Anamorphic, Kaleidoscopic and Sculptural Mirror Reflections

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Abstract

Many mirror systems, including tapered mirror kaleidoscopes, cylindrical anamorphoscopes and sculptures with mirrored surfaces produce surprisingly realistic looking "objects" such as seemingly three dimensional spheres and complex stellated polyhedra. We will discuss reflections from various mirror systems that combine art, science and mathematics and which raise thought provoking questions about the nature of "reality".

Virtual Images from Real Mirrors

Einstein reportedly remarked "reality is merely an illusion, albeit a very persistent one". If the term "visual illusions" refers to visual phenomena only partly produced by the external world, then mirrors are sources of some of the most remarkable visual illusions. Art works such as Lucas Samaras's "Mirrored Room" in Buffalo, New York and Anish Kapoor's mirrored sculpture "Cloud Gate" in Chicago, Illinois (Fig. 1) are large-scale mirror systems that certainly provide illusory (or at least highly unusual) vistas.

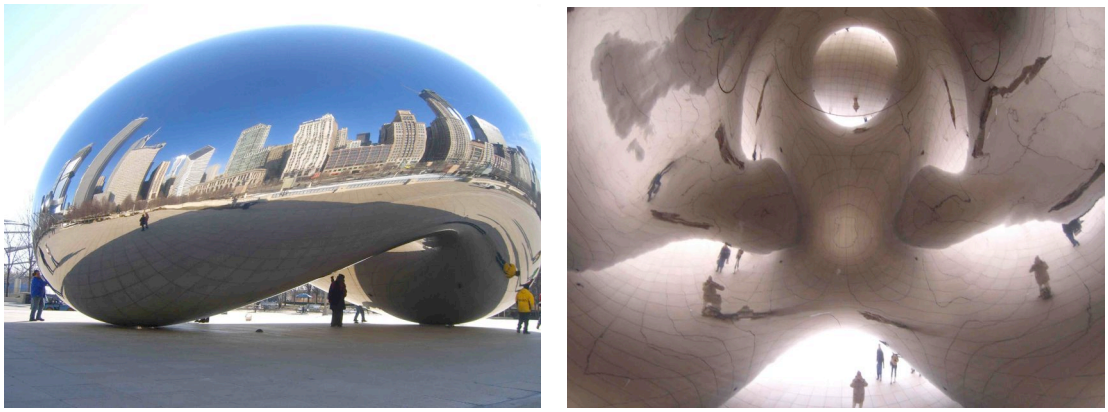

Figure 1: *Photographs of reflections taken from outside and beneath Anish Kapoor's "Cloud Gate".*

Much of the impact of these striking mirror systems arises from the fact that the worlds they present to the human observer cannot be explored simultaneously by both touch and vision. In the "real world", haptic and visual phenomena are almost always concordant.

A variety of mirrored devices produce surprisingly realistic looking 3D "objects" in this non-tactile visual sense. For example, a tapered plane mirror kaleidoscope can elicit in a viewer a strong percept of a fully 3D sphere, or of a more complex "object" such as a stellated polyhedron that is, in fact, only a "virtual" image (Fig. 2). (By comparison, parabolic mirror systems produce "real", not "virtual", images.)

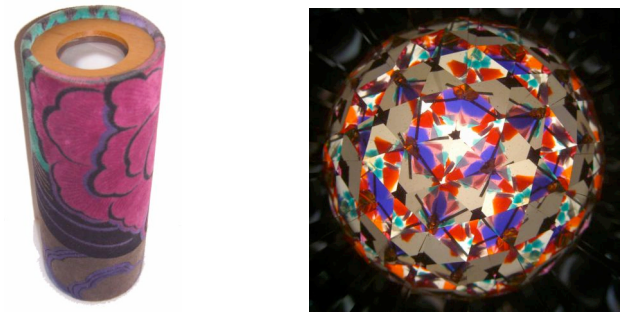

Figure 2: *Tapered mirror kaleidoscope designed by Craig Huber with an image that it produces.*

Designer Gary Allison uses flat mirrors to cover the interior surfaces of each of the regular Platonic solids. The inclusion of small holes for light and viewing results in what he calls a "holoscope" (Fig. 3).

Figure 3: *Holoscope by Gary Allison and its interior image that appears to extend to infinity.*

Cylindrical mirrors can create very realistic virtual 3D images. I produced the photograph shown below (Fig. 4) by first photographing a chess piece and then making an anamorphic projection from that image.

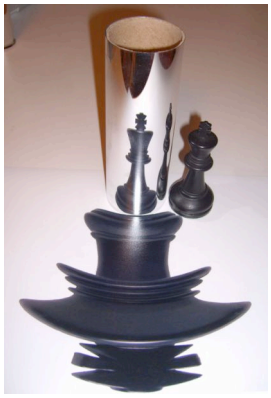

Figure 4: *A real chess piece (back right), its anamorphic projection (front) and its virtual image (center).*

Do these mirror systems combining both art and mathematics produce only "illusions"? Perhaps. But they are wonderfully persistent at mimicking reality, which, according to Einstein, is only an illusion anyway.

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