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Thematic Origins Of Scientific Thought Kepler To Einstein Pdf Pdf (Download Only)

Science and Anti-science Gerald James Holton 1993 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.

Art in Science Museums Camilla Rossi-Linnemann 2019-12-19 Art in Science Museums brings together perspectives from different practitioners to reflect on the status and meaning of art programmes in science centres and museums around the world. Presenting a balanced mix of theoretical perspectives, practitioners’ reflections, and case-studies, this volume gives voice to a wide range of professionals, from traditional science centres and museums, and from institutions born with the very aim of merging art and science practices. Considering the role of art in the field of science engagement, the book questions whether the arts might help curators to convey complex messages, foster a more open and personal approach to scientific issues, become tools of inclusion, and allow for the production of totally new cultural products. The book also includes a rich collection of projects from all over the world, synthetically presenting cases that reveal very different approaches to the inclusion of art in science programmes. Art in Science Museums should be of great interest to academics, researchers and postgraduate students working in the fields of museum studies, cultural heritage management, material culture, science communication and contemporary art. It should also be essential reading for museum professionals looking to promote more reflective social science engagement in their institutions.

Thematic Origins of Scientific Thought Gerald James Holton 1988

The Second Physicist Christa Jungnickel 2017-06-10 This book explores the rise of theoretical physics in 19th century Germany. The authors show how the junior second physicist in German universities over time became the theoretical physicist, of equal standing to the experimental physicist. Gustav Kirchhoff, Hermann von Helmholtz, and Max Planck are among the great German theoretical physicists whose work and career are examined in this book. Physics was then the only natural science in which theoretical work developed into a major teaching and research specialty in its own right. Readers will discover how German physicists arrived at a well-defined field of theoretical physics with well understood and generally accepted goals and needs. The authors explain the nature of the work of theoretical physics with many examples, taking care always to locate the research within the workplace. The book is a revised and shortened version of Intellectual Mastery of Nature: Theoretical Physics from Ohm to Einstein, a two-volume work by the same authors. This new edition represents a reformulation of the larger work. It retains what is most important in the original work, while including new material, sharpening discussions, and making the research more accessible to readers. It presents a thorough examination of a seminal era in physics.

The Eureka Effect David N Perkins 2001 Breakthrough thinking comes as a sudden, seemingly unaccountable moment of inspiration: From Archimedes' discovery in the bathtub of the principle of water displacement to Einstein's Theory of Relativity, from Brunelleschi's development of perspective drawing to the Impressionist revolution, from the taming of fire to the creation of the laser, it has shaped and advanced civilization.

Newton’s Apple and Other Myths about Science Ronald L. Numbers 2015-11-04 A falling apple inspired the law of gravity—or so the story goes. Is it true? Perhaps not. But why do such stories endure as explanations of how science happens? Newton’s Apple and Other Myths about Science brushes away popular misconceptions to provide a clearer picture of scientific breakthroughs from ancient times to the present.

Creative Collaboration Vera John-Steiner 2006-08-03 Rodin's sculpture "The Thinker" dominates our collective imagination as the purest representation of human inquiry--the lone, stoic thinker. But while the Western belief in individualism romanticizes this perception of the solitary creative process, the reality is that scientific and artistic forms emerge from the joint thinking, passionate conversations, emotional connections and shared struggles common in meaningful relationships. In Creative Collaboration, Vera John-Steiner offers rare and fascinating glimpses into the dynamic alliances from which some of our most important scholarly ideas, scientific theories and art forms are born. Within these pages we witness the creative process unfolding in the intimate relationships of Jean-Paul Sartre and Simone de Beauvoir, Henry Miller and Anais Nin, Marie and Pierre Curie, Martha Graham and Erick Hawkins, and Georgia O'Keeffe and Alfred Stieglitz; the productive partnerships of Pablo Picasso and Georges Braque, Albert Einstein and Marcel Grossmann, Aaron Copland and Leonard Bernstein, and Freeman Dyson and Richard Feynman; the familial collaborations of Thomas and Heinrich Mann, Hubert and Stuart Dreyfus, and Margaret Mead, Gregory Bateson and Mary Catherine Bateson; and the larger ensembles of The Guarneri String Quartet, Lee Strasburg, Harold Clurman and The Group Theater, and such feminist groups as The Stone Center and the authors of Women's Ways of Knowing. Many of these collaborators complemented each other, meshing different backgrounds and forms into fresh styles, while others completely transformed their fields. Here is a unique cultural and historical perspective on the creative process. Indeed, by delving into these complex collaborations, John-Steiner illustrates that the mind--rather than thriving on solitude--is clearly dependent upon the reflection, renewal and trust inherent in sustained human relationships. Here is a unique cultural and historical perspective on the creative process, and a compelling depiction of the associations that nurtured our most talented artists and thinkers. By delving into these complex, intimate collaborations, John-Steiner illustrates that the mind--rather than thriving on solitude--is clearly dependent upon the dialogue, renewal, and trust inherent in sustained human relationships.

