

REALISM FOR REALISTIC PEOPLE

In this innovative book, Hasok Chang constructs a philosophy of science for 'realistic people' interested in understanding and promoting the actual practices of inquiry in science and other knowledge-focused areas of life. Inspired by pragmatist philosophy, he reconceives the very notions of reality and truth on the basis of his concept of the 'operational coherence' of epistemic activities and offers new pragmatist conceptions of truth and reality as operational ideals achievable in actual scientific practice. Rejecting the version of scientific realism that is concerned with claiming that our theories correspond to an ultimate reality, he proposes instead an 'activist realism': a commitment to do all that we can actually do to improve our knowledge of realities. His book will appeal to scholars and students in philosophy, science and the history of science, and all who are concerned about the place of science and empirical truth in society.

HASOK CHANG is the Hans Rausing Professor of History and Philosophy of Science at the University of Cambridge. He is the author of *Inventing Temperature: Measurement and Scientific Progress* (2004), joint winner of the 2006 Lakatos Award, and of *Is Water H*, *O? Evidence, Realism and Pluralism* (2012).



REALISM FOR REALISTIC PEOPLE

A New Pragmatist Philosophy of Science

HASOK CHANG

University of Cambridge





CAMBRIDGEUNIVERSITY PRESS

Shaftesbury Road, Cambridge CB2 8EA, United Kingdom
One Liberty Plaza, 20th Floor, New York, NY 10006, USA
477 Williamstown Road, Port Melbourne, V1C 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 Information on this title: www.cambridge.org/9781108470384

DOI: 10.1017/9781108635738

© Hasok Chang 2022

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 2022

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

ISBN 978-1-108-47038-4 Hardback

Cambridge University Press 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.



> To Gretchen Siglar, for her curiosity, her insight and her love



Contents

List of Illustrations		
Αι	cknowledgements	Х
In	atroduction	I
	What Is the Problem?	I
	Pragmatist Notions of Knowledge, Truth and Reality	3
	Scientific Realism as Realistic Activism	6
	What Kind of Book Is This?	8
	A Note on Structure	11
I	Active Knowledge	12
	1.1 Overview	12
	1.2 Epistemic Agents	27
	1.3 Epistemic Activities and Systems of Practice	33
	1.4 Operational Coherence	40
	1.5 Inquiry as Aim-Oriented Adjustment	48
	1.6 Pragmatism and Active Knowledge	57
2	Correspondence	68
	2.1 Overview	68
	2.2 Correspondence Realism: Between Metaphysics and Semantics	s 83
	2.3 Can Reference Save Correspondence Realism?	92
	2.4 Faith in Science	100
	2.5 Real Representations	III
3	Reality	119
	3.1 Overview	119
	3.2 How Mind-Framing Works	131
	3.3 The Achievement of Reality	142
	3.4 Ontological Pluralism	148
	3.5 Putting Things Together	155

vii



viii	Contents	
4	Truth	163
	4.1 Overview	163
	4.2 Different Kinds of Truth	173
	4.3 Empirical Truth and Operational Coherence	179
	4.4 Truth as a Quality	186
	4.5 Plurality and Incommensurability	192
	4.6 Rehabilitating the Pragmatists	197
5	Realism	204
	5.1 Overview	204
	5.2 Pragmatism and Realism	216
	5.3 Internal and Perspectival Realism	223
	5.4 Pluralism and Realism	231
	5.5 Epistemic Iteration Revisited	239
	5.6 Progress and the Scientific Realism Debate	247
Closing Remarks		252
	A Humanist Vision of Knowledge	252
	The Road Ahead	253
	Bringing Philosophy Back to Life	254
Bibi	liography	256
Inde		275



Illustrations

I.I	An experimental arrangement demonstrating the	
	electromagnetic effect first discovered by	
	Hans Christian Ørsted	page 52
1.2	Faraday's compact rotation device	55
2.1	Ball-and-stick molecular models by August Hofmann	112



Acknowledgements

So many people have helped in the making of this book that I will not be able to list anywhere near all of them here. I will do my best to note my most salient debts, with apologies and thanks to all those who will have to go unnamed.

First of all I want to thank all of my family members near and far for being there for me, especially my parents back in Seoul, whose steadfast love and support never will wane.

I could never have completed this project without the privilege of a three-year research leave that I enjoyed as a British Academy Wolfson Research Professor. Being selected for this honour also gave me the assurance that this project was worth doing. I thank the British Academy and the Wolfson Foundation most sincerely.

I would like to thank all the people at Cambridge University Press who helped bring this book out into this world. Most of all I thank Hilary Gaskin for her long-term encouragement and support, and patience with my changing plans and ever-slipping schedule. I would also like to thank Neena Maheen and colleagues at Straive for the production work. And Damian Love's expert and meticulous attention in copyediting has been a true blessing.

