



Reduction and Emergence in Science and Philosophy

Grand debates over reduction and emergence are playing out across the sciences, from superconductors to slime mold, but these discussions have reached a stalemate with both sides declaring victory on empirical grounds. This book provides new theoretical frameworks which illuminate the novel positions of scientific reductionists and emergentists, the recent empirical advances that drive these new views, and the deeper issues in their ongoing battles. Carl Gillett highlights the flaws in existing philosophical frameworks and shows how philosophical discussions can be reoriented to reflect recent scientific advances and the new set of issues which they raise – including collectives and their behavior, the nature of “parts” and “wholes,” the character of aggregation, and hence the continuity of nature itself. His book also shows how the ongoing disputes about concrete scientific cases are empirically resolvable, and thus how we can break the scientific stalemate in future work.

CARL GILLETT is Professor of Philosophy at Northern Illinois University. He is the editor of *Physicalism and its Discontents* (with Barry Loewer, Cambridge, 2001) and the author of numerous journal articles.

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Contents

<i>Preface</i>	<i>page vii</i>
Introduction	1
Part I Groundwork	27
1 Scientific Composition, the Universe, and Everything: Or, Reductionism and Emergentism in the Sciences and Philosophy	29
2 A Beginning Framework for Scientific Composition	62
Part II The Roots of Reduction	101
3 How to be a Scientific Reductionist: Defending “Nothing But” Claims and an Ultimate Scientific Image	103
4 Understanding Scientific Reductionism: Fundamentalist Views of Ontology, Laws, Sciences, and Methodology	140
Part III The Fruits of Emergence	171
5 The Varieties of Emergence: On Their Natures, Purposes, and Obligations	173
6 A Whole Lot More From “Nothing But”: Conditioned Aggregation, Machresis, and the Possibility of Strong Emergence	200
7 Understanding Scientific Emergentism: A Mutualist Nature and its Interdependent Levels, Laws, and Sciences	234

vi		<i>Contents</i>
	Part IV New Landscapes, New Horizons	267
8	Our Competing Visions of Nature and the Sciences: Illuminating the Deeper Debates and Viable Positions	269
9	Making the Issues Concrete: The Scientific Hypotheses and Their Empirical Differences	299
10	The Age of Reduction versus the Age of Emergence: What Has Been Successfully Shown from the Sciences (So Far)	322
	<i>Glossary</i>	356
	<i>Bibliography</i>	363
	<i>Index</i>	380

Preface

The challenge and the crackling of thin ice are what give science its metaphysical excitement.

– E. O. Wilson¹

Our opening passage from the prominent scientific reductionist E. O. Wilson highlights how some of the most exciting debates in the sciences are metaphysical, ongoing, and of real import – or so I seek to show in this book. These scientific battles over reduction, emergence, and the structure of nature are what drew me into philosophy as a student from a planned career in the sciences. Philosophers of science had long discussed “reduction,” and to a lesser extent “emergence,” so it seemed obvious that philosophy was the place to look for insight. However, over the years since my switch into philosophy it has slowly dawned on me that philosophical frameworks are actually now part of the problem in our stalemated discussions about reduction and emergence.

One of my main contentions in this book is that philosophical discussions need to be refreshed by a re-engagement with the sciences, but my main work is to illuminate what is at issue in the scientific discussions. Rather than providing a comprehensive treatment of every researcher in the voluminous literature on reduction and emergence, spanning science and philosophy, I consequently focus on providing a story about the main scientific positions and I therefore apologize to writers whose work I have not critically engaged in depth or sometimes at all. Instead, I pursue the positive project of laying out better theoretical frameworks for understanding the scientific debates, their live positions, and deeper issues to highlight how empirical evidence can move these discussions forward. Along the way, I also detail why, and how, philosophical frameworks need to be refreshed and reoriented given my findings about the scientific debates.

¹ Wilson (1998), p. 55.

Although I wrote a doctoral thesis in the philosophy of mind, I was especially lucky to work in graduate school at Rutgers with Jerry Fodor, Barry Loewer, and Brian McLaughlin, who are all central figures in philosophical debates over reduction and emergence. In particular, Brian's seminal graduate course on the British emergentists ignited my interest in scientific positions and my concerns about existing philosophical frameworks. I have subsequently discussed the issues of the book with many people over the years and I apologize to anyone I have forgotten. But I recall productive discussions with: Ken Aizawa, Colin Allen, Mark Bedau, Charlotte Brown, Craig Callender, John Churchill, Lenny Clapp, Carl Craver, Seth Crook, Michael Esfeld, Jerry Fodor, Jeff Goldstein, Cleo Kearns, Jaegwon Kim, Paul Lodge, Barry Loewer, Jonathan Lowe, Brian McLaughlin, Andrew Melnyk, Ted Morris, Tim O'Connor, David Papineau, Tom Polger, Bill Ramsey, Bob Richardson, Brad Rives, Christian Sachse, J. R. Schrader, Larry Shapiro, Sydney Shoemaker, Mark Siderits, Michael Silberstein, Jim Simeone, Achim Stephan, Leopold von Steubenberg, Jackie Sullivan, Sven Walter, Fritz Warfield, Jessica Wilson, Gene Witmer, and Julie Yoo. I owe special thanks for the comments of my NIU colleagues Hal Brown and Valia Allori, who were members of a reading group that worked through a very rough, early draft of the book. And I am also grateful for discussion with the many wonderful NIU graduate students in that group, and in classes where I presented related material, including: Matt Babb, Rene Bolinger, Brian Chambliss, Dean Da Vee, Louis Gulate, Travis Hobbs, Mike McCourt, Brock Rough, Amy Seymour, Jeff Snapper, Peter Van Elswyk, and Jason Winning, amongst others. I am also grateful for the comments of three reviewers of the manuscript, an anonymous referee, and especially Andrew Melnyk and William Hasker, who generously followed up their reports with still further productive comments and conversations.

A lot of other people have supported me over the years, starting with two wonderful colleagues who were my department chairs, and I am thankful to Charlotte Brown, at IWU, and David Buller, at NIU, for all their help. A very early draft of the book was completed in a semester's research leave from teaching supported by a grant from the Templeton Foundation, for which I am grateful. Thanks are also due to my ever-accommodating Cambridge University Press editor Hilary Gaskin. And I owe thanks to Jonathan Lowe for his help placing the book with the Press and I am very sad that he is not with us to see it

Preface

ix

come out. I am also especially grateful to Barry Loewer and Jaegwon Kim for their intellectual and personal support over the years, which helped me in ways great and small.

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