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978-0-521-57201-9 - The Cambridge History of Science, Volume 6: The Modern Biological and Earth Sciences

Edited by Peter J. Bowler and John V. Pickstone

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### VOLUME 6

#### *The Modern Biological and Earth Sciences*

This volume in the highly respected Cambridge History of Science is devoted to the history of the life and earth sciences since 1800. It provides comprehensive and authoritative surveys of historical thinking on major developments in these areas of science, on the social and cultural milieus in which the knowledge was generated, and on the wider impact of the major theoretical and practical innovations. The chapters were written by acknowledged experts who provide concise accounts of the latest historical thinking coupled with guides to the most important recent literature. In addition to histories of traditional sciences, the volume covers the emergence of newer disciplines such as genetics, biochemistry, and geophysics. The interaction of scientific techniques with their practical applications in areas such as medicine is a major focus of the book, as is its coverage of controversial areas such as science and religion as well as environmentalism.

Peter J. Bowler is Professor of the History of Science at Queen's University in Belfast. He was president of the British Society for the History of Science from 2004 to 2006 and is a member of the Royal Irish Academy and a Fellow of the British Academy and the American Association for the Advancement of Science. He is the author of numerous books, including *Charles Darwin: The Man and His Influence*, published by Cambridge in 1996.

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Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, São Paulo, Delhi

Cambridge University Press

32 Avenue of the Americas, New York, NY 10013-2473, USA

[www.cambridge.org](http://www.cambridge.org)

Information on this title: [www.cambridge.org/9780521572019](http://www.cambridge.org/9780521572019)

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First published 2009

Printed in the United States of America

*A catalog record for this publication is available from the British Library.*

*Library of Congress Cataloging in Publication Data*

(Revised for volume 6)

The Cambridge history of science

p. cm.

Includes bibliographical references and indexes.

Contents: – v. 3. Early modern science / edited by Katharine Park and Lorraine Daston

v. 4. Eighteenth-century science / edited by Roy Porter

v. 5. The modern physical and mathematical sciences / edited by Mary Jo Nye

v. 6. The modern biological and earth sciences / edited by Peter J. Bowler and John V. Pickstone

v. 7. The modern social sciences / edited by Theodore H. Porter and Dorothy Ross

I. Science – History. I. Lindberg, David C. II. Numbers, Ronald L.

Q125C32 2001

509 – dc21

2001025311

ISBN 978-0-521-57201-9 hardback

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Cambridge University Press

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*History of the Total Hip Replacement* (with Julie Anderson and Francis Neary, 2007).

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Cambridge University Press

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DORIS T. ZALLEN holds a PhD from Harvard University and is Professor of Science and Technology Studies at Virginia Polytechnic Institute and State University. A former laboratory scientist, she now studies the social, ethical, and policy issues associated with advances in genetic medicine. She is the author of *Does It Run in the Family? A Consumer's Guide to DNA Testing for Genetic Disorders* (1997).

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## GENERAL EDITORS' PREFACE

The idea for *The Cambridge History of Science* originated with Alex Holzman, former editor for the history of science at Cambridge University Press. In 1993, he invited us to submit a proposal for a multivolume history of science that would join the distinguished series of Cambridge histories, launched nearly a century ago with the publication of Lord Acton's fourteen-volume *Cambridge Modern History* (1902–12). Convinced of the need for a comprehensive history of science and believing that the time was auspicious, we accepted the invitation.

Although reflections on the development of what we call “science” date back to antiquity, the history of science did not emerge as a distinctive field of scholarship until well into the twentieth century. In 1912, the Belgian scientist-historian George Sarton (1884–1956), who contributed more than any other single person to the institutionalization of the history of science, began publishing *Isis*, an international review devoted to the history of science and its cultural influences. Twelve years later, he helped to create the History of Science Society, which by the end of the century had attracted some 4,000 individual and institutional members. In 1941, the University of Wisconsin established a department of the history of science, the first of dozens of such programs to appear worldwide.

Since the days of Sarton, historians of science have produced a small library of monographs and essays, but they have generally shied away from writing and editing broad surveys. Sarton himself, inspired in part by the Cambridge histories, planned to produce an eight-volume *History of Science*, but he completed only the first two installments (1952, 1959), which ended with the birth of Christianity. His mammoth three-volume *Introduction to the History of Science* (1927–48), more a reference work than a narrative history, never got beyond the Middle Ages. The closest predecessor to the *Cambridge History of Science* is the three-volume (four-book) *Histoire Générale des Sciences* (1957–64), edited by René Taton, which appeared in an English translation under the title *General History of the Sciences* (1963–4). Edited just before the late-century

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boom in the history of science, the Taton set quickly became dated. During the 1990s, Roy Porter began editing the very useful Fontana History of Science (published in the United States as the Norton History of Science), with volumes devoted to a single discipline and written by a single author.

The *Cambridge History of Science* comprises eight volumes, the first four arranged chronologically from antiquity through the eighteenth century and the latter four organized thematically and covering the nineteenth and twentieth centuries. Eminent scholars from Europe and North America, who together form the editorial board for the series, edit the respective volumes:

Volume 1: *Ancient Science*, edited by Alexander Jones, University of Toronto, and Liba Chaia Taub, University of Cambridge

Volume 2: *Medieval Science*, edited by David C. Lindberg and Michael H. Shank, University of Wisconsin–Madison

Volume 3: *Early Modern Science*, edited by Katharine Park, Harvard University, and Lorraine Daston, Max Planck Institute for the History of Science, Berlin

Volume 4: *Eighteenth-Century Science*, edited by Roy Porter, late of Wellcome Trust Centre for the History of Medicine at University College London

Volume 5: *The Modern Physical and Mathematical Sciences*, edited by Mary Jo Nye, Oregon State University

Volume 6: *The Modern Biological and Earth Sciences*, edited by Peter J. Bowler, Queen's University of Belfast, and John V. Pickstone, University of Manchester

Volume 7: *The Modern Social Sciences*, edited by Theodore M. Porter, University of California, Los Angeles, and Dorothy Ross, Johns Hopkins University

Volume 8: *Modern Science in National and International Context*, edited by David N. Livingstone, Queen's University of Belfast, and Ronald L. Numbers, University of Wisconsin–Madison

Our collective goal is to provide an authoritative, up-to-date account of science – from the earliest literate societies in Mesopotamia and Egypt to the end of the twentieth century – that even nonspecialist readers will find engaging. Written by leading experts from every inhabited continent, the essays in *The Cambridge History of Science* explore the systematic investigation of nature and society, whatever it was called. (The term “science” did not acquire its present meaning until early in the nineteenth century.) Reflecting the ever-expanding range of approaches and topics in the history of science, the contributing authors explore non-Western as well as Western science, applied as well as pure science, popular as well as elite science, scientific practice as well as scientific theory, cultural context as well as intellectual content, and the dissemination and reception as well as the production of scientific knowledge. George Sarton would scarcely recognize this collaborative effort as the history of science, but we hope we have realized his vision.

David C. Lindberg  
Ronald L. Numbers