

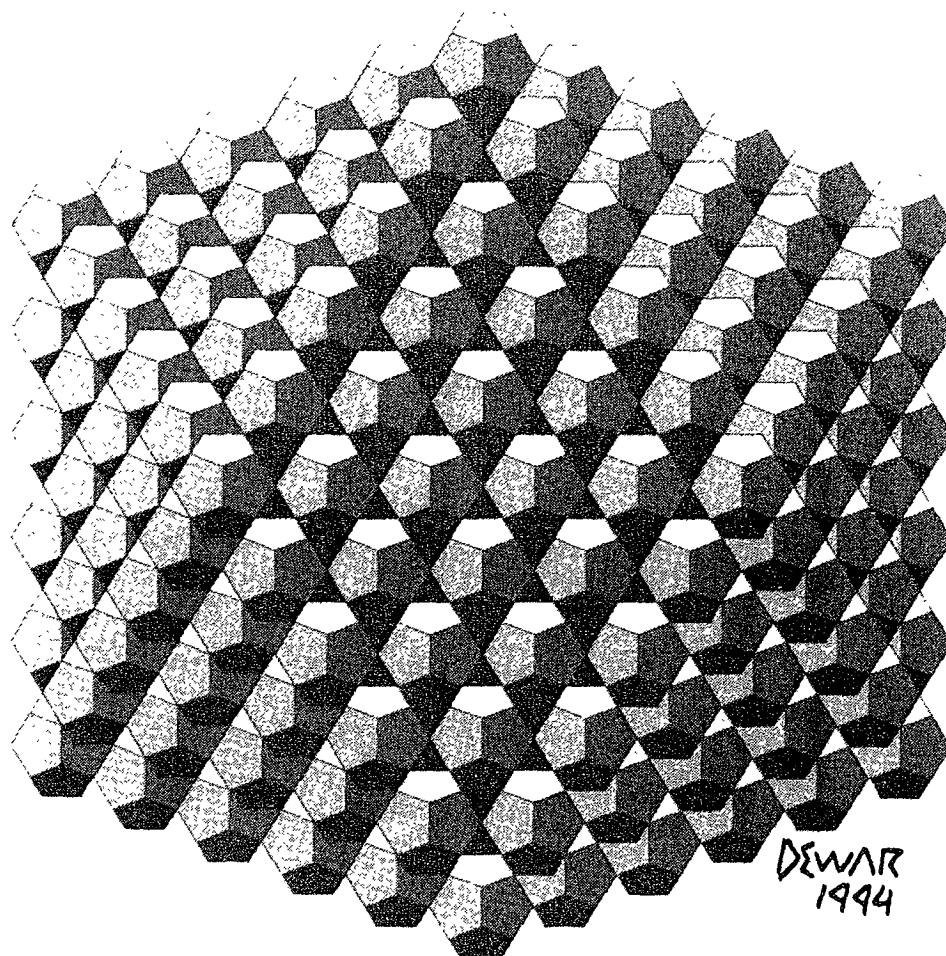
Symmetry: Culture and Science

Symmetry:
Natural and Artificial, 3

The Quarterly of the
International Society for the
Interdisciplinary Study of Symmetry
(ISIS-Symmetry)

Editors:
György Darvas and Dénes Nagy

Volume 6, Number 3, 1995



Third Interdisciplinary Symmetry Congress and Exhibition
Washington, D.C., U.S.A. August 14 - 20, 1995

VISUALLY TRANSFORMING SQUARE ROOT RECTANGLES

Elizabeth Whiteley

3001 Veazey Terrace NW #803

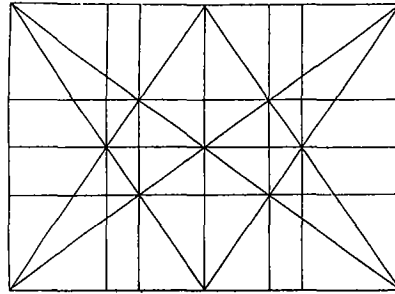
Washington DC 20008-5404 USA

E-mail: whiteley@tmn.com

The subject matter of these paintings, drawings, and sculpture is geometry. The transformations are inspired by the artistic (aesthetic) and mathematical (structural) properties of square root rectangles. Aesthetically, art connects the spiritual and the material worlds. Art links the unseen to the seen; it moves the unfelt to the felt. Structurally, the dynamic symmetry of the square root rectangles serves as an organizing force for the invention and subsequent discovery of spatial orders.

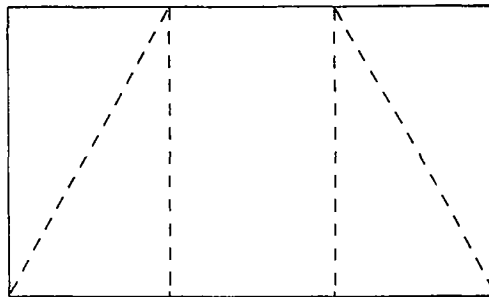
This slide lecture concentrates on $\sqrt{2}$, $\sqrt{3}$, and $\sqrt{5}$. In philosophical geometry they are considered the three sacred roots. It is noted that their "relationships are all that are necessary for the formation of the five regular ('Platonic') solids which are the basis for all volumetric forms" (Lawlor, 1982). Furthermore, "the actual process of studying and understanding the working of a natural design law, opens up a world of new ideas and frees the mind for real creation" (Hambidge, 1967). The design process of these artworks moves from the natural to the man-made.

