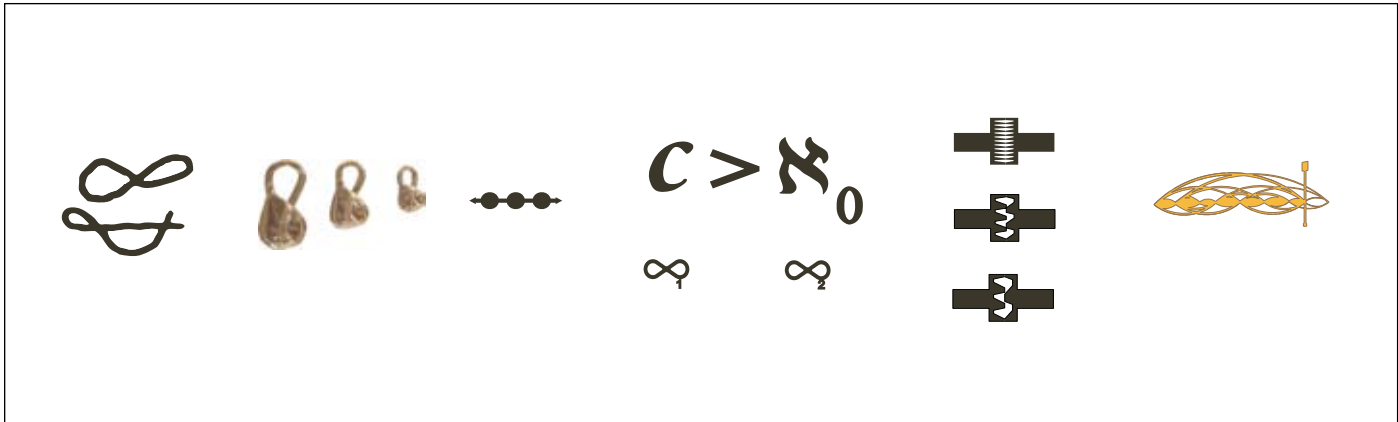


The Hands of Cantor



a sculpture by James Malbon Harrison

The Hands of Cantor:
A sculptural installation for the lobby of
The Hospital, a creative center and multi-media arts facility
located in Covent Garden, London
2005-2007

<http://www.thehospital.dreamhost.com//>

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Acknowledgements

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Most of all, I owe an enormous debt of gratitude to Pablo Schugurensky. His clarity of vision and his stewardship made the project possible. My sincere wish is that all artists would have the chance to work with such a gentleman.

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Preface

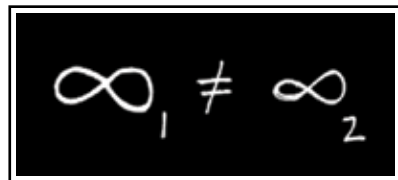
This sculpture is a compendium of strange ideas from the history of science and mathematics circa late 19th century: Klein Bottles, Atomic Knot Theory, and the Continuum. The objective was to create an unhinged wonder cabinet that spoke to the power of the imagination – the pure potential of creative archaeology, or digging for ideas.

It's generally wise to not explain sculpture - to instead follow the old adage and let the work speak for itself. However, since the primary source materials for the piece are somewhat arcane branches of mathematics, a little background is in order. Ultimately, whether a viewer has knowledge of the subject material is irrelevant. My hope is to leave them with an impression of wonder or discovery.

My premise as a sculptor, that I've overlaid on top of others' ideas, is that the [Set of Ideas] is boundless and endless. Knowledge does not have a finite maximum that we will reach someday; rather the opposite holds true, regardless of our comprehensive abilities.

The sculpture is a touchstone on ideas about the infinite, and is an attempt to describe and translate the richness of this concept, far beyond the cliché of the figure eight lying on its side. Although the actual ideas that inspired this sculpture come from the field of mathematics, they seem especially relevant to the mission of the Hospital as an institution that fosters creativity. Ideas generated in one field of study can have an enormous impact on other, seemingly unrelated fields.

Introduction


$$\infty_1 \neq \infty_2$$

Infinities come in different types, and some are bigger than others.

The secret to creativity is knowing how to hide your sources.
—Albert Einstein

Description of the Sculpture

The sculpture is composed of a series of three floating screens surrounding a giant alternating compound knot. An exploded diagram of these various components is shown on the facing page.

The screen to the left is a representation of Lord Kelvin's and Peter Tait's Atomic Knot Table, out to seven crossings.

In the center of the space hangs the giant alternating compound knot, made up of the two simplest mathematical knots: a trefoil knot and a figure eight knot.

The screen to the right comprises a series of Klein Bottles, filleted and tessellated across the space.

Finally, in the back are the Footnotes: a compendium of historic symbols of infinity.





