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Science and Anti-science
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John Stewart Bell and Twentieth-century Physics
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Niels Bohr and the Philosophy of Physics
Glimpsing Reality
Vision and Integrity

MARISOL NEIL

The Oxford Handbook of the History of Quantum Interpretations Oxford University Press
What is space? It isn't a question that most of us normally stop to ask. Space is the venue of physics; it's where things exist, where they move and take shape. Yet over the past few decades, physicists have discovered a phenomenon that operates outside the confines of space and time. The phenomenon-the ability of one particle to affect another instantly across the vastness of space-appears to be almost magical. Einstein grappled with this oddity and couldn't quite resolve it, describing it as "spooky action at a distance." But this strange occurrence has direct connections to black holes, particle collisions, and even the workings of gravity. If space isn't what we thought it was, then what is it?In Spooky Action at a Distance, George Musser sets out to answer that question, offering a provocative exploration of nonlocality and a celebration of the scientists who are trying to understand it. Musser guides us on an epic journey of scientific discovery into the lives of experimental physicists observing particles acting in tandem, astronomers discovering galaxies that look statistically identical, and cosmologists hoping to unravel the paradoxes surrounding the big bang. Their conclusions challenge our understanding not only of space and time but of the origins of the universe-and their insights are spurring profound technological innovation and suggesting a new grand unified theory of physics.

Selected Papers of Léon Rosenfeld
CRC Press
A masterful survey of the history of Marxist philosophy of science. Now with a new afterword.

Essays in the philosophy and history of the natural sciences and mathematics In honor of Robert S. Cohen Springer Science & Business Media
Originally published in 1979. This reprints

the revised and expanded edition of 1996. In this volume, physicists, biologists and chemists, who have been involved in some of the most exciting discoveries in modern scientific thought explore issues which have shaped modern physics and which hint at what may form the next scientific revolution. The major issues discussed are the understanding of time and space, quantum and relativity theories and recent attempts to unite them and related questions in theoretical biology.

Reading Bohr: Physics and Philosophy Springer Nature

The decision to undertake this volume was made in 1971 at Lake Como during the Varenna summer school ofthe Italian Physical Society, where Professor Leon Rosenfeld was lecturing on the history of quantum theory. We had long been struck by the unique blend of epistemological, histori cal and social concerns in his work on the foundations and development of physics, and decided to approach him there with the idea of publishing a collection of his papers. He responded enthusiastically, and agreed to help us select the papers; furthermore, he also agreed to write a lengthy introduction and to comment separately on those papers that he felt needed critical re-evaluation in the light of his current views. For he was still vigorously engaged in both theoretical investigations of, and critical not reflections on the foundations of theoretical physics. We certainly did conceive of the volume as a memorial to a 'living saint', but rather more practically, as a useful tool to place in the hands of fellow workers and students engaged in wrestling with these difficult problems. All too sadly, fate has added a memorial aspect to our labors. We agreed that in order to make this book most useful for the con temporary community of physicists and philosophers, we should trans late all non-English items into English.

Science and Anti-science Routledge

This book offers a new perspective on Niels Bohr's interpretation of quantum mechanics as complementarity, and on the relationships between physics and philosophy in Bohr's work. The importance of quantum field theory for Bohr's thinking has not been adequately addressed in the literature on Bohr. This book provides clarification of Bohr's writings (which usually pose problems of reading), and an analysis of the role of quantum field theory in Bohr's thinking.

From Certainty to Uncertainty Oxford University Press

In three volumes, a distinguished group of scholars from a variety of disciplines in the natural and social sciences, the humanities and the arts contribute essays in honor of Robert S. Cohen, on the occasion of his 70th birthday. The range of the essays, as well as their originality, and their critical and historical depth, pay tribute to the extraordinary scope of Professor Cohen's intellectual interests, as a scientist-philosopher and a humanist, and also to his engagement in the world of social and political practice. The essays presented in Physics, Philosophy, and the Scientific Community (Volume I of Essays in Honor of Robert S. Cohen) focus on philosophical and historical issues in contemporary physics: on the origins and conceptual foundations of quantum mechanics, on the reception and understanding of Bohr's and Einstein's work, on the emergence of quantum electrodynamics, and on some of the sharp philosophical and scientific issues that arise in current scientific practice (e.g. in superconductivity research). In addition, several essays deal with critical issues within the philosophy of science, both historical and contemporary: e.g. with Cartesian notions of mechanism in the philosophy of biology; with the language and logic of science - e.g. with new insights concerning the issue of a `physicalistic' language in the arguments of Neurath, Carnap and Wittgenstein; with the notion of `elementary logic'; and with rational and non-rational elements in the history of science. Two original contributions to the history of mathematics and some studies in the comparative sociology of science round off this outstanding collection.

