

Anamorphosis.com: Computers, Mathematics and Art

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Abstract

This paper will comment on the development over a period of several years of an exhibition, website and software application based on the ideas and history of anamorphosis – the technique of creating distorted images according to the mathematical rules of perspective and mirror reflection. I will review some of the goals of the project in developing connections between mathematics and art through the use of computers.

My interest in exploring the connections between art and mathematics stems mainly from an educational point of view. I'm basically interested in the idea of making mathematics a more accessible subject for "ordinary people". Since ancient times, mathematics has sustained a reputation for being "unreachable". I believe this situation is now changing; my own interests in mathematics have always been expressed through computer software, and I think that this can be a means of access for everyone.

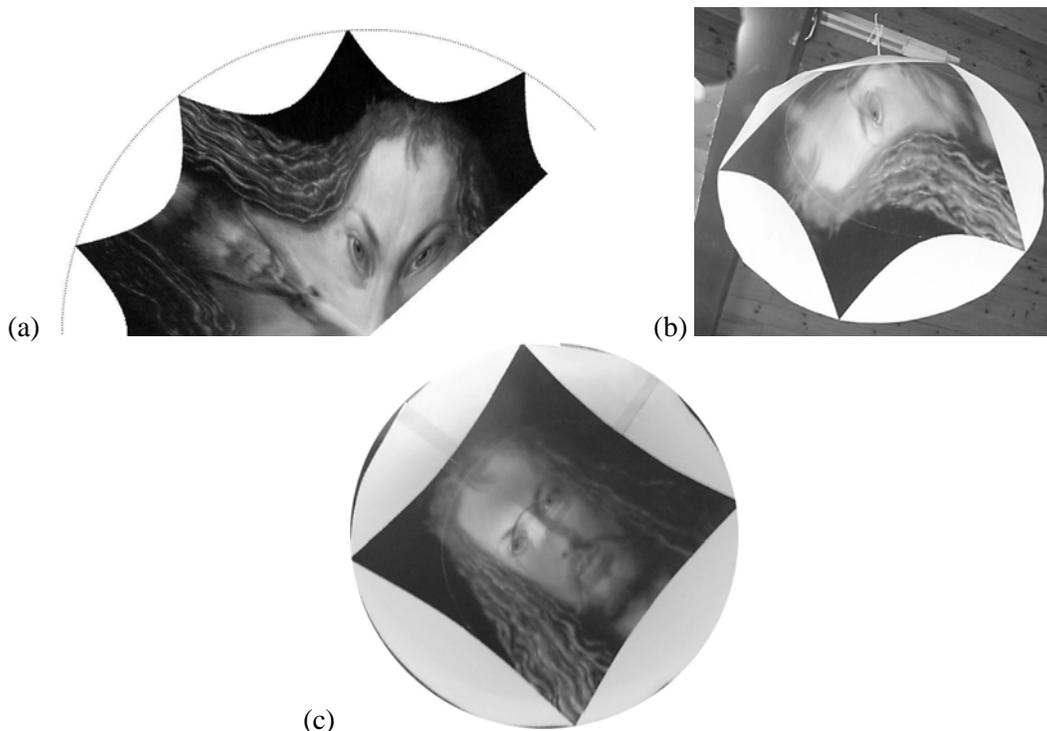
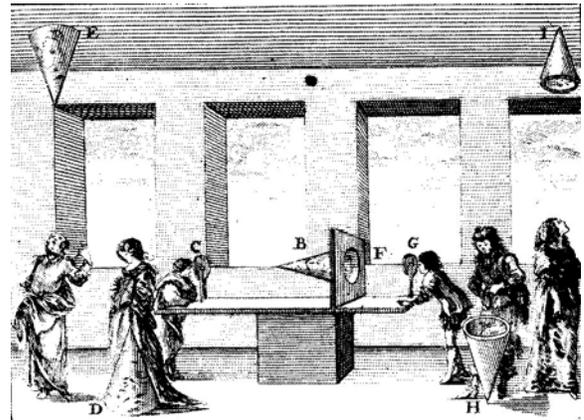


Figure: Conical projection anamorphosis of Dürer's self-portrait, generated by the software "Anamorph Me!". (a) a print-out of the anamorphosis ready to be rolled into a cone; (b) viewing the image inside the cone from a wrong position; (c) viewing the image from the right position to "decode" it.

I enjoy mathematical art, including computer-generated pieces, but let me emphasize that my intention with this anamorphosis project is not on the side of producing “art” for consumption by others. Rather I would like to stimulate as many people as possible to be producers themselves, and thus create at the very least a spark of interest in the underlying mathematics – whilst accepting that only a fraction of people will wish to pursue that interest in mathematics.

Anamorphosis is concerned with the creation of distorted images according to the mathematical rules of perspective and mirror reflection. The distinctive thing about an anamorphosis (that is, the distorted image), which contrasts it with *trompe l’oeil*, is that the undistorted form of the image must be recovered by looking at the image from an unusual or surprising location, or using an unusual shape of mirror (cylindrical, conical). For example, in the figure above are three views of one of Dürer’s self-portraits, “anamorphosed” by a software package that I wrote, *Anamorph Me!*

I have used anamorphosis as the basis for an ongoing project, “Art of Anamorphosis”, which took physical form as an exhibition held in the United Kingdom in 2001, and since then it has continued in virtual form as a website [www.anamorphosis.com] and software application.



The idea for an exhibition was particularly inspired by the delightful engravings of Jean Du Breuil created in the 1640s (*see example on right*), showing “cabinets of anamorphoses” in which curious viewers inspect the contents of rooms filled with anamorphic objects. I particularly tried to imitate the use of *large* objects suspended from walls and ceilings (the Dürer cone illustrated above was about 80cm tall) since these allow the viewer to truly walk around them and experience different perceptions of the objects.

A guiding design principle was that the exhibition should not force attention on the mathematics of anamorphosis, but rather that should be one of the aspects that a visitor might wish to pursue. Then the website, along with printed materials, should open up some of the various directions for further investigation. Anamorphosis is a particular rich topic for this because its mathematical history, as part of the development of perspective, intertwines with the development of art, science and society between the Renaissance period and the nineteenth century.

It is remarkable to reflect how the internet has revolutionized the possibility of access to information. Previously scholarly knowledge, lurking in the confines of academic institutions is increasingly available directly on the internet or via a rapid e-mail exchange with an author. Yet mathematics is not essentially knowledge of this kind, since it must be used and worked on to be meaningful. Symbolic manipulation with algebra is central to the traditional mathematical approach, and it has for long been the major stumbling block for most people’s access to mathematical ideas.

The computer opens up new possibilities for the manipulation of symbols. *Anamorph Me!* takes only the first step, in making algorithms for anamorphosis more usable for manipulating images; it does not try to open up the mathematical ideas, to deal with the manipulation of symbols (this idea is still to be developed). But the first step is powerful – it allowed people visiting the exhibition, and later on visitors to the website, to *make* anamorphic art for themselves, and thus progress from consumption to creation, and hopefully, a certain amount of mathematical thinking for themselves.

References: for readings and further information, please visit www.anamorphosis.com