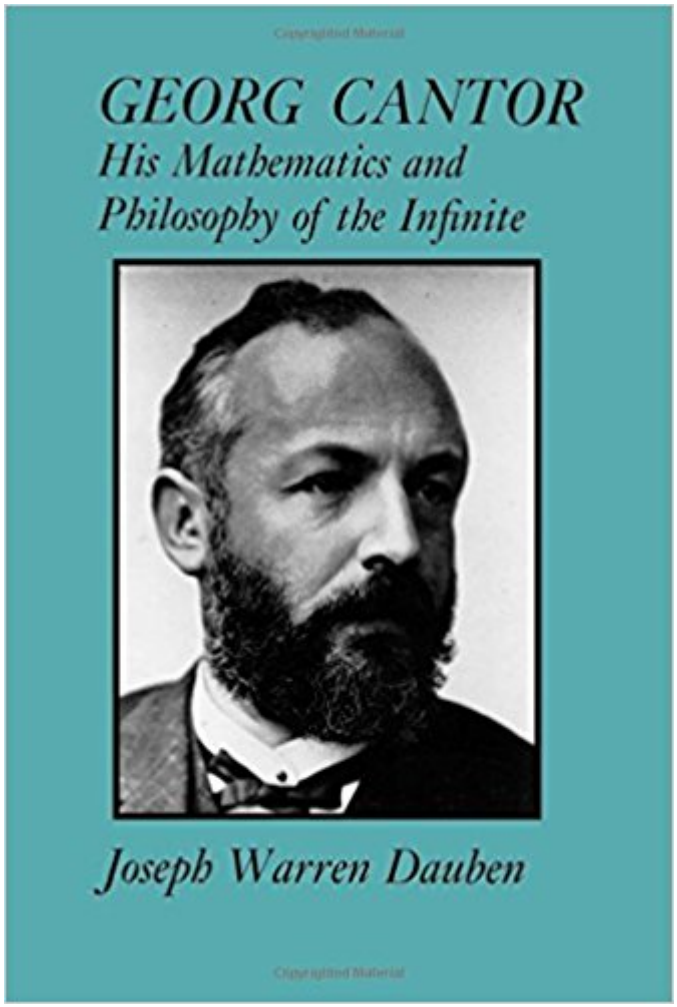
Georg Cantor: His Mathematics And Philosophy Of The Infinite



Synopsis

One of the greatest revolutions in mathematics occurred when Georg Cantor (1845-1918) promulgated his theory of transfinite sets. This revolution is the subject of Joseph Dauben’s important studythe most thorough yet writtenof the philosopher and mathematician who was once called a "corrupter of youth" for an innovation that is now a vital component of elementary school curricula. Set theory has been widely adopted in mathematics and philosophy, but the controversy surrounding it at the turn of the century remains of great interest. Cantor’s own faith in his theory was partly theological. His religious beliefs led him to expect paradoxes in any concept of the infinite, and he always retained his belief in the utter veracity of transfinite set theory. Later in his life, he was troubled by recurring attacks of severe depression. Dauben shows that these played an integral part in his understanding and defense of set theory.

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Customer Reviews

Joseph Warren Dauben, Winner of the 2012 Albert Leon Whiteman Memorial Prize, American Mathematical Society"Historians of mathematics can only be grateful for the effort Professor Dauben has expended to create the synthesis of Cantor scholarship found in this book. But the book can, and I hope will, be read with profit by a far more extensive audience. Any student, mathematician, philosopher, theologian, or general historian with an interest in Georg Cantor and the wondrous revolution in mathematical and philosophical thought that his work did so much to precipitate will find this book of considerable interest."--Thomas Hawkins, Historia Mathematica

One of the greatest revolutions in mathematics occurred when Georg Cantor promulgated his theory of tranfinite sets. This revolution is the subject of Joseph Dauben’s important study--the most thorough yet written--of the philosopher and mathematician who was once called a ’corrupter of youth’ for an innovation that is now a vital component of elementary school curricula.

