

# Gnomon: From Pharaohs to Fractals

Midhat J. Gazale

Princeton University Press, 1999

Almost 2000 years ago, Hero of Alexandria defined the gnomon as that form which, when added to some form, results in a new form, similar to the original. Self-similarity, which the author calls “gnomonicity,” is the theme of his wonderful book.

Our modern Gazale, also of Alexandria, is a mathematician and engineer who has taught at the University of Paris, is an international telecommunications and space consultant, and was president of AT&T-France. Like some modern actuaries, he is both a mathematician and a businessman.

Included in his study of self-similarity is the Fibonacci sequences of order  $m$ , where

$$F_{m,n+2} = F_{m,n} + mF_{m,n+1}.$$

Explicit formulations are given for the  $n$ th term of these sequences and their kinship with continued fractions.

The author develops an original shape he calls the “silver pentagon” that possesses mathematical properties akin to the golden rectangle. He also discusses S. Golomb’s strange little figure, the “Rep-Tile,” which the author renames the “Winkle.” His discussion of self-similarity naturally includes fractals and Bernoulli’s equiangular spiral. It also includes ladder networks and whorled figures.

I’ve been interested in the Fibonacci series and in fractals, so I was especially drawn to this book.

For those actuaries who can’t read, there are 148 illustrations, 24 in color.

—Don Sondergeld

***In the Heart of the Sea: The Tragedy of the Whaleship Essex***  
By Nathaniel Philbrick  
Viking, 2000

This is an excellent retelling of the sinking of the Essex, a whaling ship that was rammed by a sperm whale in 1820 and sank in the South Pacific. It’s the historical event that served as the basis for Her-

man Melville’s novel, *Moby Dick*.

The book is based in large part on journals kept by several of the survivors. The survivors, fewer than half of the original crew, endured an open-boat voyage of 89 days and nearly 6,000 miles before

being rescued, half again as far as the more famous open-boat voyage of Capt. Bligh of Bounty fame. Survival was possible only due to cannibalism, which unfortunately carried with it racial overtones.

— Dwight Bartlett

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