One-Cut Magic
things you can do with paper

Respect to Martin Gardner

...and my maths teacher Mr Malcolm Quinn

costel.harnasz@gmail.com

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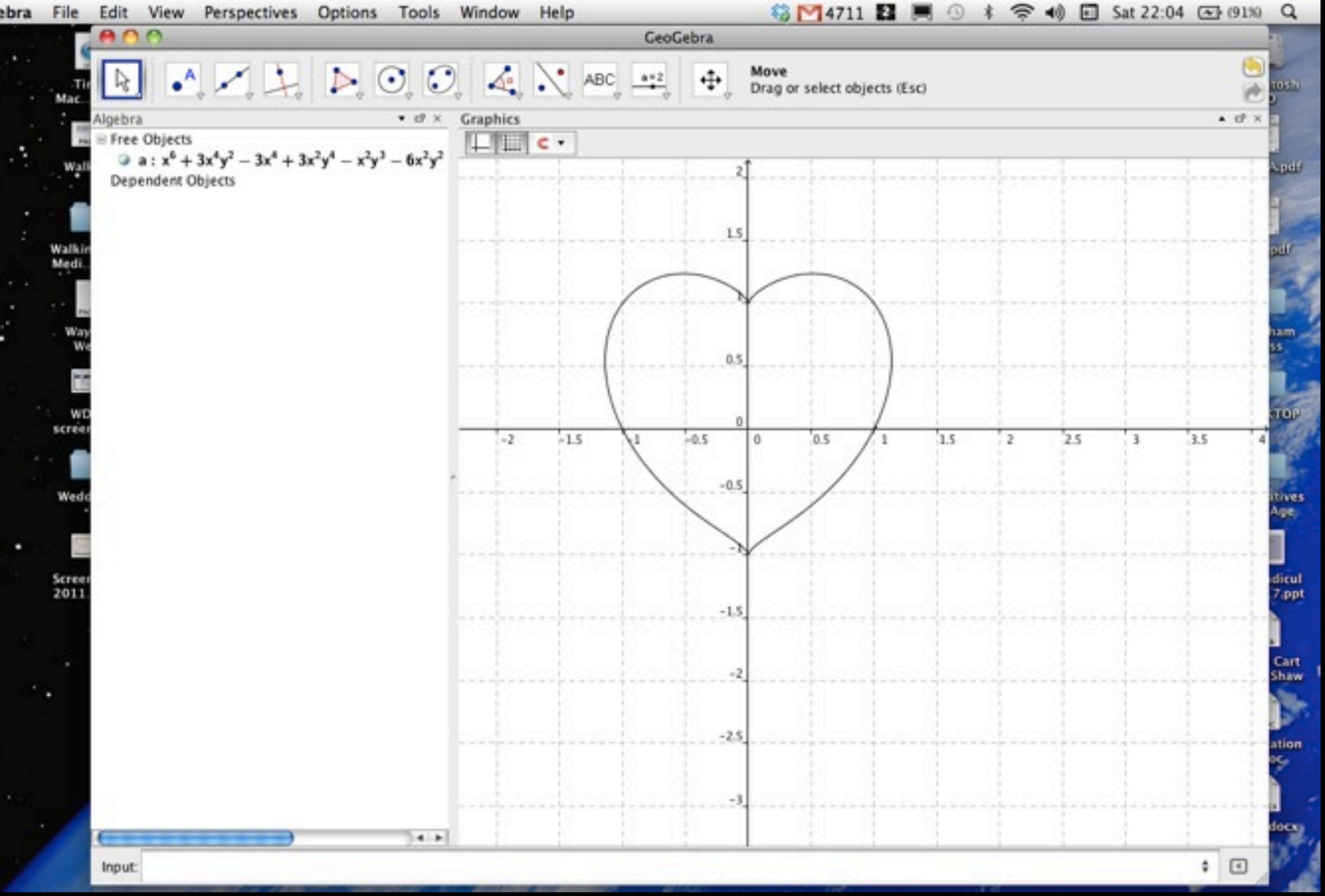
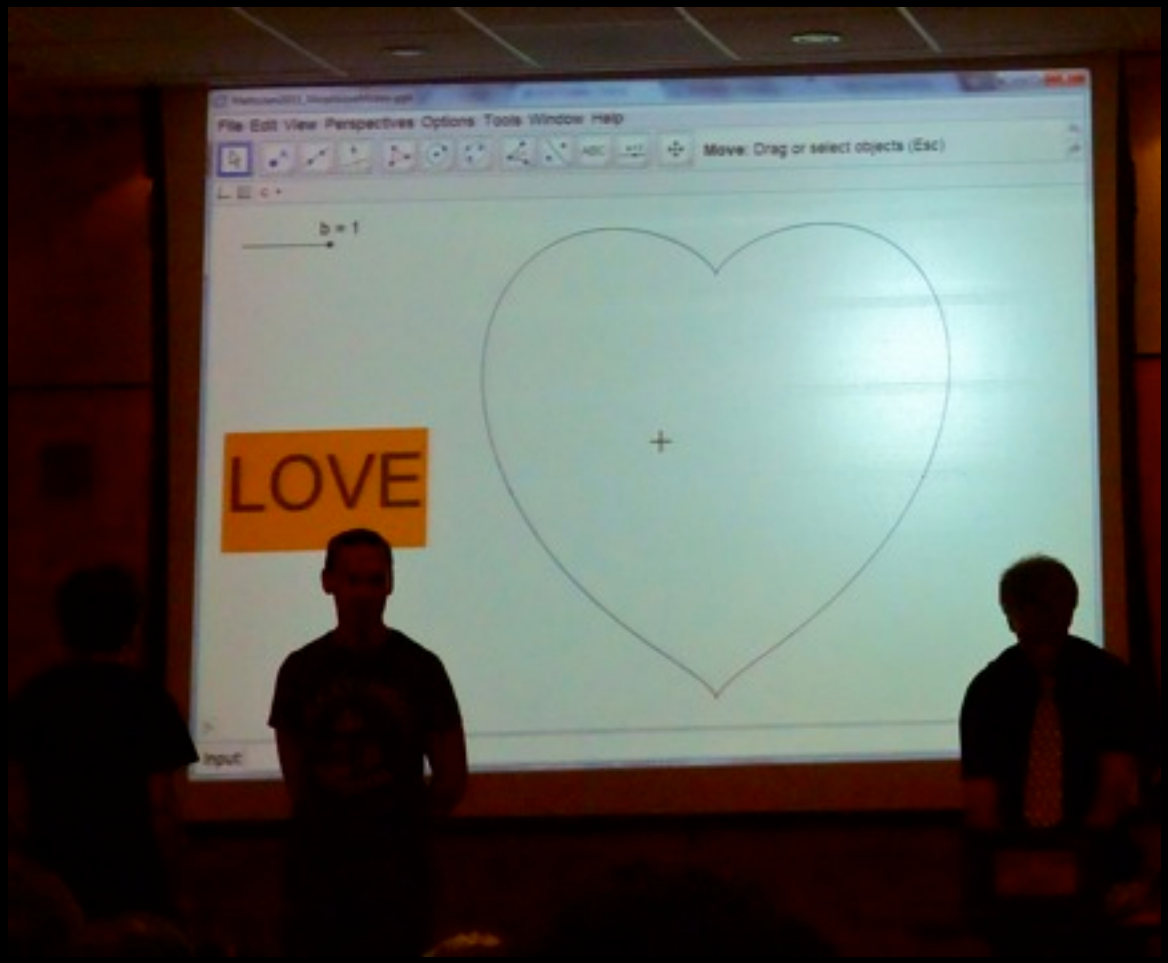
^ ^

