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by
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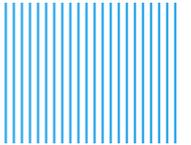
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July 1982 , 228 pp.
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An Approximation for a Theory of Inertia

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by
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Book Series: [FUNDAMENTAL THEORIES OF PHYSICS](#) : Volume 18

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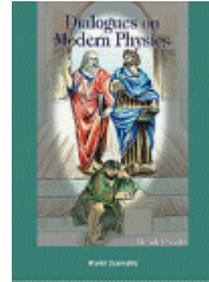
Mendel Sachs

Format: Hardcover/Paperback, 200pp.
ISBN: 9810231911 (hardcover), 9810237057 (paperback)

Publisher: World Scientific Publishing Company, Singapore

Pub. Date: 1998

Japanese translation by M. Harada (Kodansha, Tokyo, 1999) ISBN 4-06-257268-0



In this book, important conceptual developments of the two major revolutions of modern physics — the quantum and relativity theories — are presented in a nonmathematical, dialectical form of dialogue. The implications of conflicting philosophical attitudes of these revolutions in physics and applications to topics such as cosmology/astrophysics and high energy physics are emphasized. It is argued that for any substantial progress in our understanding of 21st century physics, it will be necessary to resolve these 20th century conflicts. These richly rewarding dialogues provide a starting point for discussions that could lead to such progress. An epilogue is presented on the philosophical advantage of the dialogue form for increased understanding.

[General Relativity and Matter : A Spinor Field Theory from Fermis to Light-Years \(Fundamental Theories of Physics\)](#)

Mendel Sachs

Format: Hardcover

ISBN: 9027713812

Publisher: Reidel Publishing Company (now Kluwer Academic Publishers)

Pub. Date: 1982

This monograph is unique in viewing general relativity as a fundamental theory of matter, *in all domains*. After developing the mathematical background of Einstein's relativistic formalism and the spinor-quaternion calculus in a curved spacetime, the author relates the group structure of his theory and the geometry of curved spacetime to the existence

of matter fields. The resulting generalization embraces both the inertial manifestations of matter (expressed as globally covariant field equations) and its force manifestations, in terms of a generalized spinor formalism which serves to unify them.

Novel features of general relativity are shown to emerge, in elementary particle physics as well as astrophysics. Especially noteworthy among these is a factorization of Einstein's field equations to a quaternion field formalism, which, by way of a single

covariant field, includes both gravitation and electromagnetism, coupled to matter field equations -whose linear (low energy) limit recovers quantum mechanics. The author's original approach also furnishes derivations, not previously available, of several observed properties of inertial mass and gravitational force.

[Quantum Mechanics from General Relativity : An Approximation for a Theory of Inertia \(Fundamental Theories of Physics\)](#)

Mendel Sachs

Format: Hardcover, 227pp.

ISBN: 9027722471

Publisher: Reidel Publishing Company (now Kluwer Academic Publishers)

Pub. Date: 1986

A generalization of quantum mechanics is demonstrated in the context of general relativity, following from a generally covariant field theory of inertia. Nonrelativistically, the formalism corresponds with linear quantum mechanics. In the limit of special relativity, nonlinearity remains and several new features are derived: (1) Particle-antiparticle pairs do not annihilate; an exact bound state solution is derived corresponding with all experimental facts about annihilation/creation – which, in approximation, gives the blackbody radiation spectrum for a sea of such pairs. (2) A result is proven, without approximation, that is physically equivalent to the Pauli exclusion principle – which in linear approximation, gives the totally antisymmetrised many-body wave function and Fermi-Dirac statistics. (3) The hydrogen spectrum is derived, including the Lamb shifts, in agreement with experiment; new results are found for high-energy electron-proton scattering. (4) Finally, several applications to the elementary particle domain are demonstrated, in agreement with results from experimental high-energy physics.

[Relativity in Our Time : From Physics to Human Relations](#)

Mendel Sachs

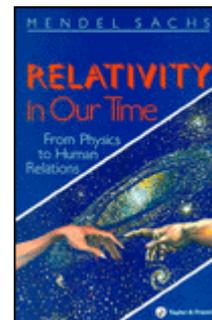
Format: Hardcover, 162pp.

ISBN: 0748401172

Publisher: Taylor & Francis, Inc.

Pub. Date: 1993

Japanese translation by M. Harada (Nippon-Hyoransha, Tokyo, 1998) ISBN 4535782636 C3042



The central contention of Relativity in Our Time is that Einstein's theory is simple from the conceptual standpoints and should therefore be comprehensible to a very broad range of readers. Outstandingly clear and eloquent text explains the beautiful theory and then extends it from problems in case physics to other domains of human understanding, including issues of societal relationships. The conceptual framework of the theory overrides its mathematical structure and Professor Sachs is able to address and vividly describe the subject to the extent that this book will grasp the

imagination of anyone with an interest in the fundamental working of the universe, at any scale. The book is as appropriate for the humanities student as for the professional physicist. Einstein's relativity theory is central to both dynamical and energetic properties in the universe; Relativity in Our Time sets the theory in context and clarity. The overwhelming assertion of the book is that the principle of relativity leads to a theoretical structure with tremendous predictive capacity, from the microscopic range of particle physics to the domain of the universe at large-cosmic scales. Sachs' arguments cascade outwards in logical and expressive discussions to encompass the new view of space, time, spacetime, the curvature of spacetime and gravitation, as well as the unified field concept, and an approach to cosmology. Perhaps most fascinating of all is the relevance of the theory to human relations in the social sciences. The economy and breadth of this book make it a convincing and worthwhile source of fundamental understanding of the scientific interpretation of our time.

