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Preface

It was inevitable that I would eventually write on empiricism. However, it was not obvious to me, until recently. For a long time, I did not see that much of my work relied tacitly on the idea that experience has a unique capacity to inform us of contingent facts. That idea, I now see, forms an essential part of the solution to a problem that has driven my research from the outset. I have long harbored a fascination with science and its far-reaching successes. How could we meager humans discover so much of such profound depth about the world? I had to understand how this magic worked.

A large part of the solution lay in inductive inference. It is the logic that connects our experience of the world with those profound discoveries. The goal of my work on the material theory of induction was to find an account of inductive inference rich enough to be applied to specific cases in the history of science, while, at the same time, vindicating the cogency of the inferences.

In these efforts, I had given little attention to experience as the font from which the inductive inferences drew. My optimism about science inclined me towards the scientific realism that came to prominence over the last half century. Scientific realism was then engaged in mortal combat with an implacable foe, empiricism, or, more precisely, the constructive empiricism devised by Bas van Fraassen. This empiricism is profoundly skeptical of the successes of science so prized by realists. It was an unappealing doctrine. I was loath to embrace empiricism. What resulted was an enduring, but hidden tension in my work, which drew heavily on the power of experience. My critiques of thought experiments and the philosophical literature on causation and possibility were, it became clear to me, driven by a deep commitment to empiricism.

The defining turn was a recognition of something I had long known but to which I had paid little attention. The empiricism routinely expressed by scientists is different from the skeptical empiricism of the past few decades of philosophy of science. The scientists had recognized that their successes depend essentially on a solid foundation in experience. That foundation is just a beginning. From it, they can infer securely to core results in their science that are quite remote from experience. The skeptical empiricism of philosophy of science has two parts. First, experience has the unique capacity to inform us of the world. Second, all we can

learn from experience is the content of that experience itself. The scientists had fully embraced the first part, but, perhaps unwittingly, fully dispensed with the second.

The scientists were right in their conception of empiricism and we philosophers were wrong. The scientists' empiricism formed the starting point for my present reconfiguration of empiricism as a doctrine capable of recounting and vindicating the successes of science. Once I had decided on this project, it was immediately clear that the very concept of experience itself needed extensive revision. The notion still routinely employed in philosophy and philosophy of science was one introduced in the seventeenth and eighteenth century. Experience was equated with the excitations of our sense organs; and the processing of that experience was still often understood in terms of our mental processes. Modern science has moved far from this conception. Experience now includes instrumental sensings and the mechanized processing of what is sensed.

We need, I realized, an empiricism that responds to how science is in the twenty first century. As I write these words, it is nearly four years since I began writing on this project. The result contains many more words than I had expected. There are now seventeen chapters that recount the history of empiricism, develop and defend the version of empiricism I advocate, "small-e empiricism," and report some of its consequences.

In this project I have been helped by many, who have politely suffered my rambling speeches over my latest excitement and my peculiar queries over what to them must surely seem to be on the outermost edge what is reasonable. My habit is to offer specific thanks to individuals in the chapters to which their help is pertinent. As to the overall project, it has benefited greatly from the stimulating intellectual environment provided by the faculty and graduate students in my Department of History and Philosophy of Science; and by the Fellows visiting in the Center for Philosophy of Science, both at the University of Pittsburgh.

I owe a special thanks to the students who participated in my graduate seminar on "Empiricism in Science" in my department in the spring of 2024. My thanks to Jim Brown, who casually noted, before I realized it, that my 1980s analysis of thought experiments was empiricist. He planted a seed I initially resisted. James Norton has kindly endured my repeated pleas for help in the philosophy literature and has patiently tolerated my testing of new ideas.

My thanks to faculty and students at the University of Melbourne. They participated in a reading group, organized by Sam Baron, on the nearly completed draft of this volume in March

and April, 2026. Chapters 1, then 16, then 12, then 7, 8 and 9 together, then 17 and finally 11 were read successively. I thank all the participants for their attention and discussion and especially Sam Baron, Tsz Ho Chan, Martin Leckey, Aiden Meyer, Reba Nelson, Cristian Philippi and Howard Sankey. Needless to say, none of those mentioned here are culpable for errors of detail and errors of conception in this volume. They tried to help but I resisted.

Finally, my greatest thanks are to my partner in life, Eve. For the years of the writing of this text, she tolerated a spouse whose head was buried in a computer screen and whose mind was in distant lands of thought, wrestling with sinister beasts. This work is dedicated to her. It is scant compensation for my inattention.