

*The Cambridge Companion to*  
John Herschel

It has been said that being scientific in Victorian England meant to be as much like John Herschel as possible. This volume shows readers what it meant to be John Herschel (1792–1871), one of England’s most prominent polymaths. Drawing on his published oeuvre and recent scholarship, as well as an immense amount of surviving archival material and correspondence, these essays present the first ever comprehensive account of Herschel’s life, work, and legacy. From mathematics and astronomy, to philosophy and politics, the volume sheds new light on his crucial role in the history of Victorian science and explores a wide array of issues in the history of nineteenth-century culture, philosophy, mathematics, and beyond.

STEPHEN CASE is a professor in the Department of Chemistry and the Geosciences, Olivet Nazarene University, and the author of *Making Stars Physical: The Astronomy of Sir John Herschel* (2018).

LUKAS M. VERBURGT is Gerda Henkel Stiftung Research Scholar and affiliated to the Netherlands Institute for Advanced Study. He has authored and coedited several books and numerous articles on the history of science and philosophy in nineteenth-century Britain.

Cambridge University Press & Assessment  
978-1-009-23770-3 — The Cambridge Companion to John Herschel  
Edited by Stephen Case, Lukas M. Verburgt  
Frontmatter  
[More Information](#)

---

*The Cambridge Companion to*  
**John Herschel**

---

*Edited by*

STEPHEN CASE

Olivet Nazarene University

LUKAS M. VERBURGT

Netherlands Institute for Advanced Study in the Humanities  
and Social Sciences



**CAMBRIDGE**  
UNIVERSITY PRESS

Cambridge University Press & Assessment  
 978-1-009-23770-3 — The Cambridge Companion to John Herschel  
 Edited by Stephen Case, Lukas M. Verburgt  
 Frontmatter  
[More Information](#)



Shaftesbury Road, Cambridge CB2 8EA, United Kingdom  
 One Liberty Plaza, 20th Floor, New York, NY 10006, USA  
 477 Williamstown Road, Port Melbourne, VIC 3207, Australia  
 314-321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre, New Delhi - 110025, India  
 103 Penang Road, #05-06/07, Visioncrest Commercial, Singapore 238467

Cambridge University Press is part of Cambridge University Press & Assessment, a department of the University of Cambridge.

We share the University's mission to contribute to society through the pursuit of education, learning and research at the highest international levels of excellence.

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

Information on this title: [www.cambridge.org/9781009237703](http://www.cambridge.org/9781009237703)

DOI: 10.1017/9781009237727

© Cambridge University Press & Assessment 2024

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press & Assessment.

First published 2024

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

*Library of Congress Cataloging-in-Publication Data*

NAMES: Case, Stephen, editor. | Verburgt, Lukas M., editor.

TITLE: The Cambridge companion to John Herschel / edited by Stephen Case, Olivet Nazarene University, Lukas Verburgt, Netherlands Institute for Advanced Study.

DESCRIPTION: Cambridge, United Kingdom ; New York, NY : Cambridge University Press, 2024. | Includes bibliographical references and index.

IDENTIFIERS: LCCN 2023034830 (print) | LCCN 2023034831 (ebook) | ISBN 9781009237703 (hardcover) | ISBN 9781009237673 (paperback) | ISBN 9781009237727 (ebook)

SUBJECTS: LCSH: Herschel, John F. W. (John Frederick William), 1792-1871. | Astronomers—Great Britain—Biography | Astronomy—History—19th century. | Astronomers—South Africa—Biography. | Astronomy—South Africa—History—19th century.

CLASSIFICATION: LCC QB36.H59 C36 2024 (print) | LCC QB36.H59 (ebook) | DDC 520.92 [B]—dc23

LC record available at <https://lcn.loc.gov/2023034830>

LC ebook record available at <https://lcn.loc.gov/2023034831>

ISBN 978-1-009-23770-3 Hardback

ISBN 978-1-009-23767-3 Paperback

Cambridge University Press & Assessment has no responsibility for the persistence or accuracy of URLs for external or third-party internet websites referred to in this publication and does not guarantee that any content on such websites is, or will remain, accurate or appropriate.