Part I: Generating A System of Harmonic Decomposition. "The dynamic rectangles, however, can produce the most varied and satisfactory harmonic (consonant, related by symmetry) subdivisions and combinations...by the simple process...of drawing inside the chosen rectangle a diagonal and the perpendicular to it from one of the two remaining vertices and then drawing any network of parallels and perpendiculars to sides and diagonals" (Ghyka, 1977). In this way, a visual border is prepared within which limitless things can occur. The following line drawing illustrates the harmonic decomposition of $\sqrt{2}$.

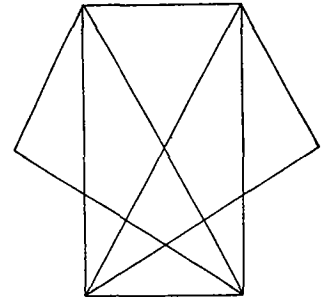


√2 Rectangle 1:1.4142
Harmonic Decomposition: Diagonal/Vertical/Horizontal Network

Part II: Generating Forms and Shapes. The 2-dimensional harmonic decomposition is a map for exploring the 3-dimensional possibilities of the root rectangle area. With much curiosity, I select lines and fold the rectangle along those lines in order to make a distinctive form with which I resonate aesthetically. They are models for the artworks. The following illustration shows the fold lines for √3 and the resulting form drawn as a 2-dimensional shape.



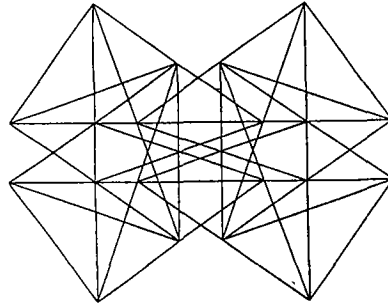
√3 Rectangle 1:1.732
Stage 1: Fold Lines



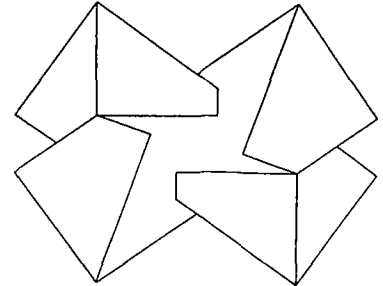
√3 Rectangle
Stage 2: Folded Shape

Part III: Generating Icons. The icon images are initiated by overlaying multiples of the shapes described in Part II in order to invent a more complex shape. Then, I search intuitively, selecting lines until I feel a sense of beauty, completion, and purity about the

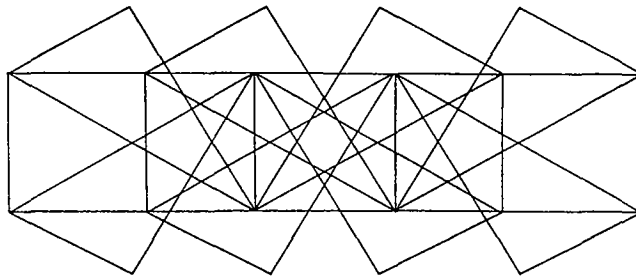
shape. Occasionally, they seem to be anthropomorphic. The following line drawings illustrate the complex drawing stage and a chosen icon for ↓2, ↓3, and ↓5. They are models for the artworks.



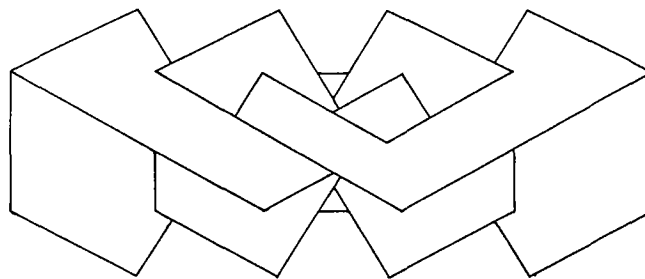
↓2 Rectangle
Stage 1: Complex Drawing



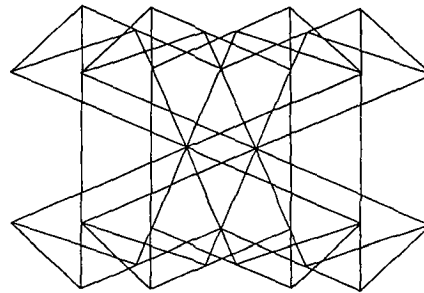
↓2 Rectangle
Stage 2: Icon



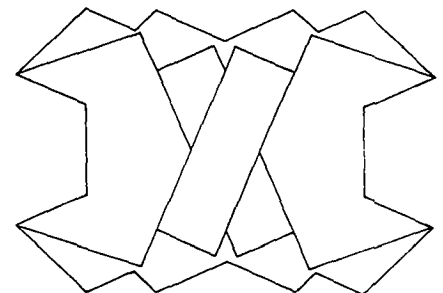
↓3 Rectangle
Stage 1: Complex Drawing



↓3 Rectangle
Stage 2: Icon



√5 Rectangle
Stage 1: Complex Drawing



√5 Rectangle
Stage 2: Icon

In conclusion, these shapes, forms, and icons are the spatial evolutions of their numbers ($\sqrt{2}$, $\sqrt{3}$, and $\sqrt{5}$) processed through their rectangles. They are celebrations of the act of mathematizing. They are material and permanent as works of visual art. With radiant color, they exhibit the technical and the non-technical properties of symmetry. Whether by reflection, rotation, repetition, or bilateral symmetry, they fascinate the eye. They confirm that there is an accessible and underlying visual order in the world.

REFERENCES:

1. Lawlor, Robert. *Sacred Geometry: Philosophy and Practice* (London: Thames and Hudson, 1982) p. 36.
2. Ghyka, Matila. *The Geometry of Art and Life* (New York: Dover, 1977) p. 126.
3. Hambidge, Jay. *The Elements of Dynamic Symmetry* (New York: Dover, 1967) preface.