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978-1-107-01838-9 - The Construction of the Heavens: William Herschel's Cosmology

Michael Hoskin

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The Construction of the Heavens

The astronomical observations of William Herschel (1738–1822) made him question the accepted model of the clockwork universe. This volume explains the development of Herschel's thoughts on what he called 'the construction of the heavens' and reprints his principal papers on this subject.

The preliminary chapters provide an introduction to Herschel, including his unusual path to astronomy, the discovery of Uranus and his work on the evolution of stellar clusters, which eventually led him to challenge the unchanging Newtonian universe. The second half of the text comprises eight of Herschel's key papers on what we today would call cosmology, representing his progress between 1783 and 1814, fully annotated with historical notes and modern astrophysical explanations.

Ideal for undergraduate and postgraduate students in the history of science and in astronomy, this volume explains Herschel's pivotal role in the transformation from the clockwork universe to the 'biological' universe of modern astronomy.

The author of four previous books on the Herschels, Michael Hoskin has taught history of astronomy at the University of Cambridge throughout his career. He is an Honorary Fellow of the Royal Astronomical Society, Doggett Prizewinner of the American Astronomical Society, and Jaschek Prizewinner of the European Society for Astronomy in Culture. In acknowledgement of his contributions to the history of astronomy, the International Astronomical Union has named a minor planet Hoskin.

Cover illustration (front, inset): miniature of William Herschel as a young man, artist unknown, Herschel Family Archives; (front, main): William Herschel's diagram to illustrate his theory of the solar apex, from his paper in *Philosophical Transactions*, vol. 73 (1783); (back): watercolour that accompanied the 25-ft reflector that William Herschel made for the King of Spain, courtesy of the Observatorio Astronómico Nacional, Madrid.

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*William Herschel's
Cosmology*

MICHAEL HOSKIN

Churchill College, Cambridge

with astrophysical notes by

DAVID DEWHIRST

AND

WOLFGANG STEINICKE



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Preface

Half-a-century ago, as a young historian of astronomy at Cambridge University, I published my first book, *William Herschel and the Construction of the Heavens*. Its theme was the investigations into the universe beyond the solar system that were carried out in the late eighteenth and early nineteenth centuries by the Hanoverian-born musician-turned-astronomer, William Herschel. Herschel marks the watershed separating the clockwork universe of Newton and Leibniz from the cosmos in which we live today, in which everything – even the cosmos itself – has a life history. Because Herschel's own writings on cosmology were difficult to access, being available only in the original pages of *Philosophical Transactions* or in the two massive volumes of collected works published in 1912, I also reproduced the most important of his publications on the subject. In this I was fortunate to enlist the collaboration of a Cambridge astrophysicist, David Dewhirst, who supplied extensive footnotes in which he identified the objects that Herschel was citing in his papers.

In the succeeding fifty years I have published four books and innumerable articles on William Herschel, his sister Caroline who was his collaborator, his son John, and the other members of this hugely-talented family. I have learned much in the process, and Part I of this book presents my current understanding of Herschel's work on what he termed "the construction of the heavens". Part II contains a slightly different selection of Herschel's own papers. Gone are two papers published when he was nearly eighty, which I now realize proved to be of minor significance; included are the remarks prefaced to his third and final catalogue of nebulae. After half-a-century, I once again have the collaboration of David Dewhirst, but this time he is joined by Wolfgang Steinicke, whose familiarity with the nebulae studied by Herschel and his immediate successors is unrivalled.

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John Herschel-Shorland has been generous and helpful as always. I am grateful to the Royal Astronomical Society for permission to reproduce documents from their Herschel Archive, and to their Librarian, Peter Hingley, and to the Librarian of the Cambridge University Institute of Astronomy, Mark Hurn, for many favours. Bernard Hoskin kindly drew the diagrams I use to illustrate my argument. Finally, my thanks to my editors at Cambridge University Press, with whom it has been a pleasure to collaborate.