Looking Back on a Bestseller: Dirk Struik's *A Concise History of Mathematics*
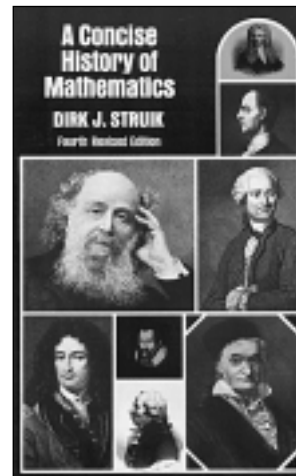
David E. Rowe

Few books on the history of mathematics that were written over fifty years ago continue to attract many readers today, and certainly none has done so well as Dirk Struik's *A Concise History of Mathematics*, first published in 1948. This classic survey has gone through four editions and appeared in translation in at least eighteen different languages. Even its author had difficulty keeping up with the count, but whenever a new translation appeared, authorized or not, he tried to obtain a copy for his bookshelf. Clearly, *Concise History* not only gave the history of mathematics considerable visibility, it also helped promote a new kind of interest in the subject. Most standard histories before it had stressed the incremental growth of new knowledge, shorn for the most part from the social contexts out of which these results grew. Struik, on the other hand, emphasized the shifting social and political contexts that preconditioned these intellectual developments. At the same time, he sought to convey at least a glimpse of the rich diversity of mathematical ideas and cultures. For many who, like myself, went on to become professional historians of mathematics, this little gem was the book that first opened our eyes to an unsuspected world filled with the interplay of mathematical ideas, institutions, and people.

Of course, not many people decide to take up history of mathematics as a career, so I don't want to make too much of Struik's impact on such a small subset of his readers. What about all the others in the broader audience he wanted to reach? What made this book such a success, and why has it retained so much of its freshness today? No doubt there were a number of circumstantial factors that help account for this, but beyond these I think the main reason had to do with the author's unusual qualifications and especially his character. Dirk Struik loved mathematics as well as history all his life, having acquired these passions from his father, a grammar school teacher in Rotterdam. When in 1989 Dirk was awarded the Kenneth O. May Medal for his contributions to the history of mathematics, he began his acceptance speech with a tribute to Hendrik Jan Struik:

> Vom Vater hab'ich die Statur
> Des Lebens ernstes Führen
> (J. W. Goethe, *Xenien VI*)

("From my father I have the stature/To lead an earnest life.") With regard to his father's intellectual passions, he liked to quote an even more famous line from Goethe's *Faust*: "Was du ererbt von deinen Vätern hast, erwirb es, um es zu

David E. Rowe is a professor of the history of mathematics and natural sciences at the Universität Mainz and is currently on leave at the Dibner Institute for the History of Science and Technology of the Massachusetts Institute of Technology. His e-mail address is rowe@mathematik.uni-mainz.de.

besitzen." ("That which you have inherited from your fathers, acquire it so as to make it your own.") Dirk did, and consequently he knew an awful lot about both mathematics and history, clearly important qualifications for anyone who wants to become a reputable historian of mathematics.

Of course, that wasn't his life's goal; he first wanted to become a first-rate mathematician. But history of mathematics was such a natural interest, he couldn't help but pick up valuable insights along the way. A wonderful chance came in 1925 when he was a fellow of the Rockefeller Foundation in Göttingen. He arrived there in late June, just in time to attend Felix Klein's funeral. Soon afterward, Richard Courant asked if he would be interested in helping to edit Klein's unpublished lectures on the mathematics of the nineteenth century (*Vorlesungen über die Entwicklung der Mathematik im 19. Jahrhundert*). These were lectures that Klein delivered in his home during the war years, when only a few younger men were still in town (Emmy Noether attended regularly). Klein spoke and wrote about the world of mathematics he knew in vivid language, and these lectures give a highly personalized account of mathematical "high culture". A somewhat similar flavor animates the last chapters of Struik's more modest *Concise History*. Even some of the thematic elements in his account come straight out of Klein's lectures (the pivotal role of Gauss on the dividing line between the eighteenth and nineteenth centuries, the parallels between Gauss and Legendre, and the emphasis on Monge and the École Polytechnique as key modernizing factors for all of European mathematics).

One of Dirk's former students, Lorraine Daston, today a distinguished historian of science and codirector of the Max-Planck-Institut für Wissenschaftsgeschichte in Berlin, wrote of him that during her graduate school days he "seemed to her the closest approximation to omniscience in human form." Part of the secret to this, I think, stemmed from his uncanny linguistic abilities. Drawing on a reading knowledge of at least eight languages, Struik could move across nearly every major cultural divide. As he saw his book pass through so many translations, he took a keen interest in learning more about the mathematical traditions of the respective nations or regions associated with the language in question. His linguistic talents also bore fruit when he translated and edited several minor classics for his *Source Book in Mathematics* (1969).

Beyond these intellectual qualifications, Struik had a natural ability to communicate in a writing style that reflected the warmth of his personality. Never ponderous or pedantic, his work conveyed a clear sense of his resilient optimism, genuine humility, and a taste for light irony. And then there was his inquisitiveness, his truly insatiable appetite for knowledge. As Joan Richards so aptly expressed it, "what made him so special was not so much that he was interesting, but that he was interested." And he stayed that way all his life. So it is hardly surprising that the new editions and translations of his *Concise History* reflected an ongoing dialogue, as Struik kept abreast of new contributions and changing research trends.

