Polyhedral Tableaux

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Abstract

Polyhedra as subjects for artists working in two-dimensional media — paintings and prints — were something of a rarity in the 20th century. However, in the 15th – 17th centuries, a large number of artists — including Leonardo da Vinci and Albrecht Durer — produced "polyhedral tableaux." Here we present several 20th century artists — little discussed in the mathematics community — who have produced such art works that go far beyond mere illustration.

Introduction

Beginning in the 15th century with the re-discovery of linear perspective, artists incorporated polyhedra and other geometrical objects into their 2D artworks. Sometimes these images were used as illustrations, as were Leonardo da Vinci's designs for Pacioli's "Divine Proportion." Other times the Platonic solids, mazzocchios and other geometrical objects were incorporated by artisans into two-dimensional intarsia, marquetry and mosaics. A splendid overview of these works can be found in the book *Fantastic Geometry* by David Wade [1]. Here we discuss the re-emergence of this genre in the 20th century.

From Uccello to Escher

One of the earliest and most beautiful of these polyhedral tableaux can be found in a mosaic in the floor of St. Mark's Basilica in Venice (Figure 1a). It features the small stellated dodecahedron. The design is attributed to Paolo Uccello, ca. 1425 AD. Maurits Escher incorporated the same figure in his 1952 lithograph "Gravitation." Both are considered works of art, not simply mathematical illustrations.

Figure 1: *(a) Paolo Uccello, mosaic; (b) Maurits Escher, lithograph "Gravitation".*

From Durer to Desmazieres

Perhaps the best known, and most mysterious, mathematical artwork of all time is Durer's 1514 engraving "Melancholia I." It includes a magic square; a sphere; several mathematical and scientific instruments; and a polyhedral object whose identity is still debated. Part of the print is shown in Fig. 2a.

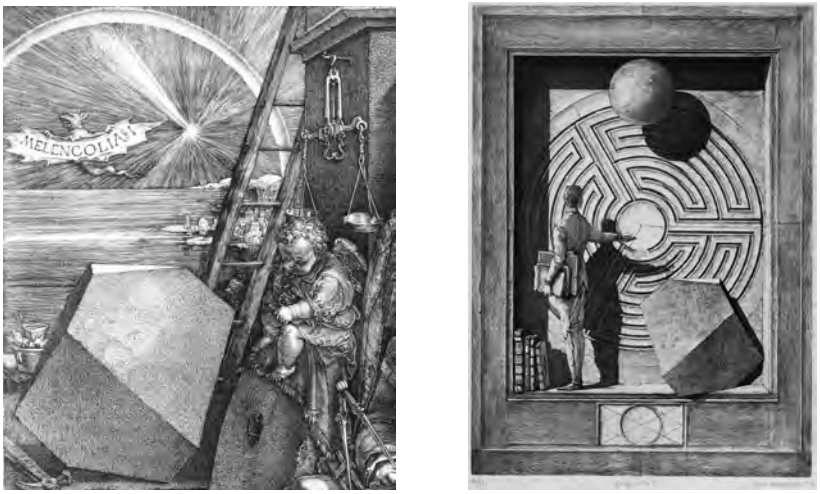


Figure 2: *(a) Albrecht Durer, part of "Melancholia 1";(b) Erik Desmazieres, engraving "Labyrinthe II."*

Erik Desmazieres is a 20th and 21st century artist who should be more widely known to the mathematical community as an engraver of truly extraordinary technical skill. Several of his large-scale engravings are reminiscent of Piranesi's "Carceri" incorporating remarkable linear, as well as curvilinear, perspective views. His 2003 engraving "Labyrinthe II" (Figure 2b) is clearly an homage to Durer. Its message is open to a variety of interpretations. What both of these engravings demonstrate is that the inclusion of polyhedra can lead to novel artistic and intellectual statements beyond the mathematics alone.

From Jamnitzer, Stoer and Lencker to Neitzert

Wenzel Jamnitzer, Lorenz Stoer and Hans Lencker were the best-known early practitioners of "fantastic geometry." Jamnitzer was a goldsmith, print maker and etcher who lived in Nuremberg from 1508 to 1585. He is most remembered for his book *Perspectiva Corporum Regularum* that contains 120 polyhedral forms based on the Platonic solids. That book, originally published in 1568, was reprinted [2] in 1964 with an expansive preface by the 20th century artist Albert Flocon (see below).

