Perspectives on Borges' Library of Babel

CJ Fearnley
cjf@CJFearnley.com
http://www.CJFearnley.com

Jeannie Moberly
moberlypj@yahoo.com
http://Moberly.CJFearnley.com

240 Copley Road
Upper Darby, PA 19082, USA

29 July 2015

Presentation to **Bridges Baltimore 2015**: *Mathematics, Music, Art, Architecture, Culture* at The University of Baltimore in Baltimore, MD, USA
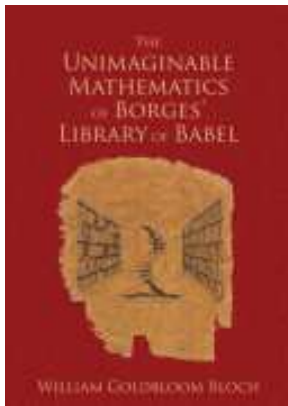
Landing Page for our work on Harmonic Perspective:
http://www.CJFearnley.com/HarmonicPerspective

Our 2012 Bridges paper: "Harmonic Perspective"

- This work continues our 2012 Bridges paper on "Harmonic Perspective" with two new geometrical variants on harmonics: harmonic sequences and nets of rationality and a pencil of nonintersecting Apollonian circles.

The Bridges Archive: 20... ×

archive.bridgesmathart.org/2012/bridges2012-481.html ▼ ℂ 🔍 ▼ Google

Home

LINKS

The Bridges Organization

YEARS

2015
2014
2013
2012
2011
2010
2009

Harmonic Perspective

C. J. Fearnley and Jeannie Moberly
Proceedings of Bridges 2012: Mathematics, Music, Art, Architecture, Culture (2012)
Pages 481–484

Abstract

In projective geometry basic incidence relations and duality are primary. Perspective is an elementary relation between points or lines linked to perspective drawing. Harmonics are little known but pervasive geometric invariants featuring a fundamental fourness divided into two pairs. We discuss several definitions of harmonics, from ones involving basic incidence constructions to non-projective ones with circles, angles and distance ratios. This preliminary study provides a glimpse into the possibilities of harmonic perspective. We describe three artworks that explore harmonics, perspective and their interrelationships. They are composed on

Perspectivism

- In a free on-line course on Dante, Giuseppe Mazzotta defines perspectivism as "a way of assembling various points of view."

- Perspective may be important: knowing, doing, and perceiving may be subject to both its power for seeing and its biases.

- How can artists move beyond the limiting form of perspective developed by Renaissance artists and abstracted into the science of projective geometry by mathematicians?

The Library of Babel

- This work explores a new subject in the form of The remarkable "Universe (which others call the Library)" described in "The Library of Babel" by Jorge Luis Borges (1941).

- The Library consists of a vast number of rooms each with the same number of books, airshafts, staircases, and anterooms.

- The librarians wander their whole lives through the labyrinth of rooms wondering about the nature of their Universe.

- Many aspects of the Library are left open to speculation.

The Unimaginable Mathematics of Borges' Library of Babel

- William Goldbloom Bloch's great book is an accessible, fun survey of the mathematical surprises lurking in The Library.

