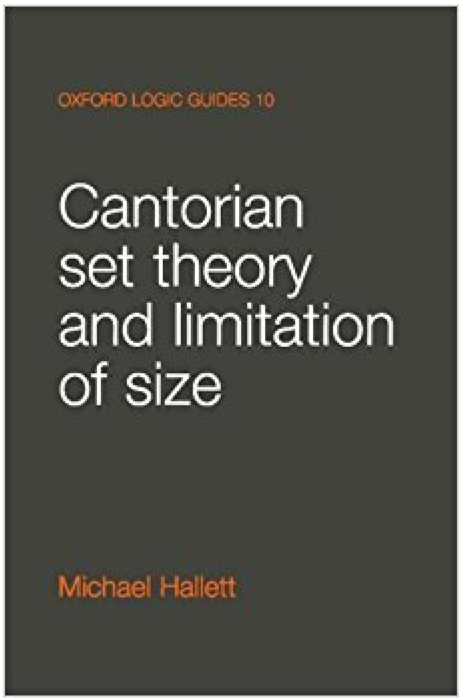
Cantorian Set Theory And Limitation Of Size (Oxford Logic Guides)



Synopsis

Cantor’s ideas formed the basis for set theory and also for the mathematical treatment of the concept of infinity. The philosophical and heuristic framework he developed had a lasting effect on modern mathematics, and is the recurrent theme of this volume. Hallett explores Cantor’s ideas and, in particular, their ramifications for Zermelo-Frankel set theory.

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Customer Reviews

"Here is the first full-length study to do justice both to the mathematical importance of Cantor’s work and to the philosophical ideas that governed it....The book is very well informed mathematically, yet much of Hallett’s perceptive comment on and his patient and sympathetic interpretation of the philosophical ideas of Cantor and the other founders of set theory will be readily intelligible to nonspecialists, making the book of great interest to mathematician and philosopher alike."--Choice"Establishes a new plateau for historical comprehension of Cantor’s monumental contribution to mathematics."--The American Mathematical Monthly

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This is BY FAR the best and most INTERESTING book available on how Cantor developed his key ideas about transfinite sets, large cardinals, ordinals etc. It contains materials that will be highly relevant to even the most advanced set theorists, while yet managing to be generally accessible to those who, like myself, have only around a B.S. mathematics degree level of understanding of the field. This ability to be of use and interest to readers with such widely varied mathematical preparations is a true tribute to the author's gift for being able to explain even very advanced concepts clearly and directly, something which is evident throughout the text, -- and unfortunately sorely missing in most mathematical texts operating at such a high level of abstraction. To be a bit more precise, I hope, persons with only a basic understanding of set theory -- something around what one should be able to glean from reading, say, Halmos' "Naive Set Theory" -- will indeed find themselves "out at sea" at times, but actually surprisingly FEW times, considering how well the author manages to unpack most of the key concepts and draw you back into the primary narrative. No doubt because this book is so much better than all its competitors, used copies, even the paperbacks, are now selling for a small fortune. [I kid you not, I just saw one listed at over $990!; though a few minutes of searching the main web book seller consolidators -- including the listings here at -- should still bag you one for under $100, at least if you act reasonably soon.] Clearly the publisher really needs to reissue this work to meet the fully justified demand! When and if they will do so, -- after all, it was last released, in its one and only paperback edition, in 1986! -- is anybody's guess. So, if you are a Cantor scholar, or a serious set theorist of any persuasion, you should probably bite the bullet and buy one now before the price really goes through the roof and you have to rely on marked-up, slowly disappearing library copies, -- until, that is, they all get stolen and resold on the web, which has happened to several classic math works already. One last thing, for those who don't really need the most sophisticated work on Cantor's intellectual development, Joseph Dauben's biography of Cantor is also very good and still widely available at a reasonable price. [His biography of Abraham Robinson is also very good by the way.]

Georg Cantor lived from 1845 to 1918. Judging from Hallet's bibliography, Cantor's publications on sets and infinity occurred in the years 1872 to 1897. A letter of 1899 to Richard Dedekind [1831-1916] is also relevant. This letter is the only writing by Cantor included in Jean van Heijenoort'sÂ From Frege to GÃ¶del: A Source Book in Mathematical Logic, 1879-1931. No letter or publication by Cantor later than 1899 is discussed in Hallet's book, although a letter from 1903 to Philip Jourdain [1879-1919] is mentioned as outlining the proof given in the 1899 letter to Dedekind, and a partial sentence is quoted from a letter to Jourdain in 1904. Ernst Zermelo [1871-1953] edited Cantor's collected works in 1932, published as Gesammelte Abhandlungen mathematischen und philosophischen Inhalts. Cantor'sÂ Contributions to the Founding of the Theory of Transfinite

NumbersÂ (translated in 1915 by Jourdain) date from 1895 and 1897, and are Cantor's last public presentations of his ideas.Hallet's book does not contain biographical details on Cantor, and it is not a general history of the rise of set theory. It is foremost an account of Cantor's conception of infinity, both metaphysical and mathematical, and of Cantor's varied presentations, in publications and letters, of his theories of cardinal and ordinal numbers. Hallett focuses tightly on Cantor's writings as he meticulously traces the development of Cantor's ideas, and only after he has established Cantor's views does Hallett include the work of others, unless he gives a joint comparison with the focus on Cantor.Cantor's set theory is not axiomatic, and although Hallett discusses to some degree, mainly in Part 2, the relationship of the axiomatic theory of sets to Cantor's conception of sets and infinity, the emphasis of the book is on Cantor's work, and only secondarily on the contributions of others as they explored and expanded on Cantor's ideas.In the first two chapters of Part 2, Hallett is less concerned with how proposed axioms combine to define a theory of sets than with how certain axioms have been discussed and justified (for example, as a means of limiting the comprehension of sets or of representing the iterative conception of sets) and with the claim that the set theoretic paradoxes are meaningfully related to Kant's antinomies of pure reason.In the final two chapters, Hallett discusses the differing systems of Zermelo and John von Neumann [1903-1957], where his focus in chapter seven is on Zermelo's axiom system in relation to his 1904 and 1908 proofs of the well-ordering theorem, and in chapter eight on von Neumann's theory of ordinals from 1923 (also anticipations of it by others), his use and clarification of the axiom of replacement first proposed by Abraham Fraenkel [1891-1965], and von Neumann's axiomatic theory of functions (not sets) of 1925.= CONTENTS =