I don't have to worry about the mud any more when I hang my laundry out to dry. The driveway moved, and there is a nice retaining wall and the beginnings of a rock garden. I'm currently installing a back-splash in the kitchen. Shelves and storage spaces are slowly emerging. I recently had a closet/book case built in the alcove and have added a few pieces of real furniture. The little red table I got when I was four was finally put away when I found a chest with inlaid old-world maps that is a perfect coffee table. I'm not afraid to invite people in. There is a ton of little things to do yet, but the dome is starting to feel like a home.

I should have been much farther along, but the house had to be fixed first and that has taken a long time. The guys who built my house did not think, and as a result, did not seal anything. From the foundation



up, inside and out, nothing was done to keep insects and air out. Not around the doors and windows, not where a bad cut resulted in a gap between pieces of wood. All he did was cover over seams and gaps with trim. Fortunately, pictures I took during construction showed where the major problems were located. The worst one was in the roof decking, running the perimeter of the cupola where nothing had been done to seal the space between the vent and the plywood. The gap was large enough to feel the insulation below once the shingles were removed. Sixteen inches of



insulation may be fine, but it does no good if air is allowed to move through it. The first blower door test

showed air leakage was three times that expected for a new house. This was after I sealed major leaks at the riser walls and around the hubs.

The general contractor has continuously avoided responsibility by pointing to the fact that the issue of a air/vapor barrier, a concept not widely known or used in the South, was never addressed in the construction manual. While this is true, and this whole mess could have been avoided if the manufacturer's instructions were more complete, as a professional builder my general contractor should have sealed the dome in some fashion. All he needed to do was think, or ask. But he did neither. So, in addition to finishing the house, I have worked extensively to make the joint somewhat airtight. I can't wait for winter this year to see if all the work has paid off.

Part of the reason the house has "grown up" recently is because I was forced to hide a lot of stuff, like the wires to the TV. I personally don't play with



toilet paper rolls, but kittens do. In April, I got a couple of adorable ones. They are sisters, but have masculine names. Alek is named after Alexander Graham Bell, the first to conceive of a geodesic dome house, and Bucki is of course for Buckminster Fuller.

I couldn't have picked more perfect pets. They are quite petite and fit into the small dome very nicely. Both have extremely short fur and require no grooming. But the best part for me is that they are very vocal, talking to each other, me and the world. And love to play! The dome is littered with their toys, mostly trash that hasn't made it outside. There

are boxes and bags and balls of all sorts. Wadded up pieces of foil, a red ribbon, a piece of cardboard with a rubberband stretched around it. Drinking straws and a feather wand they love to pull around. But mostly, they love to play with each other--running and romping all over the dome. The cork floors make them sound like a herd of horses and lend clues as to what they are doing. I love to sit here in the morning and just listen to them play. With a little practice you can see what they are doing just by listening. Across the dome floor, onto the chair and up the cat tree next

to it, down the back of it the tree and over to the stairs, up the stairs into

the loft, on and around the bed, up on the pony wall, down the stairs, around the corner and across the dome again. Most of the time at full speed with occasional arched prancing for effect. And then there is the wrestling. And playing with tails. They are a great source of joy in my life.

Unfortunately, there is also a big black cloud looming over my little piece of heaven in the form of my neighbor. For the vanity of one woman, the county has taken a quarter of my property so she can have a street sign naming her driveway in her honor. Her driveway is an access easement on my property. This may be America in 2012, but respect for "foreigners" means nothing here. If you weren't born and raised here or know the right people, you have no rights.

The good'ole boys still run this county. For this same reason, I am unable to receive any justice from the man who ruined my house.

The good'ole boys still run this county.

I purchased four acres on the side of a mountain literally a mile from a national forest and intend to install a six foot fence to get any privacy. I love my dome. I love my cats. I love the beautiful scenery and wildlife around me. But I am disappointed with the people around here. I consider the squirrels and deer my neighbors. I feed the deer and we even got into a little routine this year. They knew to look at the house, but the cats usually alerted me to their presence. The deer would back up enough to let me fill their bowl, a Texas shaped feeder my sister

made, with corn, with me talking to them the whole time. Sometimes they

would answer back with a little noise or a wink or wiggle or the tail. We are comfortable around each other and I enjoyed their company. I hope they return next year when hunting season is ended.