View of sculpture from top of stairs



View from landing



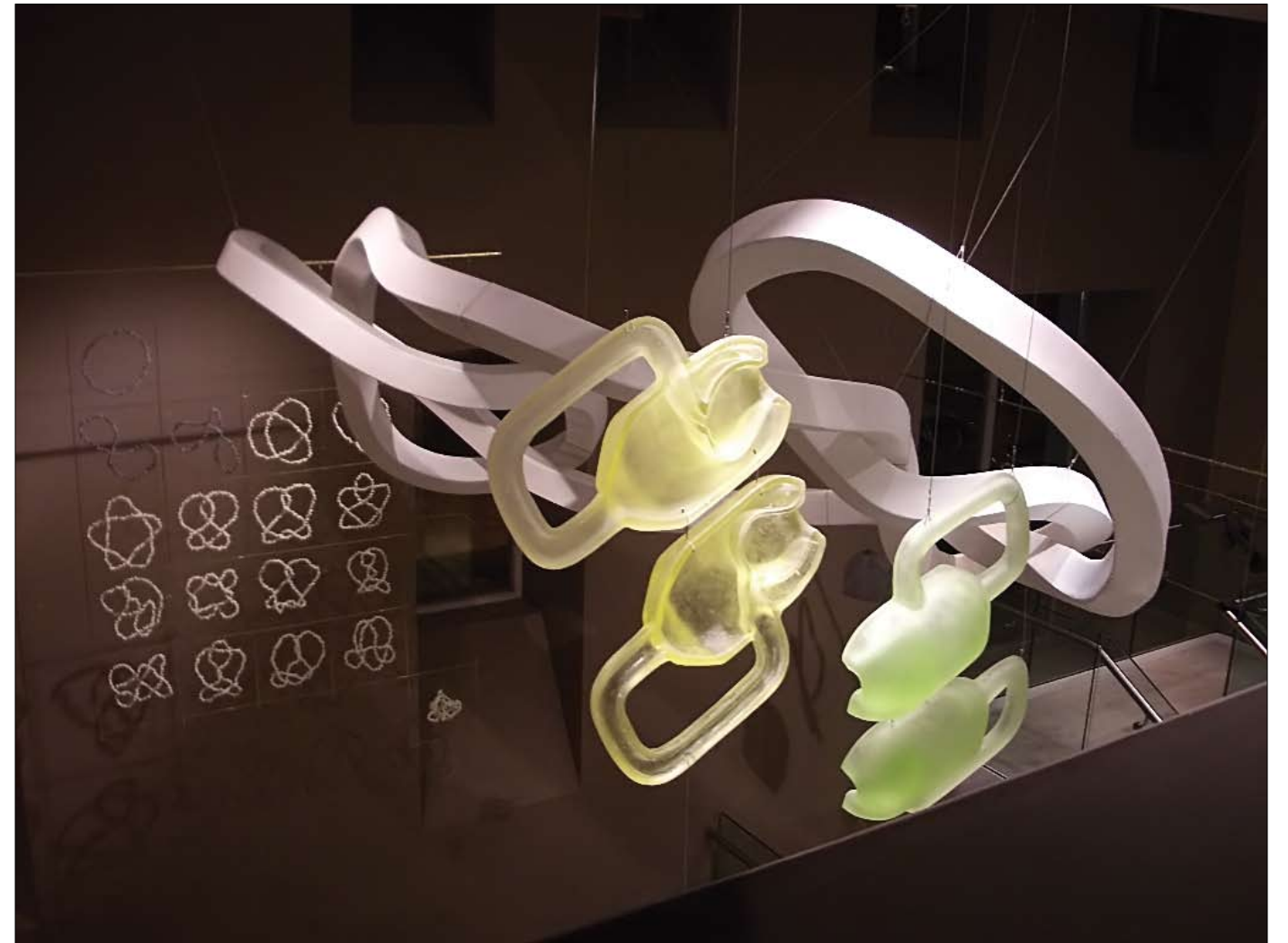
View upon entering lobby



View of Atomic Knot Table



View from mezzanine

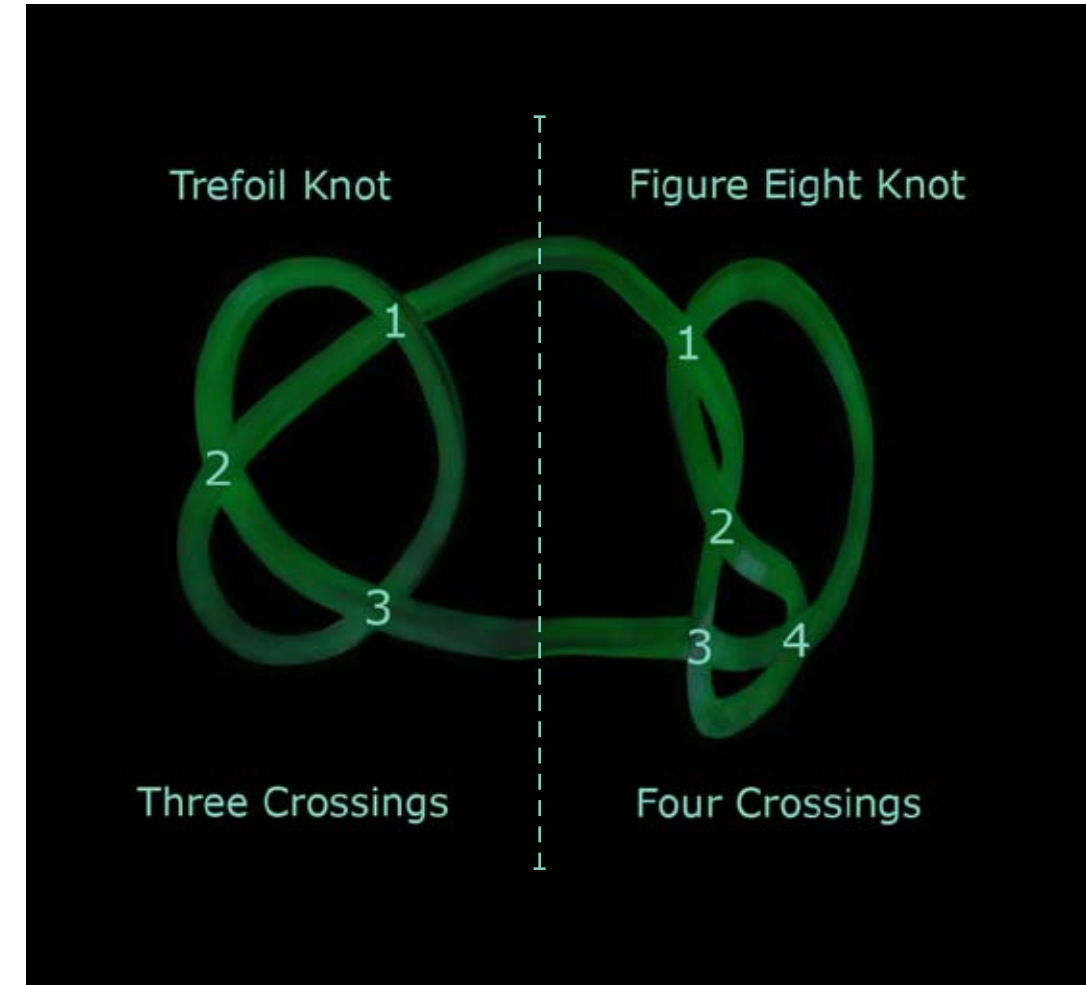


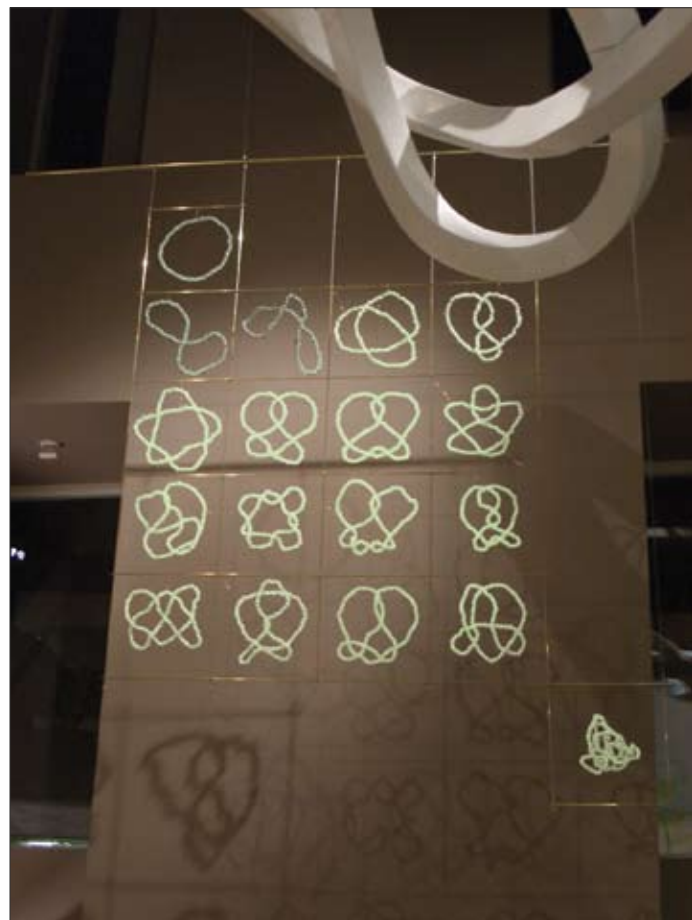
View from mezzanine