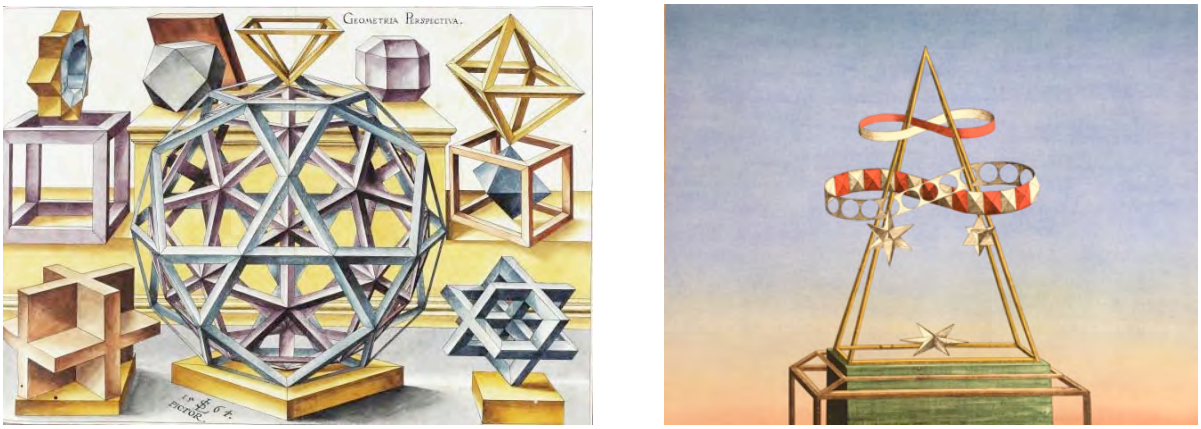


Figure 3: *(a) Lorenz Stoer, hand-colored engraving; (b) Jorg Neitzert, "Obelisque", ink/gouache/collage.*

Hans Lencker published his book *Perspectiva Literaria* in 1571 showing his mastery of perspective by using both letters and polyhedra. Lorenz Stoer published a remarkably modern, almost surreal, series of 10 engravings in his 1567 book *Geometria et Perspectiva*. He also produced two other sets of hand colored engravings. The 20th century artist Jorg Neitzert did a series of what might be called homages to several of these early masters. A comparison of old and new polyhedral tableaux is shown in Figure 3.

Albert Flocon

Albert Flocon was a master of engraving as well as an academic professor and author. He has been called the French Escher by some art critics and, in fact, they knew each other and influenced each other's work. Flocon wrote an important book on curvilinear perspective [3], and "illustrated" works of poetry and philosophy with engravings of images that include polyhedra, knots and other geometrical figures.

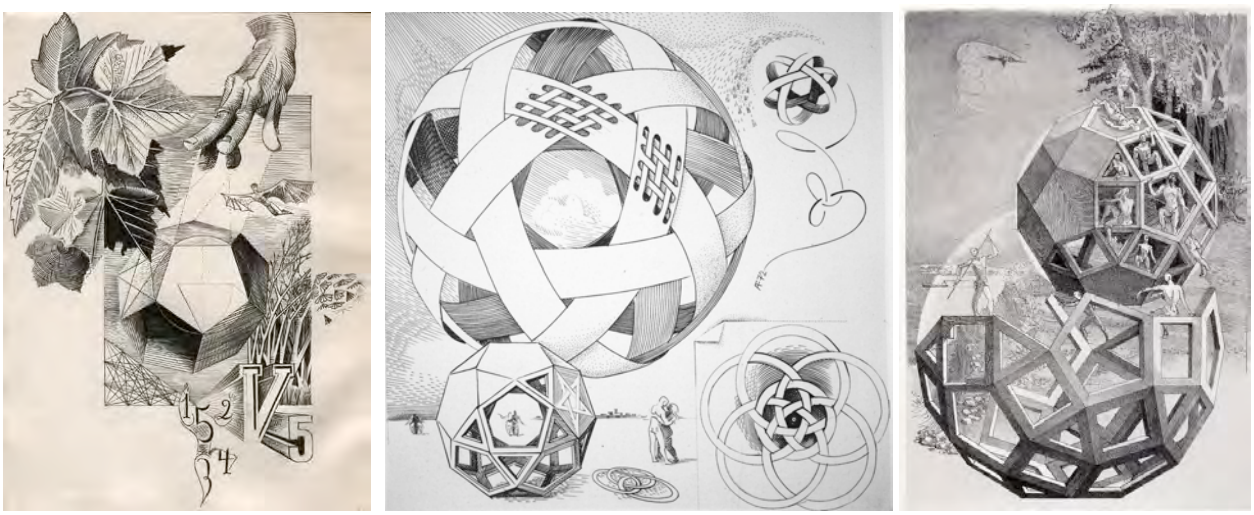
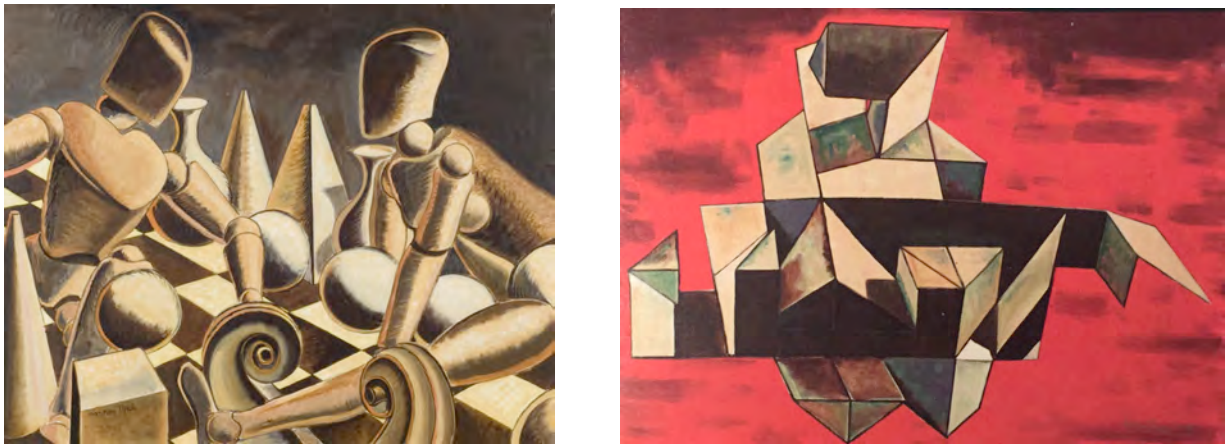