## Contents

*List of Figures* page vii

*List of Contributors* ix

*Acknowledgments* xii

*Chronology* xiii

### Introduction

STEPHEN CASE AND LUKAS M. VERBURGT 1

#### 1 John Herschel: A Biographical Sketch

EMILY WINTERBURN 12

#### 2 The Mathematical Journey of John Herschel

TONY CRILLY 35

#### 3 John Herschel's Astronomy

STEPHEN CASE 55

#### 4 Stargazer at World's End: John Herschel at the Cape, 1833–1838

STEVE RUSKIN 77

#### 5 Herschel's Philosophy of Science: *The Preliminary Discourse on the Study of Natural Philosophy* and Beyond

LUKAS M. VERBURGT 99

vi Contents

- 6 Drawing Observations Together: John Herschel and the Art  
of Drawing in Scientific Observations  
OMAR W. NASIM 127
- 7 Photology, Photography, and Actinochemistry: The  
Photographic Work of John Herschel  
KELLEY WILDER 160
- Appendix: Herschel's Vegetable Colors  
CAROLIN LANGE 179
- 8 Herschel's Planet: Earth in Cosmic Perspective  
GREGORY A. GOOD 186
- 9 John Herschel and Scientific Standardization  
EDWARD J. GILLIN 209
- 10 John Herschel and Politics  
WILLIAM J. ASHWORTH 231
- 11 John Herschel's Methodology in the Scientific Community  
CHARLES H. PENCE 257
- Further Reading* 280  
*Index* 285

## Figures

- 4.1 Twenty-foot telescope at Feldhausen page 83
- 4.2 Herschel memorial obelisk at Feldhausen 87
- 6.1 No. 322. John Herschel, *Glacier of Zermatt with the summit* (1) ascended on September 7. 20.1 × 29.9 cm. (From Larry J. Schaaf, *Tracings of Light: Sir John Herschel & the Camera Lucida* [1989]) 132
- 6.2 Frontispiece to *Description of the camera lucida: an instrument for drawing in true perspective, and for copying, reducing, or enlarging other drawings: to which is added . . . A letter on the use of the camera l by Capt. Basil Hall* (Sold by G. Dollond, optician to His Majesty, 59, St. Paul's Church Yard, London, who was the sole manufacturer of this instrument to the patentee, the late Dr. W. H. Wollaston [1830]) 135
- 6.3 No. 517 "enlarged copy . . . made for Mrs. Babbage," from No. 322 *Glacier of Zermatt with the summit*. 21.0 × 30.7 cm. (From Larry J. Schaaf, *Tracings of Light: Sir John Herschel & the Camera Lucida* [1989]) 137
- 6.4 No. 298 John Herschel, *Valley of Fassa from Opposite Gries* (August 1824). Note Herschel's annotations throughout the drawing, including notes on lighting, thickness of trees, location of dolomite rock deposits, etc. 139
- 6.5 Engraved drawing of "The Great Nebula in the Sword-handle of Orion as seen in the Twenty-feet Reflector at Feldhausen," in John Herschel's *Cape Results* (1847), plate VIII 148
- 7.1 John Herschel. *Photographic Memoranda*, photographic fixing experiments 710–714. c.1839 (Harry Ransom Humanities Research Center, Austin, Texas) 166

viii List of Figures

- 7.2 Photographed spectra in “Experiments on the Photographic Sensibilities of Salts of Supposed New Elements Made with the Spectroscopic Camera by Sir J. Herschel Bart. at Collingwood April–Sept. 1859.” 172
- 7.3 John Herschel, Chrysotype images supplied with Art. 212, Herschel. 1842 paper (Royal Society Library) 175
- 7.4 Observations on sunspots using cyanotype “blanks” or forms (Royal Astronomical Society. Observations made in May 1871) 177
- 7.5 Reworking Herschel’s experiment 1183 with elder leaves using a modern reconstruction of Herschel’s “spectroscopic camera” and plant-based chemistry (Carolin Lange, August 6, 2022, 10:30–11:30 a.m.) 180
- 11.1 The young Charles Darwin, in a watercolor portrait painted by George Richmond in the late 1830s (Public domain) 264
- 11.2 Michael Faraday, painted in 1842 by Thomas Phillips (Public domain) 269

## Contributors

WILLIAM J. ASHWORTH is Reader in History at the University of Liverpool. He is the author of *Customs and Excise: Trade, Production and Consumption in England 1640–1845* (2003), *The Industrial Revolution: The State, Knowledge and Global Trade* (2017), and *The Trinity Circle: Anxiety, Intelligence, and Knowledge Creation in Nineteenth-Century England* (2021).

STEPHEN CASE is a professor in the Department of Chemistry and the Geosciences at Olivet Nazarene University. He is the author of *Making Stars Physical: The Astronomy of Sir John Herschel* (2018) and the forthcoming *Creatures of Reason: John Herschel and the Invention of Science*.

