Fibonacci is Not a Pizza Topping

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Last month I saw an amazing advertisement appearing in our woodworking universe. You might say that about all of the Woodpeckers advertisements – promoting good looking, even sexy tools and accessories for the woodworker who has money to burn or who does some odd task many times per day. I don't fall into either category, though I often click on the ads to see the details and watch a video or two. These days I seem to have time to burn, if not money.

Anyway, as someone who took too many math courses in my formative years, this ad absolutely caught my attention. I was left guessing two things: what is a Fibonacci and why would anyone need such a tool?

Mr. Fibonacci and his Numbers

Mathematician Leonardo Fibonacci was born in Pisa – now Italy – in 1170 and is credited with the first CNC machine and plunge router. Fibonacci popularized the Hindu–Arabic numeral system in the Western World (thereby replacing Roman numerals) primarily through his publication in 1202 called the Book of Calculation. Think how hard it would be to do any

woodworking today if dimensions were called out as XVI by XXIV (16 x 24). But for this bevel cut article, the point is that he introduced Europe to the sequence of Fibonacci numbers.

Fibonacci numbers are a sequence in which each number is the sum of the two preceding numbers. Here are the first Fibonacci numbers.

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610, 987, 1597, 2584, 4181, 6765, 10946, 17711, 28657, 46368, 75025, 121393, 196418.

You quickly get the gist. Well, if you pay attention, it turns out that once you get past the first few Fibonacci numbers, the ratio of two sequential numbers asymptotically approaches 1.61803.

8/5 =	1.600
89/55 =	1.6181818
233/144 =	1.618055
10964/6765 =	1.618034

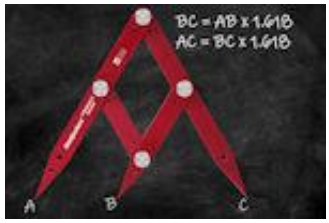
It's magic. Imagine trying to do this arithmetic in longhand division or in Roman Numerals; that would be awesome.

And speaking of non-Fibonacci asymptotes that principle applies to my own woodworking. I seem to approach the finish line of any project asymptoticly, never quite getting there. Maybe that Woodpeckers gauge would help.

The Golden Ratio

We've all heard of the golden ratio. The golden ratio is "the smaller part is to the larger as the larger is to the whole. Using algebra, this would be expressed as A/B = B/(A+B). Since we are interested in a RATIO, we can set A to equal 1 and solve the equation and get B = 1.618. AHA! There is a connection to Fibonacci! Or at least a weird coincidence.

Fibonacci himself lived in the Middle Ages, but the golden ratio was used by the ancient Greeks and Egyptians to build buildings, temples, columns, tombs etc. Is this an example of the chicken and the egg dilemma? Which came first, the golden ratio, or the Fibonacci numbers? No contest. In between ancient times, the Middle Ages, and today, the golden ratio was studied by many, including well-knowns Pythagoras, Euclid, and Kepler. It appears in numerous patterns in nature as well as man-made systems. It may also be the key to the atom bomb.



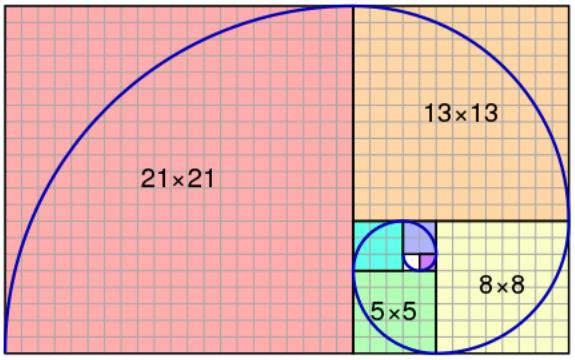
EMGW members are likely to use the golden ratio in cabinet boxes, doors, and other 2-D and 3-D objects. In short, the golden ratio is 1.618, often rounded to 1.62, and for woodworkers, 1.625 or 1 5/8. So, if your panel door is 8 inches wide, the golden ratio suggests the door should be 13 inches tall. If it's 10 inches wide, then it should be 16.2 inches tall (10 x 1.618). If you can't do the arithmetic, I guess the

Woodpecker tool will do it for you. Also, if you want to explore more, you can subscribe to an entire journal dedicated to the study of the Fibonacci numbers, the Fibonacci Quarterly. And so it goes.

The Fibonacci Gauge

But how or why did Woodpeckers turn this into a neat tool? ($80 for the 12", $100 for the 24", and $130 for the 48"). The company says: "Adjust the Fibonacci Gauge so that the middle point and the outside point it is closest to match part of your project. Now the space between the middle point and the more distant outside point is 1.618 times greater. What's more, the two outside points are 1.618 times the space between the middle point and the more distant outside point. Having the ratio two different ways in the same tool is just one of the head-scratching phenomena surrounding the Golden Ratio." Is this like a modern-day compass? Or just a replacement for a ruler and a calculator? You decide.

The Spiral



Lots of mystery surrounds the Fibonacci spiral. You see in the diagram that successive, adjacent squares are drawn with the sides being sequential Fibonacci numbers (1-1-2-3-5-8-13-21). By drawing a smooth curve connecting the opposing corners you create a spiral that approximates many things occurring in nature like the leaves on a stem, the fruit sprouts of a pineapple or artichoke, seashells, etc.