The Quantum Physicists Policy Press

Cultural Psychology is a radical new look in psychology that studies how persons and social-cultural worlds mutually constitute one another. With the increase of globalization and multicultural exchanges, cultural psychology becomes the psychological science for the 21st century. Encounters with others fundamentally transform the way we understand ourselves. No longer can we ignore questions about how our cultural traditions, practices, beliefs, artifacts and other people constitute how we approach, understand, imagine and remember the world. The Niels Bohr Professorship Lectures in Cultural Psychology series aims to highlight and develop new ideas that advance our understanding of these issues. This first volume in the series features an address by Prof. Jaan Valsiner, which is followed by ten commentary chapters and his response to them. In his lecture, Valsiner explores what Niels Bohr’s revolutionary principle of ‘complementarity’ can contribute to the development of a cultural psychology that takes time, semiotics, and human feeling seriously. Commentators further discuss how complementarity can act as an epistemology for psychology; a number of new methodological strategies for incorporating culture and time into investigations; and what cultural psychology can contribute to our understanding of imagination, art, language and self-other relations.

John Stewart Bell and Twentieth-century Physics Springer

Though the publication of Kuhn's Structure of Scientific Revolutions seemed to herald the advent of a unified study of the history and philosophy of science, it is a hard fact that history of science and philosophy of science have increasingly grown apart. Recently, however, there has been a series of workshops on both sides of the Atlantic (called '&HPS') intended to bring historians and philosophers of science together to discuss new integrative approaches. This is therefore an especially appropriate time to explore the problems with and prospects for integrating history and philosophy of science. The original essays in this volume, all from specialists in the history of science or philosophy of science, offer such an exploration from a wide variety of perspectives. The volume combines general reflections on the current state of history and philosophy of science with studies of the relation between the two disciplines in specific historical and scientific cases.

Cultural Psychology and Its Future Springer

LÃ©on RosenfeldWorld Scientific

Integrating History and Philosophy of Science Springer Science & Business Media

Containing the proceedings of the symposium held by the American Academy of Arts and Sciences to celebrate the 100th anniversary of the birth of Niels Bohr, this collection was first published in 1988. More than any other individual, Bohr was responsible for the development of quantum mechanics and for many of its applications in the pursuit of fundamental understanding of physical reality. In addition to his unique role in the discovery and elucidation of quantum theory, Bohr led the study of the fission of nuclei and was greatly concerned with the impact of the existence of the atomic bomb in the post-World War II era. This unique volume provides a panoramic view of modern physics, some of the philosophical issues associated with quantum theory, the impact of this momentous scientific development on the political circumstance

