# PHILOSOPHY OF SCIENCE

Official Journal of the Philosophy of Science Association



**VOLUME 41, NUMBER 4** 

December, 1974

### PHILOSOPHY OF SCIENCE

#### JOURNAL OF THE PHILOSOPHY OF SCIENCE ASSOCIATION EDITORIAL BOARD:

RICHARD S. RUDNER, Department of Philosophy, Washington University, St. Louis, Missouri 63130, Editor in Chief

PETER ACHINSTEIN, Department of Philosophy, The Johns Hopkins University, Baltimore, Maryland 21218

Peter D. Asquith, Department of Philosophy, Michigan State University, East Lansing, Michigan 48823, Managing Editor

GUSTAV BERGMANN, Department of Philosophy, University of Iowa, Iowa City, Iowa 52240

MAY BRODBECK, Department of Philosophy, University of Iowa, Iowa City, Iowa

ARTHUR BURKS, Department of Philosophy, University of Michigan, Ann Arbor, Michigan 48104

C. WEST CHURCHMAN, Graduate School of Business Administration, University of California, Berkeley, California 94720

THEODOSIUS DOBZHANSKY, Department of Genetics, University of California, Davis, California 95616

ADOLF GRÜNBAUM, Department of Philosophy, University of Pittsburgh, Pittsburgh, Pennsylvania 15260

EDWARD MADDEN, Department of Philosophy, State University of New York, Buffalo, New York 14214

HENRY MARGENAU, Department of Physics, Yale University, New Haven, Connecticut 06520

GERALD J. MASSEY, Department of Philosophy, University of Pittsburgh, Pittsburgh, Pennsylvania 15260

ALBERTO PASQUINELLI, Facoltà di Lettere e Filosofia, Università degli Studi di Bologna, University of Bologna, Bologna, Italy

WESLEY C. SALMON, Department of Philosophy, University of Arizona, Tucson, Arizona 85721

KENNETH F. SCHAFFNER, Department of History and Philosophy of Science, University of Pittsburgh, Pittsburgh, Pennsylvania 15260

DUDLEY SHAPERE, Department of Philosophy, University of Illinois at Urbana, Urbana, Illinois 61801

J.J. C. SMART, Department of Philosophy, La Trobe University, Bundoora, Australia MELFORD E. SPIRO, Department of Anthropology, The University of California at San Diego, La Jolla, California 92037

PATRICK C. SUPPES, Department of Philosophy, Stanford University, Stanford, California 94305

LEWIS K. ZERBY, Department of Philosophy, Michigan State University, East Lansing, Michigan 48823

#### **BOOK REVIEWS:**

James Van Evra, Department of Philosophy, University of Waterloo, Waterloo, Ontario, Canada **ASSISTANT EDITORS:** 

Patricia Ann Fleming and Paul C. L. Tang, Department of Philosophy. Washington University, St. Louis, Missouri 63130

#### GOVERNING BOARD OF THE ASSOCIATION:

Israel Scheffler, President (1975) Robert Cohen, Vice-President (1975)

Peter D. Asquith, Secretary-Treasurer (1975)

Mario A. Bunge (1974) Richard S. Rudner

Brian Ellis (1975) Wesley C. Salmon (Past Pres.) Adolf Grünbaum (Past Pres.) Michael J. Scriven (1975) Ian Hacking (1974) Wolfgang Stegmüller (1975)

Ernest Nagel (Past Pres.) Patrick C. Suppes (1975)

MADE AND PRINTED IN GREAT BRITAIN BY WILLIAM CLOWES & SONS, LIMITED, LONDON, BECCLES AND COLCHESTER

PHILOSOPHY OF SCIENCE is published quarterly by the Philosophy of Science Association, 18 Morrill Hall, Department of Philosophy, Michigan State University, East Lansing, Michigan 48823. Subscription price \$15.00 U.S.A. (\$16.00 non-U.S.A.) per Volume. Single numbers \$5.00. Membership dues, which include subscription, \$10.00. Subscription inquiries should be https://doi.org/10.1086/phdirected to the Warraging Editor Second Class postage paid at East Lansing, Michigan and at

## **CONTENTS\***

QUANTUM THEORY AND COSMOLOGY, C. J. S. CLARKE	317
THE IGNORANCE INTERPRETATION DEFENDED, NEAL GROSSMAN	333
MECHANISMS AND PURPOSIVE BEHAVIOR III, LARRY WRIGHT	345
EXTENSIVE MEASUREMENT WITHOUT AN ORDER RELATION, ERIC W. HOLMAN	361
MEASUREMENT WITHOUT ARCHIMEDEAN AXIOMS, Louis Narens	374
DISCUSSION: THE CONVENTIONALITY OF TEMPORAL RELATIONS IN RELATIVITY THEORY, B. MAUND	394
DISCUSSION: MORE ON FODOR'S DISTINCTION BETWEEN STRONG AND WEAK SIMULATIONS, YORICK WILKS	408
DISCUSSION: STRONG, WEAK & FUNCTIONAL EQUIVALENCE IN MACHINE SIMULATION, A. ROSENBERG & N. J. MACKINTOSH	412
Thematic Origins of Scientific Thought: Kepler to Einstein, Gerald Holton; Thaddeus J. Trenn—The Philosophy of Biology, Michael Ruse; David Berlinski—Logic Matters, P. T. Geach; Rita Nolan—Epistemics & Economics: A Critique of Economic Doctrines, G. L. S. Shackle; L. A. Boland—Karl Popper, Bryan Magee; Michael Krausz—Likelihood: An Account of the Statistical Concept of Likelihood and its Application to Scientific Inference, A. W. F. Edwards; Charles G. Morgan—Method, Model and Matter, Mario Bunge; Raimo Tuomela—History as Applied Science: A Philosophical Study, William Todd; Alexander Rosenberg—The Conceptional Foundations of Contemporary Relativity Theory, J. C. Graves; Jeffrey Bub.	415
ABSTRACTS FROM INQUIRY	433
INDEX TO VOLUME 41	435

<sup>\*</sup> The contents of Philosophy of Science are indexed in Science Citation Index, ABC Pol Sci, Language and Language Behavior Abstracts, and The Philosopher's Index.