Life in a dome and out in the boonies has been a learning experience. I'm still working on window treatments for the winter sun.

Living in a building with triangles and walls that lean and where nothing is square is a challenge and requires constant ingenuity. I think that is part of what makes dome people special. And what I've learned in my different, rural life! A heat-generated fan on the wood stove is wonderful. You can use a wrench tied to a rope to clean out your flue. Copperheads travel in pairs, so if you kill one, be on the lookout for the other. Fawns lose their spots before changing to their winter coats. And most important of all, keep your eyes on the road at all times. But the most important change to happen around here has been in me. I have taken the trip of a lifetime. The solitude and space have allowed me to travel deep within to find and face my demon - the core of my unhappiness and until now, the core of my being. But, after much introspection and a lot of tears, I have figured out how to change, to be a better person. It has been a hard journey and I appreciate the friends who have not only stuck by me in it, but helped along the way by letting me vent my frustrations and answered my questions. Just recently, I have started to feel better about myself. I am coming out the other side. At almost 50, I can see the person I want to be. A simple person who enjoys the simple things, living in a simple dome.



Domology

Joe Frawley



**A study of geodesic domes
Over the last 25 years**

**Problems and solutions in the design and development
of the dome as a primary living space**

That's a screen shot of Joe Frawley's book, *Domology: A Study of Geodesic Domes Over the last 25 Years*. Joe passed away a couple of years back. I don't think you can buy the book at this time. Maybe never again.

Joe's family provided me with a copy shortly after Joe's passing. I was allowed to use snippets of the book.

I never had the opportunity to meet Joe...nothing I can do about that now. Since this issue of Dome Times, Issue X, is the last issue until I complete my schooling, seems just that I provide my last brief glance at Domology. But, I can not capture the wisdom in this book with a couple of snippets. So, I am going to use Maureen Frawley's forward to the book as my last entry on Joe. Tonight, I will read his book again...and learn something new.

- William Koonce, Dome Times Editor

FORWARD

Maureen Frawley

In 1930 at the age of 15, Joe Frawley and his younger sister Helen helped their parents dig the foundation for the family home, a large white house that welcomed friends and relatives to their dairy farm for many years. He installed indoor plumbing and designed and built a wind generator to provide electricity to the milk house. In 1930, his father bought a 1926 Ford Model T touring car with side curtains for Joe and Helen to drive the five miles from the farm near Houlton, Wisconsin to the high school in Stillwater, Minnesota. Joe promptly cut off the top and the back, making a more practical pick-up truck. He also learned how to take the engine apart and put it back together again, a talent that served him well and saved him thousands of dollars in car repair costs over the years.

Wanting to experience life beyond the farm, Joe moved to St. Paul, Minnesota, and combining his talent for things mechanical with his Irish "gift of gab," became a salesman for several companies ranging from construction machinery to mutual funds.

In 1975, he began selling dome homes for the "Big Outdoors People." In 1980 he and two other employees began their own company, "Energy Structures, Inc." which developed and marketed the "Energy Strut," a radical step forward in geodesic design. In 1984 his son Kevin came on board.

Joe not only educated himself about designing, manufacturing, and marketing geodesic domes, he pursued the writings of Buckminster Fuller, learning everything he could about domes and dome philosophy. From 1990 to 1999, Joe wrote articles for "Dome Magazine," a quarterly publication dedicated to the dome industry. Joe's passion, as expressed in these articles is all encompassing, affecting every aspect of his life. In 1984, at the age of 69 he built his own dome home. In the 90s, his company went global with a website designed by his son Jim. In 2007, at the age of 92, he sold his last dome and shipped it to Mongolia.

His dome home expressed his values: personal and political independence, low-cost housing for the "have-nots," energy efficiency to conserve natural resources, and an ever-present enthusiasm for being informed about the world around him.

