HYPERSEEING

The Publication of the International Society of the Arts, Mathematics, and Architecture
June 2007
www.isama.org

BRIDGES DONOSTIA JULY 24-27

Articles Exhibits Resources Cartoons Books News Ilustrations Announcements Communications

HYPERSEEING

Editors. Ergun Akleman, Nat Friedman.

Associate Editors. Javier Barrallo, Anna Campbell Bliss, Claude Bruter, Benigna Chilla, Michael Field, Slavik Jablan, Steve Luecking, John Sullivan, Elizabeth Whiteley.

Page Layout. Ranjith Perumalil

JUNE, 2007

Cover Photo: Journeys by John Robinson

Articles

Cartoons

News

Book Reviews

Communications

Resources

Illustrations

Announcements

Article Submission

For inclusion in Hyperseeing, authors are invited to email articles for the preceding categories to: ***hyperseeing@gmail.com***

Articles should be a maximum of four pages.

JOHN ROBINSON, SCULPTOR, MAY 5, 1935 -APRIL 6, 2007

RONNIE BROWN

Figure 1. Adagio

I first saw John Robinson's work by chance in 1985, at his Freeland Gallery in Albemarle St, off Picadilly, London. I was amazed by the sculptures of children happily playing without fear among these beautifully crafted, abstract shapes. It seemed to me sensible that this abstract work, some of which could be used to illustrate my planned lectures on knots, should be brought to the attention of the mathematical community.

In 1988 I realised that John might be able to help with an exhibition on `Mathematics and Knots' we at Bangor were designing for the Pop Maths Roadshow at Leeds in 1989. We had intended to include knots in art and history, but this became too ambitious, as it was hard enough to get knots in mathematics finished. So I telephoned John and asked if he was interested in an exhibition. He replied that in the time available we should be able to do something good.

The following April, he invited me to his home in Somerset to help choose the sculptures, and then drive up to Leeds to see how they should be displayed. We clicked, and I was fascinated to learn his career as a self taught artist and of the genesis of his sculptures. He left an English private school at 16, and eventually married and became a sheep farmer in Australia. There he began his self education in astronomy and science, dazzled by the night sky of the desert. One day he bought some modelling clay, and began modelling friends and children. This work went so well, that he and Margie decided to sell up, and for him to try his hand at a career as a sculptor in England, since Europe was the Mother of Western Art. Within two years he had sold some life size sports figures and his

Figure 2. Consilience

Figure 3. Courtship Dance

career as a realistic sculptor was in train. He has sculpted over 100 children. To illustrate this work, I would like to show Umbrella Children in Figure 12.

In 1970 he was meditating after listening to a Mozart Violin Concerto, and a sculpture came into his mind. He excitedly dashed to his studio and made Adagio in Figure 1. It then occurred to him that if sculpture could symbolise music, perhaps it could also symbolise other values in life. So he embarked on his series of Symbolic Sculptures, comprising over 100 items, and these are what we most want to show in this essay for ISAMA.

The range of intention of these works is remarkable. He is often inspired by mathematical forms. On thinking of the Möbius Band as a line moving and twisting around a circle, he began to investigate the twisting of other shapes. I have used these three photos in Figure 16 showing the making of Eternity to illustrate the topological concept of fibre bundle: the fibre is the triangle, the base is the circle, and all is put together with a twist. The name of the sculpture is his own twist on the idea. What is also remarkable is John's force in seeing an idea through to the completed sculpture.

A further example of this is Rhythm

Figure 4. Freeland Gallery

Figure 5. Gordian Knot

Figure 6. Immortality

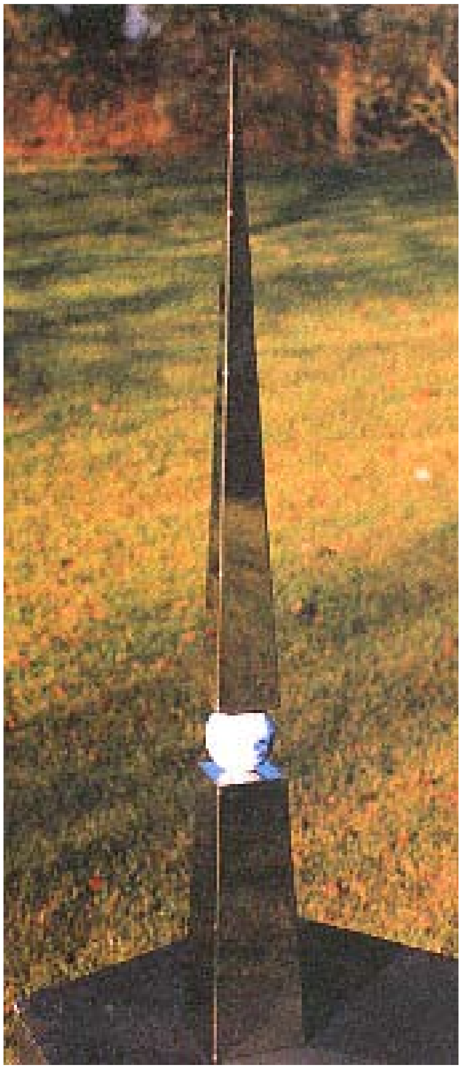


Figure 7. Earth Time

of Life in Figure 15, where the form had to be cast from 15 parts, then welded together in such a way as to preserve the symmmetry despite differential cooling. The mathematical form of this sculpture is a 15-4 torus knot; John found the shape by wrapping ribbon around an inner tube, 15 times one way, 4 times the other) and being amazed that it eventually came back to the start. Note that 15 and 4 are coprime, have no common divisors. The name of the sculpture derives from the helical form of DNA, which was much in the air at the time, and the outer circle represents the Universe. This form also can be seen as a fibre bundle.

Courtship Dance in Figure 3 was inspired by the dance of Brolga, a bird of the crane family, seen by John at a billabong. John's subtitle is: `the necessary prelude to creation'. Note that the two forms are each cut from an egg. The theme of the cycle of life is continued in several sculptures, one of which is Maternity, whose outer form is cut from an egg. A similar form is in Mortality: from nothing to nothing, cut from an egg, the cycle of life. These are part of a series including also: Womb, Conception, Embryo, Love Knot, which indicate his attitude to life and the family. John is entirely self taught, but his art is generated by his life as part of the wide world, with experience of exploring Western Australia, working his own sheep farm and bringing up a family.

One of John's sculptures arose fom a visit of the blind geometer Bernard Morin to John in 1990. Bernard is very keen on model making, and he explained a a version of the Möbius Band which is at the heart of a model of the Projective Plane in flat elements. We cut this out under Bernard's directions. John transformed this into the amazing sculpture Journey, which he sees as giving visions of horizons.

John often makes an impact without using strong technical effects. Joy of Living (inspired by dancing in a Greek village) is an example, where the rhythm of dance is conveyed entirely by the form. John loved making connections between

Figure 8. Janus

Figure 9. Joy of Living

Figure 10. Maternity

Figure 11. Mortality

Figure 12. Umbrella Children

areas of thought. For his reason he was taken by the book of E.O. Wilson on `Consilience', and made two version of sculptures with that name: here is one of them, the most recent.

It is a version of the Borromean Rings, in that it is formed of three elements no two of which are linked but the whole cannot be taken apart. John made several other versions of this concept, and all three may be seen outside the Isaac Newton Institute in Cambridge, England. His first version was made out of squares. He realised this illustrates the fact that the whole may be more than the sum of its parts, and so called it Creation. It is easy to make out of card! This shows the range of the work. It is a rare artist who has such deep appreciation of the sciences, and for example can appreciate the scientific account of matter-antimatter in Janus, let alone express it, or the notion of Earth Time, as a small part of the treck from the big bang to the infinite stretches of time, but with its special qualities.

