Mathematics and Art: Mathematical Visualization in Art and Education
by Claude P. Bruter (Ed.)
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Reviewed by Helmer Aslaksen

I'm convinced the title of this book will intrigue most readers of the Mathematical Intelligencer. When you look at the list of contributors and see names like Michele Emmer, Michael Field, George W. Hart, John Hubbard, Richard S. Palais, Konrad Polthier and John Sullivan (to name but a few in alphabetical order), I'm sure you will be even more interested. The book is the proceedings of the Colloquium on Mathematics and Art held in Maubeuge in September 2000, and as soon as I opened the book, I started wishing I had been there. It must have been a killer conference! But does that make for a killer conference proceedings?

Mathematics and Art is a very wide term. My background involves teaching a course on Mathematics in Art and Architecture at the National University of Singapore, consulting for an exhibition called "Art Figures: Mathematics in Art" at the Singapore Art Museum, and numerous TV interviews and public lectures at museums, libraries and schools.

I personally like to subdivide discussion of mathematics and art into the following four rough categories.

- Mathematics in art
- Mathematical art
- Mathematics as art
- Mathematics is art

"Mathematics in art" refers to topics like perspective in paintings, symmetry in ornamental art and musical scales. This is material that even the most anti-scientific artist theorist will recognize. You can approach virtually any art museum with an offer of a public lecture on such topics and be confident of a good turnout.

"Mathematical art" includes the works of Escher and other mathematically inclined artists, who while being worshiped by mathematicians are sometimes frowned upon or ignored by the art community. When I was working on the exhibition at the Singapore Art Museum, I had to conform to a strict "no Escher" policy. An offer to an art museum of a public lecture about Escher may not necessarily be accepted.

"Mathematics as art" refers to visual mathematics. With the advent of computer graphics, mathematicians have been able to create stunning graphics. Yet how many art museums would be interested in a public lecture about the Mandelbrot set?

"Mathematics is art" refers to the view held by many mathematicians that mathematics is an art, not a science. However, few art theorists share this view.

This classification is of course very subjective and reflects my own views and experiences. At the same time, I hope it may serve as a possible frame of reference for your expectations when picking up this book.

How many proceedings from conferences that you did not attend do you have on your bookshelf? I think it's only fair to say that many of the articles in the book are not easy reading. If you are planning to teach a course on mathematics in art for first year general students, then I'm afraid you will not find many articles that you can use directly. The article on "The Mathematics of Tuning Musical Instruments — a Simple Toolkit for Experiments" by Erich Neuwirth is one of the exceptions.

The word "education" appears in the subtitle, but I'm left with a feeling that some of the authors feel that as soon as you have a couple of pictures, it is "educational". Fortunately, Michael Field and Ronnie Brown wrote about their experiences in teaching undergraduate classes.

In the interesting article "Mathematics and Art: The Film Series", Michele Emmer says: "If it is almost impossible to describe a film using words, it is good, because it means that the film has been made really using a visual technique, mixing, images, sounds, music in an essential and possibly unique way." By the same token, a good lecture on mathematics and art may not translate into a good article. Many of the articles are written by people I admire deeply, who are excellent speakers and have wonderful web pages. Yet I sometimes do not get much out of their articles in this book.

I must also confess that at times I have problems with the writing style.

On page 1 of the book, it says: "One of the reasons, the main one to my eyes, which solders the arts to mathematics is probably the following: the tangible object, the living being, are not only present in space, and are evolving in space, but are moreover highly elaborated construction, obtained from the unfolding of the properties of the primordial space." I don't like it when I'm "dead on arrival" on page 1 of a book, and when on page 9 of the opening article it says: "From there results that the acquisition of the knowledge and the formation of the spirit, which have a phylogenesis, deserve to be conceived according to a process of ontogenesis which respects this phylogenesis", I went into a shell-shock that I never fully recovered from.

One article is about the ARPAM project. What is the ARPAM project? Good question! The 15 page article does not explain the acronym "Association pour la Réalisation et la Gestion du Parc de Promenade et d'Activités Mathématiques". After reading the article, it was unclear to me whether this was just a plan or whether the parks actually existed.

The articles follow the order of the talks at the conference. I think the book would have been more useful if for instance the three articles on music had been grouped together. There are also no biographies of the authors.

There are 57 pages of color plates at the end. Almost all of them appear in the main text in black and white. I must confess that I am color-blind, so my view may be biased, but for many of them I did not see a compelling reason to duplicate them in color. With all due respect to the late Fred Almgren, do we need to see a color picture of him in addition to the black and white picture in the text? Do the pictures from Bruce Hunt's excellent article "A Gallery of Algebraic Surfaces" look so much better in two colors than in black and white? And unfortunately, the color pictures from Maria Dedo's excellent article on "Machines for Building Symmetry" did not appear in the main text at all. I think the color pictures would have been more effective if they had been selected more carefully and that it was indicated clearly which of the black and white pictures had color versions in the back.

The conference must have been spectacular, and the proceedings contain a number of excellent articles that deserved better editing, both in terms of the writing style of the individual articles and the overall organization of the book.

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