This collection of his articles expresses his abiding commitment to educating people not only about domes as an alternate building system, but about the principles of the life he lived—a life of simplicity, determination to learn how everything from cars to computers works, and a willingness to help others, especially his six children, Jim, Maureen, Madeleine, Joan, Kevin and Kathleen. Joe died on March 11, 2010. We are grateful that he was our father, but the time we had with him was too short.

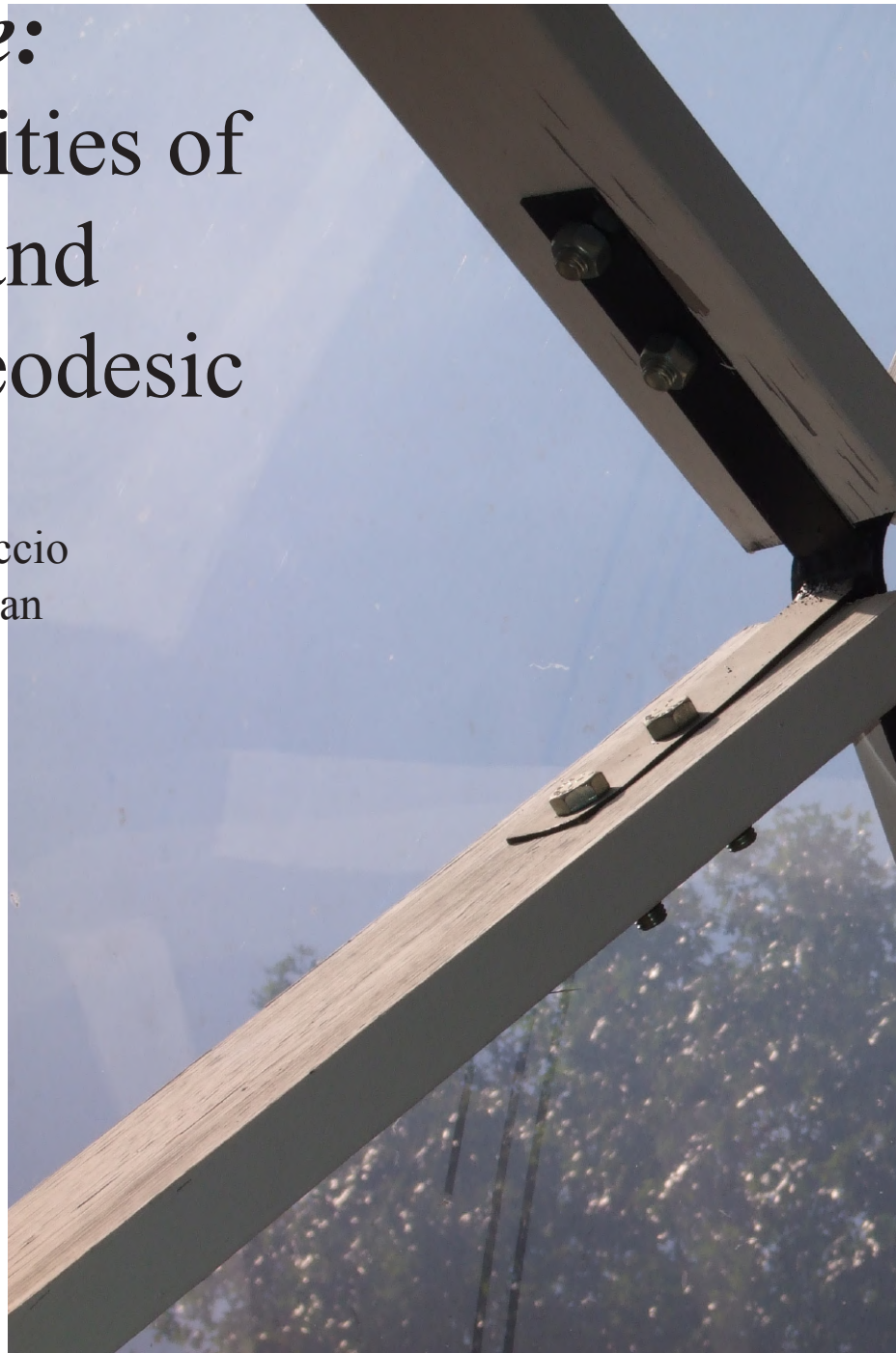
Domicile: Practical Realities of Building and Living in a Geodesic Dome

