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EDITED BY ROBERT S. COHEN AND MARX W. WARTOFSKY

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PSA 1974

PROCEEDINGS OF THE 1974 BIENNIAL MEETING
PHILOSOPHY OF SCIENCE ASSOCIATION

Edited by

R. S. COHEN, C. A. HOOKER,
A. C. MICHALOS AND J. W. VAN EVRA



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PREFACE

For this book, we have selected papers from symposia and contributed sessions at the fourth biennial meeting of the Philosophy of Science Association, held at the University of Notre Dame on November 1-3, 1974.

The meeting was lively and well-attended, and we regret that there was no way to record here the many stimulating discussions after the papers and during the informal hours. We also regret that we had insufficient space for all the contributed papers. Even more, some of the symposia were not available: those on systems and decision theory (C. W. Churchman, P. Suppes, I. Levi), and on the Marxist philosophy of science (M. W. Wartofsky, R. S. Cohen, E. N. Hiebert). Unhappily several individual contributions to other symposia were likewise not available: I. Velikovsky in the session on his own work and the politics of science, D. Finkelstein in the session on quantum logic.

Memorial minutes were read for Alan Ross Anderson (prepared by Nuel Belnap) and for Imre Lakatos (prepared by Paul Feyerabend). They initiate this volume of philosophy of science in the mid-seventies.

ROBERT S. COHEN, *Boston University*
C. A. HOOKER, *University of Western Ontario*
ALEX C. MICHALOS, *University of Guelph*
JAMES W. VAN EVRA, *University of Waterloo*

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MEMORIAL MINUTES

(1)

ALAN ROSS ANDERSON died at home in Pittsburgh on December 5, 1973, of cancer. It was characteristic of him that throughout the long period of his illness he remained active and cheerful. He is survived by his wife, Carolyn, his mother, and four children.

Alan made a number of significant and typically seminal contributions to mathematical logic, always presenting his ideas in a delightfully informal literary style designed to satisfy both sense and sensibility. Notable are his early work in modal logic, his reduction of deontic logic to modal logic via introduction of a propositional constant for The Bad Thing, and his work, largely in collaboration with me, on relevance logics, issuing in a two-volume work *Entailment: the logic of relevance and necessity*.

With interests always wide-ranging, he collaborated over the years with the social psychologist O. K. Moore on early education of children, autotelic folk-models, and related topics in the theory of social interaction, placing unvarying emphasis on the central theme of his career: the potential application of formal methods. Alan also edited two books outside his specialties: *Minds and Machines*, and (with others) *Philosophic Problems*.

Alan's teaching life was spent at Dartmouth, Yale, and Pittsburgh. Both in and out of the classroom Alan was a spectacularly good teacher with unerring pedagogic judgement and a superb sense of the *a propos*. One of his favorite phrases was 'the spirit of the enterprise'; and no one excelled him at communicating not just results but feels, approaches, styles – and at teaching others the importance of doing likewise.

Alan was deeply involved in service to the profession he loved, always combining seriousness about getting the job done with his unfailing casual good cheer. He served in reviewing and editorial capacities for a number of journals, as one or another officer of a variety of professional

organizations, and also contributed unstintingly to his own university, both at Yale and at Pittsburgh.

I do not know anyone who generated as much affection in as many people as Alan. We surely miss him. For those who may wish to remember him, an endowed Alan Ross Anderson Memorial Fund has been established at the University of Pittsburgh.

NUEL D. BELNAP, JR.

(2)

IMRE LAKATOS died at home in London, on February 2, 1974. Lakatos was a fascinating person, an outstanding philosopher, and the best theoretician of science of the past fifty years. He was a rationalist, for he believed that man should use reason in his private life and in his attempt to understand the world. He was an optimist for he thought reason capable of solving the problems generated by the attempt. He had a realistic view of this capability, for he saw that it cannot be completely distilled into a set of abstract rules, into a 'logic', and that it cannot be improved by an abstract comparison of such rules either: if reason is to have a point of attack in our real world with its complex episodes and its hair-raising ideas and institutions, then it must have some *sophistication*, it must not be less complex and less cunning than the theories it is supposed to evaluate; on the other hand, it must *not be too severe* or the attempt to improve science will lead to the elimination of science. We need a form of reason that is neither content with the mere contemplation of science (as are most so-called reconstructions), nor intent on Utopian reform. The demands of reason must be adapted to the historically given material without losing the power to transform this material.

This *practical* side of methodology is only rarely examined by philosophers of science. The usual procedure is to compare abstract rules with other abstract rules, considering also certain simple logical restrictions. This is how Popper defends his rule of falsification: singular statements may entail the *negation* of universal statements, they do not entail universal statements. But the question still remains whether scientific theories in the form in which they are used by scientists and in

which they lead them to their surprising discoveries are ever in sufficient harmony with observation to survive the rule. Lakatos has seen that they are not and he has invented a criterion for the comparative evaluation not of ideal statements, but of the logically imperfect, anomaly-ridden and often absurd theories that constitute science. The criterion can be applied to 'pure' mathematics as well. The underlying theory of scientific change combines strict judgement and free decision, it uses rules of thought without overlooking historical accident, it implies a historical view of reason and a rational view of history. It is one of the most important achievements of 20th century philosophy.

But Imre Lakatos was not only a theoretician. He was also a most efficient propagandist. He strengthened the power of his arguments with dazzling oratorical displays in lectures, biting humour in discussions, and charming persuasion in private conversations. Soon he was surrounded by a new kind of intellectual community based on friendship and sceptical interest rather than on the slavish acceptance of an idea. His collaborators were not always rationalists, for he was not at all narrow-minded, and even a Dadaist like myself could derive great pleasure from working with him. This was possible because Imre Lakatos was above all a kind and warmhearted human being, deeply impressed by the growing irrationality and injustice in this world, by the almost unsurmountable power that mediocrity possesses today in almost all fields, the younger generation not excluded, always ready to defend his ideas and his principles, even in trying and dangerous situations, not easily silenced and yet not without insight into the basic absurdity of all human effort. A man like him cannot be grasped by studying his writings alone. And his achievement will survive only in the hands of those who have his freedom, his inventiveness, and his love for life.

PAUL FEYERABEND