Finally, I would like to show John's

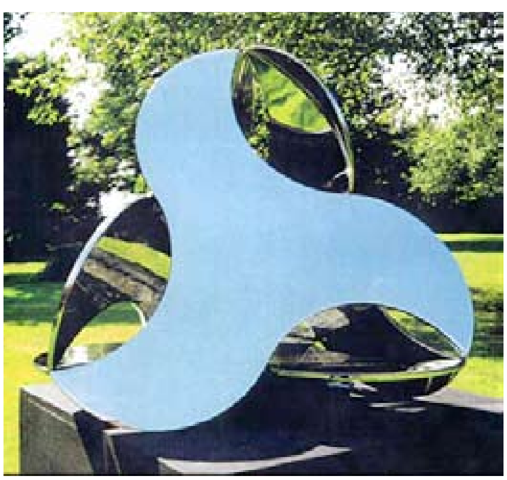


Figure 13. Prometheus' Hearth

Figure 14. Pulse

Figure 15. Rhthym of Life

Figure 16. The making of 'Eternity'

sculpture `Immortality' in Figure 6. This came about as a version of fibre bundle but with a more intreresting `base' than a plain circle. The form was made by threading matchboxes onto a wire trefoil knot. But only John could give the elegence and rhythm of line and form To this sculpture he has given the subtitle `Passing on the torch of life'. This John has surely done for us all. We shall surely miss his creative force, kindness and generosity of spirit. John died of lung cancer after a short illness, with, as he said, no regrets, and in the midst of his family. For more on his work see the web sites www.bradshawfoundation.com, www.popmath.org.uk.

The Bradshaw site shows also John's passionate interest in the development of man, civilisation and art. The Popmath site started in 1996, and it was great to see how quickly John took to the use of computers, and found the web gave freedom to develop his accounts of his sculptures and life. John has been well supported by his sponsors, Edition Limitée, who have also sponsored our collaborations on exhibitions, catalogue, web and CDRom development. The last version of the Popmath Site was further supported by a grant from EPSRC in 2002, and is based on a CDRom produced under an EC grant in World Mathematics Year 2000. John was also delighted that his sculpture 'Prometheus' Hearth' was donated to and gave the name to the Mathematics Centre at the nearbye Frome Community College. That was John's vision of the role of mathematics.

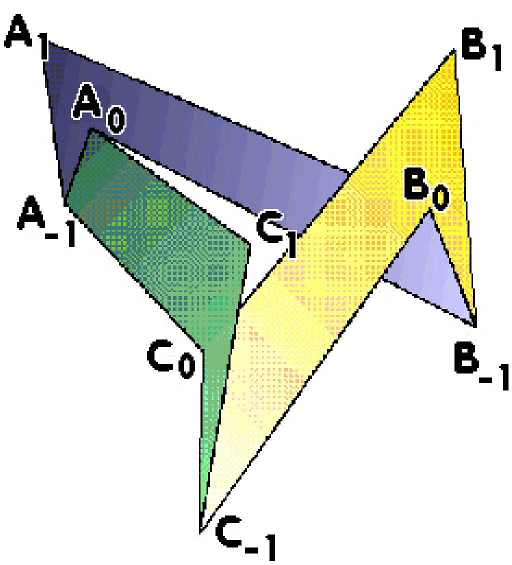


Figure 17. The Brehm model of the Mobius Band

Figure 18. Journeys

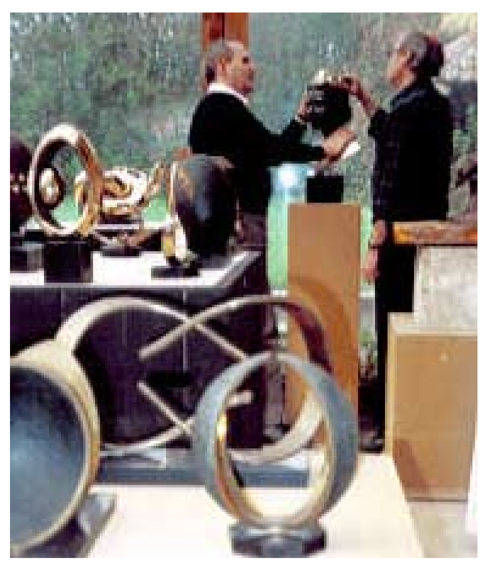


Figure 19. Bernard Morin and John Robinson

HYPERBOLIC ORIGAMI

ADRIENNE SACK

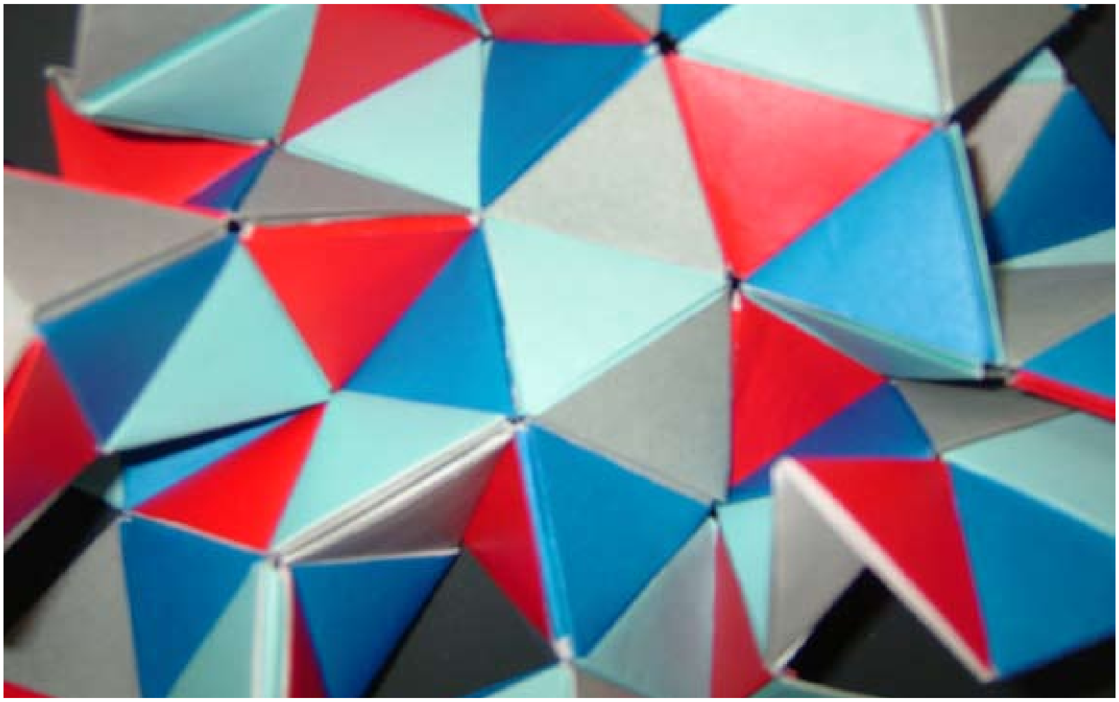


Figure 1. Hyperbolic Origami Surface

Introduction

Origami guru and mathematician Robert Lang writes in Origami Design Secrets: Mathematical Methods for an Ancient Art, “In recent years, origami has attracted the attention of scientists and mathematicians, who have begun mapping the ‘laws of nature’ that underlie origami, and converting words, concepts, and images into mathematical expression.” As an artist, I was curious to see what, if anything, my life-long obsession with origami could teach me about mathematics. Wherefore, as the subject of my undergraduate senior honor’s thesis, I set out to make a viable origami model of a hyperbolic surface in an effort to better understand hyperbolic geometry.