Mum Romanian Dad Polish


$x^2+(y-\sqrt[3]{x^2})^2=1$
Rufus


File Edit View Perspectives Options Tools Window Help
Sat 22:04
GeoGebra
Move
Drag or select objects (Esc)
Algebra
Free Objects
a : x^6 + 3x^4y^2 − 3x^4 + 3x^2y^4 − x^2y^3 − 6x^2y^2
Dependent Objects
Graphics
Input:


File Edit View Perspectives Options Tools Window Help
Move: Drag or select objects (Esc)
b = 1
LOVE
Input: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SIGMA XI

Recreational Computing

Erik D. Demaine

MARTIN GARDNER was a great man of many talents. He was an amateur mathematician, a puzzler, a professional magician, a debunker of pseudoscience, and a popular writer about all of these topics. He wrote more than 65 books and published a column, "Mathematical Games," in *Scientific American* for 25 years, from 1957 to 1982. Because of his influence on countless readers, Gardner became known as the father of "recreational mathematics"—playful mathematical problems designed and solved purely for fun. Gardner's accessible, inviting prose and his ability to correspond with impressive numbers of readers gave the general public the opportunity to enjoy mathematics and to participate in mathematical research. Many of today's mathematicians, including myself, entered the field at least in part due to Gardner's influence.