Giant Compound Mobius Knot

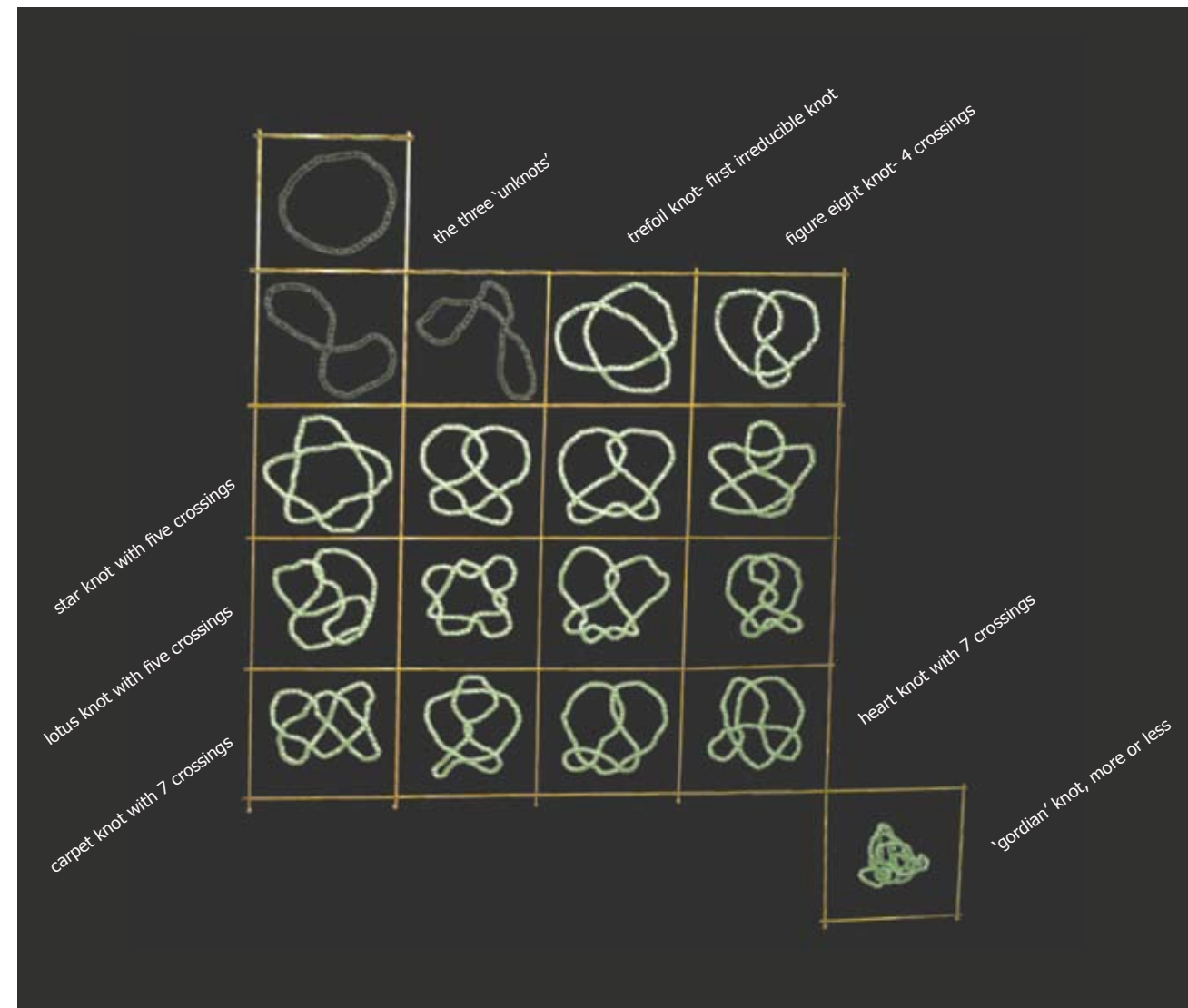
This piece, hanging in the center of the space, is actually the two simplest mathematical knots joined in one loop. On the left is the Trefoil Knot, with three crossings, and on the right is the Figure Eight Knot, with four crossings. Additionally, there is a $1/4$ twist in the square cross section of the knot itself. If an ant were to walk along the giant knot's surface, it would have to complete four laps in order to end up where it started. If unravelled, the knot would create a ribbon 200ft (62M) in length.