William Thurston offers a model of hyperbolic geometry. He writes that you can create your own hyperbolic paper by cutting out several equilateral triangles and joining seven of them around each vertex, thus creating a model with negative curvature concentrated at its vertices. Jeffrey Weeks suggests that the easiest method to construct this model is to cut out several hexagons, cut a slit in them, and add an extra equilateral triangle to each one. While he posits that this model is quite floppy and that it should be floppy, I felt that it was not floppy enough. Indeed, it only flopped around the seventh triangle and at the edges where the hexagon units attached to each other. It did not flop much at all around six triangles at every vertex that were not cut. You can plainly see that Thurston’s model will expand infinitely, assuming you have a sufficient supply of paper, tape, and patience. It is Thurston’s model that I was determined to create out of origami.

Origami Construction of a Hyperbolic Model.

After pouring over approximately twenty origami books and scouring the internet, I discovered that no one to my knowledge has devised an equilateral triangle unit

Figure 2. Euclidean surface

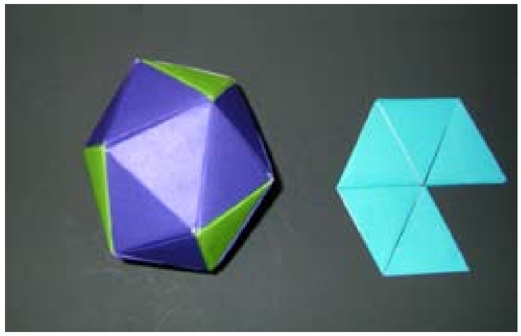


Figure 3. Icosahedron

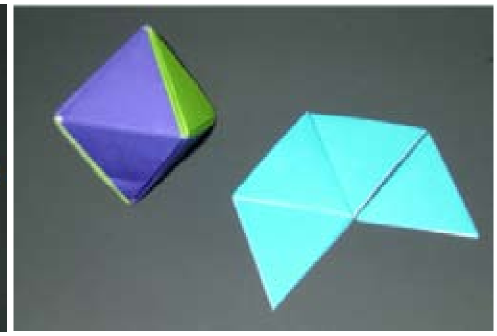


Figure 4. Octahedron

that could be assembled with seven around a vertex. I realized that I would have to create my own equilateral triangle unit.

I considered that my units would need to have a connector piece as well as a place to insert it on all three sides of every triangle. I tried several ways of folding the paper over itself, accordion-style,. Finally, I stumbled upon a model that locked itself and possessed insertion points on all sides. I realized that as the model expanded, consequently putting more strain at every connection point, it would simply fall apart. I determined resignedly that I would need to resort to a little strip of adhesive tape, nothing less than a violent assault to my origami sensibilities. Proper origami artists never use tape or glue or scissors once they have commenced folding a model. However, I'd come far enough in devising my model that I had to sacrifice one of my principles—never use tape in origami—for another one, namely, finish your thesis. Furthermore, the strains put at each vertex, as described earlier, seemed like a sufficient justification for using a little bit of double-sided tape.

The double-sided tape trick worked very well and I was able to create a model of a hyperbolic surface. Although folding several dozen more units and assembling them was a rather tedious and time-consuming task, the results were worth it: I'd successfully created a new representation of Thurston's model! See Figure 1.

As previously mentioned, assembling three, four, five, or six equilateral triangles around a vertex will result in stable models (no tape needed!) that offer insights into other geometries. The versatility of the equilateral triangle allowed me to show other types of curvature as well. Intuitively, we know that six equilateral triangles will make a hexagon which can tile a flat surface. Thus, I put six triangles around a vertex to show zero curvature. This is known as a Euclidean surface, as in Figure 2.

Note that a Euclidean surface will expand infinitely. But what happens if you put five or fewer triangles around a vertex? Five triangles around a vertex results in an icosahedron with positive curvature, as in Figure 3.