By Richard Cappuccio
with David Gorman

Geodesic domes had a particular resonance during the heyday of the counterculture of the 1960s. They promised a rational architectural change. In the aftermath of the Montreal World's Fair, the culture used Bucky's diction—Spaceship Earth. Today Fuller's language is simplified to words like "sustainable" and "green."

Part of the interest in the dome was the perception that these were do-it-yourself projects. Depending on the size and scope, they were. The popular culture embraced the promise of lighter, stronger, and more flexible structures. One current manufacturer of high quality build-your-own-dome kits still promotes the idea-like simplicity of the building process: "The only tools you will need," they say on their website, are "socket wrenches, hammers, and ladders"; they do add that scaffolding and a nail gun are both desirable. Those of us who have taken on building or renovating living space know that we eventually become veterans—sometimes that includes expertise with a new skill; sometimes it is a heightened sense of frustration. Building a geodesic dome has its own skill sets. In building a permanent home, issues of waterproofing and practicalities like insuring that structure are important. Those issues have different complexities for those who build and live in a geodesic dome.

After he left religious life, David Gorman



moved from New York to build a dome in the woods on Shannon Farm, an intentional community in Nelson County, Virginia. In March 1986, Gorman cleared a site for his structure. For the next two years he kept detailed records on a daily basis of his plans, construction, and solutions for making the dome his home. In August, 1987, he moved into "an enclosed but far from complete structure." He still lives in it today. The magnificence of the design of the dome gave birth to a dream of life beyond the rectangle to a post-modern Palladian structure. To state it simply, the geodesic dome is cool. Gorman's dream of living in



strongly embraced the practical aspects of Fuller's dome—the affordability, the adaptability, and, if you will, the spaceship earth-ability. Today, I think we can admit, some of the early literature is a time capsule for the cultural historian. Peter Douthit, writing under the name Peter Rabbit, built geodesic domes at the Drop City commune in Colorado out of junked car parts. Yes, they were affordable: the 1960s total cost for a “Cartop Dome . . . [was] \$15, mostly for sheet metal screws.” These were domes that could be built in two and half days entirely from reclaimed material from the local junk yard.

The Whole Earth Catalog, the publication that Steve Jobs referred to as “Google in paperback form,” was filled with do-it-yourself suggestions and solutions. These range from the cosmic—“To build a dome first you find a spot/ make sure it is your spot”—to the questionable method of digging the foundation: “put [a] half stick [of] 40% dynamite primed in [a] hole made by pipe/ boom—nice hole/ clean out with post hole digger.”

One early effort at understanding dome construction is documented through the “Indlu Geodesic Research Project” in Durban, South Africa in 1958. Buckminster Fuller visited the site and personally helped students. The complexity of the undertaking was soon apparent in their report: “Use of drawing board and T-square was almost nil.” The positive elements of the geodesic dome were all noted: the students, under Fuller's supervision,

a dome started in the sixties: “I recognized the dome as being unique and beautiful. It was in the seventies when I started thinking about building. In the 80s I was serious. I bought a homeowner's construction book. Chapter one was a test: What tools are you familiar with that you know how to use? Can you do electricity, plumbing, foundation, framing, etc? I marked my answers, totaled the score, and failed the test. The recommendation: don't start because I wouldn't finish. I turned the page to chapter two and built a dome.”

Some early dome-it-yourself literature

noted its economy and potential for mass production. However, this experimental dome was small and covered in sheet metal. There was not enough time to complete one important element of construction: waterproofing.

About his dome, David Gorman says, “I recognized that leaks in a dome roof were an unsolved problem. Waterproofness fails because of the many seams at the triangle boundaries.” Gorman's plan was for a thirty-foot diameter, 5/8's dome. It has ninety seams. Each one can flex. Let's translate that. Each seam can leak.



