FIBONACCI NUMBERS IN DIATOMS?

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In the October 1968 issue of *Pacific Discovery* there appeared an article entitled, "Nature's Opaline Gems," by G. Dallas Hanna of the California Academy of Sciences. At the beginning of the article an allusion was made to Fibonacci in connection with patterns in nature. This naturally aroused a curiosity about the possibility of such numbers having been found in diatoms (nature's opaline gems). Mr. Hanna was good enough to send over an electron microscope reproduction of a diatom that looked something like a sunflower (see Fig. 1). However, the count did not seem to work out and there were some disturbing features such as rays that started in from the edge but did not go all the way to the center.

A meeting was arranged with Mr. Hanna at the Academy of Sciences and there in the Geology Department the author encountered the world of diatoms. Mr. Hanna has been working on these algae of ancient times with their silicified cell walls since 1916. Long rows of books dealing with them as well as ponderous tomes containing drawings made of them in the past century show that this field has attracted the attention of many nature explorers.

After viewing some of the magnificent pictures that are now being produced by a special electron microscope (see Fig. 2 for another example), work was begun on going through the books, examining the pictures, counting rays and other features. After some time, the author asked Mr. Hanna whether the numbers on these specimens remained constant for a given species. He said that they did not; in fact that they varied widely without any particular pattern.

Thus the question whether there are Fibonacci patterns in diatoms seems to have a negative answer. The result is being reported here as part of the total picture of Fibonacci numbers in nature as well as to suggest that those who are interested in the world of microscopic creatures might want to examine them from this point of view.

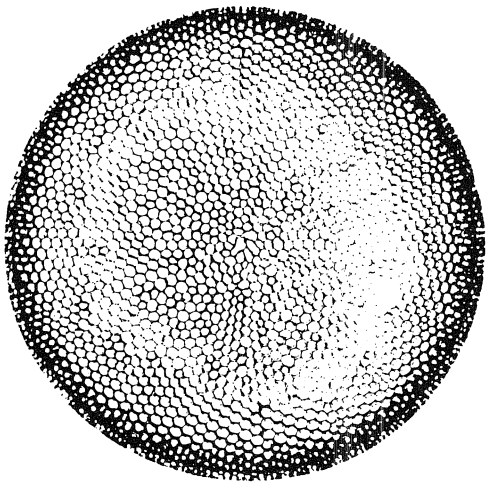

Figure 1

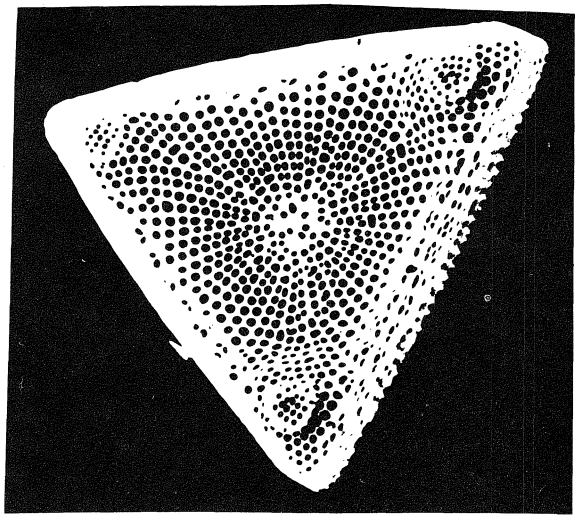

Figure 2

This note was written quite some years ago. In the meantime, the gracious and generous G. Dallas Hanna has passed away.

Shortly after we had virtually written off a connection between diatoms and Fibonacci numbers an article was received from Edward A. Parberry entitled "A Recursion Relation for Populations of Diatoms," published in *The Fibonacci Quarterly* of December, 1969, pp. 449–456.