Four triangles around a vertex results in an octahedron which also

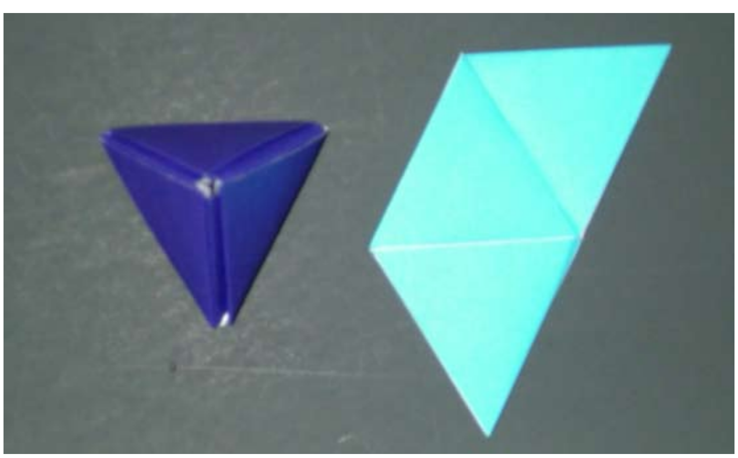


Figure 5. Tetrahedron

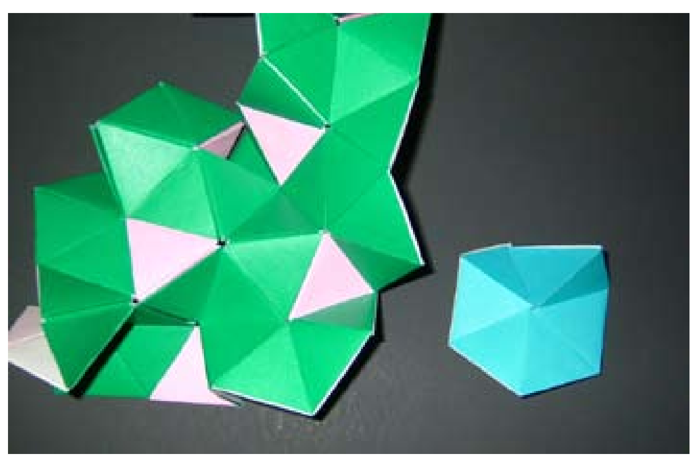


Figure 6. Adding a seventh triangle

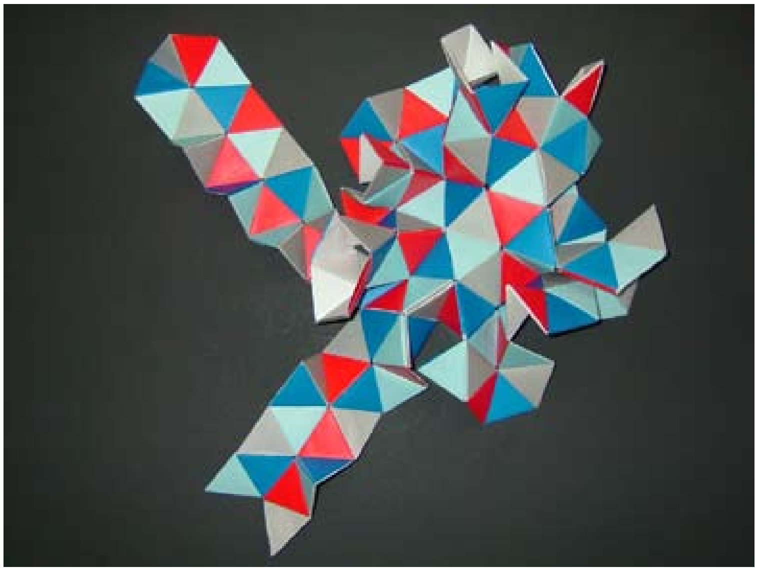


Figure 7. Infinite expansion

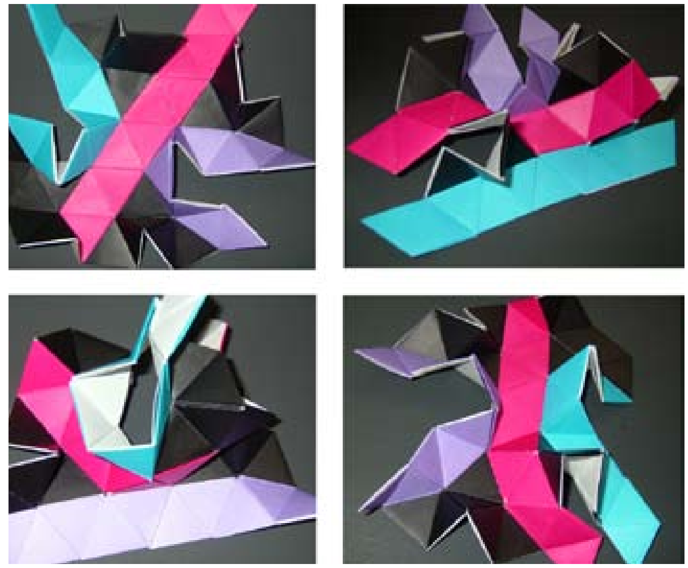


Figure 8. Straight lines

has positive curvature, as in Figure 4.

Three triangles around a vertex results in a tetrahedron ,as in Figure 5.

The models with three, four, and five triangles around a vertex all have positive curvature. These models, known as Platonic solids, show us what happens if our triangles are too few to tile the plane—the models close in on themselves. Thus, any model with positive curvature inherently cannot extend infinitely. Note that we cannot create a model with fewer than three triangles. The models above all show in a different color the triangle which differentiates each model from the one below it. I made an additional model to show how adding the seventh triangle (in pink) morphs a Euclidean surface (in green) into a hyperbolic one, as in Figure 6.

One of my goals in creating my own model of a hyperbolic surface was to have a model that in addition to being aesthetically appealing, also illustrated hyperbolic geometry's properties. The model can expand infinitely, as in Figure 7. Another property is the existence of an infinite number of lines through a point parallel to a line. I constructed a model that showed what these parallel lines look like. Because of the model's intrinsic floppiness, making one line straight in Euclidean terms inevitably caused the model to ripple and twist the orientation of the other lines. However, the different pictures show that the lines between the purple, pink, and blue strips are indeed actual lines.

Figure 9. Bucky ball

Several months after I completed my thesis, I was thinking about various color patterns I could create when making Tom Hull's bucky balls, and I realized that the pentagonal rings which comprise part of a bucky ball

Figure 10. Hyperbolic heptagonal rings

add negative curvature to the hexagons, which have zero curvature. The pentagonal rings are necessary to create the sphere, and the hexagonal rings space the pentagonal ones in order to enlarge the space. See Figure 9.

What would happen, I wondered, if I made heptagonal rings? Could it be that I'd spent several months agonizing over my own model of hyperbolic origami, when the answer was in the bucky balls I'd been making since I was fourteen? It turned out that I was right. Heptagonal rings did indeed form a hyperbolic surface. A close-up of the model in Figure 10 shows the construction with heptagonal rings. Tom Hull's PHiZZ units are especially useful for constructing different origami models because they are easy and fairly quick to fold, use squares of paper, and connect without any connector units or adhesive. It is also simple to combine rings with positive, zero, and negative curvature to create different objects, such as the torus in Figure 11.

The ability to combine rings with different kinds of curvature as I did with the torus opens up the possibility for all kinds of models. Currently I am experimenting with the PHiZZ unit to create a genus three Klein quartic and a genus five cube frame. I also intend to assemble a hyperbolic surface made from heptagonal rings with a tessellated coloring pattern suggested by Douglas Dunham.

Related Websites

Tom Hull's buckyballs and PhiZZ unit:
http://merrimack.edu/~thull/phzig/phzig.html

Doug Dunham's (7,3) tessellated coloring pattern:
http://www.d.umn.edu/~ddunham/p7073.gif

Triangle unit folding instructions:
http://rusmp.rice.edu/presentations/2007_NCTM_OrigamiFolding.pdf

References

Robert Lang, Origami Design Secrets: Mathematical Methods for an Ancient Art (Natick: A. K. Peters Ltd., 2003),
p.5.

William Thurston, Three-Dimensional Geometry and Topology (Princeton University Press, 1997), pp 50-51.

Jeffrey Weeks, The Shape of Space: How to Visualize Surfaces and Three-Dimensional Manifolds
(New York: Marcel Decker, Inc., 1985), pp. 151-154.

Figure 11. Torus

FROM ENGINEERING TO ART DOUGLAS PEDEN

I: Organic Period Example: Brute (1963) 40X40 inches

The following is an introduction to a series of articles broadly and briefly surveying the various periods in the evolution of my painting style to this date; indeed, a time dimension of some 40 plus years. It will be presented showing its relationship to music, mathematics, and science. The various periods can be categorized and outlined as follows:

I: Organic Period 1963-1964

II: Linear/Landscape Period 1965-1970

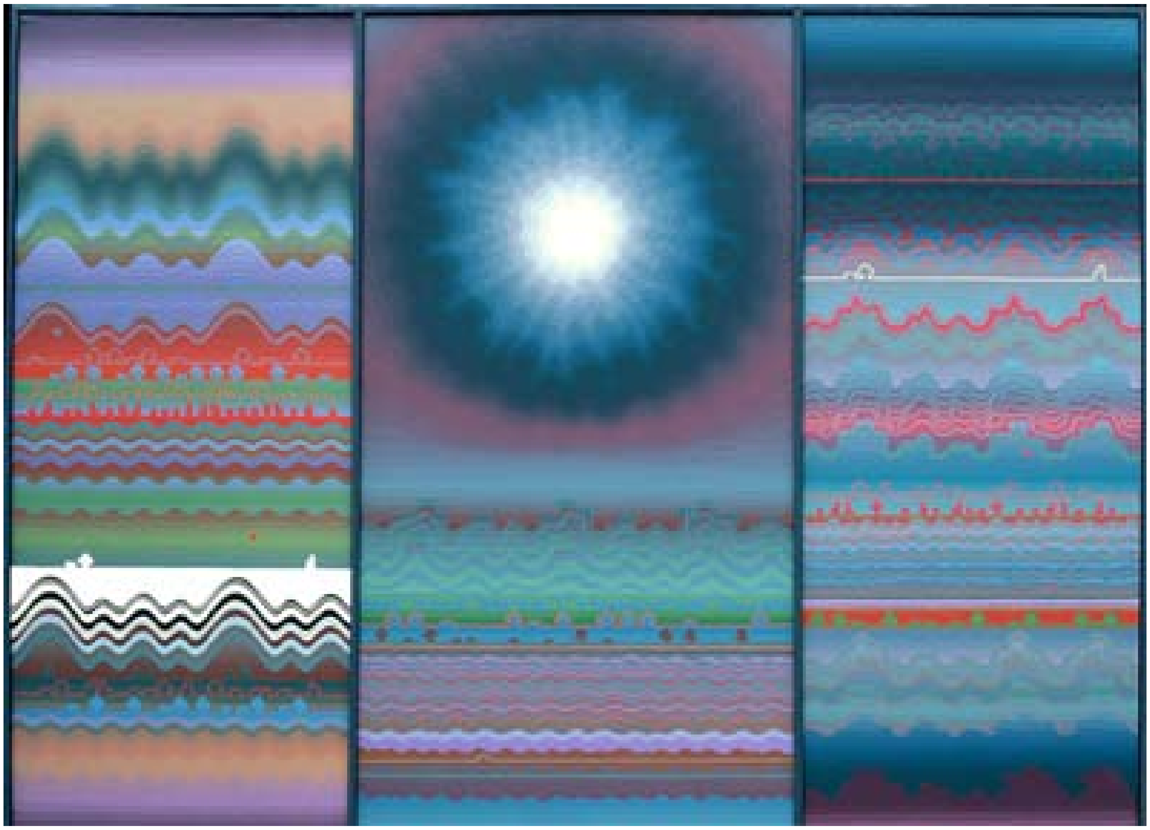
III: Grid Geometry/Euclidean Space Period 1971-1988