Clearing the Site

In setting out to deal with waterproofing, Gorman visited communities that had them: “In one case I was astonished when I was told that I was invited because it was expected that I would solve their leaking problems. It was a short trip from ‘leaks’ to ‘minimize damage from the leaks’ to ‘Hey, what’s a little water in your house?’ There are worse problems. I appreciated the beauty of the dome, its correctness, its appropriateness for me.”

In the mid-eighties, when Gorman finally started to build, it was neither a fanciful structure made out of car parts nor simply an experiment. It is his permanent home. Gorman purchased a dome kit with pre-cut lumber and hubs. He’s philosophical about the water issue: “Dome hubs allow ‘flex’ and seams get gaps. That’s not a Bucky issue. Bucky didn’t design hubs that flex; hubs are the building supply response to joining the struts at the triangle vertices.”



Two Years of Detailed Records

Aware of waterproofing issues, Gorman built to minimize damage from leaks, including a careful choice of insulation and building materials: “Fiberglass insulation when wet would lose its purpose and not insu-

late—wet fiberglass compacts. It could grow mold or rot the wood frame. I opted for Styrofoam insulation because it doesn’t absorb and hold water; it sheds water. The dome construction literature didn’t address the issue. I followed roofing books to have a moving layer of air under the skin, above the insulation that would absorb any moisture and vent it to the outside. I used five-ply, ½ inch, waterproof glue plywood that, at the time, was not available on the east coast. I had to special order a bundle from a west coast plywood manufacturer. I put three 1 inch diameter holes in each strut just under the plywood skin. I built soffits that flare at the base of the roof just above the knee



wall.”

Gorman reflects that these soffits have helped to keep the dome dry: “They act as an air inlet so the outside air slowly goes up the air space between the plywood skin and the Styrofoam insulation. Just like water condenses on the side of an ice drink in the summer, moisture could form when the moist, warm interior air meets the cold winter air in the roof. The moving layer of moist air is vented to the outside.”



Soffits

Waterproofing a dome requires consideration of the possibility of “wicking,” the principle that liquid for a short distance will travel up. “Wicking on a roof between the shingles depends on the angle of the roof,” Gorman explained. “If there’s a shallow angle, the water will travel further between the shingles. At the side of the dome where the angles

approach or exceed vertical, the wicking is very little; however, near the top of the roof where the shingles are at a shallow angle, wicking might occur and water could breach the surface of the dome. If I had put standard fiberglass shingles on the upper, shallow angled triangles, water could ‘wick’ up between the shingles and get into the dome. I used Carlisle Rubber Roofing on the upper wood skin triangles and have had few problems.”

One innovation Gorman included in the construction of his dome was building a hatch into the roof. This is accessible by ladder from the interior second story: “Walking on fiberglass shingled roof



Carlisle Roofing

can reduce its lifespan; instead of leaning a ladder onto the shingles to get onto the roof, say, for chimney cleaning, I can climb up, flip open the hatch, and climb out onto the rubber roof. The rubber stretches enough during dome flexing so there is less leaking than when using straight shingles.”

Despite his best planning, there was one part of the construction that would warrant a do-over: “I put in triangular skylights to increase interior light, but I put the flat side up, instead of the pointed side up. Water and snow melt is dammed by the flat side instead of shed. Perhaps if I had hired a more experienced roofer, he or she might have caught this oversight.”



Roof Exit

He contacted the manufacturer of the kit, but they advised only to “get a good roofer.” He researched waterproofing in the architecture library at the University of Virginia in nearby Charlottesville and even asked them for advice: “The secretary was very enthusiastic about my request to have a grad student advise me for credit for his course. This was



The struts on my dome are 5 foot three, six foot three

in early August, 1986. I explained that I was going to finish the plywood skin and be ready to install the outer roof surface that September.

There was no response. Zip. Squat.