[Relativity in Our Time : From Physics to Human Relations](#)

Mendel Sachs

Format: Paperback, 162pp.
ISBN: 0748401180
Publisher: Taylor & Francis, Inc.
Pub. Date: January 1993

[Einstein Versus Bohr : The Continuing Controversies in Physics](#)

Mendel Sachs

Format: Hardcover/Paperback
ISBN: 0812690648 (hardcover), 0812690656 (paperback)
Publisher: Open Court Publishing Company
Pub. Date: 1988

Japanese translation by M. Harada and K. Sugimoto (Maruzen, Tokyo, 1991) ISBN 462103636X C0042



Einstein Versus Bohr is unlike other books on science written by experts for non-experts, because it presents the history of science in terms of problems, conflicts, contradictions, and arguments.

Science normally "keeps a tidy workshop." Professor Sachs breaks with convention by taking us into the theoretical workshop, giving us a problem-oriented account of modern physics, an account that concentrates on underlying concepts and debate. The book contains mathematical explanations, but it is so-designed that the whole argument can be followed with the math omitted.

Professor Sachs' story begins with classical and nineteenth century physics, describes the early discoveries in particle theory, and introduces the "old" quantum theory, which evolved into the quantum mechanics of the Copenhagen School.

Such important ideas as the Einstein Photon Box experiment and

the Einstein-Podolsky-Rosen Paradox, and Schrodinger's Cat Paradox are clearly expounded, followed by a completely fresh explanation of relativity *in conceptual terms*, showing how apparent paradoxes can be removed by Einstein's own interpretation, especially that of his later years.

Professor Sachs gives a detailed comparison of the fundamentals of the quantum and relativity theories, suggesting how the contradictions might be resolved. In an epilogue, he makes suggestions, with reference to religious notions, Taoism, and Buber's theory of I-Thou, for generalizing Einstein's approach beyond physics.

[The Field Concept in Contemporary Science](#)

Mendel Sachs

Format: Out of Print

ISBN: 0398026076

Publisher: Charles C. Thomas Publishers

Pub. Date: 1973

Dr. Sachs presents a lucid, non-mathematical account of the role of the continuous field concept in three major areas of twentieth century science: the theory of electromagnetism, the theory of relativity, and the contemporary theory that underlies phenomena in the microscopic domain of atoms, molecules and elementary particles – the quantum theory. Electromagnetic theory has been interpreted in terms of a continuous field of potential force that electrically charged matter could exert on other charged matter, should the test matter be placed at any of a continuum of spatial points. The formal expression of the theory of relativity has been interpreted in terms of a continuous field of geometry – the continuous set of relations between the points of space-time, as determined by the matter distribution of a physically closed system. The variables of the quantum theory have been interpreted in terms of a field of probability - the continuous distribution of a sequence of chances that a macroscopic apparatus will determine that the microscopic object will have one set of physical properties or another. Each of these field theories is analyzed from the point of view of its philosophical content, and the contrasting views in terms of the atomistic theories are presented. Discussion is given to the logically dichotomous and compatible aspects of these theories as well as indications of possible paths toward their unification into a general field theory of matter. The reader is presented with biographical backgrounds of the chief scientists whose works are discussed, adding the human element to this unfolding story of the evolution of field theories, from the points of view of the proponents as well as the opponents of the continuous field approach.

[Ideas of Matter : From Ancient Times to Bohr and Einstein](#)

Mendel Sachs

Format: Hardcover/Paperback (Out of Print)

ISBN: 0819116157 (hardcover), 0819116165 (paperback)

Publisher: University Press of America

Pub. Date: 1981

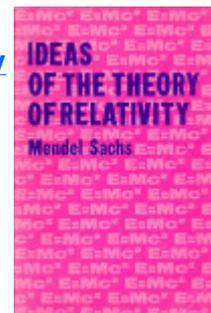
The primary focus of this book is concerned with the main philosophical ideas and debates of the two major developments of twentieth century physics – the quantum theory of measurement and the theory of relativity – as underlying theories of matter. The following are the chapter headings:

1. Introduction.
2. Ancient Views of Reality in Physics.
3. A Renaissance (Galileo, Newton, Descartes, Spinoza, Hume, Kant).
4. Nineteenth Century Physics (Dalton, Boltzmann, Faraday, Maxwell).
5. Discoveries about Matter and Radiation Early in the Twentieth Century.
6. Wave-Particle Dualism of Matter.
7. Interpretations of Wave Mechanics.
8. The Copenhagen Interpretation of Quantum Mechanics.
9. Objections to Quantum Mechanics and Counter-Proposals
10. The Theory of Relativity.
11. Cosmology. Epilogue, Bibliography.