This book could not at all have become what it is without the generous help of Philip Kitcher, who encouraged and instructed me in this direction of work for many years. Crucially, he helped me gain the British Academy award, reviewed the proposal for this book and then the full manuscript for the press, and gave me what I will always think of as the shining exemplar of constructive criticism. And he did it all without ever having any obligation to mentor me. In a very similar vein I would also like to record my deep thanks to Martin Carrier.

Equally indispensable has been the help from my 'Angels' (PhD students and others), who worked as my 'pacemakers' as I raced to make the first full draft of this book, and gave me endless advice and encouragement.



Acknowledgements

хi

Those weekly Zoom meetings through the coronavirus pandemic will live forever in my fond memory. I thank especially Céline Henne, Oscar Westerblad, Helene Scott-Fordsmand, Emilie Skulberg and Bob Vos; equally insightful feedback, though less extensive, came from Sarah Hijmans, Milena Ivanova, Hannah Tomczyk, Agnes Bolinska, and Grace Field. I also thank Daniel Ott, Rory Kent and Henrique Gomes for their contributions. The Angels also continue to be my own European Union through the dark days of Brexit.

Similarly, at earlier stages of work, groups at some leading centres of philosophy of science have provided memorable formative occasions for my work on this project. I will always remember with great appreciation the seminars and reading groups at Bielefeld (hosted by Martin Carrier), Tartu (Ave Mets and Endla Lõhkivi), Edinburgh (Michela Massimi) and UCL/LSE (Chiara Ambrosio and Roman Frigg). Also important have been occasions to present my work at the Aristotelian Society (Hannah Carnegy, Guy Longworth), Leeds (Greg Radick), Hanyang University (Sang Wook Yi), Vienna (Martin Kusch, Fritz Stadler, Elisabeth Nemeth), Ghent (Erik Weber), Oxford (Simon Saunders, Harvey Brown), TU-Berlin (Friedrich Steinle), Pardubice (Filip Grygar), Pittsburgh (Sandy Mitchell), LOGOS and UAB in Barcelona (Carl Hoefer, Genoveva Martí, Thomas Stürm and Silvia de Bianchi), Bern (Andrea Loettgers), Simon Fraser (Holly Andersen), Toronto (Hakob Barseghyan), Montevideo (Lucía Lewowicz) and many other places, as well as various conference series including SPSP, &HPS, PSA, CLMPST and the European Pragmatism Conference. I thank not only the people named above as my main hosts, but many others who lent me their thoughts and ears on all those occasions.

There are a number of other people that I would like to thank for their helpful critical and constructive feedback on earlier versions of various parts of this book over many years. It is impossible to mention all of them, but I especially want to mention Nancy Cartwright, Roberto Torretti, Paul Teller, Miriam Solomon, Léna Soler, Jamie Shaw, Mike Stuart, Alison Wylie, Sabina Leonelli, Jeremy Butterfield; and also Anna Alexandrova, Rachel Ankeny, Theodore Arabatzis, Marina Banchetti, Ann-Sophie Barwich, Mieke Boon, Karim Bschir, Julia Bursten, Anjan Chakravartty, Alan Chalmers, Mazviita Chirimuuta, Stijn Conix, Claudia Cristalli, Adrian Currie, Henk de Regt, Stuart Firestein, Dagfinn Føllesdal, Peter Galison, Marta Halina, Clevis Headley, Robin Hendry, Gerald Holton, Phyllis Illari, Alistair Isaac, Katie Kendig, Ken Kendler, Helen Lauer, Tim Lewens, Geoffrey Lloyd, Cheryl Misak, Miguel Ohnesorge, Themis



xii

Acknowledgements

Pantazakos, Lydia Patton, Huw Price, Karoliina Pulkkinen, Ken Schaffner, Dunja Šešelja, William Simpson, George Smith, Christian Straßer, Mauricio Suárez, Katie Tabb, Dave Teplow, Nick Teh, Peter Vickers, Rick Welch, Bill Wimsatt and Jim Woodward.

Nearer home, I thank my colleagues, students and other members and associates of the Department of History and Philosophy of Science at the University of Cambridge for providing a most congenial and stimulating intellectual environment and first-rate library resources and administrative support.

Through all these interactions and many others, I have felt that a certain global scholarly village felt the need for a book like this, and somehow nominated me to write it. In actual practice this meant that when I presented earlier versions of the material contained in this book, so many of you encouraged me so enthusiastically but also told me that I needed to do more, and better. I especially have in mind the community that formed through the Society for Philosophy of Science in Practice (SPSP). This book is for you, and I hope it is worth the wait.