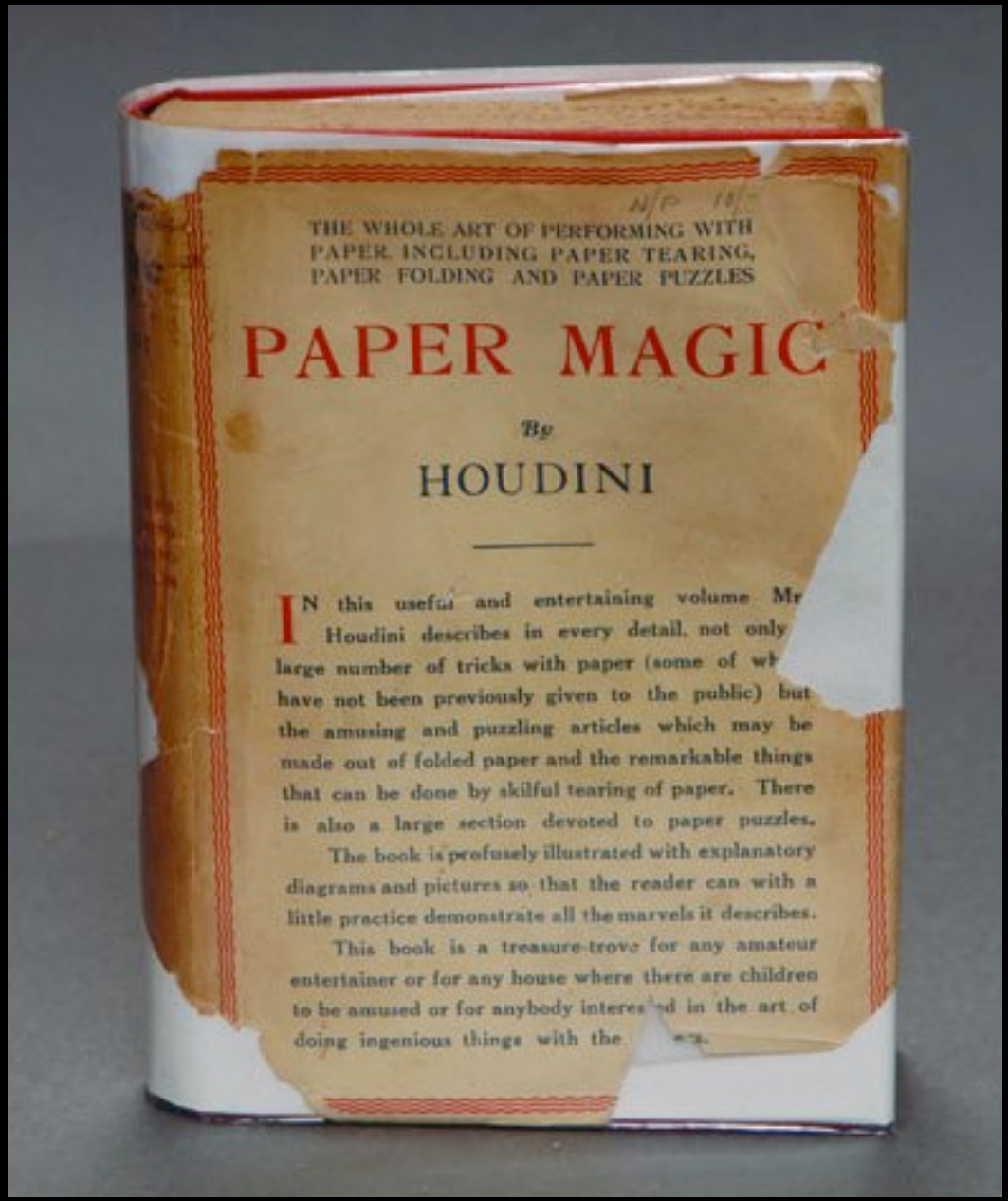
Puzzles and tricks from Martin Gardner inspire math and science

