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Leonardo Fibonacci

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History Of Mathematics

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Leonardo Fibonacci was a mathematician in the late twelfth to mid-thirteenth century. He grew

up and was trained in North Africa, where his father worked. His major contributions to

mathematics can be found in his books- *Liber Abaci, Practica Geometriae, Flos, and Liber*

Quadrotorum. Little can be found about his Christian faith, but fruits of his faith can be seen

through some of his work. As a mathematician, I would like to exemplify Christ in all aspects of

my life.

Leonardo Fibonacci, widely known for his work on the Fibonacci Sequence, could be considered a man of mystery. Why? Because we know very little about his life, faith, and background most likely due to the fact that so many writings by him were lost. Born with the name Leonardo of Pisa, he was later nicknamed Fibonacci from the latin name Filius Bonacci. Fibonacci was a talented mathematician, who had a different approach than most Europeans and wrote many books on his discoveries.

Born in Italy around 1175 A.D., Leonardo Fibonacci grew up in North Africa, where his father, Guilielmo Bonaccio, held a diplomatic position representing the merchants of Pisa. In North Africa he lived to Algeria, where he went to school and trained with an Arab master to be the mathematician that we all know. His father was insistent on his son study in North Africa. Fibonacci wrote in *Liber Abaci* that his father, "having an eye to usefulness and future convenience, desired me to stay there and receive instruction in the school of accounting" ("Leonardo Pisano Fibonacci", 1998). Fibonacci later travelled to Egypt, Syria, Greece, Sicily, and Provence to continue his studies, and recognized the benefits of the mathematical systems used in these places. It is clear that Fibonacci looked back on his work and was grateful that his father allowed him to study outside of Europe.

After all of his traveling, Fibonacci returned to Pisa around 1200 A.D. Leonardo Fibonacci worked closely with Michael Scotus, Theodorus Physicus, and Dominicas Hispanus. These men were astrologers and philosophers who worked on Frederick II's court in the thirteenth century. Frederick was crowned King of Germany in 1212 A.D. and the Holy Emperor in 1220. Another member of this court was Johannes of Palermo, and he sent problems to Fibonacci, which were solved and sent back to Frederick II.

Although some were overlooked at the time they were presented, his introduction to Indian-Arabic numerals, his work on number theory, and much more can be found in the writings of Fibonacci that are still preserved to this day. His first and most known book was *Liber Abaci*, written in 1202 A.D. and dedicated to Michael Scotus. Scotus played a part in helping Fibonacci transmit the Muslim knowledge to the Europeans. This book is composed of four sections. The first section is about the mathematics that Fibonacci learned throughout his travels. The second section was written towards merchants. The third sections consists of puzzles including what would be known as the Fibonacci sequence. This sequence was found by looking at the reproduction of rabbits resulting in this sequence- 1, 1, 2, 3, 5, 8, 13, 21, 34... Finally, section four demonstrates the application of algebraic methods.

His next book was Practica geometriae (1220), which was dedicated to Dominicus Hispanus and divided into eight chapters. It was composed of geometrical theorems and proofs based on Euclid's famous writings, *Elements* and *On Divisions*. Continuing his theme of practical mathematics, Fibonacci includes applications in his book, like information for surveyors.

In 1225 A.D., Leonardo Fibonacci wrote *Flos,* which was composed of the problems Johannes of Palermo sent Fibonacci, and was then sent to Frederick II. An example of one of the problems is the approximation to a root of $10x + 2x^2 + x^3 = 20$. He then goes on to show a series of linear problems in which some where presented in *Liber Abaci*.

One of Fibonacci's most impressive works, *Liber quadratorum*, was also written in 1225 A.D. This book introduces his knowledge of number theory. Unfortunately, this was one of the

works of Fibonacci that was overlooked. *Liber quadratorum* addresses square numbers and their ability to be constructed by two odd numbers and the construction of Pythagorean triples.

Leonardo Fibonacci is known to be Christian Mathematician. There is no good evidence of his faith in Christ, but we can see the fruit of his faith through his work. As mentioned before, Fibonacci worked with the Indian-Arabic number system and brought this back to Europe with him. During this time were the crusades against Islam. Therefore, Europeans were not open to hearing anything that came from this group of people and found anything Arabic to be suspicious. By moving past their differences and working with the Muslim people is just one way we see the fruit of Fibonacci's faith.

Though there is not much evidence of how Fibonacci's faith related to the discoveries he made, we can see how our faith is related to his discoveries. First of all, we should recognize that any discovery that came from Leonardo of Pisa is originally from God, our creator. The Fibonacci Sequence, which once again was discovered by Fibonacci using the population of rabbits, can be seen in all of creation. A spiral is formed using this sequence, which is found in sea shells, flowers, and even in the human body. Many believe that this is God's fingerprint in mathematics.

I believe God's plan for my life is to teach math at the secondary level. Knowing that there are many challenges that come with this job, I will trust in the Lord to provide. A significant way that my faith will drive me as a mathematician is remembering that everything I learn and teach is from God and for God, so I will glorify him in all that I do. I will praise him for all that he created, including mathematics.

In order to exemplify Christ in my work life, I will keep my focus on Christ, and in return my actions will be glorifying Him. I will treat my future students fairly and encourage them rather than discourage them. I also plan to exemplify Christ in my home life by guiding my family to serve the Lord, and living life selflessly. All in all, I want every part of my life to be focused around the true foundation, Jesus Christ.

Works Cited

"Fibonacci, Leonardo, or Leonardo of Pisa." *Complete Dictionary of Scientific Biography*,
Encyclopedia.com, www.encyclopedia.com/science/dictionaries-thesauruses-pictures-and-press-
releases/fibonacci-leonardo-or-leonardo-pisa. Accessed 28 Sept. 2017.

Gies, Frances Carney. "Leonardo Pisano." *Encyclopædia Britannica*, Encyclopædia Britannica,
inc., 18 Apr. 2017, www.britannica.com/biography/Leonardo-Pisano, 27 Sept. 2017.

J J O'Connor and E F Robertson, "Leonardo Pisano Fibonacci", Fibonacci biography, http://
www-history.mcs.st-andrews.ac.uk/Biographies/Fibonacci.html, 27 September 2017.

Mastin, Luke. *Fibonacci - Medieval Mathematics - The Story of Mathematics*,
www.storyofmathematics.com/medieval_fibonacci.html, 28 Sept. 2017.