“Finally, I contacted a local roofer who does a lot of work at Wintergreen, a nearby ski resort. I offered to hire him at any rate of pay he wanted. He agreed to honcho my roofing crew of neighbors. As we got closer to the start date I confirmed, ‘You’re gonna be there, right?’ He replied, ‘Sure, but if I’m late, start without me!’ You can see where this is going; he never showed.” Years later Gorman found out that the reason that this roofer never showed was that he could not guarantee that his work would be water tight: “The bottom line in my experience was that professionals don’t want to do domes. It is an action structure, it is a dynamic structure. Domes flex, but professional roofers may not have the mental muscle for the job. They only think and work on static structures. They can’t handle Bucky.”



Conforming to local building codes is important, but it’s not straight and easy. Placement of windows in the dome shows exactly that. Windows have to be cut through triangles that have horizontal base. You can’t cut a strut, put a sill, and install a window without compromising the integrity and strength of the Dome. This presented an anxious

moment when the local inspector performed a final walk-through: “In my upstairs bedroom and bathroom, the window sills are 55 inches from the floor.

The Nelson County Building Inspector walked in my bedroom and said, ‘I have to fail you for inspection. That window is too high off the floor to be an escape window, an emergency exit from which a person



To be able to sit at my desk & look out the second floor window

could drop the 13+ feet to the ground.’ It may look like a window but if it is 55 inches from the floor, according to my local code, it is not a real window. But to be able to sit at my

desk and look out the second window, I had fortunately already built a 16 inch tall platform. The sill of that window is 39 inches from the platform floor. That is a window, and the building inspector was relieved and satisfied. The dome passed inspection.”

Bucky did not have to consider homeowners’ insurance, but homeowners have to. During construction Gorman’s insurance was \$400 for the first year, but because it took two summers to build his dome, he fit the profile of an owner/builder who might torch the structure for the insurance money. His insurance doubled for the second year. Even now coverage is restricted. For example, his insurance does not cover falling trees: “If a tree hit the dome, they would have to check all the hubs and struts for repair, not just the struts directly hit. The shock of the hit might affect all the hubs. They did write one provision. I am insured in the case of flying trees. If part of a tree that would normally fall and not hit the dome breaks off and the wind blows it into and damages the dome, I am cov-



In my case the tree was blown away from the dome

ered. This past July we had 90 minutes of high winds (60 to 70mph) that knocked down trees onto houses

and cars of my neighbors. In my case the tree was blown away from the dome.”

There are aspects of Bucky’s dome that exceed insurance requirements and building codes. Local code requires that a roof support fifteen pounds of snow load per square foot: “The dome roof is rated at 90 lbs per square foot. No problem there. The county building inspectors wanted to know how my dome would fare in an earthquake. I showed the inspector the signed building plans that satisfy California earthquake requirements. In August 2011 there was an earthquake centered down in Louisa County sixty miles east that affected the mid-Atlantic states. I heard the dome flex; I felt my chair sway. I looked at my watch to check the time and continued to read.”

There is another aspect of Bucky’s design that is understated, the projections for energy efficiency. Gorman lives in the woods and has a medium size stove with about three cubic feet of firebox. To sat-



That stove supplies me with all the heat I need

isfy the local codes he had to have a traditional heating source, so he installed electric baseboard heating in all the rooms. He doesn’t need them: “Every three

or four years I test them. The downstairs bedroom, when occupied in the winter, needs the supplemental heat. The stove alone heats the kitchen, the up and downstairs bathrooms, the living room, and the upstairs bedroom. A stove with dried oak, damped down, will go all night. Seven hours later, I’m plenty warm upstairs. One time as a test, with this one stove, I got the upstairs into the mid-90s. Here’s the key to Bucky’s projections: cold winds, no matter from what direction, slip around the shape of the dome.”