IV: Crossfield Geometry/Grid field Space Period 1989-1991

V: Interfield Geometry/Gridfield Space Period 1992-

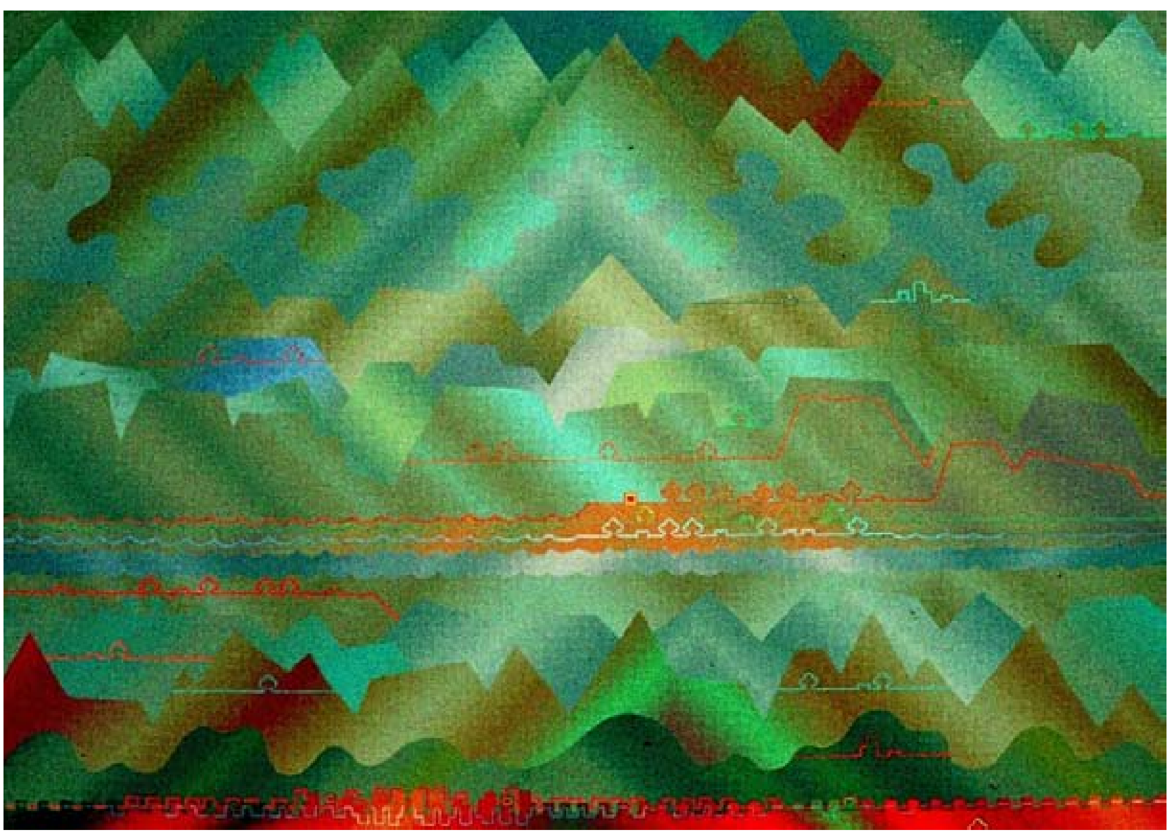
As human beings, we all go through an evolution of personal development as individuals; indeed, as painters, we begin by copying our peers, nature, and other artists to eventually collect our own lexicon of images with which to visually express ourselves and the world we live in.

A simple, and somewhat amusing, example of this personal graphic growth can be seen in the evolution of one's own handwriting (for better or worse). But, to proceed on a more serious note, to paraphrase a poem by the American poet Robert Frost, we as artists, scientists — indeed, as creative individuals in any endeavor, begin our life and vocation by taking the road most traveled by, until some of us, coming to a fork in the road, take the one less traveled by; and a few more observant travelers see a road never traveled by and boldly forge ahead into the unknown. I deem myself fortunate in that I have traveled all these roads. And if by example I can encour-



II: Linear/Landscape Period Example: Landscape 23: Homage III (1969) 55X73 inches

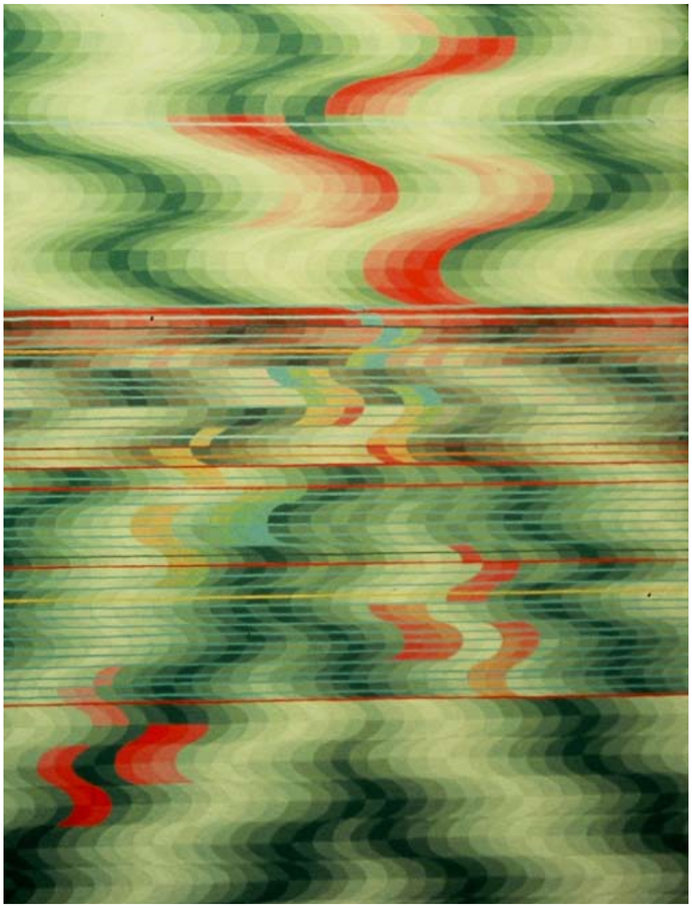
to any particular stylistic approach (road) — especially their own. I feel fortunate in that they acted not only as guides, but also, as stern and helpful critics in the basic development of my work. As insightful instructors, a good example is when I was studying and experimenting with the various styles of the masters and becoming increasingly frustrated because I felt I was going nowhere — except in the craft of imitating. This went on until one of my pro-



III: Grid Geometry/Euclidean Space Period Example: Landscape 56: (1972) 40X54 inches

age others to think and act beyond the boundaries of conventional wisdom, I would be satisfied.