of the Cold War Era and the qualities of a superlative scientist.
Twenty-First-Century Perspectives Routledge
Niels Bohr and Philosophy of Physics: Twenty-First Century Perspectives examines the philosophical views, influences and legacy of the Nobel Prize physicist and philosophical spokesman of the quantum revolution, Niels Bohr. The sixteen contributions in this collection by some of the best contemporary philosophers and physicists writing on Bohr's philosophy today all carefully distinguish his subtle and unique interpretation of quantum mechanics from views often imputed to him under the banner of the “Copenhagen Interpretation.” With respect to philosophical influences on Bohr's outlook, the contributors analyse prominent similarities between his viewpoint and Kantian ways of thinking, the views of the Danish philosopher Harald Høffding, and themes characteristic of American pragmatism. In recognizing the importance of Bohr's epistemological naturalism they examine his defence of the indispensability of classical concepts from a variety of different perspectives. This collection shows us that Bohr's interpretation of quantum mechanics, now nearly a century old, still has the power to shed light on a variety of issues that have arisen only since his lifetime, as well as decoherence theory and other non-collapse interpretations. Balancing historical themes with contemporary discussions, Niels Bohr and the Philosophy of Physics establishes Bohr's on-going contribution to the philosophy of physics and examines his place in the history of philosophy.
Problems and Prospects Springer Science & Business Media
Léon Rosenfeld (1904–1974) was a remarkable, many-sided physicist of exceptional erudition. He was at the center of modern physics and was well-known as Niels Bohr's close collaborator and spokesman. Besides he reflected deeply on the history and philosophy of science and its social role from a leftist perspective. As both actor and acute spectator of modern physics and as a polyglot cosmopolitan whose life crossed those of many important people in both the East and West, as well as by virtue of his close collaboration and friendship with Bohr, Rosenfeld was an important figure in twentieth century physics. His biography illuminates the development, popularization, and reception of quantum physics and its interpretation in addition to the development of the political Left. The book draws extensively from previously untapped, unpublished sources in more than five languages.Contents: Physicist of the Second Quantum GenerationRosenfeld in CopenhagenPhysics, Philosophy, and Politics in the 1930sSurviving the War in UtrechtCold War and Political CommitmentBohr's Cold Warrior Readership: Students and professionals studying the history of science.
Weimar Culture and Quantum Mechanics Harvard University Press
Introducing the reader to the very latest developments in the philosophical foundations of physics, this book covers advanced material at a level suitable for beginner and intermediate students. A detailed overview is provided of the central debates in the philosophy of quantum mechanics, statistical mechanics, quantum computation, and quantum gravity. This book enables both philosophers and physicists to engage with the most pressing problems in contemporary philosophy of physics in a fruitful way.
Spooky Action at a Distance Cambridge University Press
This volume reprints Paul Forman's classic papers on the history of physics in post-World War I Germany and the invention of quantum mechanics. The Forman thesis has become famous as the first argument in favor of the cultural conditioning of scientific knowledge, in particular for its demonstration of the historical connection between the culture of Weimar Germany — known for its irrationality and antiscientism — and the emerging concept of quantum acausality. At the 2007 international conference in Vancouver, Canada, leading historians of physics discussed the implications of the Forman thesis in the historiography of modern science. Their papers collected in this volume represent a cutting-edge research on the history of quantum revolution.
The Ashgate Companion to Contemporary Philosophy of Physics University of Chicago Press
This book explains, in simple terms, with a minimum of mathematics, why things can appear to be in two places at the same time, why correlations between simultaneous events occurring far apart cannot be explained by local mechanisms, and why, nevertheless, the quantum theory can be understood in terms of matter in motion. No need to worry, as some people do, whether a cat can be both dead and alive, whether the moon is there when nobody looks at it, or whether quantum systems need an observer to acquire definite properties. The author’s inimitable and even humorous style makes the book a pleasure to read while bringing a new clarity to many of the longstanding puzzles of quantum physics.
Mind, Action and Strategy in an Uncertain World Harvard University Press
These two volumes contain all of my articles published between 1956 and 1975 which might be of interest to readers in the English-speaking world. The first three essays in Vol. 1 deal with historical themes. In each case I as far as possible, meets con have attempted a rational reconstruction which, temporary standards of exactness. In The Problem of Universals Then and Now some ideas of W.V. Quine and N. Goodman are used to create a modern sketch of the history of the debate on universals beginning with Plato and ending with Hao Wang's System L. The second article concerns Kant's Philosophy of Science. By analyzing his position vis-a-vis I. Newton, Christian Wolff, and D. Hume, it is shown that for Kant the very notion of empirical knowledge was beset with a funda mental logical difficulty. In his metaphysics of experience Kant offered a solution differing from all prior as well as subsequent attempts aimed at the problem of establishing a scientific theory. The last of the three historical papers utilizes some concepts of modern logic to give a precise account of Wittgenstein's so-called Picture Theory of Meaning. E. Stenius' interpretation of this theory is taken as an intuitive starting point while an intensional variant of Tarski's concept of a relational system furnishes a technical instrument. The concepts of inodel world and of logical space, together with those of homomorphism and isomorphism be tween model worlds and between logical spaces, form the conceptual basis of the reconstruction.
Making Sense of Quantum Mechanics Springer Science & Business Media
The problem of quantum gravity is often viewed as the most pressing unresolved problem of modern physics: our theories of spacetime and matter, described respectively by general relativity (Einstein's theory of gravitation and spacetime) and quantum mechanics (our best theory of matter and the other forces of nature) resist unification. Covered with Deep Mist provides the first book-length treatment of the history of quantum gravity, focusing on its origins and earliest stages of development until the mid-1950s. Readers will be guided through the impacts on the problem of quantum gravity resulting from changes in the two ingredient theories, quantum theory and general relativity, which were themselves still under construction in the years studied. We examine how several of the

