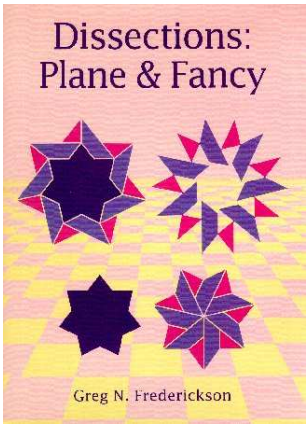

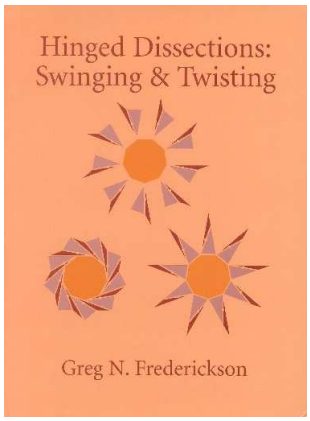

Greg N. Frederickson
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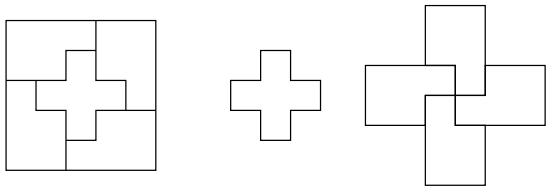
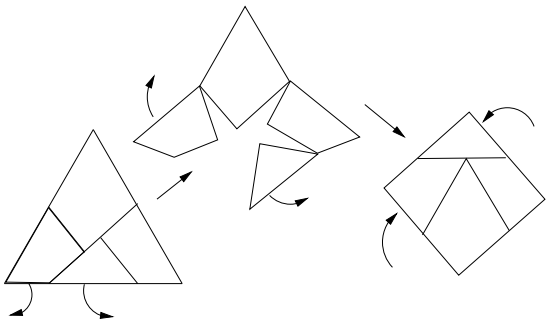
Dissections: Plane & fancy, Cambridge University Press, Cambridge, 1997, ISBN 0-521-57197-9 (hardback) and 2003, ISBN 0-521-52582-9 (paperback);

Hinged dissections: Swinging & twisting, Cambridge University Press, Cambridge, 2002, ISBN 0-521-81192-9 (hardback)

The first book of the author on this subject appeared in 1997 in hardback. On the occasion of the publication of his second book, the first book was reprinted as a paperback edition. So we can review both books simultaneously since they became available in their present form almost simultaneously.

Dissections are just a playful way of cutting an reassembling geometrical objects. In the figure on the right you see how a square can be cut into five pieces and reassembled as two crosses. Of course this is just a very simple example and there are many other similar dissections one could imagine, not only of squares, but also of stars, triangles, rectangles, polygons, etc.





To explain what hinged dissections are, it is best to take a look at the figure on the left which represents a hinged dissection of an equilateral triangle to a square. The triangle is dissected and reassembled to form a square. However the extra constraint is that the pieces of the dissection are attached to each other by hinges. This hinged dissection from a triangle to a square with only 4 pieces was described in Henry Dudeney's book *The Canterburry Puzzles* (Heinemann, 1907)[1].

There are many variations possible on this idea: sometimes the transform is to a figure with a hole, so there are hinged dissections from a figure to two other figures (the hole and the rest of the figure). Again, possible figures are triangles, squares, polygons, stars, etc. but also dissections with curved boundaries are discussed. Also cases where some of the pieces are allowed to be flipped, and 3D variants of these puzzles are treated. The author gives several techniques for constructing some of the dissections (this is e.g., related to overlapping tesselations of the plane), and he also gives a lot of historical remarks. Many of these puzzles have indeed a long history. Where possible the original inventor of a

[1] A revised edition was published by Dover Publications in 1958.

dissection puzzle was given credit where possible. In fact since he wrote his first book he set up a website

`http://www.cs.purdue.edu/homes/gnf/book.html`

and he had a lot of feedback that is often included in the second book. The first one may give some details on some of the puzzles, but the second one is greatly self-contained. Thus it is not at all necessary to read the first book first. Also his website with many links to webpages about dissections and related puzzles (many of them are animated and illustrate much better the swinging of the pieces than what we attempted above) is worth a visit. See

`http://www.cs.purdue.edu/homes/gnf/book/webdiss.html`

These books give many new perspectives for all those who love math puzzles. They will adore the second book as much as they loved the first, and they will devour it with great enthusiasm. The style is lively and pleasant to read. Practically no mathematical prerequisites are needed, so that everybody can be intrigued by this fascinating play of fancy pieces swinging and twisting around.

A. Bultheel