The road I will present in these essays was taken because of a personal need to give voice to my imagination by inventing and exploring new worlds in a language I was familiar with and felt comfortable in, which was the language of images. At this point, I must give credit to my professors who did not restrict me

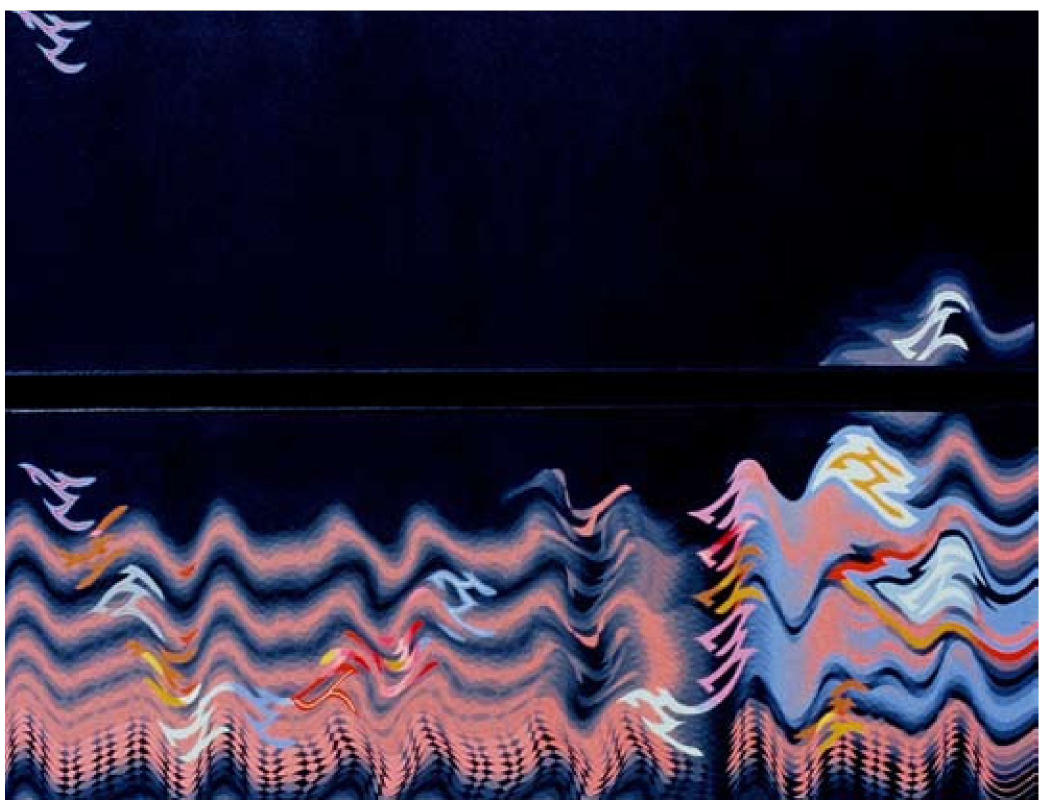


IV: Crossfield Geometry/Grid field Space Period Example: Climbing Clown (1990) 24X18 inches

fessors noticed some sketches in my notebook and suggested painting what I was drawing, which once pointed out became obvious. However, before proceeding further, it might be helpful to include some of the background that contributed to my artistic growth.

As my father was an engineer it was expected I follow the same path. After concentrating on engineering preparatory courses at Ann Arbor High School in Ann Arbor, I went on for my undergraduate studies in Aeronautical Engineering and graduate studies in Nuclear Engineering at the University of Michigan; during the summers I worked at Douglas Aircraft and North American, Rocketdyne in California, primarily as a mathematician. It so happens that during my university years, I became interested in the arts and when time permitted studied these, mostly on my own, with ever increasing eagerness. However, there came a time when I found it necessary to find steady employment; hence, I got a job with Atomic Power and Development Associates (APDA) in Detroit, working in the various aspects of nuclear reactor design — in this case, one of the first fast breeder reactors. After five years working for APDA with an ever increasing love of the arts, especially painting, I quit the engineering profession to study and become a painter. This was done with the support of my wonderful wife; indeed, my only support at the time. We, with our two young children moved to Colorado where I obtained a Master of Fine Art (MFA) from the University of Colorado, Boulder in 1965. So, given this mixture of science and art let us proceed on the task at hand.

In this essay, the following will simply be an example chosen from each period that reasonably shows the kinds of paintings I was doing at that time. Details will be given with each subsequent article as time and space allow; in other words, to be continued.



V: Interfield Geometry/Gridfield Space Period Example: Symphonic Variations (1993) Diptych: 2-25X63 inch panels

DAVID CHAMBERLAIN: MELODIC FORMS

NAT FRIEDMAN

Figure 1. Cadenza, marble

Every time I think of David Chamberlain, it takes me back to the first Art and Mathematics Conference AM 92 where David was an invited speaker. I had always admired his work and was very glad when he agreed to attend AM 92. He showed a very interesting video that also included swooping curving flight paths of him in his homemade ultralight airplane. It helped me to gain a feeling for his shapes that were also inspired by musical forms.

The question period after his talk is also an event that now seems hilarious but freaked me out at the time. David mentioned that he didn't get excited about algorithmic art because it was too deterministic-or something like that. Anyway, Tony Robbin got quite upset and asked David if he thought that creative ideas came from just f…… around. Well everyone jumped into the argument and everyone had to use the f-word. I was totally embarrassed since there were a number of women in the audience and really didn't know what to do. So I started singing a song to break up the "fight" but it did no good as I really can't sing. Anyway, the upshot was that everyone thought it was a "very lively discussion" that I will never forget. Thank you David and Tony for an enduring AM 92 memory.

I actually had David do the opening talk at AM 93 but there were no violent reactions-so disappointingly boring.

Thus here we are fifteen years later, less hair, more pounds, and hopefully still high energy. It is a pleasure to do an article on David's work, which really speaks for itself. As seen in Cadenza in Figure 1, it is all about form, space, and light, which I can really appreciate since that is how I think about my own work. At one conference someone asked me What is space? My Zen reply was Space is space-but the better question is Why is space? My answer

Figure 2. Mazurka, Bronze

to that is “Space is where the light goes.” Thus in sculpture one opens the form to shape space so that light can enter and interact with the form and space. The marble sculpture Cadenza in Figure 1 displays a whole range of light and shadow interacting with the form and space. Light is very light, m=E/c2, so when the light touches the form it is a very light touch. You or I or the form, do not feel the light touch of light!

Here are some thoughts of David concerning light and shadow.

Regarding light (and its absence, including shadow)… One of my favorite discoveries was a sign on the outside door of a university darkroom that read, simply, “Keep Door Closed - Don’t let the Dark Out”. Playing with light artfully is, especially for the sculptor, an attempt to control both its reflection and its absorption, and the judicious lack of light gives power and life to its counterpart. It is the delicious gray areas that, as transitional surfaces, become more and less illuminated as they compel us to view into, through and around a sculpture’s forms and spaces. So working with light is also working with dark.