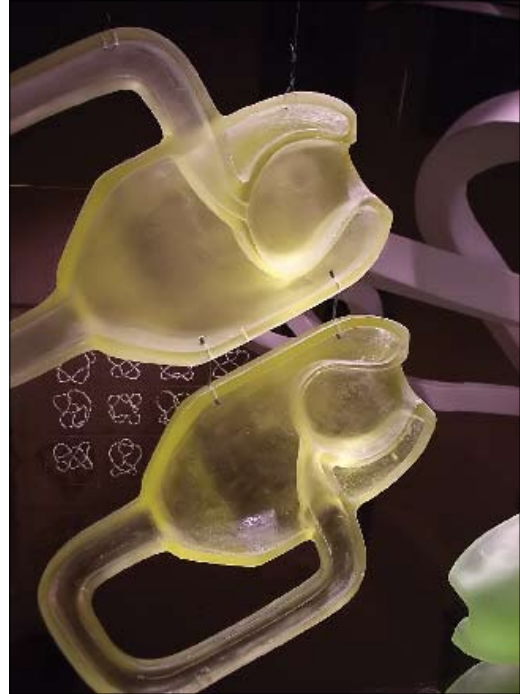




The Atomic Knot Table

In 1867, William Thompson (later 1st Baron or Lord Kelvin) proposed that atoms were 'knotted vortices floating in aether'. His colleague Peter Tait went to the trouble to distinguish what made one knot mathematically different from another, thus creating a forerunner (however incorrect) to the Periodic Table of the Elements. Inasmuch as Kelvin was technically wrong about the constitution of atoms, the research into knots inspired by his conjecture has proved useful in present day studies of the knotting and folding of DNA and proteins.





Klein Bottles-Tessellated

A Klein Bottle is a bottle that drinks itself. After the Mobius Strip, the Klein Bottle may be the next most recognized symbol of infinity. This curiosity of topology was invented by the great Felix Klein, who inspired an industry of strange surfaces to be produced from Munich for Departments of Mathematics around the globe. The Klein Bottle is a sculptural version of a tautology. It also represents a departure point: the moment when mathematics went from geometry to topology, and therefore out of the realm of that which is describable in three dimensions.

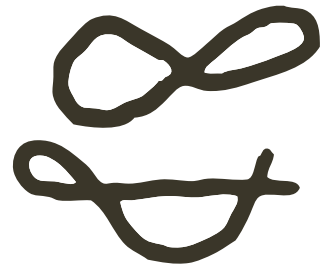


Klein Bottles form a wallpaper pattern across space.

Footnotes



Owing to the large number of 'asides' the sculpture was generating, it became necessary to incorporate them in an annotated form, through the literary device of plac ————— ing notes at the foot of the sculpture.