View of Apollonian Ventilation Shafts

Another View of "Borges' Library of Babel"
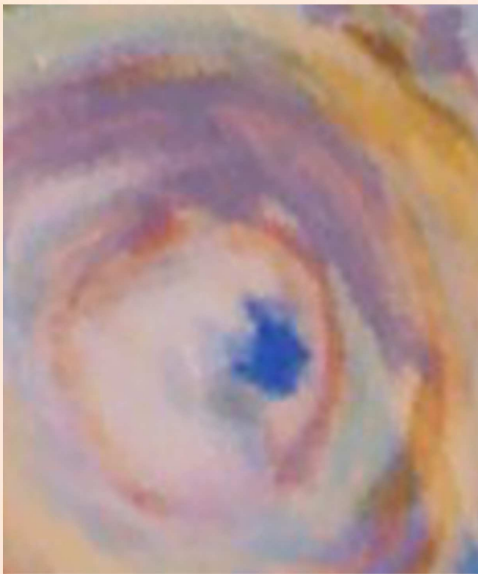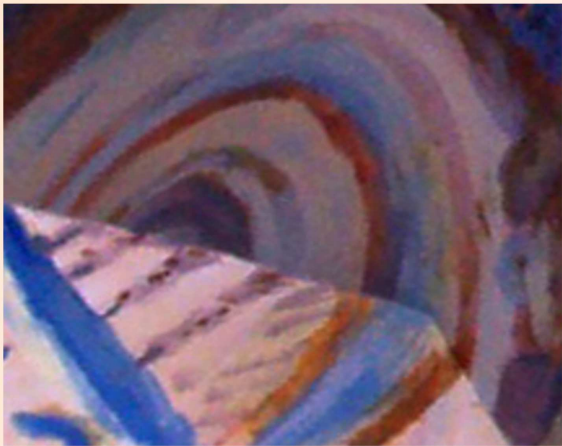
INFINITE LIBRARY
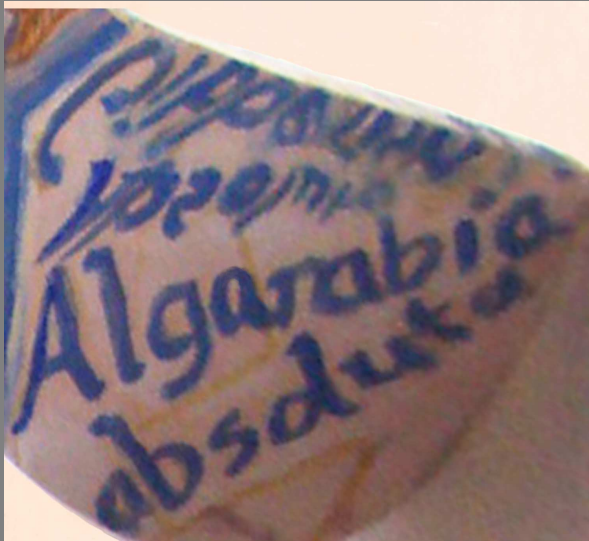
Algarabia absoluta !
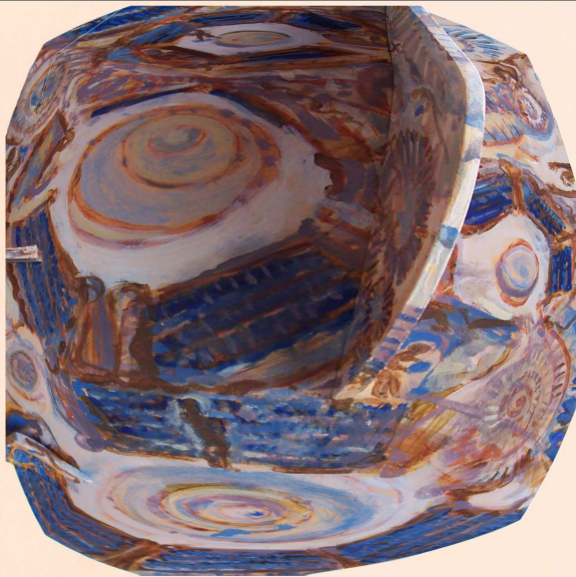
I'm lost in a library
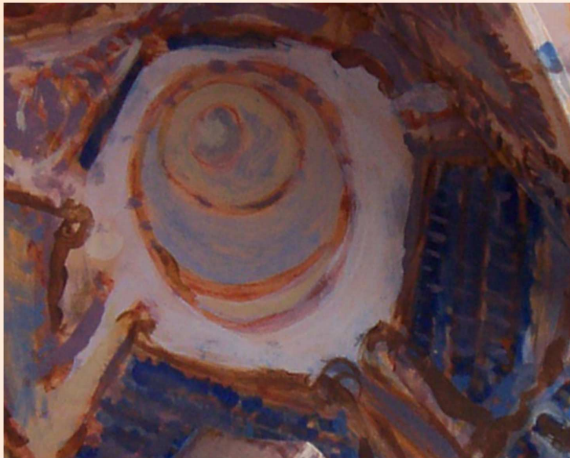
of hexagonal rooms.
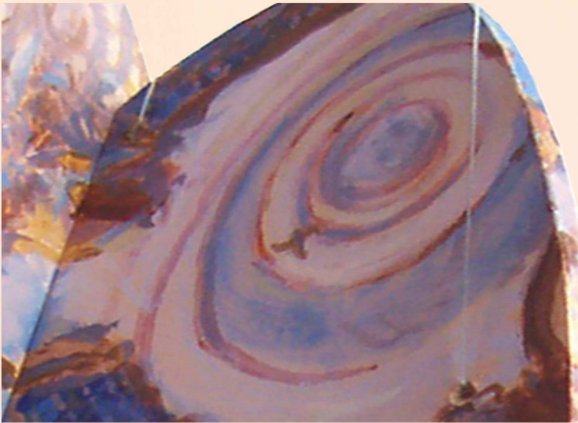
Central air shafts extend