A second sculpture Mazurka is shown in Figure 2. Here is an example of David’s characteristic concept of having the curving form suspended in light and space. The space is there for the light and the space and light are there for the form to be suspended in. The delicate bluish-green patina interacts beautifully with the light. I think of the form as a turning dancer suspended in space. This sculpture also relates to a swooping curving flight path. David remarks:

Speaking of Zen, I think that in viewing a dimensional artwork like this we all try, at various levels, to be the sculpture… to put ourselves into the forms and spaces. I know that when I create these pieces I imagine that I am inside the pieces and that their surfaces are my skin: indeed, I am a dancer and the sculpture has a vitality and life force that makes me move and spin around, creating certain dynamic effects. While performing in the stage-lights I can

Figure 3. Viole, Porcelain

Figure 4. Adagio, South American Mahogoney

engage in some mysterious sleight of hand to emphasize certain areas while hiding others… and all this changes as I move around. Perhaps that is why almost all my works are rotational. I become the sculpture… I see the light effects from inside the piece. The porcelain sculpture Viole is shown in Figure 3. Here the form-space-light effects are quite strong. In this case the form suspended in light and space is a band of varying width and thickness.

Marble and porcelain are very effective for interacting with light. Wood tends to absorb light but oiled wood reflects light, so that the effect is a very warm light. The wood sculpture Adagio is shown in Figure 4. Here we see the design is a variation on the design of Cadenza in Figure 1.

A second wood sculpture Medley is shown in Figures 4 and 5. The piece is mounted so that it can be rotated to allow a variety of views with varying light effects that makes it advantageous for hyperseeing. David states that:

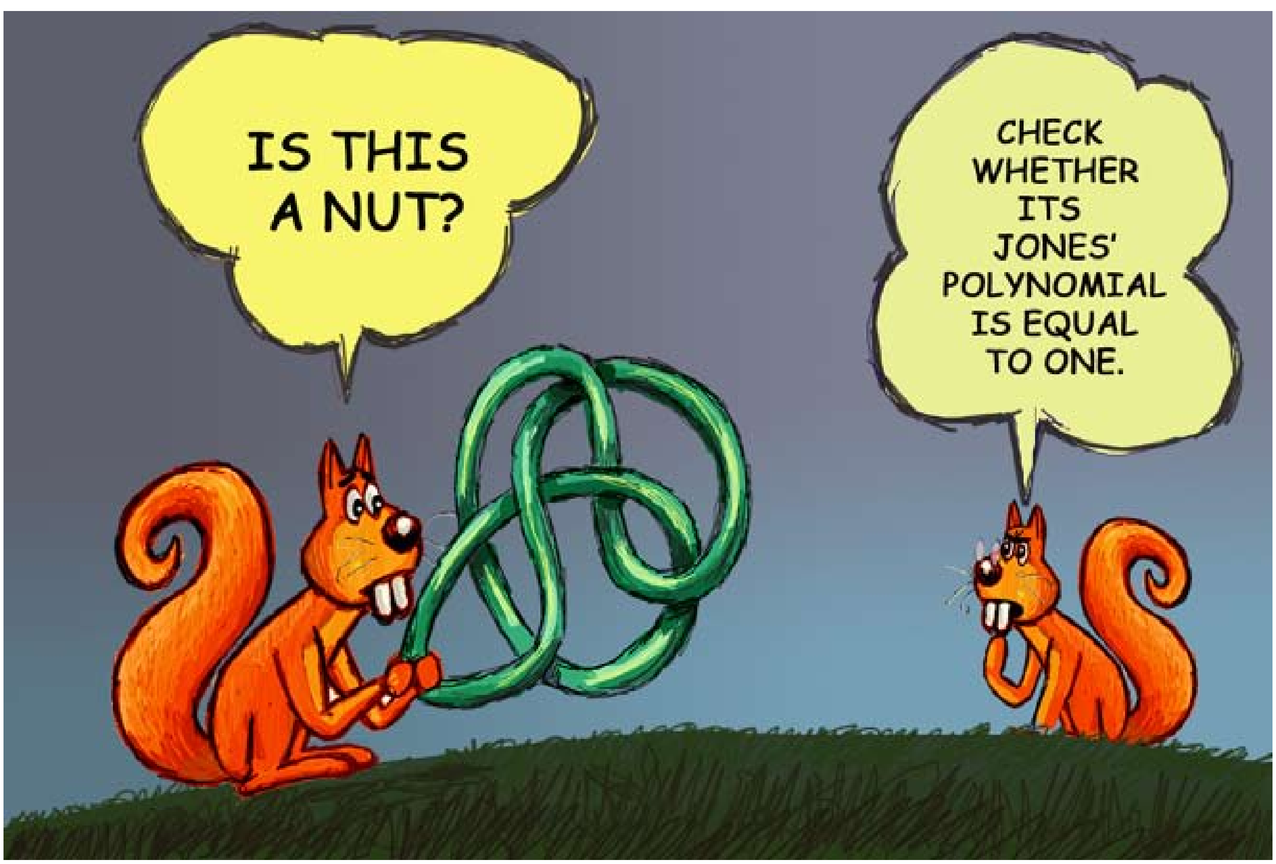
Medley in Figures 5 and 6 is a topological inversion of the forms found in the other pieces (this is especially apparent in Cadenza and Adagio.) The continuous melodic lines comprising the twisted edges of the triangular section struts that cross each other appear in the interior instead of the exterior, and also the continuous surfaces orchestrating the strut architecture are in the interior rather than outside the overall framing form.

See http://chamberlain-studios.com for additional works by David Chamberlain.

Figure 5. Medley, South American Mahogoney

Figure 6. Medley, Alternate view.

KNOT THEORY **ERGUN AKLEMAN**



NEWS

Museum of Modern Art, NYC,
Richard Serra Sculpture: Forty Years.
June 3-September 10, 2007

This is a grand retrospective of the work of Richard Serra of the past 40 years. In particular there are some exciting very recent pieces including “Sequence” , 2006, which is a double figure-eight curved maze that you can walk through. This is one very impressive topological manifold in two-inch steel. An image may be seen at www.gagosian.com. Several reviews are available if you Google Museum of Modern Art, Richard Serra exhibit. The catalog “Richard Serra Sculpture: Forty Years” is available at Amazon.

The Institute For Figuring

The Institute For Figuring is an organization dedicated to the poetic and aesthetic dimensions of science, mathematics and the technical arts. The Institute’s interests are twofold: the manifestation of figures in the world around us and the figurative technologies that humans have developed through the ages. From the physics of snowflakes and the hyperbolic geometry of sea slugs, to the mathematics of paper folding, the tiling patterns of Islamic mosaics and graphical models of the human mind, the Institute takes as its purview a complex ecology of figuring. For more details visit : www.theiff.org

BOOK REVIEWS

My Dance is Mathematics by JoAnne Growney,
Paper Kite Press, Wilkes-Barre, PA, © 2006, 2007, www.wordpainting.com/paperkitepress.

This square, red, hand-stitched chapbook contains poems that feature mathematics in their structure or imagery. The title poem, “My Dance is Mathematics,” honors mathematician Amalie “Emmy” Noether even as it recognizes the gender inequalities among today’s mathematicians. Here is an excerpt:

> In spite of Emmy’s talents,
> always there were reasons
> not to give her rank
> or permanent employment.
> She’s a pacifist, a woman.
> She’s a woman and a Jew.
> Her abstract thinking
> is female and abstruse.
>
> Today history books proclaim that Noether
> is the greatest mathematician
> her sex has produced. They say she was good
> for a woman.