TONY CRILLY is Emeritus Reader in Mathematical Sciences at Middlesex University. His principal research interest is the history of mathematics. He has written and edited works on fractals, chaos, and computing, is the author of *Arthur Cayley: Mathematician Laureate of the Victorian Era* (2005), and is completing a biography of mathematician Thomas P. Kirkman.

EDWARD J. GILLIN is Lecturer in the History of Building Sciences and Technology at the Bartlett School of Sustainable Construction, UCL. His books include *Entente Imperial: British and French Power in the Age of Empire* (2022), *Sound Authorities: Scientific and Musical Knowledge in Nineteenth-Century Britain* (2022), and *An Empire of Magnetism: Global Science and the British Magnetic Enterprise in the Age of Imperialism* (2024).



x List of Contributors

GREGORY A. GOOD is Director Emeritus of the Center for History of Physics, American Institute of Physics. He writes about the history of the earth sciences from the time of John Herschel to the twenty-first century. His current books are on astronomers' research on the earth and on space weather.

CAROLIN LANGE is an artist specializing in experimental photography and spectroscopy of the 19th century. Her work has been exhibited internationally at the Platform for Contemporary Art TENT and at the Center for Art and Media ZKM, among others. She is currently an M4C funded PhD candidate at the Photographic History Research Centre at De Montfort University, Leicester.

OMAR W. NASIM is Professor of the History of Science at the University of Regensburg in Germany. Nasim's research centers on the formation of knowledge historically considered, especially at the intersections of material, visual, and intellectual cultures. He is the author of the award-winning book *Observing by Hand: Sketching the Nebulae in the Nineteenth Century* (2013) and, more recently, *The Astronomer's Chair: A Visual and Cultural History* (2021).

CHARLES H. PENCE is a lecturer at the Université catholique de Louvain in Louvain-la-Neuve, Belgium, where he directs the Center for Philosophy of Science and Societies (CEFISES). He also serves as a coeditor of the journal *Philosophy, Theory, and Practice in Biology* (*PTPBio*). His work centers on the philosophy and history of biology, with a focus on the introduction and contemporary use of chance and statistics in evolutionary theory.

STEVEN RUSKIN's work focuses on the history of nineteenth-century science, specifically astronomy, exploration, and the field sciences. He is the author of *John Herschel's Cape Voyage: Private Science, Public Imagination, and the Ambitions of Empire* (2004) and *America's First Great Eclipse: How Scientists, Tourists, and the Rocky Mountain Eclipse of 1878 Changed Astronomy Forever* (2017).

LUKAS M. VERBURGT is currently a Gerda Henkel Stiftung Research Scholar and affiliated as Research and Project Associate to

the Netherlands Institute for Advanced Study in the Humanities and Social Sciences. His main research focus is the changing relationship between science and philosophy in the long nineteenth century, especially in Victorian Britain. He is the author of numerous articles and (co)editor of several volumes, including *Aristotle's Syllogism and the Creation of Modern Logic* (2023) and the forthcoming *Cambridge Companion to Charles Babbage*.

KELLEY WILDER is Professor of Photographic History and Director of the Photographic History Research Centre at De Montfort University, Leicester, UK. She has published widely on material cultures of nineteenth- and twentieth-century photography and science, including *Photography and Science* (2009) and *Documenting the World: Film, Photography and the Scientific Record* (2016, with Gregg Mitman).

EMILY WINTERBURN has served as Curator at the Royal Observatory, Greenwich, and as a research fellow at the Centre for History and Philosophy of Science, University of Leeds. She is the author of *The Stargazer's Guide: How to Read Our Night Sky* (2009) and *The Quiet Revolution of Caroline Herschel: The Lost Heroine of Astronomy* (2017).

### *Acknowledgments*

We would like to express our gratitude to the late Michael Hoskin and to Michael Crowe, who together have done much to move Herschel scholarship forward since the early work of Susan Faye Canon. We acknowledge permission from the following institutions to quote from materials held in their collections: the British Library; the Harry Ransom Center, University of Texas, Austin; National Maritime Museum; Royal Society; Science Museum Group; St John's College and Trinity College, Cambridge; and Yale University. Lukas Verburgt acknowledges support from a Gerda Henkel Stiftung research grant (AZ 23/F22).