I can think of no better way to illustrate his personality as a writer than by quoting from Struik's preface to the third revised edition of *Concise History*, which came out in 1966:

> The first edition of this book appeared in 1948. Since then the reception has been generous, both in this country and abroad, even if occasionally a Russian brow was raised for apparent neglect of Čebyšev, as Scotch or French brows may have been darkened because of apparent lack of respect to the memory of Gregory or Roberval. There have been several translations, and in some of them the translators have added material of special interest to their readers. Thus we find a section on Russian mathematics in the Ukrainian translation (Kiev, 1961) and in the Russian one (Moscow, 1964). I myself, when preparing a Dutch version of the book (Utrecht-Antwerp, 1965), added items of interest to Dutch readers.

Reading between the lines, one can easily sense Struik's low-key but evident excitement over the fact that his vision of mathematics as anchored in culture and evolving dialectically through time was beginning to resonate around the world. By this time the German translation of *Concise History* had already gone through three editions, and soon afterward Hans Wussing would establish a stronghold for both teaching and research on the history of mathematics at Leipzig's Karl Sudhoff Institute in the German Democratic Republic. Struik's *Concise History* was standard reading for the students there.

In his preface Struik went on to describe various updates and improvements that had been made, for example in the bibliographies, and how he had incorporated these into the new third English edition. He even told a little story about how it happened that the third edition contains a new treatment of Chinese mathematics:

> One day, one of my friends in Peking discovered a Chinese translation (Peking, 1956) which he forwarded to me. The translator of this edition, in his preface, praised the book but objected to its treatment of Chinese mathematics. Since I already had some misgivings,

I rewrote the section on this subject. In this edition ancient Chinese mathematics now appears, as it should, as an integral part of medieval and premedieval mathematics, and not as a phenomenon outside of the main current of scientific development.

This anecdote speaks volumes about Struik's attitude toward his work. He knew he had embarked on a new adventure, and he was eager to see where it would lead him. In an article from 1942 entitled "On the Sociology of Mathematics", he even sketched a Marxist program aimed at studying mathematics along lines inspired by the work of the British Social Relations in Science Movement. Marxists have often been criticized as dogmatists (and not just during the McCarthy era), but no informed reader could possibly say this about Struik's approach in *Concise History*. Indeed, his book was an ongoing effort to present an overarching portrait of mathematical developments on a broad canvas of time and space. Its spirit was open-ended, without a trace of dogmatism, and its Marxist features were so attenuated that few could have guessed this guiding orientation unless they either knew the author personally or had read his other work.[1]

In the closing remarks of his preface to the third edition, Struik noted that his revised *Concise History* still ended around 1900, a long way from the year 1966. That would no longer do, and so he called for a concise history of mathematics in the spirit of his survey that would cover the period 1900 to 1950. After all, "the market teems with histories of twentieth-century physics." And while he admitted that the developments in physics were more spectacular, he was equally convinced that:

> the period that began with Poincaré, Hilbert, Lebesgue, Peano, Hardy and Levi-Civita offers a wealth of material for a fascinating history of mathematics, both in its own right and in relation to logic, physics, and engineering. Who of you, gentle readers, is going to take the initiative?

I remember my enchantment with Struik's book when I first read it as a graduate student, and I can also remember reading these words and fantasizing about what it might be like to "take the initiative" offered so seductively by its author. Luckily, I then had no idea of the Herculean efforts that would have been involved. Struik, after all, had spent his whole life acquiring the kinds of skills one needed. He could already read more languages as a teenager than I would ever learn; no one was going to fill his shoes.

Perhaps he came to realize many years later that the challenge he tossed out in 1966 was just a little daunting. So in 1987, still not yet ninety, he brought out the fourth edition of his *Concise History* with a new chapter on the first half of the twentieth century. This sketches various institutional changes that went hand in hand with the burgeoning intellectual developments of this period. Not surprisingly, Struik used Hilbert's problems from his speech at the International Congress of Mathematicians in Paris to convey a sense of the enterprise. He then turned to various special traditions: real variable theory in France; the impact of E. H. Moore's school at the University of Chicago on American mathematics; and the emergence of new research fields, including abstract algebra, set theory, and the foundations of mathematics. He surveyed all the leading mathematical centers—from Berkeley and Cambridge to Moscow and Lvov—including those he knew firsthand: Rome and Göttingen. Not surprisingly, he was at his best when writing about the work that excited him most in differential geometry and tensor analysis, a field that exploded in the wake of Einstein's general theory of relativity.

Despite its easy, flowing style, Struik's *Concise History of Mathematics* should not be mistaken as a book for beginners. Its principal audience was and remains broadly educated mathematicians and those with a serious interest in history of the exact sciences. My own experience suggests that most undergraduate students in mathematics are unable to appreciate this book unless they have already had a fair amount of mathematics, and usually they need a good course in the history of mathematics too. Young people with the requisite background can easily manage Struik's book, which can practically serve as a litmus test to determine whether they will find studying the history of mathematics exciting or not. Euclid was reputed to have told King Ptolemy that there were no "royal roads" to mathematical knowledge (though many over the centuries seem to have thought that Euclid's *Elements* provided the path of least resistance). The same is true, perhaps even more so, for the history of mathematics. But for those prepared to undertake this long and arduous journey, nothing is more indispensable than a good guidebook. Struik's *Concise History*—written with insight, perspective, and an intimate knowledge of and affection for the subject—is admirably designed to fulfill that purpose.

---

[1] *For an interesting comparative portrait of how Struik and two other Dutch mathematicians dealt with the interplay between political and mathematical ideas, see Gerard Alberts, On connecting socialism and mathematics: Dirk Struik, Jan Burgers, and Jan Tinbergen,* Historia Math. **21** (1994), 280–305.