with a book falling

through the room
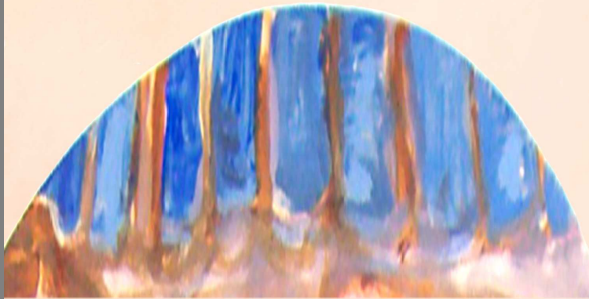
to the room below

and below.

It falls endlessly.

It never comes to a stop.
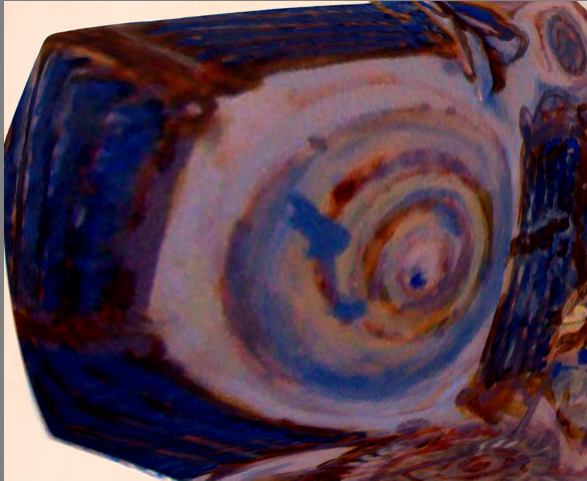
.... I'm lost .....

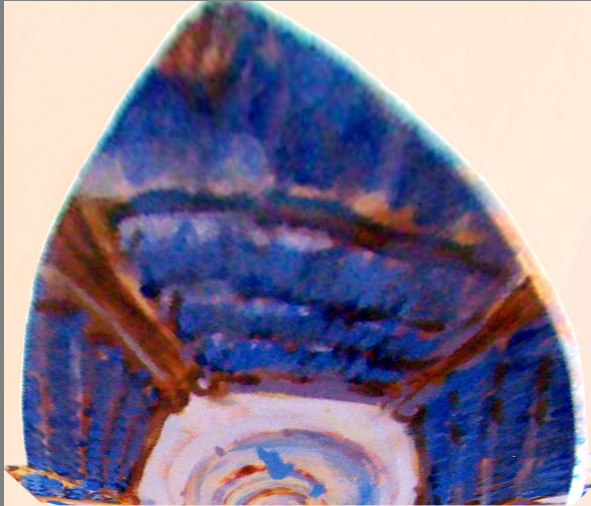Can I find myself in a book?

32 books on a shelf

of a bookcase with 5 shelves

with 4 bookcases per room

quite a manageable 640

books per room.