Interesting read.

This is the definitive book about George Cantor, the brilliant mathematician whose work includes the groundbreaking development of both set theory and transfinite numbers.Interestingly, the author’s preface says this is not a biography of Cantor, though it does include personal information, especially as it relates to Cantor’s intellectual development and emotional issues. Rather, it’s a thorough and rigorous exposition of his mathematical and philosopical ideas. Dauben says, "... this book represents a study of the pulse, metabolism, even in part the psychodynamics of an intellectual process: the emergence of a new mathematical theory".But, a few warnings. While both the and jacket blurb claims this is for the "general reader", it is not. It is most definitely NOT a popularization, and I don’t think the publisher tries to make that clear. It is a scholarly tract, an extension of Dauben’s Harvard doctoral dissertation, and it seems he has not watered it down much. It is highly technical, with many equations, and is primarily written for academicians who are fluent in higher mathematics (clearly, not a large potential audience for the book!). Consistent with such a scholarly publication, it includes excellent index, bibliography, and notes sections, with many entries being technical, from obscure journals, and/or in foreign languages.I found that my three semesters of college calculus (though no set theory) were inadequate preparation to follow many of the mathematical arguments. If you have an undergraduate or higher degree in pure mathematics, you should have no trouble.Dauben also uses a fair amount of German, and a little French and Latin, all without translation -- you’re expected to know these things.It’s possible to get a sense of Cantor’s accomplishments by simply skipping over the math and foreign languages that are beyond you, although the more prepared you are in these areas, the more you’ll get out of the book.However, if you’re interested in the history of math but want to avoid the naked technicalities, I instead recommend William Dunham’s "Journey Through Genius", which uses nothing beyond high-school mathematics. Dunham’s book has twelve readable chapters on significant mathematical discoveries, and as a measure of Cantor’s importance, he, like Euclid and Euler, gets two chapters while Archimedes, Newton, and the rest get just one.

I've just been rereading parts of this book in order to get clearer about how it was possible for Cantor to work for many years, and always with great rigor, on the ordering of the transfinite ordinals and yet still continue to reject, quite dogmatically in general, the existence of infintesimals, or "granulars" as they are sometimes called, and to do so despite numerous explications and/or personal letters from Thomae, du Bois-Reymond, Stolz, Veronese and Vivendi [not to mention Peirce and Weyl, who had no direct contact with Cantor] all of which argued -- in my view quite correctly -- that admitting the legitimacy of the transfinite ordinals immediately implied the existence of the infintesimals as well. Dauben does an admirable job of showing why and how Cantor went about trying to exclude what he calls the "Chorela-Bacillus of infintestimals" with which he believed -- wrongly as it turns out, since Leibniz and several others had already developed Real Analysis and the Calculus on the basis of such quantities -- Thomae had first "infected" mathematics. Obviously this is one of Cantor's most egregious errors, something which is easy to see from our perspective today, especially after Abraham Robinson's rigorous theorization of Non-Standard Analysis, and which ought -- I believe -- to have been fairly obvious to Cantor at the time, especially since so many other leading mathematicians of his day were lining up against him on the issue and providing serious arguments to counter his own dogmatic "immunization strategies" and the subsequent digging in of his heels. At any rate, Dauben explains all of this infintesimal denial very clearly in this biographically organized presentation of Cantor's seminal mathematical [and, albeit to a lesser extent, philosophical] insights and theorizations. All in all I would certainly give this work the full 5 stars of praise!

I found this was an excellent memoir of Cantor and his ideas. It goes far more deeply into the mathematics than other discussions of Cantor, and makes you want to read more about both set theory and about the development of topology in the early twentieth century. It also attempts to place Cantor's philosophy and mathematical ideas into a psychological context as well, which is probably appropriate - even essential - in the case of Cantor. Though, in twenty years, this aspect of the book may not wear well. All in all, it is a refreshingly strong and insightful treatment of one of the major historical figures in nineteenth century mathematics.

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