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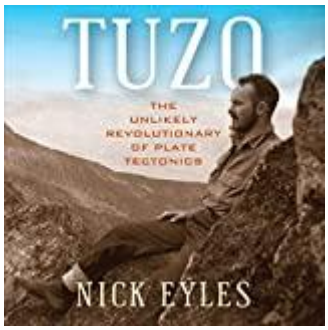
Nick Eyles. *Tuzo: The Unlikely Revolutionary of Plate Tectonics.* Toronto: Aevo UTP, 2022. Illustrations, maps. xi + 283 pp. $48.95, paper, ISBN 978-1-4875-2457-9.



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Canadian geologist Nick Eyles's 2022 monograph, *Tuzo: The Unlikely Revolutionary of Plate Tectonics*, is the first biography of his fellow Canadian geologist and geophysicist, John Tuzo Wilson (1908-93), who made substantial contributions to the theory of plate tectonics. Wilson is particularly famous for conceptualizing hot spots and transform faults. The history of geology is one of the youngest and least developed fields within the history of science.[1] Even Alfred Wegener, probably the most important geologist of the twentieth century, has had few biographical treatments. As many of the pioneers of plate tectonics have only passed relatively recently, there is a dearth of biographies for many of these men. Conceived after a chance encounter with Wilson's daughter, Eyles's biography brings to life both the scientific and the personal life of this significant figure.

For the first four chapters of the book, to a certain extent, Eyles weaves his account of Wilson's birth, family, education, and early career with the Geological Survey of Canada, with an account of the history of continental drift theory more broadly. His fifth chapter, which addresses Wilson's service with the Royal Canadian Engineers, provides a lively account of Canada's war effort and the work conducted by army engineers. It also includes an account of Wilson's service with Operation Musk Ox, an early Cold War military exercise to forestall a potential Russian invasion of Canada through the Arctic.

Chapter 6, which begins with the start of Wilson's academic career at the University of Toronto, again interweaves Wilson's life with the history of geophysics generally, such as his participation in the International Geophysical Year, and continental drift specifically, ranging from the geographical evidence being pushed by Southern Hemisphere geologists, to the mapping of the Atlantic Ocean's floor by Maurice Ewing's Lamont Observatory group, to the paleomagnetic research of Edward Irving and Keith Runcorn at Cambridge. After a discussion of Wilson's conversion into a mobilist, chapter 7 addresses his contributions to the field, including his seminal works on hot spots and the Hawaiian Islands and on trans-

form faults on the ocean floor, his supervision of Lawrence Morley (known today for his studies on the magnetic properties of ocean crust) at Toronto, and his public outreach, which included presentations at the Expo 67 and a speaking tour through China. The eighth chapter serves as a primer on plate tectonics, while the final chapter deals with Wilson's later life and his legacy in the field.

This book was great fun to read. Eyles has a lively voice, and I enjoyed his sly asides and ease explaining geological concepts and terms in a simple and engaging fashion. Further, as it was written with access to Wilson's family archive, this book contains rich details about Wilson's personal and academic life that remind readers that scientists are not aloof geniuses but real people: for instance, Wilson cheated on his Latin entrance exam for university and found his weakness at mathematics a factor that both handicapped his graduate work and drove him away from physics and into geology. Princeton, where Wilson earned his doctorate, was his third choice, after Harvard and Lehigh did not work out. I also enjoyed the recurring tensions between the fields of physics and geology as well as Eyles's discussion of geology as a discipline closely connected with mining and government concerns over minerals. You can tell that Eyles is enthusiastic about geology and therefore enamored by the life of one of its great men. I would certainly recommend this to students interested in geology or even those who wish to learn more about the messiness of a Kuhnian revolution, though the philosopher Henry Frankel argued that the rise of continental drift theory did not actually resemble a scientific revolution according to Thomas S. Kuhn's definition.[2]

But as he is writing a history book, Eyles falls into a trap. A geologist himself, he accepts plate tectonics and is grateful and in awe of those who developed the theory, leading to one of the greatest scientific revolutions in history. Somewhat hyperbolically, he even concludes that "Wilson is to earth science what Charles Darwin is to biology and Galileo and Copernicus to astronomy," despite spending many pages talking about the team-based nature of scientific research (p. 240). From this viewpoint, anyone who opposed continental drift or plate tectonics was wrong and therefore an obstacle to the theory not having widespread acceptance sooner. Wilson himself, until he accepted Wegener's ideas in the early 1960s, "was on the wrong side of history" (p. 169). Eyles cites Kuhn at the beginning of the book, yet this book very much fits into Kuhn's definition of older histories of science—the one that his ***Structure of Scientific Revolutions*** seeks to circumvent—in which the author feels "he must determine by what man and at what point in time each contemporary scientific fact, law, and theory was discovered or invented" and "must describe and explain the congeries of error, myth, and superstition that have inhibited the more rapid accumulation of the constituent of the modern scientific text."[3]

Modern reconstructions of Pangea and recent photographs of ancient striations and tillites help the reader to better understand modern conceptions of plate tectonics, but intermixing these with an account of Wegener's 1915 ***Origins of the Continents and Oceans*** is misleading. Wegener's critics are portrayed as nationalistic and religious reactionaries who "quarantined the impressionable minds of students from dangerous foreign ideas," as they were "fixated on unmoving continents and oceans," never giving drift a fair evaluation because of its Germanic origins in the aftermath of World War II (pp. 4, 44). In fact, Eyles goes so far as arguing that the main reason for the rejection of continental drift in the American context came from "a resistance to any outside foreign ideas where there was no room for any divine plan or unique American solutions," adding a bit of conflict theory to his analysis (p. 57). Yet, as Eyles himself shows, critics to continental drift existed around the world. Indeed, he suggests that Wilson's long attachment to permanentism was due to his practically being brainwashed by the

"dogmatic permanentism" he encountered from his advisors in Toronto, Cambridge, and Princeton, rather than that this was a reasonable and mainstream idea from the period. In Wilson's "classic"-style PhD thesis on the geology of the Beartooth Mountains, Eyles finds "no inkling of the genius to come" (p. 94). Since Wilson himself was annoyed that his conversion to mobilism took so long, a recurring theme in the sixth chapter, Eyles too seems astonished that Wilson did not convert sooner. Essentially, while I really enjoyed the book, my criticism is that Eyles is a geologist writing about history. But he is upfront about this and *Tuzo* is aimed at a wider audience, so that is not necessarily a problem.

In a final quibble, which does not reflect on the author, the book's layout makes it somewhat difficult to read. Its dimensions resemble that of a paperback coffee-table book or textbook and each page consists of two columns of text. Perhaps this would be fine if each pair of pages was a self-contained unit, but the book has over two hundred pages of narrative. This format may appeal to some people, especially considering its lavish illustrations, but I found it very awkward. I did appreciate the copious images throughout the book, both from Wilson's life and from Canadian landscapes.

Notes

[1]. Mott T. Greene, "History of Geology," *Osiris* 1 (1985): 97–116.

[2]. Thomas S. Kuhn, ***The Structure of Scientific Revolutions*** (Chicago: University of Chicago Press, 2012); and Henry Frankel, "The Non-Kuhnian Nature of the Recent Revolution in the Earth Sciences," ***PSA: Proceedings of the Biennial Meeting of the Philosophy of Science Association*** 1978, no. 2 (January 1978): 197–214.

[3]. Kuhn, ***Structure of Scientific Revolutions***, 2.

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