

**GALILEO, HUMAN KNOWLEDGE,
AND THE BOOK OF NATURE**

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IN PHILOSOPHY OF SCIENCE

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HUMAN KNOWLEDGE,
AND THE BOOK OF NATURE

Method Replaces Metaphysics



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*Dedicated to
Callen and Cael,
who supervised.*

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PREFACE

There is a danger in writing about certain cultural icons. This is especially true when they are one of that small group which constitutes The Founders of Modern Science: Copernicus, Kepler, Tycho Brahe, Galileo, and Newton. It is dangerous because everyone is an expert on, for example, Galileo. And they will tell you so, without hesitation. Thus, for a philosopher of science with interests in both the history of science and the problem of understanding the nature of scientific development, attempts to comprehend and illuminate the epistemology of someone like Galileo can be a humbling experience. The result of those efforts, found here, is a rather constrained and reasonably narrowly focused work which concentrates mainly on the texts, on what Galileo actually said. On occasion I have addressed some of the controversies that have arisen over the years, but for the most part, my concern has been to construct for Galileo something we can identify as his epistemology, as revealed in his last two and greatest works, *Dialogue on Two Chief World Systems* and *Discourses on Two New Sciences*.

Why Galileo, and why this book? Galileo first. Call it a lifelong fascination, call it a monkey on my back, but having grown up, so to speak, on Feyerabend's caricatures and having felt the need for careful counters to those provocative attacks on the epistemological value of science, while trying to figure out where philosophy of science was supposed to go after Kuhn, it seemed that attending to Galileo on his own terms made more and more sense. Add to this the increasing depth and extent of recent research on such topics as the influences on Galileo by scholars such as William Wallace and Alister Crombie, or on the development of Galileo's

early views on motion by Winifred Wisan, and the issue becomes more pressing. With this new scholarship, and the battles it encourages over texts and historical context, etc., an appreciation of Galileo's contribution to the epistemological foundations of modern science becomes all the more in danger of being lost. It is a paradox that the more we learn the less we seem to remember.

Ultimately, however, the pressure to make sense of Galileo's philosophical contributions came not so much from a concern over those other problems, but from my students and from my teachers. If you use Galileo's *Dialogue* in a class on revolution in science you are going to be faced with lots of problems, from the obvious ones about its relation to Galileo's trial of 1633 to more troublesome issues about, for example, the epistemological motivation for some of his argumentative moves. Cliché though it may be, the fact of the matter is that inquiring minds *do* want to know. My students have been eager and patient and a constant source of inspiration for twenty years now while I slowly tackled the problem that they and I had created. Add to that Bob Butts' haunting presence and moral stance that proclaimed something to the effect that even if you didn't know what you were teaching when you started, you had better learn it soon and get it right. "Getting it right" meant learning how to read the texts and the times, and despite his efforts to teach me how, I am sure Stillman Drake remains despairing. Nevertheless, I cannot thank him enough for the time he took and for the care. Maybe in another life I can become an historian.

There is one last reason for writing this book. All agree that Galileo is one of the Founders of Modern Science. The question that has bothered me is to what does he owe this claim? While there are clear scientific accomplishments to his credit, they cannot be all that warrants his canonization. Others, such as Torricelli, made major contributions and yet are not included in the mystical Founders Circle. I argue that Galileo's most significant contribution to modern science, the one for which he justly

deserves credit but to which little more than lip service has been paid, is his conception of the proper method for science. Here I am speaking of his normative views, not the Aristotelian legacy he often employed and could not fully shake. Galileo's view of method not only helped to focus the domain of modern science, it remains an appropriate vision even today.

Many people deserve thanks, many more than I can mention here. Most of the first draft was completed at the University of Pittsburgh's Center for Philosophy of Science in the fall semester of 1984. That precious time would not have been possible without the kind invitation of its director, Nicholas Rescher, and without the support provided by the Center and by Virginia Polytechnic Institute and State University for that term and for the Spring of 1991. Marcello Pera spent many hours attempting to show me the error of my ways. Alfred Nordmann provided detailed, sensitive, and invaluable notes on an entire draft, as did Mike Resnik. Donald Mertz provided important criticism. Marjorie Grene read the whole thing twice, complaining constantly about all the pragmatism, but without her assistance the resulting text surely would have been much impoverished both philosophically and stylistically. A special thanks to Roger Ariew and to Peter Barker for hours of conversation and for serving as scholarly resources. Roger also served yet again as technical advisor on the production end. To Kathy Macleod and to Karen Snider, many thanks for correcting my typing, spelling, grammar and general bad judgement. Patricia Summers proofed and reproofed, indexed and reproofed. To William Wallace, Bill Shea and many others in the Galileo fraternity, I am deeply appreciative of their patience. This is especially true of Ernan McMullin who once told me in a very Irish tone, "Now Joseph, you ought not to be doing it!" But in the end, little in my life would be possible without Donna, who truly understands and tolerates with bemused smiles, both my obsession with those obscure passages in Italian and Latin and my love of mowing pastures.

Newport, Virginia
May 1991

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