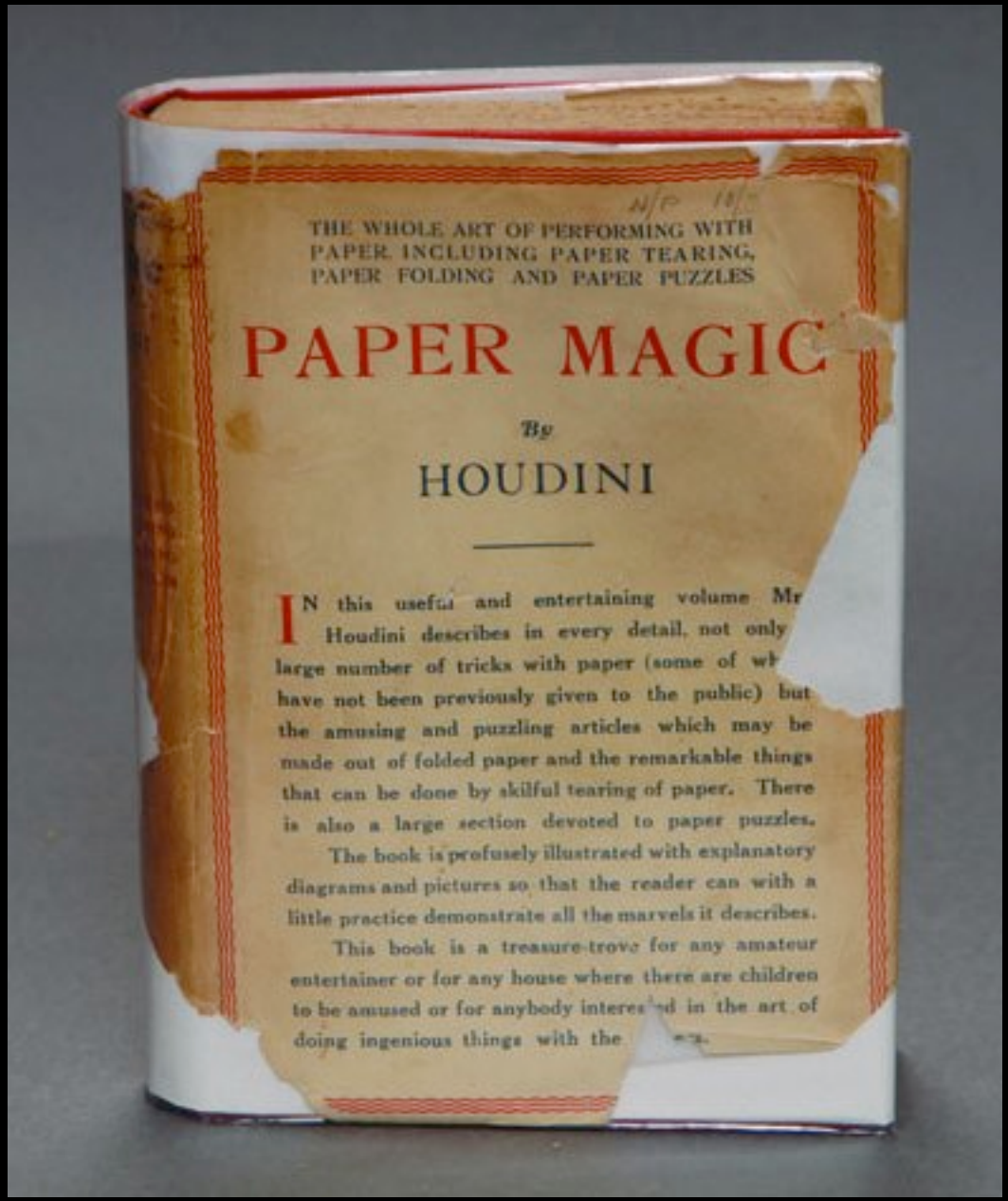
I am a theoretical computer scientist, which puts me at the boundary of computer science and mathematics. The goal of the field is to use mathematics to understand computation—what it is and what it can do. Readers of this column already know that computation is extremely powerful, offering new perspectives, approaches and solutions in perhaps every discipline. lenges and tricks automatically. Voilà, recreational computer science!