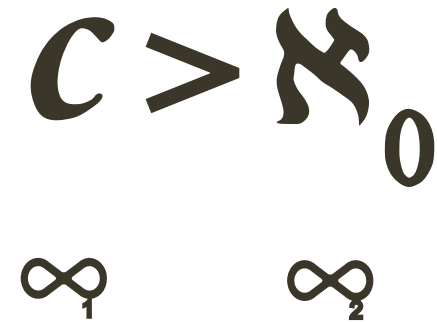
Möbius Strip
Ampersand



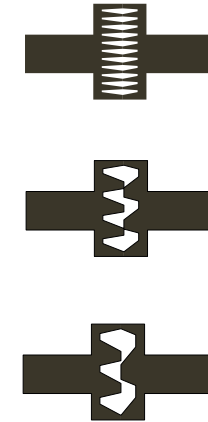
Klein Bottles



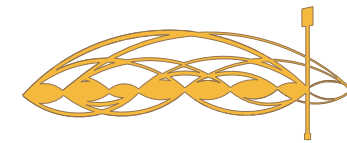
Ellipses



Cantor's continuum



Many vs. Many
4 vs. 3
3 vs. 2

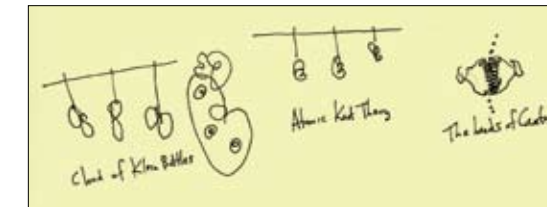
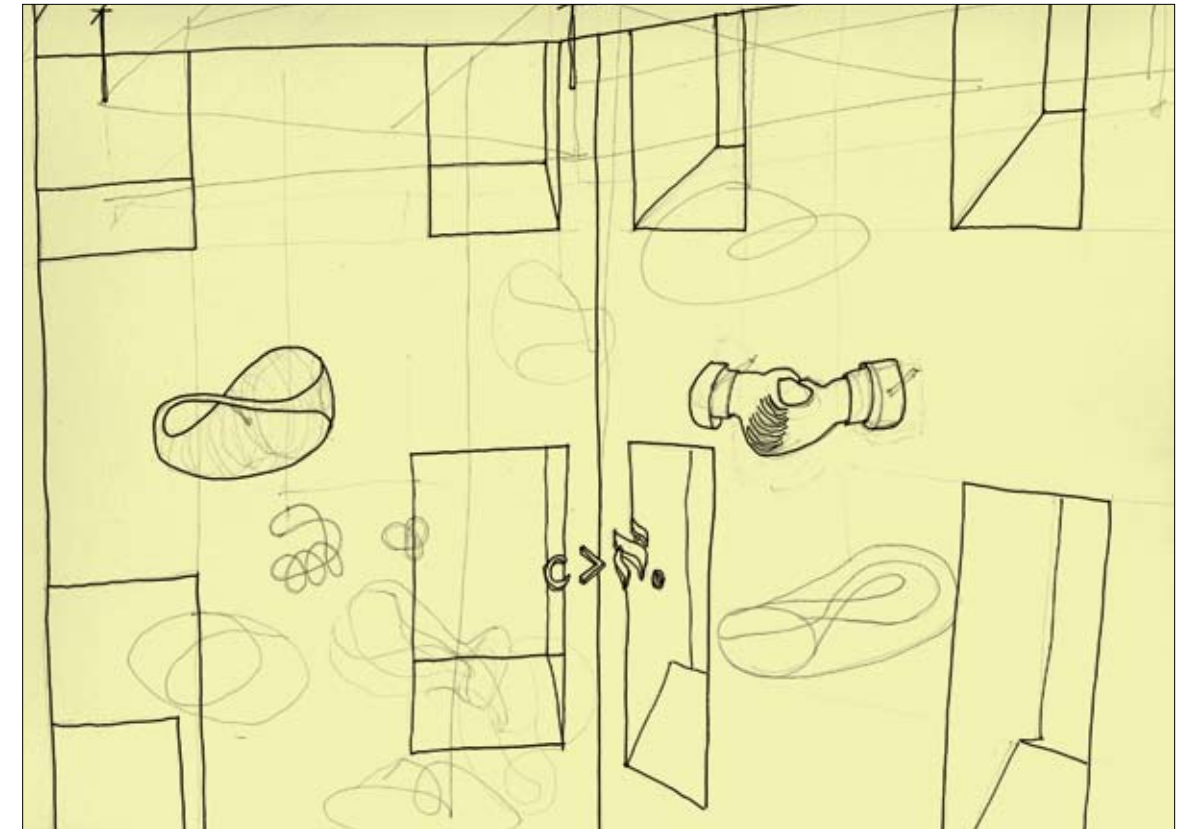