Figure 4: *Albert Flocon, book engravings from (a)"Traite du Burin", (b)"Entrelacs" & (c) "En Corps".*

Man Ray

The great American polymath (painter, photographer, print maker) Man Ray was first introduced to the world of mathematical models with a visit to the Institute Henri Poincare in Paris in the 1930s. These objects appeared in a variety of his works, most prominently in his 1940s "Shakespearean Equations" [4].



Figures 5: *May Ray: (a) "Endgame", oil on canvas; (b) "The Tempest", oil on canvas.*

Mario Logli

The appearance of polyhedra in wood intarsia probably reached its peak in the 16th century Studiolo in the Palazzo Ducale in Urbino, Italy – the hometown of 20th century Italian artist Mario Logli [5]. In his polyhedral tableaux, he has portrayed the look of a mystical Urbino filled with a variety of polyhedra.

Figure 6: *Mario Logli, selected lithographs of landscapes and buildings that include polyhedra.*

Donmoyer, Orosz, Peticov … and a 21st Century Question

I am aware of other artists working today, such as Sylvie Donmoyer, Istvan Orosz and Antonio Peticov, who are producing imaginative two-dimensional artworks that contain polyhedra (Figure 7). Are there yet more artists creating such polyhedral tableaux at the present time? I, for one, would like to learn of them.

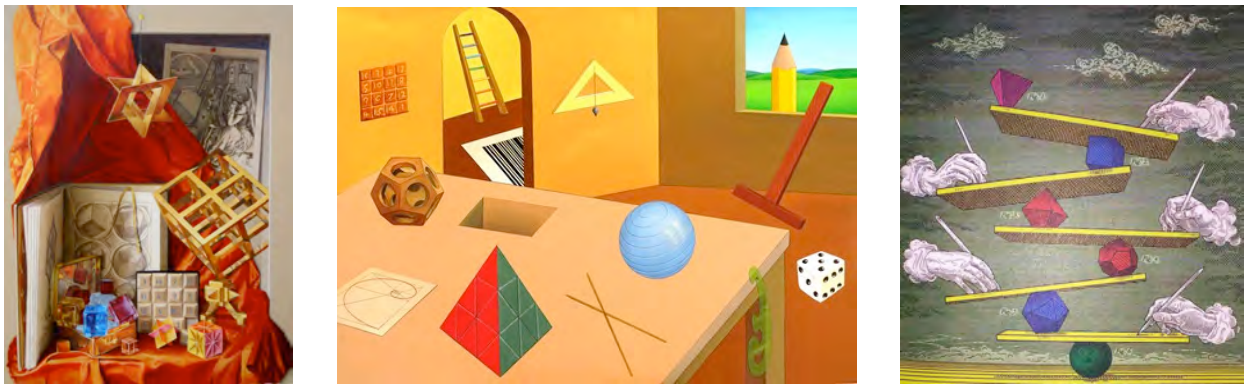


Figure 7: *(a) Sylvie Donmoyer, "Still Life With Magic Square", oil on canvas; (b) Antonio Peticov, "New Building", acrylic on canvas; (c) Istvan Orosz, "Science and Art", silkscreen.*

Acknowledgments

I thank Istvan Orosz, Antonio Peticov and Erik Desmazieres for verbal discussions about their art. I also had an interesting written correspondence with Jorg Neitzert about his geometrical prints.

References

[1] D. Wade, *Fantastic Geometry*, Squeeze Press, London, 2012.
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