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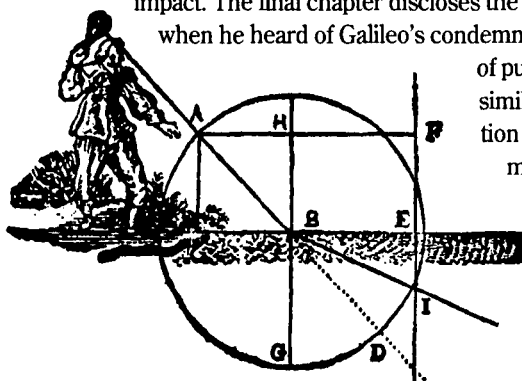
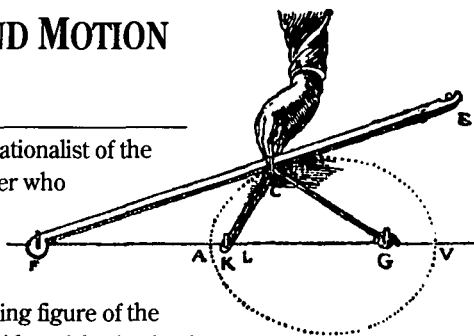
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# THE MAGIC OF NUMBERS AND MOTION

## *René Descartes' Scientific Career*

William R. Shea

Descartes is often described as the leading rationalist of the seventeenth century, an armchair philosopher who believed that his metaphysics contained all the principles of physics, and that physics was nothing but geometry. Such a simple characterization hardly does justice to a leading figure of the Scientific Revolution and conveys but a poor idea of the fascinating and complex way that his philosophy and his science interacted. This book provides a broader and fuller picture of a man of genius who lived in an age when a scholar could take the whole of knowledge for his province. In chapters one and two, we follow Descartes from his early training in a Jesuit College in France to the Netherlands where he enlisted in the army and was rescued from the boredom of barrack-life by Isaac Beechman, who stimulated his interest in mathematics, music, the law of free fall and problems in hydrostatics. In chapter three, we see how Descartes was launched on his reform of geometry by the brilliant discovery of a mathematical device that enabled him to find mean proportionals and trace out curves of increasing complexity. Chapter four discusses Descartes' attempt to extend the empire of mathematics to musical consonance. Chapter five reveals that Descartes was not always clad in the shining armour of rationality, and that he was interested in the Rosicrucian movement at the time he experienced his celebrated dream in 1619. Chapter six outlines Descartes' quest for a method based on clear and distinct intellectual perception, and his conception of the role of the natural philosopher as seeking proportional relations among fundamental magnitudes. Chapter seven tells of his spectacular discovery of the law of refraction, and chapter eight shows how Descartes used his metaphysics to ground his physics. Chapter nine recounts his triumphal explanation of the rainbow, and chapter ten outlines his achievements in optics. Chapters eleven and twelve describe the genesis and properties of his new world, and discuss the role of his laws of motion and his rules of impact. The final chapter discloses the shock that Descartes experienced



when he heard of Galileo's condemnation in 1633, and how he found a way of publishing his ideas without incurring a similar fate. The conclusion draws attention to the tension between Descartes' methodological ideal and his actual scientific procedure, and the appendix offers a useful chronology of Descartes' life and work.

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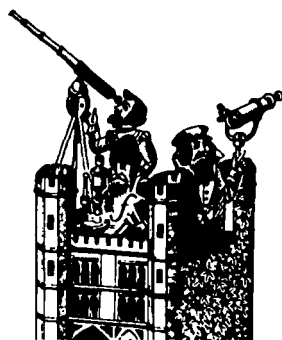
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## SOLOMON'S HOUSE REVISITED

*The Organization and Institutionalization of Science*

Tore Frängsmyr, editor

Science is not only a matter of great theories and daring thinking. It is also about organization and practical work. The scientist has seldom been in an ivory tower; on the contrary, he has been dependent on the society around him. Today more than ever, the scientist is part of an organization, either in a small laboratory or as part of a network in a big project. This book, the 75TH NOBEL SYMPOSIUM, examines six aspects of the subject.



ABBREVIATED CONTENTS: The Role of the Academies in the Growth of Science (*Roger Hahn, Michael Hunter, Gunnar Eriksson*) Universities vis-à-vis Free Associations (*Matti Klinge, J.B. Morell, Giuliano Pancaldi*) The State, the Church, and Secret Societies (*B.J.T. Dobbs, Lorraine Daston, Inge Jonsson*) The Laboratory and the Workshop: Science and Industrialism (*Eda Kranakis, Svante Lindqvist, Hans-Werner Schütt*) Driving Forces behind Science: Prizes, Evaluation Systems, Career (*Robert Marc Friedman, David Edge, Aant Elzinga*) National or International: The Role of Big Science (*Elisabeth Crawford, John Krige, Gösta Ekspong*) Concluding Discussions (*Paolo Galluzzi, Mary Jo Nye, J. L. Heilbron*)

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## PERSUADING SCIENCE

*The Art of Scientific Rhetoric*

Marcello Pera and William R. Shea, editors

Persuading—oneself as well as others—is one of the main aims of science, and the techniques of persuasion used by scientists are as numerous and as varied as the fields of scientific investigation themselves. The meaning of a theory and the significance of an experiment depend on the larger context of words and ideas in which they are imbedded, and from which they are made to spring, or from which they refuse to rise and remain burdened and buried. Scientific discourse is neither the straightforward decoding of reality, nor the passive transmission of information, but a constant activity of selecting, defining and transforming words to communicate effectively: it must be seen in relation to the situation of scientists and their audience, and it involves an awareness of the uses and abuses of language in a given group, at a given time, and in a specific set of circumstances. The original and incisive essays in this book examine the role of scientific rhetoric from the vantage point of historical epistemology and in the writings of the pioneers of scientific prose. Scientific discourse, as we know and practice it, was fashioned in the seventeenth century by two or three generations of brilliant minds whose eponyms are Bacon, Galileo, Descartes and Newton. Their achievements and their limitations as men of persuasion are explored and discussed. They are also contrasted with more recent writings where new and daring metaphors are called into play.

THE CONTRIBUTORS: Philip Kitcher, Marcello Pera, Ernan McMullin, Paolo Rossi, Dudley Shapere, Richard Westfall, William Shea, Peter Machamer, Maurizio Mamiani, and Gerald Holton. *Detailed contents are available upon request.*

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