If I leave this room
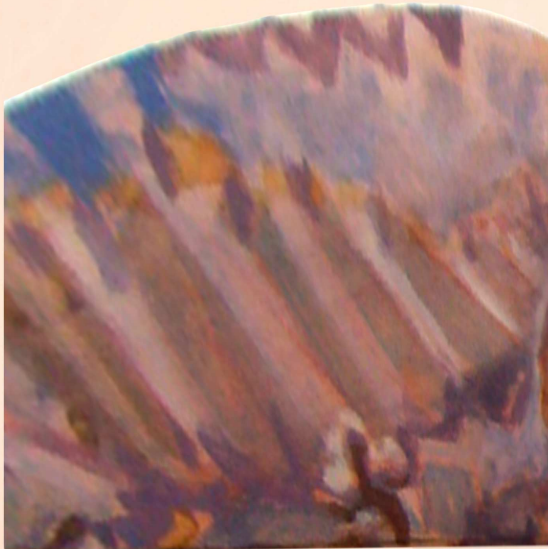
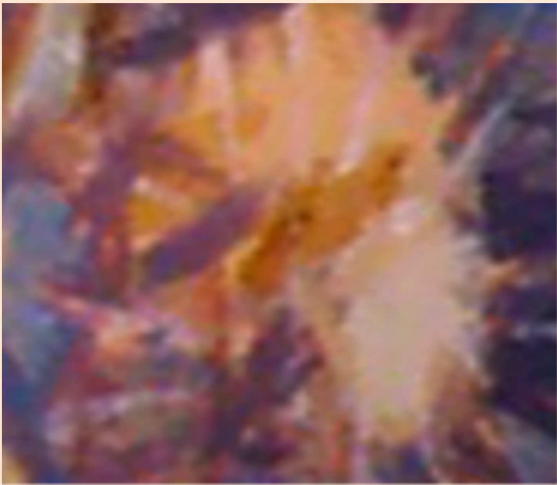to follow a shadow

on the stairs,

I go up,

I go down,

all the same

no direction, no end.

The book will tell me ....

.... but which book?

25 to the 1,312,000th power

books in the library

Which page?

Which word?

Can I find myself in a word

or an extreme number?

The librarian stamps the book

and stamps the next.

He can see the number
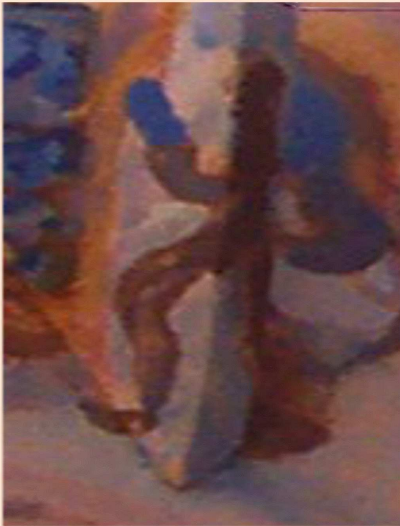
of characters in the universe

Stamp,

stamp,

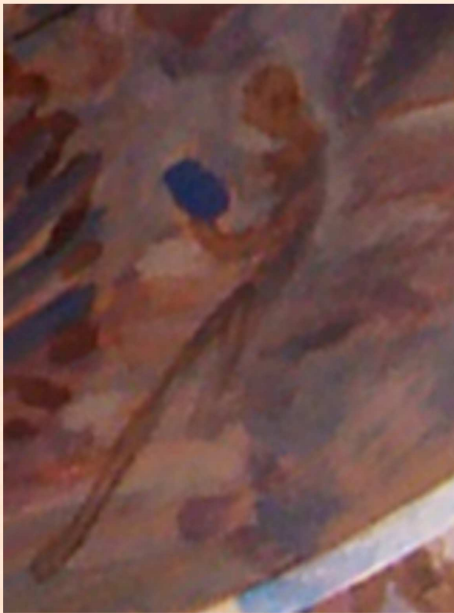stamp.

He's reading on the toilet.

The words go in and out

following the numbers.

He reads

and reads

absolute gibberish.

