

## 106 Years Dedicated to Mathematics

Mathematics is one of the basic subjects that is taught to students since their very first years in school. We've learned about theorems, rules, and applications. However, we are never taught on how these theorems and applications were discovered and developed. This lack of instruction on how mathematics was originated makes many people fear the subject because it appears to many as a mystery. Nowadays, there exist sources that explained to us how the subject was developed since its first origins. A person who has contributed a lot to our understanding of the history of mathematics is Dirk Jan Struik.

Dirk Jan Struik was born on September 30, 1894 in Rotterdam, Netherlands. Surprisingly he was born on the same year as Norbert Weiner, who will become his colleague in the United States at the Massachusetts Institute of Technology (MIT) later in his life. Very limited information about his family is available. His father was Hendrik Jan, a grammar school teacher. There is not mention of his mother in any source pointing to his family. However, it is known that he had a brother named Anton and a sister named Lena.

On various occasions during his last years of life, Struik attributed his longevity and happiness to "the three Ms: Mathematics, Marxism and marriage." (2) This statement comes into a fact by studying how these three subjects affected his personal and professional life.

Since very early in age, Struik was exposed to mathematics by his father, who motivated his three children to develop interest in mathematics by involving them in solving problems that appeared in a magazine designed for teachers. His father's interest in mathematics had a significance influence on Struik, his brother and sister. Anton became an engineer, Lena became a teacher, and Dirk became a very well known mathematician and historian.

Struik received his formal education at the Hogere Bugerschool in The Hague, which was a high school that prepared students to enter a university, which is exactly what he did. In 1912, Struik entered the University of Leiden with the idea of becoming a high school teacher. While in Leiden, he took courses of mathematics from J.C. Kluyver, astronomy from Willem de Sitter, physics from Paul Ehrenfest, and history of mathematics from J.A. Vollgraf. Dirk was very influenced by Paul Ehrenfest, who "...showed [him] how science is a living and growing

field."(5). To this he attributed his understanding of the spirit of mathematics and science. Struik also created a good relationship with J.A. Schouten.

While working on a dissertation, Struik's funds ran out, so he left to Alkmaar where he taught high school mathematics. After a short period of time, Schouten offered him to become his assistant. Struik accepted this offer and came to the Technical University in Delft. He received his doctorate in 1922 with a dissertation on applications of tensor methods to Riemannian manifolds under the supervision of the geometer W. van de Woude.

During this time, Struik met and soon married Saly Ruth Ramler, a Czech mathematician. She wrote her doctorate on the axiomatics of affine geometry under the supervision of G. Pick and G. Kowalewski at the University of Prague in 1918. Struik often noted that she "may have been the first woman at this institution to receive a doctorate in mathematics."(4) Throughout most of her adult life, Ruth was kept out of mathematics due to health problems and the tension of raising three daughters. However, in later years, she became active again by participating in meetings and publishing. Struik was married to Ruth for seventy years until her death at the age of 99. They had three daughters: Ruth Rebekka Struik, a mathematics professor at the University of Colorado; Anne Machi of Arlington, MA, a teacher; and Gwendollyn Bray of New Zealand, an ecologist.

A Rockefeller Fellowship enabled Struik and Ruth to travel to Rome, where they had the opportunity to meet and collaborate with many mathematicians including Amaldi, Caselnuovo, Volterra and Bianchi. Struik also worked and collaborated with Levi-Civita while his stay at the University of Rome. There, Struik solved a problem that involved properties of waves in canals with finite depth; this problem has been suggested by Levi-Civita.

Also, while in Rome, Struik became first interested in the history of mathematics as a result of his encounters with the historians of mathematics Ettore Bortolotti and Giovanni Vacca. He also met G.J. Hoogewerff, who was the director of the Dutch archaeological institute in Rome. Hoogewerff induced Dirk to study Paul van Middelbur, a Dutch renaissance mathematician, which he did. Due to his admittance to the Vatican Library, Struik was able to study the history of mathematics in Italy during the Renaissance.

After nine months of their stay in Rome, Struik received an extension of the Rockefeller Fellowship, so he and his wife traveled to Göttingen, which was turning into a major mathematical center. Here the Struiks also had the opportunity to meet some of the great