core approaches of today were formed in an era when the field was highly unfashionable. The book aims to be accessible to a broad range of readers and goes beyond a merely technical examination to include social and cultural factors involved in the changing fortunes of the field. Suitable for both newcomers and seasoned quantum gravity professionals, the book will shine new light on this century-old, unresolved problem.
Language, Logic and Method Springer
Fundamental problems of the uses of formal techniques and of natural and instrumental practices have been raised again and again these past two decades, in many quarters and from varying viewpoints. We have brought a number of quite basic studies of these issues together in this volume, not linked con ceptually nor by any rigorously defined problematic, but rather simply some of the most interesting and even provocative of recent research accomplish ments. Most of these papers are derived from the Boston Colloquium for the Philosophy of Science during 1973-80, the two exceptions being those of Karel Berka (on scales of measurement) and A. A. Zinov'ev (on a non-tradi tional theory of quantifiers). Just how intriguing these results (or conjectures?) seem to us may be seen from some brief quotations: (1) Judson Webb: " . . . . the abstract machine concept has many of the appropriate kinds of properties for modelling living, reproducing, rule following, self-reflecting, accident-prone, and lucky creatures . . . the a priori logical results relevant to the abstract machine concept, above all Godel's, could not conceivably have turned out any better for the mechanist. " (2) M. L. Dalla Chiara: " . . . modal interpretation (of quantum logic) shows clearly that it possesses a logical meaning which is quite independent of quantum mechanics. " (3) Isaac Levi: (as against Peirce and Popper) " . . . infallibilism is con sistent with corrigibilism, and a view which respects avoidance of error is an important desideratum for science.
LÃ©on Rosenfeld IAP
What is good science? What goal--if any--is the proper end of scientific activity? Is there a legitimating authority that scientists mayclaim? Howserious athreat are the anti-science movements? These questions have long been debated but, as Gerald Holton points out, every era must offer its own responses. This book examines these questions not in the abstract but shows their historic roots and the answers emerging from the scientific and political controversies of this century. Employing the case-study method and the concept of scientific thematathat he has pioneered, Holton displays the broad scope of his insight into the workings of science: from the influence of Ernst Mach on twentiethcentury physicists, biologists, psychologists, and other thinkers to the rhetorical strategies used in the work of Albert Einstein, Niels Bohr, and others; from the bickering between Thomas Jefferson and the U.S. Congress over the proper form of federal sponsorship of scientific research to philosophical debates since Oswald Spengier over whether our scientific knowledge will ever be "complete." In a masterful final chapter, Holton scrutinizes the "anti-science phenomenon," the increasingly common opposition to science as practiced today. He approaches this contentious issue by examining the world views and political ambitions of the proponents of science as well as those of its opponents-the critics of "establishment science" (including even those who fear that science threatens to overwhelm the individual in the postmodern world) and the adherents of "alternative science" (Creationists, New Age "healers," astrologers). Through it all runs the thread of the author's deep historical knowledge and his humanistic understanding of science in modern culture. Science and Anti-Science will be of great interest not only to scientists and scholars in the field of science studies but also to educators, policymalcers, and all those who wish to gain a fuller understanding of challenges to and doubts about the role of science in our lives today.
and the Quantum-To-Classical Transition Springer Science & Business Media
The decision to undertake this volume was made in 1971 at Lake Como during the Varenna summer school ofthe Italian Physical Society, where Professor Leon Rosenfeld was lecturing on the history of quantum theory. We had long been struck by the unique blend of epistemological, histori cal and social concerns in his work on the foundations and development of physics, and decided to approach him there with the idea of publishing a collection of his papers. He responded enthusiastically, and agreed to help us select the papers; furthermore, he also agreed to write a lengthy introduction and to comment separately on those papers that he felt needed critical re-evaluation in the light of his current views. For he was still vigorously engaged in both theoretical investigations of, and critical not reflections on the foundations of theoretical physics. We certainly did conceive of the volume as a memorial to a 'living saint', but rather more practically, as a useful tool to place in the hands of fellow workers and students engaged in wrestling with these difficult problems. All too sadly, fate has added a memorial aspect to our labors. We agreed that in order to make this book most useful for the con temporary community of physicists and philosophers, we should trans late all non-English items into English.

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