

# **Philosophy of Science**

**Volume 46  
1979**

**Reprinted with the permission of the original publisher  
by  
Periodicals Service Company  
Hudson, NY  
2021**

**Printed on acid-free paper.**

**This reprint was reproduced from the  
best original edition copy available.**

**NOTE TO THE REPRINT EDITION:**

**In some cases full page advertisements which do not add to  
the scholarly value of this volume have been omitted.  
As a result, some reprinted volumes may have irregular pagination.**

PHILOSOPHY  
OF  
SCIENCE

*Official Journal of the Philosophy of  
Science Association*



VOLUME 46, NUMBER 1

**March, 1979**

# PHILOSOPHY OF SCIENCE

(ISSN 0031-8248)

JOURNAL OF THE PHILOSOPHY OF SCIENCE ASSOCIATION

## EDITORIAL BOARD:

KENNETH F. SCHAFFNER, *Editor-in-Chief*  
PETER MACHAMER, *Associate Editor*

PETER ACHINSTEIN	ADOLF GRÜNBAUM	VADIM SADOVSKY
PETER ASQUITH	KEITH GUNDERSON	MICHAEL SCRIVEN
NUEL BELNAP	MARY HESSE	WILFRID SELLARS
MAY BRODBECK	CLIFFORD HOOKER	J. J. C. SMART
ROBERT CAUSEY	DAVID HULL	DUDLEY SHAPERE
H. TRISTRAM ENGELHARDT, JR.	LARRY LAUDAN	LAWRENCE SKLAR
ARTHUR FINE	ISAAC LEVI	PATRICK SUPPES
JERRY FODOR	RUTH BARCAN MARCUS	KLEMENS SZANIAWSKI
RONALD GIERE	ERNAN McMULLIN	HÅKAN TÖRNEBOHM
CLARK GLYMOUR	RICHARD RUDNER	STEPHEN TOULMIN

## ASSISTANT EDITOR:

Vincent Batts

## EDITORIAL ASSISTANT

Lucinda Stouffer

## GOVERNING BOARD OF THE ASSOCIATION:

Mary Hesse, President (1979)  
Ernan McMullin, President-elect (1979)  
Hilary Putnam, Past President (1979)

Nancy Cartwright (1980)	Stephan Körner (1980)
Marjorie Grene (1979)	Henry Kyburg (1979)
David Hull (1980)	Alex Michalos (1979)
Jaegwon Kim (1980)	Linda Wessels (1979)

## EXECUTIVE SECRETARY:

Peter D. Asquith

MADE AND PRINTED IN THE USA BY  
EDWARDS BROTHERS, INC., ANN ARBOR, MI

---

PHILOSOPHY OF SCIENCE is published quarterly by the Philosophy of Science Association, 18 Morrill Hall, Department of Philosophy, Michigan State University, East Lansing, Michigan 48824. 1979 Subscription price \$27.50 U.S.A. (\$28.50 non-U.S.A.) per Volume. Single numbers \$8.00. 1979 Membership dues, which include subscription, \$25.00. Subscription inquiries should be directed to the Executive Secretary. Second-class postage paid at East Lansing, Michigan and at additional mailing offices. © 1979 by the Philosophy of Science Association.

## CONTENTS\*

<b>REALISM AND INSTRUMENTALISM IN 19TH-CENTURY ATOMISM, MICHAEL R. GARDNER . . . . .</b>	<b>1</b>
<b>EVIDENCE AND HYPOTHESIS: AN ANALYSIS OF EVIDENTIAL RELATIONS, HELEN E. LONGINO . . . . .</b>	<b>35</b>
<b>SUBSTANTIAL CAUSES AND NOMIC DETERMINATION, HENRY BYERLY . . . . .</b>	<b>57</b>
<b>TIME'S ARROW AND THE STRUCTURE OF SPACETIME, GEOFFREY MATTHEWS . . . . .</b>	<b>82</b>
<b>CONFIRMATION AND PREDICTION, G. H. MERRILL . . . . .</b>	<b>98</b>
<b>ON GRÜNBAUM AND RETROCAUSATION IN CLASSICAL ELECTRODYNAMICS, CHARLES NISSIM-SABAT . . . . .</b>	<b>118</b>
<b>RETROCAUSATION AND THE FORMAL ASSIMILATION OF CLASSICAL ELECTRODYNAMICS TO NEWTONIAN MECHANICS: A REPLY TO NISSIM-SABAT'S "ON GRÜNBAUM AND RETROCAUSATION," ADOLF GRÜNBAUM AND ALLEN I. JANIS . . . . .</b>	<b>136</b>
<b>DISCUSSION: GENERALITY AND NOMOLOGICAL FORM, MARK WILSON . . . . .</b>	<b>161</b>
<b>BOOK REVIEWS . . . . .</b>	<b>165</b>
<i>The Young Darwinian and His Cultural Circle, Edward Manier; The Structure of Geology, David B. Kitts; Creation by Natural Law: Laplace's Nebular Hypothesis in American Thought, Ronald L. Numbers; Acts and Other Events, Judith Jarvis Thompson; Religion and Scientific Method, George Schlesinger.</i>	
<b>INSTRUCTIONS TO CONTRIBUTORS . . . . .</b>	<b>172</b>

\*The contents of PHILOSOPHY OF SCIENCE are utilized in compiling the following bibliographic sources: *ABC Pol. Sci.*; *Bulletin Signalétique*; *Index to Book Reviews in the Humanities*; *Isis Critical Bibliography*; *Mathematics Review*; *Philosophers Index*; *Science Citation Index*; *Sociological Abstracts*.