## Chronology

- 1792 Born, March 7, only child of William Herschel and Mary Pitt (née Baldwin) in Slough
- 1800 Attended Eton College for three months
- 1800–09 Educated at a private school in Hitcham, near Slough, led by George Gretton, graduate of Trinity College, Cambridge, and later dean of Hereford
- 1802 Traveled with his parents to Paris, where his father and others, including Pierre-Simon Laplace, had an audience with Napoleon Bonaparte
- 1809 Entered St John's College, Cambridge
- 1809–10 Occasional factory visits around Britain with his father, recorded in a "Travel Diary"
- 1813 Graduated Senior Wrangler; awarded First Smith's Prize; elected fellow of St. John's College (relinquished upon his marriage in 1829); elected fellow of the Royal Society; founding member and first president of the Analytical Society; publication of *Memoirs of the Analytical Society*, composed together with Charles Babbage
- 1814 Entered Lincoln's Inn to train for the Bar
- 1815 Returned to Cambridge as mathematics "subtutor" and examiner at St. John's College
- 1816 Publication of translation of S. F. Lacroix, *An Elementary Treatise on the Differential and Integral Calculus*, cotranslated with Babbage and George Peacock; left Cambridge in October for the family house in Slough

xiv Chronology

- (“Observatory House”) to be “going, under his father’s direction, to take up star-gazing”
- 1820 Publication of *A Collection of Examples of the Application of the Calculus of Finite Differences*; founding member of the Astronomical Society of London, renamed Royal Astronomical Society in 1831
- 1821 Awarded Royal Society’s Copley Medal for mathematical contributions to its transactions
- 1821–23 Collaboration with James South on the (re)observation of double stars
- 1822 Death of father, William Herschel, aged 83
- 1823 Publication of work on optical spectra of metal salts in *Transactions of the Royal Society of Edinburgh*
- 1824–27 Secretary of the Royal Society
- 1825 Awarded French Academy of Sciences’ Lalande Prize with James South; invented the actinometer, to measure heating power of the sun’s rays
- 1826 Awarded Astronomical Society’s gold medal for work with his father
- 1827 Publication of “Light” in the *Encyclopaedia Metropolitana*
- 1827–29 First period as president of the Astronomical Society, later periods followed in 1839–41 and 1847–49
- 1829 Marriage to Margaret Brodie Stewart (1810–84)
- 1830 Candidate for presidency of the Royal Society, lost to the duke of Sussex; birth of first of a total of twelve children, Caroline Herschel (†1909)
- 1831 Publication of *A Preliminary Discourse on the Study of Natural Philosophy*; made Knight of the Royal Guelphic Order
- 1832 Elected Foreign Honorary Member of the American Academy of Arts and Sciences
- 1833 Publication of *A Treatise on Astronomy*; awarded French Academy of Sciences’ Lalande Prize
- 1834–38 Lived and worked at Feldhausen, Cape Town, South Africa, where he erected a twenty-foot reflecting telescope, the site of which was marked by a stone obelisk in 1842; produced 131 botanical illustrations with his wife, using a camera lucida (later published as *Flora Herscheliana*)

- 1836 Awarded Astronomical Society's gold medal; elected Foreign Honorary Member of the Royal Swedish Academy of Sciences; birth of second son, Alexander Stewart Herschel (†1907), astronomer
- 1837 Endorsement of Charles Lyell's gradualist (or "uniformitarian") view of geological change, included in Babbage's unofficial *Ninth Bridgewater Treatise*
- 1838 Created baronet of Slough in the county of Buckingham
- 1839 First glass-plate photograph, showing his father's forty-foot telescope
- 1839–40 Read two papers on "photography" (a term of his coinage) to the Royal Society
- 1840 Awarded Royal Society's gold medal for contributions to the development of photographic techniques
- 1841 Birth of fifth daughter, Amelia Herschel (†1926), with William Whewell as godfather
- 1842 Invented the cyanotype process (blueprints)
- 1847 Publication of *Results of Astronomical Observations made at the Cape of Good Hope*; awarded Royal Society's Copley Medal for Cape "Results"
- 1849 Publication of *Outlines of Astronomy*
- 1850–54 Master of the Mint
- 1854 Elected member of the American Philosophical Society
- 1855 Birth of ninth daughter, Constance Anne Herschel (†1939), later lecturer in natural sciences at Girton College, Cambridge
- 1859 Published a study of color blindness in *Philosophical Magazine*
- 1864 Publication of *General Catalogue of Nebulae and Clusters*
- 1865–71 Compiled a catalog of all known double and multiple star systems, which appeared posthumously in 1874 as *General Catalogue of 10,300 Multiple and Double Stars*
- 1866 Publication of *The Iliad of Homer: Translated into English Accentuated Hexameters*
- 1871 Died, May 11, at home in Collingwood, Kent, aged 79; received a national funeral and buried in Westminster Abbey, London