[Ideas of The Theory of Relativity; General Implications from Physics to Problems of Society](#)

Mendel Sachs

Format: Out of Print
ISBN: 0706514610
Publisher: Israel Universities Press
Pub. Date: 1974

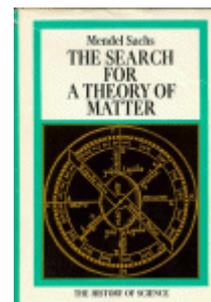


This book shows how a single assertion – the principle of relativity – leads to a theoretical structure that has tremendous predictive capacity. The theory covers the entire range of the physical universe from the microscopic range of elementary particle physics to the domain of cosmology. The different topics are presented in a non-mathematical fashion, and include space-time, the curvature of space-time and gravitation, and unified field concepts and cosmology. Throughout the text, extensions into the area of human relations are discussed from the point of view of the physical scientist.

[The Search for a Theory of Matter](#)

Mendel Sachs

Format: Out of Print
ISBN: Library of Congress Catalog Card No. 72127974
Publisher: McGraw-Hill
Pub. Date: 1971



This book explores in an enlightening, readable way how first one theory, then another was proposed, how some have reappeared after being discarded, how attempts have been made to fuse

apparently contradictory theories into a unified and cogent explanation.

Ranging from the physics of the ancient Greece through Galileo's studies of freely falling bodies, Newton's laws of motion and gravitation, Faraday's field concept, the theories of Maxwell and Boltzmann, the experiment of Michelson and Morley, to Einstein's theory of relativity, Bohr's model of the atom and the modern quantum theory, Dr. Sachs examines and illuminates man's attempts to gather the laws that govern the motion of objects, electricity, magnetism, optics, gravitation and atomic and elementary particle physics into a satisfactory unified theory of matter.

The book is suitable for senior high school students, college freshmen and all other readers interested in discussions of the important concepts and conflicts of ideas that have appeared throughout the history of physics, highlighting the developments in the twentieth century.

Solid State Theory

Mendel Sachs

Format: Out of Print

ISBN: Library of Congress Catalog Card No. 6221804

Publisher: McGraw-Hill

Pub. Date: 1963

Dover Publications reprinting, 1974, Library of Congress Catalog Card No. 7478777.

The most important single feature of this fine work is its emphasis on the role played by the symmetry of crystal lattices in the determination of many of the physical properties of solids. Group theory is introduced and the representations of finite groups are utilized to analyze atomic energy levels in crystal lattices as well as selection rules for transitions between these levels. This aspect of solid state physics enables one to determine many of the qualitative features of solid state properties before numerical computations begin.

In general, the book exploits a few basic principles in developing in detail some of the general features of solids, rather than trying a wide area in less detail. The author feels that this approach will give the reader enough fundamental background to enable him to proceed further on his own in research.

The book is designed for two different groups of physics students and researchers:

Those who are primarily interested in pursuing further research in experimental or theoretical solid state physics,

Those whose chief interest is not in solid state physics, but who wish to broaden their knowledge of solid state theory as an example for many applications in theoretical physics – e.g. group theory and the use of the S-matrix approach for scattering

problems.

The book should also appeal to students and researchers in allied fields (such as physical chemistry, metallurgy, electrical engineering, etc.) who may derive some insight into their own studies of solids from the point of view of fundamental physics.



Amazon.com and BarnesandNoble.com list my books on the Internet for purchase.

I have published approximately 150 technical articles in the journals, in astrophysics, particle physics, unified field theory and the philosophy of physics. Many of these articles are referred to in the books listed above. The titles of recent papers are as follows:

- "On Unification of Gravity and Electromagnetism and the Absence of Magnetic Monopoles", *Nuovo Cimento* **114B**, (1999).
- "On the source of Anisotropy in Cosmic Radiation from General Relativity", *Nuovo Cimento* **110A**, 611 (1997).
- "Changes in Concepts of Time from Aristotle to Einstein", *Astrophysics and Space Science* **244**, 269 (1996).
- "An Interpretation of the Top Quark Mass in Terms of a Proton Mass Doublet in General Relativity", *Nuovo Cimento* **108A**, 1445 (1995).
- "On the Rotation of Galaxies in General Relativity", *Physics Essays* **7**, 490 (1994).
- "On the Problem of Cosmology", *Physics Essays* **6**, 32 (1993).
- "On the Possible Origin of CP Violation in Neutral Kaon Decay", *Nuovo Cimento* **72A**, 361 (1982).
- "A Pulsar Model from an Oscillating Black Hole", *Foundations of Physics* **12**, 689 (1982).
- "On Stellar Collapse and the Black Hole Limit from a Dynamical View", *Annales Institut Henri Poincare* **28**, 399 (1978).
- "The Electron-Muon Mass Doublet from General Relativity", *Nuovo Cimento* **7B**, 247 (1972).



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