Gardner's work continues to influence researchers such as myself. The three examples I'll describe are solutions to problems that Gardner posed—ones he stated explicitly or ones that have been inferred from his work. Throughout Gardner's writings are countless mathematical questions, puzzles and magic tricks that deserve further research and extension. I encourage everyone to read through his collected works, for the fun this always brings, as well as to help find these seeds for future research. I will collect your suggestions, which you can send to martingardner@csail.mit.edu. Long live the spirit of Martin Gardner!

One-Cut Magic

Our first example of recreational computer science is inspired by a magic


THE WHOLE ART OF PERFORMING WITH PAPER INCLUDING PAPER TEARING, PAPER FOLDING AND PAPER PUZZLES
PAPER MAGIC
By
HOUDINI
IN this useful and entertaining volume Mr Houdini describes in every detail, not only large number of tricks with paper (some of wh have not been previously given to the public) but the amusing and puzzling articles which may be made out of folded paper and the remarkable things that can be done by skilful tearing of paper. There is also a large section devoted to paper puzzles.
The book is profusely illustrated with explanatory diagrams and pictures so that the reader can with a little practice demonstrate all the marvels it describes.
This book is a treasure-trove for any amateur entertainer or for any house where there are children to be amused or for anybody interested in the art of doing ingenious things with the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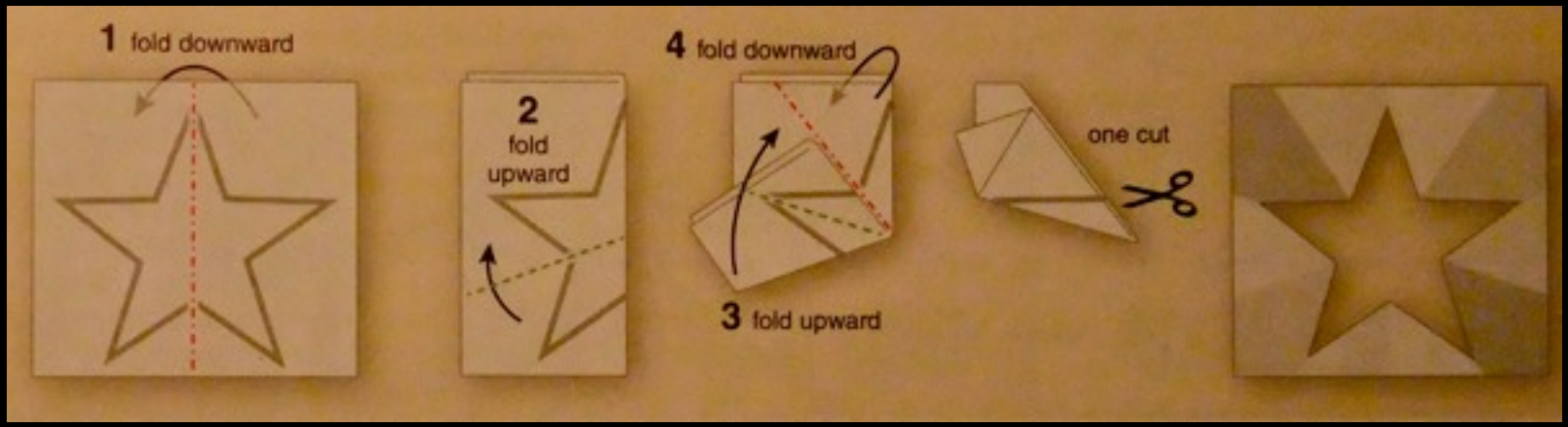
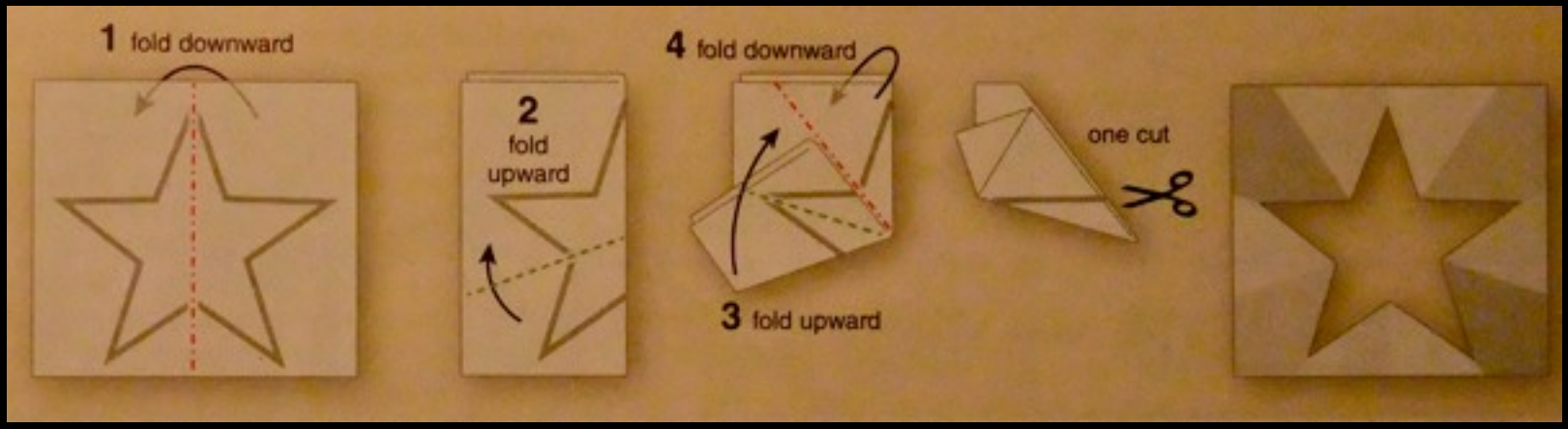
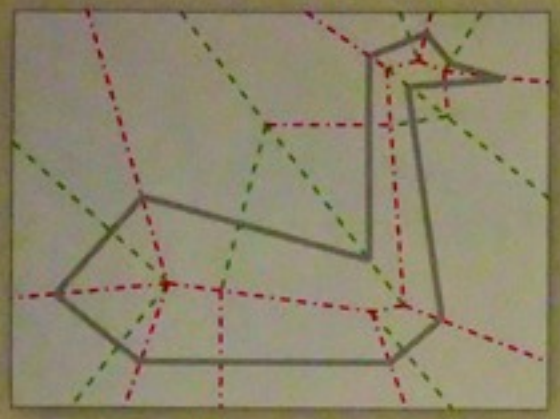
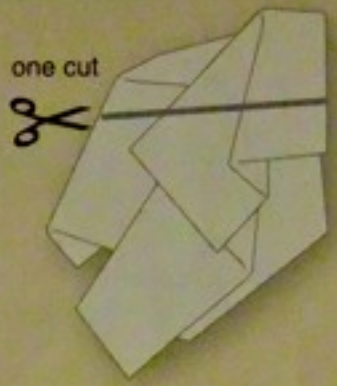
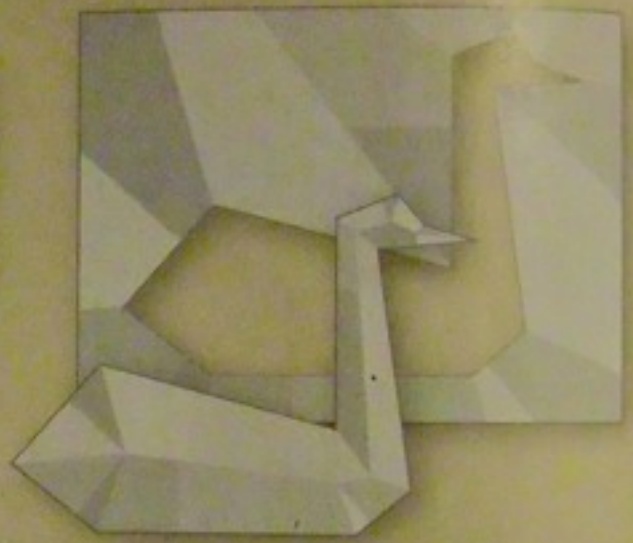

1 fold downward
2 fold upward
4 fold downward
3 fold upward
one cut



"More complicated designs…present formidable problems."







fold upward fold downward

The fold-and-one-cut method can be used to produce shapes of theoretically limitless complexity. One such shape is a swan, with fold lines as indicated at left, leading to the collapsed paper with one cut line at center, and resulting in the final figure at right. To download and print this example, go to http://amsci.org/swan.pdf. For other examples, see the website http://erikdemaine.org/foldcut/.