A Harmonic Sequence: Constructing the Integers Geometrically

Nets of Rationality
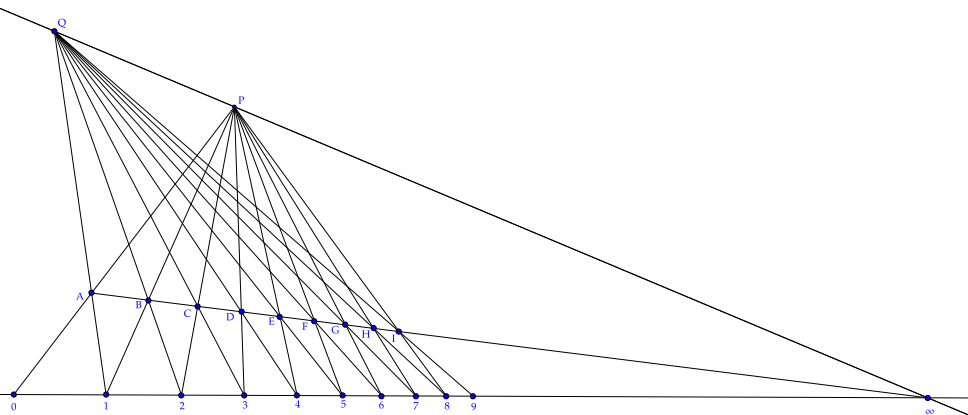
- By adding, multiplying and dividing the points of a harmonic sequence geometrically, any rational number can be constructed.

- By producing another harmonic sequence (which may be metrically incommensurable with the first) on another distinct line and aligning the two lines with a shared point, a planar net of rationality may be developed.

- Repeat again for a "net of rationality" in 3-space.

- Jeannie used such nets to "measure" the space in laying out "Borges' Library of Babel"

Constructing a Pencil of Apollonian Circles

Apollonian Circles in "Borges' Library of Babel"
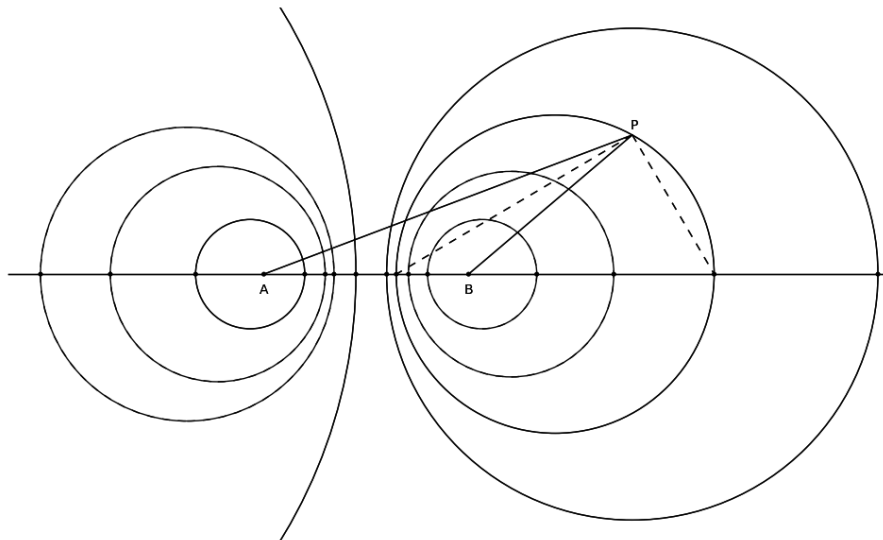
- Apollonian circles are used to represent the layout of the rooms and ventilation shafts in The Library.

Conclusion and Questions

- An artwork is a tool for the imagination.
- Jeannie's "Borges' Library of Babel" and Borges' short story both provide tools for us to imagine the ethereal concepts of the enormous but finite and the infinite and the infinitely periodic suggested at the end of Borges' story and in Bloch's in analysis of "The Grand Pattern".
- Can the concrete incidences in harmonic constructions engage us in imagining the wild abstractions of The Library?
- Can the unknowable, the unimaginable and the ineffable be represented artistically? How can we assemble these points of view?
- How can we get perspective on perspective?

Thank You

Thank You!

Any Questions?

Landing Page for our our work on Harmonic Perspective including our
Bridges 2012 Paper & Presentation:
`http://www.CJFearnley.com/HarmonicPerspective`