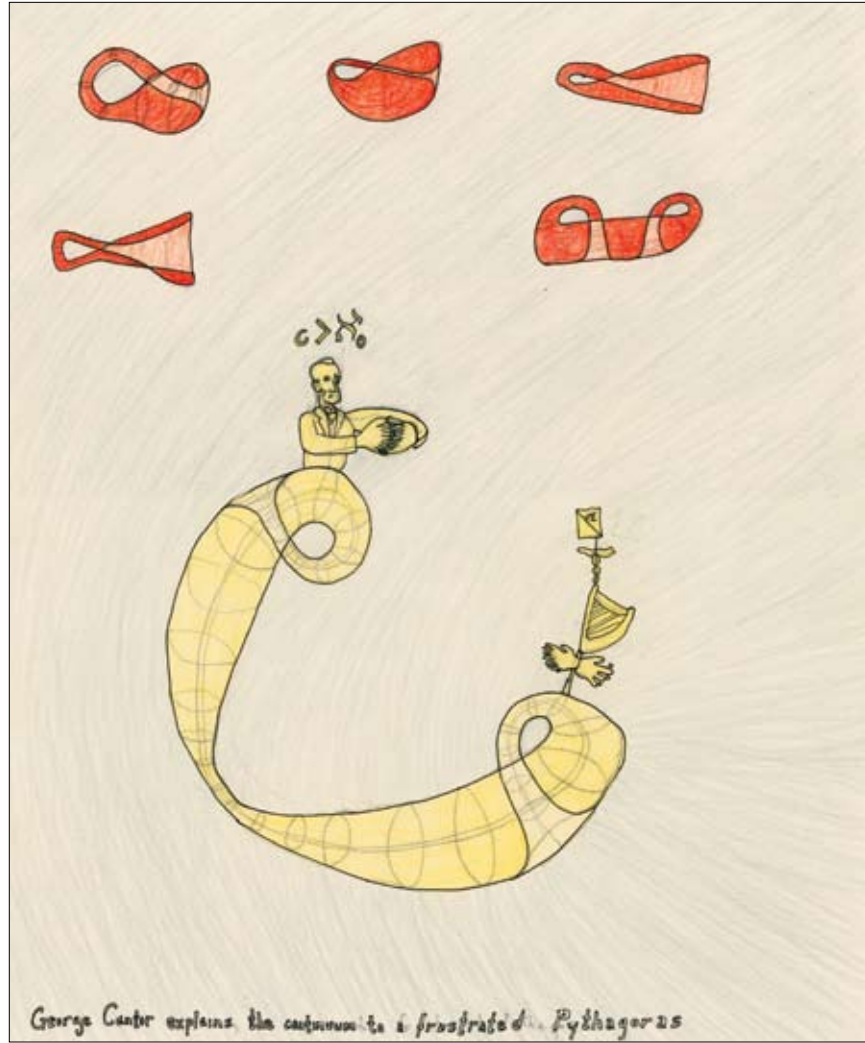
Octave

Preparatory Drawings

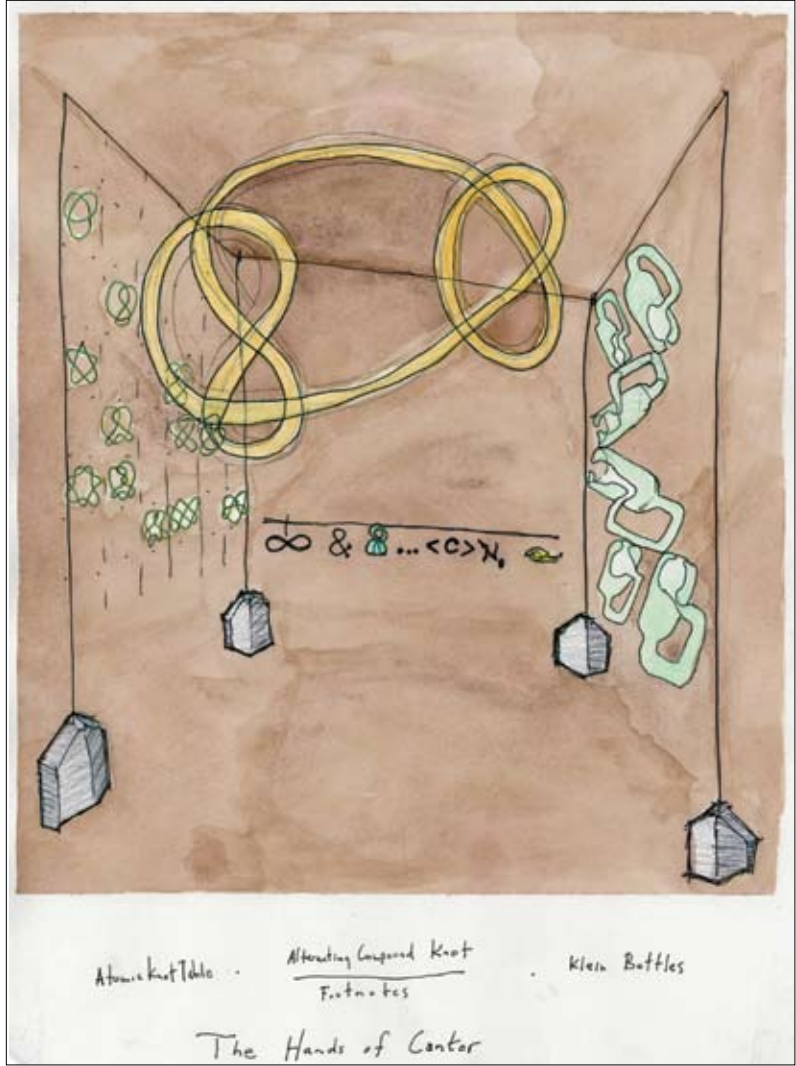
Drawing is a way to quietly destroy a piece of paper while testing an idea. I use drawing as an investigatory tool within a realm of complete permission. Many of my drawings hit the cutting room floor, yet they are indispensable in arriving at the final work. At the end of a project it is revealing to go back and review the drawings and what could have been: where things diverged, where one idea died off and another one began.

For me, drawing is the quickest way to capture an idea - and the freshness of that idea remains in the drawing even if it isn't realized in the final piece. While on the one hand the drawing is subservient - a means to an end - at its best, a drawing is promise and potential.