THE ELEMENTS
OF GEOMETRIE
of the most aunci-
ent Philosopher
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of Megara.

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With a very fruitfull Preface made by M. I. Dee,
[illegible]

Imprinted at London by John Daye.

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1613

Faithfully (now first) translated into the Englishe toung, by

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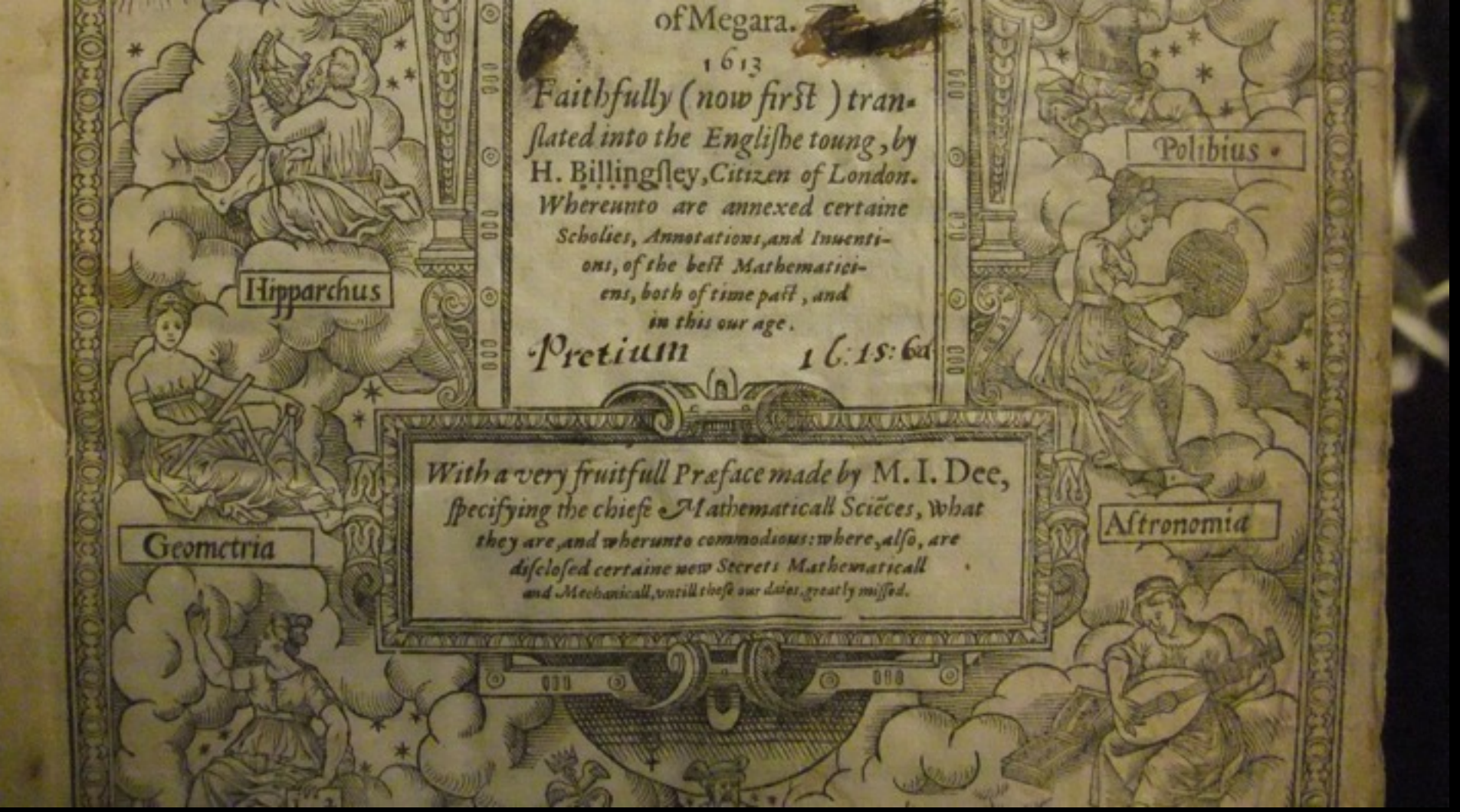

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Hipparchus

Polibius

Geometria

Astronomia

Musica

Arithmetica

IB. F

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