On the other hand, Gorman objects when people paraphrase Bucky and say it takes fewer building supplies to enclose a space in a dome than an equal space in a traditional structure: “The struts on my dome are five foot three, six foot three, and six



Questions about how the geodesic dome affected my aging process remain. Good or bad?

foot six. Building materials come in standard lengths. There is a costly waste factor. The makers of the kit had to throw away a lot of wood when prefabricating the struts; when I was finishing the space, I had to throw away

a lot of plywood which commonly comes in four by eight sheets.” He had to resign himself to use a few of the left over pieces for a separation wall between two bins of fire wood. “That’s the only use I found for these oddly shaped scraps,” he recounted. “They were not big enough for any other construction.”

The early dome literature focuses on the debate of whether the geodesic dome is practical or not. Recently, when talking about his dome, he was surprised by the number of questions about how the geodesic dome affected his aging process. He had never heard or read anything about this before and added, “I just had to renew my driver’s license, and it is not a flattering picture.” About the quarter century he spent building, maintaining, and living in his dome, Gorman remains philosophical: “Over the years I had to resolve a number of issues, and I just found a new leak recently. Although everyone can visually appreciate

the dome, conforming to codes, insuring, and waterproofing the structure may mean that it is not right for everyone. After twenty-five years, it is right for me.”

I have never desired to leave my dome living



From the Editor:

My wife, Susan, and I have visited too many dome homes to remember. What we do remember are some of the common comments made by dome homeowners. Sure, there have been comments to the extreme that do not reflect the norm. Some of those touch on disappointment in craftsmanship, manufacturer, and incompetent dome manufacturers/dome builders. One of the more common remarks is that dome living relieves stress, and we all know less stress is good for the body. Perhaps, one day, someone will take up the cause to study how dome living impacts the emotional and physical nature of the occupant. Certainly, perhaps it is not the dome that impacts, but the natural tendency of those who choose to live in domes to take care of themselves.

I have interviewed and/or visited only three dome homeowners who were not married while living in a dome. Maybe there are many like that. My point is that experiencing a family life has shown to be good for health. I know many of you could come up with other factors for increased longevity that has nothing to do with your living in a dome. I think I will postulate that it is not the dome that impacts aging, but the type of individuals who choose to live in domes... brave, intelligent, and caring individuals.



It is Right for Me



Why I Hate My House on Piers

by Jack Chilla

We covered basements in a previous issue and why, in the Pacific Northwest and in other areas of the country, basements make good sense, not only for added floor space but also in comfort, convenience and safety.

This then allows us to move on to slabs. Slabs are easier and cheaper to construct and build on than basements. Many houses are on slabs and it is a proven design, one that if I didn't have a basement would rather have. In many areas all that is needed for a slab is to have a bulldozer level the ground, stake the parameter, and go. Here in my neck of the woods, it is a little more complicated than that. Not only does the code require you to level your ground, but in some areas they want you to put piers inside the earth to help support the floor, at the very least the code demands you put two feet of gravel down, wait a year for the weight of the rock to squish out all the water so you have a solid base to build on. Assuming you still have two feet of rock still showing above grade, if not, be prepared to pour some more rock on the ground so you have two feet showing, wait a year, and then see what happens. The astute reader will notice that the inspector only requires two feet of rock showing at building, so many contractors here will keep an eye on the pad, and if it shows that it sinks six months, they add more rock, not caring if the house sinks after that. Buyers beware. Did I mention the joys of building on primordial ooze? This is it. And yes, the basement scenario is the same, but hopefully you're digging down

enough to get to some solid ground that will support the weight of the rock.

Wil Fidroeff, from EconOdome <http://one-eleven.net/~econodom/> has yet another approach to the slab:

Wil has pioneered a raised-bed foundation, where two rows concrete blocks are placed flat in a circle, about ten feet wider than the dome is going to be. Then the interior is filled with gravel. The gravel acts both as drainage and support for the concrete slab, as a bonus, it also allows radon to escape without going through your house. It also should make your dome sorta earthquake proof as the dome will "float" on the gravel. Of course this is just an overview, but it looks like a great idea, the only drawbacks I was told are, the ground where the

concrete blocks are on needs to be fairly level (same as a slab), and this technology does not lend itself very well to domes with extensions. Wil also told me that you need to keep little kids from picking the small gravel up and throwing it; otherwise the slab may become undermined (oops)!