COMMUNICATIONS

This section is for short communications such as recommendations for artist's websites, links to articles, queries, answers, etc.

A SAMPLE OF WEB RESOURCES

[1]www.kimwilliamsbooks.com
Kim Williams website for previous Nexus publications on architecture and mathematics.

[2]www.mathartfun.com
Robert Fathauer's website for art-math products including previous issues of Bridges.

[3]www.mi.sanu.ac.yu/vismath/
The electronic journal Vismath, edited by Slavik Jablan, is a rich source of interesting articles, exhibits, and information.

[4]www.isama.org
A rich source of links to a variety of works.

[5]www.kennethsnelson.com
Kenneth Snelson's website which is rich in information. In particular, the discussion in the section Structure and Tensegrity is excellent.

[6]www.wholemovement.com/
Bradfrod Hansen-Smith's webpage on circle folding.

[7]http://www.bridgesmathart.org/
The new webpage of Bridges.

[8]www-viz.tamu.edu/faculty/ergun/research/topology
Topological mesh modeling page. You can download TopMod.

[9]www.georgehart.com
George Hart's Webpage. One of the best resources.

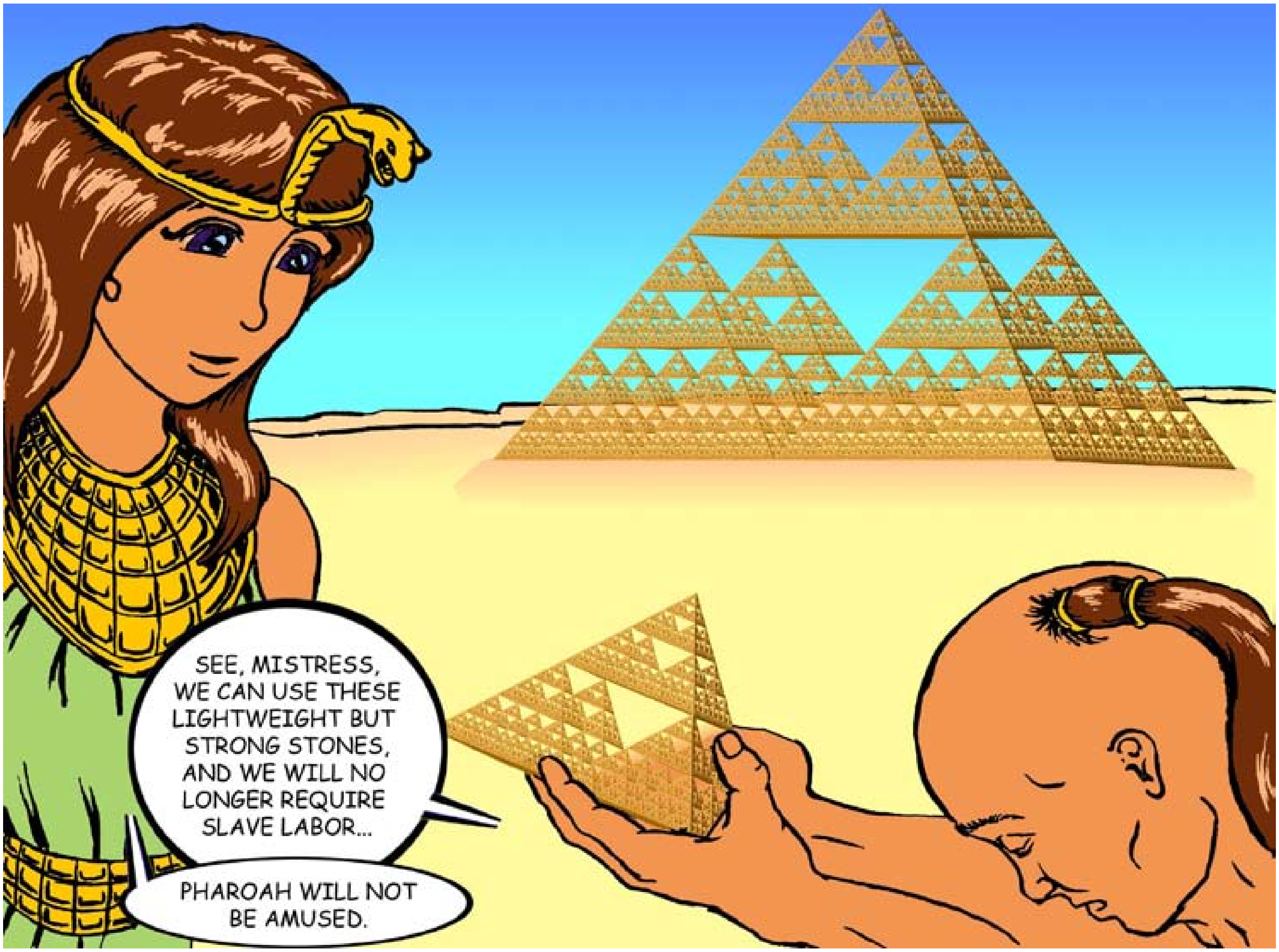
[10]www.cs.berkeley.edu/
Carlo Sequin's webpage on various subjects related to Art, Geometry ans Sculpture.

[11]www.ics.uci.edu/~eppstein/junkyard/
Geometry Junkyard: David Eppstein's webpage anything about geometry.

[12]www.npar.org/
Web Site for the International Symposium on Non-Photorealistic Animation and Rendering

[13]www.siggraph.org/
Website of ACM Siggraph.

ILLUSTRATIONS BY ROBERT KAUFFMANN

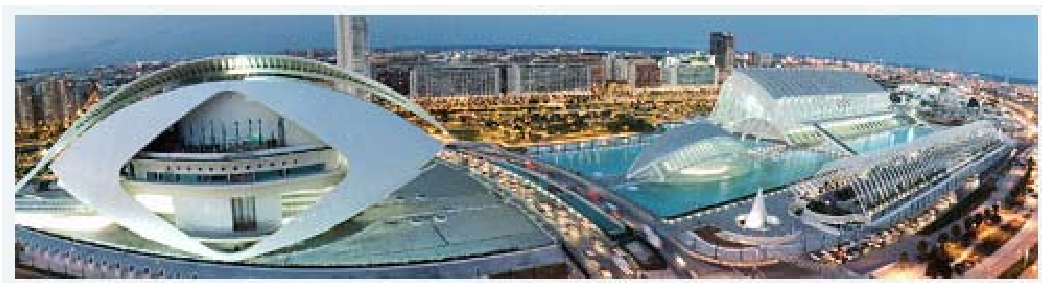


ANNOUNCEMENTS

The Proceedings of ISAMA 2007 is now available from LULU as the May issue of Hyperseeing. Log in to: www.lulu.com and search for Hyperseeing. The May issue can be downloaded from the Hyperseeing page.

ISAMA VALENCIA 2008:
A CALATRAVA CELEBRATION

Seventh Interdisciplinary Conference of
The International Society of the Arts, Mathematics, and Architecture
honors the artist, engineer and architect
Santiago Calatrava



(photo, spanish-living.com)

Valencia's City of Arts and Science
(ciudad de las artes y de las ciencias)
Designed by Valencian architect Santiago Calatrava

June 16-20, 2008
Universidad Politecnica De Valencia

(photo, spanish-living.com)

L'Hemisfèric – Imax Cinema, Planetarium and Laserium

Details of ISAMA VALENCIA 2008: A CALATRAVA CELEBRATION will be announced at www.isama.org on October 1, 2007.