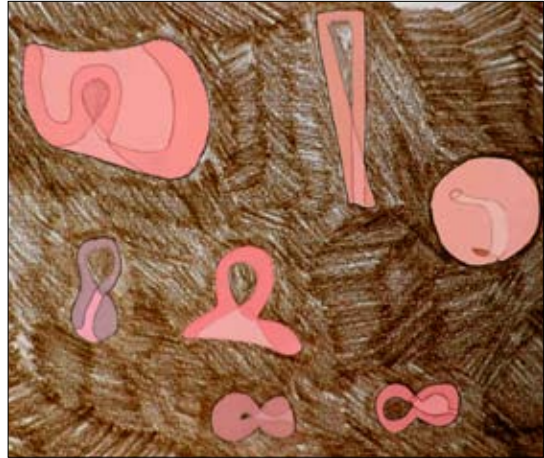




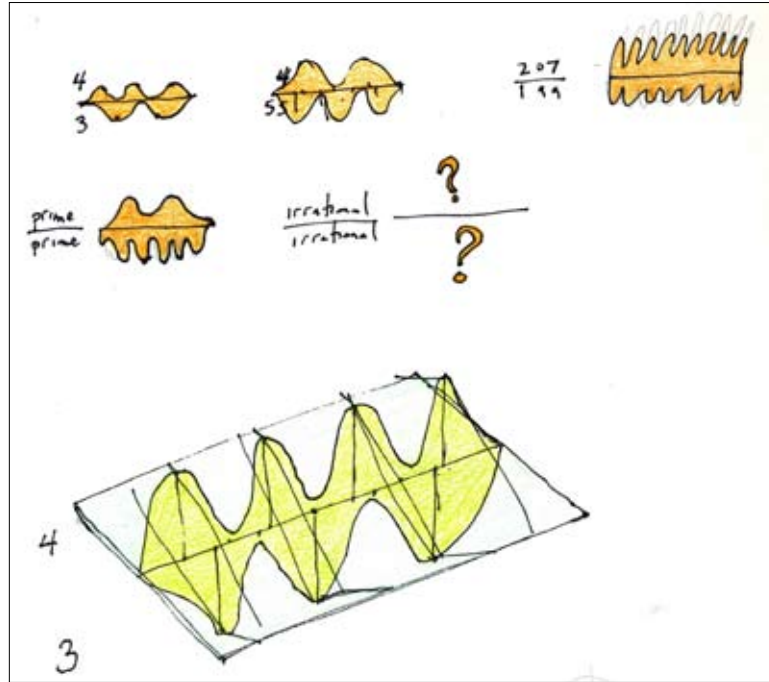
Early sketch depicting various Klein Bottle concepts.



The sculpture begins to organize itself.



A Taxonomy of Klein Bottles

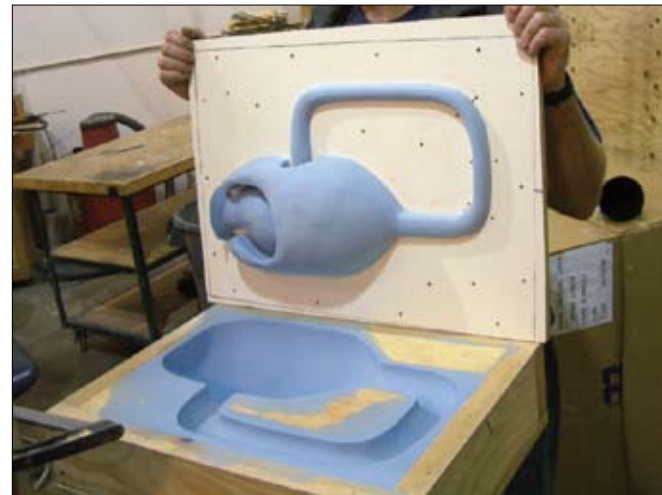


Ratios - this vs. that, space vs. solid, thing vs. between.



Mathematical 'trophy heads' for the lobby walls.

The Making Of: Fabrication, Installation, Cutting Room Floor



For the fabrication, a warehouse was rented out to mock up the interior space of the Hospital lobby at full scale. This enabled me to rapidly sketch out ideas as they would appear in the final sculpture. Individual parts had to 'compete' to make the cut. The pictures to the left show many versions of the Klein Bottle being roughed out, although only one version made it into the final piece.



Giant Knot fabrication - fiberglass coating and phosphorescent paint application.



Klein Bottles fresh out of the mold.



Graphite Footnotes after water cutting.



Various stages of full scale mock-up.

Installation- Ship in a Bottle



Arrival of the crates



Unpacking



Training to use the 'Octopus'.



Squeezing the Octopus through the building



Rigging the steel armature into position.



Installing Footnotes



Lifting Giant Knot



Securing Giant Knot



The sculpture was installed over a period of nine evenings, beginning at midnight and 'striking' by 7am the following morning: February 24 - March 5, 2005. Thanks to everyone who helped along the way.

THE END

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for other large strange things

visit

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Acknowledgements and Credits

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Peter Avery

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Resin Klein Bottles: Dodge Molds

Watercutting: Hegar Manufacturing

Art handling: ArtWorks, Momart

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by David Foster Wallace
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