Now, not being a contractor/engineer, or anything of the sort, if you have your heart set on a slab, and you need only the dome, then Wil's method seems worthwhile to explore, if you need (or want) extensions, then, we're back to the slab or the basement. Or, a hybrid.

What is a hybrid of a slab and basement? It is something I have been working on in my head, and running it past contractors it seems to pass muster.

Here is the idea. When leveling for a slab, find the centerlines of where your dome is going to be for illustration purposes say a 40 foot dome. Next, on the center, mark 10 feet off center, so you will have a 20x20 foot space marked off. It doesn't matter what shape it is in but a square would be easier. Dig, dig to a minimum of 8 feet below the slab. Pour flooring, walls and water proof as you would a regular basement. Then with decking, cover it and with an opening that will need to be incorporated in the dome above, prepare the site as you would with normally for a slab.

Why? This is your mechanical room. This can also become your safe room, your storage room, or whatever you need it for, but on your blueprints it is a mechanical room where your plumbing and electrical is situated. Of course this route would preclude the

use of Wil's system, but if I know Wil, he might be working on a fix for this.

If you run your plumbing pipes through here, then in case of a catastrophic plumbing failure, you can still get to a majority of your pipes without having to dig up your slab (that is with proper planning), the same with your electrical, and furnace, water heater and whatever else you might be able to name or have around. Perhaps you might be able to fit a freezer down there too and have this space act as a pantry, or use it as a root cellar. Anyways, I have run this passed by my county's building department and said they would approve it (yes I have this in writing), providing it is built to the same standards as a basement sans openings. If this is the way you might go be sure to



run it past your building inspectors also.

The final type of foundation is called post and pier type. That is the house is built on a posts or piers. What is the difference? The post is sitting on the ground, while the pier is sank beneath the ground below frost level. You normally only see post foundations where the frost doesn't get below a half-inch, like it does here in the Pacific North West, or on the cliffsides of California, beaches near hurricanes or other places that only have building sites that are impossible to build on in any other way, these buildings are built on piers, which are usually concrete. This is fine and I suppose if it is the only way to build or you want to have a "tree house" effect. But what I am talking about happened before the building codes were established.

The builders did before building codes, instead of leveling the ground; the earlier builders sank wood posts in the ground at the parameter and down the center so that it could make a level frame for the future house. Then the builders ran floor joists and set posts

into the ground every so often, which would allow the joists to have some support as these wood posts made contact with the ground. Sometimes there is a foot between ground level and the joists, sometimes two feet, and other times just a matter of inches, as long as the floor was level (or somewhere close) and didn't sit on the dirt. This type of house foundation was cheap, cheaper than concrete as well as quick, and, you could build with the material already on the land, wood. This is the type of foundation and floor I have. The problem with type of foundation is that if the wood is not treated, it is an open invitation to insects. With time, the land settles or heaves-up, or becomes soft. While this type of foundation is sturdy and handles earthquakes well (the reason for my neighbors cracked basement) due to most of the house riding on top of earth. It still remains after some years, the floor comes out of level, floor joists are softer and sometimes you get bouncy floors, and the building comes out of square: Essentially, all the things that make an old house have character.

Remember, the code is there for a reason...

Speaking of reason: Now is the reason I hate pier and post, foundations. It is because I have four dogs, two cats, and a house on mud. I am tired of having to crawl under the house with clearances between 18 inches and 3 feet depending on where I crawl, having to reinsulate the ductwork, where the cat and who knows what naps during the cold days of winter. I have also once came across a basketball size wasp nest complete with wasps underneath the house and there are things odd things that go bump in the night under the house which sets the dogs off and makes for a less than perfect night's sleep (I don't care what those mattress commercials say).

That is why in my dome I want a basement, but will probably (due to economic reasons) have a slab/hybrid system for my foundation and not on piers, even though it is a cheaper option (ya gotta draw the line somewhere). Your experience and opinion on this matter maybe a bit different, but, if you decide to build on a crawlspace, and you have (a) cat(s) don't say I didn't warn you.

References:

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