A Philosophical Guide to Chance

It is a commonplace that scientific inquiry makes extensive use of probabilities, many of which seem to be *objective chances*, describing features of reality that are independent of our minds. Such chances appear to have a number of paradoxical or puzzling features: they appear to be mind-independent facts, but they are intimately connected with rational psychology; they display a temporal asymmetry, but they are supposed to be grounded in physical laws that are time-symmetric; and chances are used to explain and predict frequencies of events, although they cannot be reduced to those frequencies. This book offers an accessible and non-technical introduction to these and other puzzles. Toby Handfield engages with traditional metaphysics and philosophy of science, drawing upon recent work in the foundations of quantum mechanics and thermodynamics to provide a novel account of objective probability that is empirically informed without requiring specialist scientific knowledge.

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Preface

When I began writing this book, I believed that I had identified a realist theory of chance which – though not entirely novel – had not been defended as well as it might have been. My book was to have been the definitive presentation and defence of a realist account.

Roughly six years later, I have come to appreciate much better the enormous difficulties facing not only that theory, but all realist accounts of chance, and I find myself in the mildly embarrassing position of writing the preface to a book in which I defend a modest form of anti-realism. In some sense, I now believe, Hume was correct to say that chance has no 'real being' in nature (Hume 1902 [1777]: §8, part I).

During this gradual conversion, becoming better acquainted with the literature, I frequently found the going rather difficult. Much of the literature is very technical, to the point of being inaccessible to many readers, including myself. This is unfortunate. Our best physical theories strongly suggest that chances are a fundamental part of reality. If we are to understand and evaluate these claims, we need to understand philosophical and scientific debates about chance. In consequence, I have written this book, not merely as a vehicle for my own ideas, but also to introduce the philosophy of chance to the broadest possible audience. While I don't pretend that the material is always easy, I expect it should at least be accessible to any tertiary-level reader.

To keep the main line of argument as uncluttered as possible, I have set more technical material and asides which pursue debates of more narrow interest in text boxes. The reader can omit these without fear of losing the main plot. Suggestions for further reading can be found in the footnotes.

I have been fortunate in my friends and colleagues, who have provided invaluable assistance throughout this project.

My greatest thanks go to John Bigelow, Antony Eagle, Patrick Emerton, Lloyd Humberstone, Barry Loewer, and Alastair Wilson, each of whom has read drafts of more than one chapter and provided extremely thoughtful comments and suggestions. I also received some very helpful guidance from an anonymous reader for Cambridge University Press.

Individual chapters benefited from the comments of Stephen Barker, Rachael Briggs, Daniel Cohen, Nina Emery, Steve Gardner, Hilary Greaves, Carl Hoefer, Jenann Ismael, Aidan Lyon, Harry Perlman, Huw Price, and Paul Tappenden. In 2009, a reading group at Monash discussed what was destined to become roughly Chapters 2–7. I am grateful to all the participants, but especially to Alexander Bird, Joshua Luczak, Bryan Paton, and Joel Reicher. Earlier versions of the material were presented to audiences at MIT, Monash, Rutgers, the University of Sydney, Kyung Hee University, and ANU. A sabbatical at MIT in the fall of 2009 was a marvellous environment in which to consolidate my work on the later chapters.

And finally, I'm grateful to many people for stimulating conversations about chance while I have been working on the topic, but most especially to David Albert, John Bigelow, Barry Loewer, Huw Price, Jonathan Schaffer, and Alastair Wilson.