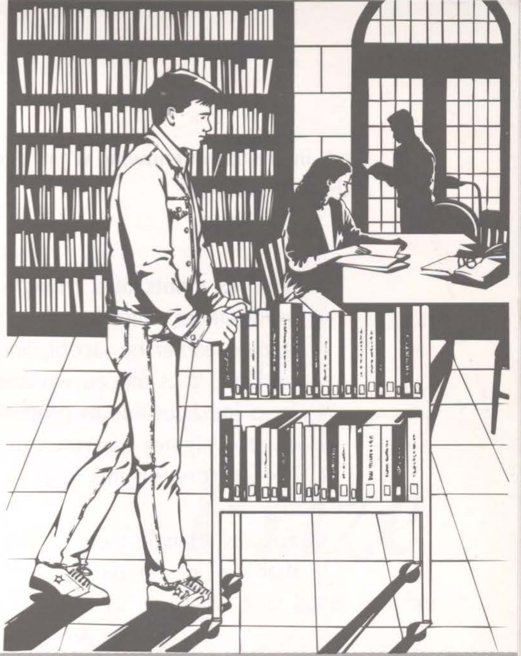


From the shelves of the National Library ...

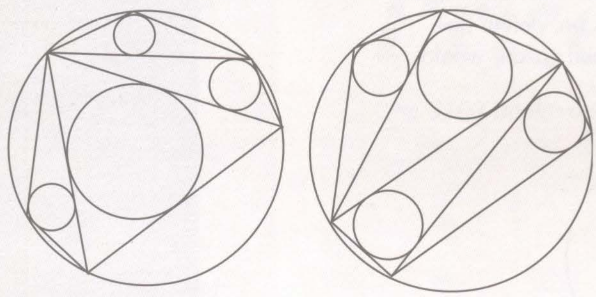
The Penguin Dictionary of curios and interesting geometry, by David Wells. Penguin.
ISBN 0-14-011813-6.

Reviewed by Chan Sing Chun

This book is out of the ordinary in the sense that we do not have to read it from cover to cover. It is a dictionary of geometrical facts. It starts off with an introduction, a chronological list of mathematicians and a bibliography, and finally the dictionary (276 pages) itself, followed by an index.

For example if you are interested in knowing what the "Japanese Theorem" is all about, look it up here. Let the author explain:

Japanese theorem. Johnson records this Japanese theorem, typical of its period, exhibited in a temple to the glory of the gods and the discoverer, dated about 1800.



Draw a convex polygon in a circle, and divide it into triangles. Inscribe a circle in each triangle. Then the sum of the radii of all the circles is independent of the vertex from which the triangulation starts. Any triangulation will do: the sum in the second figure is the same as the sum in the first.

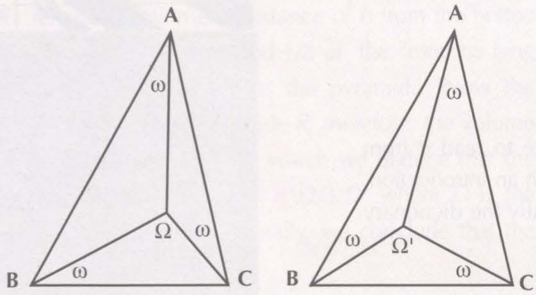
Reference: R. A. Johnson, *Advanced Euclidean Geometry*, Dover, New York, 1960.

The proof is not given in the book and unfortunately the reference by R. A. Johnson is not available in the National Library.

Next, interested in knowing what "Brocard points of a triangle" are? Here is what the author says:

Brocard points of a triangle. Named after Henri Brocard, a French army officer, who described them in 1875. However, they had been studied earlier by Jacobi, and also by Crelle, in 1816, who was led to exclaim, 'It is indeed wonderful that so simple a figure as the triangle is so inexhaustible in properties. How many as yet unknown properties of other figures may there not be?' How prophetic! Entire books have been written on this figure.

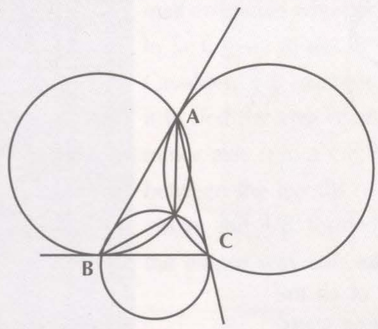
For any triangle there is a unique angle ω, the Brocard angle, such that the lines in the figure concur, at the Brocard points Ω and Ω'.



The Brocard angle is given by this formula whose simplicity suggests that it must be significant:

$$\cot \omega = \cot A + \cot B + \cot C$$

The Brocard points can be constructed geometrically by drawing the circles that pass through two vertices, touching one side, as in this next figure. The circles touching *AB* at *A* and so on, define one Brocard point, and the circles touching *AB* at *B* and so on, would define the other.



Here are two more 'wonderful' properties: If $C\Omega'$ and $B\Omega$ meet at *X* and *X'*, and so on, then Ω, Ω', *X*, *Y*, and *Z* all lie on a circle.
If three dogs start at the vertices of a triangle and chase each other's tails, each moving at the same speed, then the final dogfight will take place at one or other of the Brocard points, according to the direction of the chase. Compare the fate of four dogs chasing each other, under *pursuit curves.*

And do you know what a Julia set is? The answer is in the book.

My conclusion is that it is an interesting book full of geometrical information. Anyone who likes mathematics, especially geometry, will like this book as fish likes water.

Enjoy yourself by reading it!