The Logical Leap David Harriman 2010-07-06 A groundbreaking solution to the problem of induction, based on Ayn Rand's theory of concepts. Inspired by and expanding on a series of lectures presented by Leonard Peikoff, David Harriman presents a fascinating answer to the problem of induction-the epistemological question of how we can know the truth of inductive generalizations. Ayn Rand presented her revolutionary theory of concepts in her book Introduction to Objectivist Epistemology. As Dr. Peikoff subsequently explored the concept of induction, he sought out David Harriman, a physicist who had taught philosophy, for his expert knowledge of the scientific discovery process. Here, Harriman presents the result of a collaboration between scientist and philosopher. Beginning with a detailed discussion of the role of mathematics and experimentation in validating generalizations in physics-looking closely at the reasoning of scientists such as Galileo, Kepler, Newton, Lavoisier, and Maxwell-Harriman skillfully argues that the inductive method used in philosophy is in principle indistinguishable from the method used in physics.

Person-Centered Studies in Psychology of Science Lisa M. Osbeck 2022-12-29 This unique collection examines "the acting person" as an important unit of analysis for science studies, using an integrative approach of in-depth case studies to explore the cognitive, social, cultural, and personal dimensions of a series of key figures in the sciences, from Goethe to Kepler to Rachel Carson. Opening up key questions about what science is, and what comprises a scientist, the volume offers an accessible introductory approach to psychology of science, a growing area in Science and Technology Studies (STS). Case studies focus on the psychological contexts of the contributions for which the scientist is known. Without diminishing its epistemic authority, science is presented as a psychologically saturated human activity, one that is especially illustrative of the way social, cognitive, and personal processes intermingle to both facilitate and impede scientific accomplishment. Each case study ends with a set of discussion questions, providing a valuable resource for student reflection and discussion, inviting analysis of similarities and differences in science in the context of very different lives and different projects. Person-Centered Studies in Psychology of Science is essential reading for scholars and graduates interested in the psychology of science, personality theory, social, or cognitive psychology, general psychologists, and theoretical psychologists.

God and Time Gregory E. Ganssle 2002 This is a collection of previously unpublished essays written by leading philosophers about God's relation to time. The essays have been selected to represent current debates between those who believe God to be atemporal and those who do not.

Historical Roots of Cognitive Science Theo C. Meyering 2012-12-06 Cognitive science, in Howard Gardner's words, has a relatively short history but a very long past. While its short history has been the subject of quite a few studies published in recent years, the current book focuses instead on its very long past. It explores the emergence of the conceptual framework that was necessary to make the rise of modem cognitive science possible in the first place. Over the long course of the history of the theory of perception and of cognition, various conceptual breakthroughs can be discerned that have contributed significantly to the conception of the mind as a physical symbol system with intricate representational capacities and unimaginably rich computational resources. In historical retrospect such conceptual transitions-seemingly sudden and unannounced-are typically foreshadowed in the course of enduring research programs that serve as slowly developing theoretical con straint structures gradually narrowing down the apparent solution space for the scientific problems at hand. Ultimately the fundamental problem is either resolved to the satisfaction of the majority of researchers in the area of investigation, or else-and much more commonly-one or more of the major theoretical constraints is abandoned or radically modified, giving way to entirely new theoretical vistas. In the history of the theory of perception this process can be witnessed at vari ous important junctures.

Thought Experiments in Philosophy, Science, and the Arts Mélanie Frappier 2013 From Lucretius throwing a spear beyond the boundary of the universe to Einstein racing against a beam of light, thought experiments stand as a fascinating challenge to the necessity of data in the empirical sciences. Are these experiments, conducted uniquely in our imagination, simply rhetorical devices or communication tools or are they an essential part of scientific practice? This volume surveys the current state of the debate and explores new avenues of research into the epistemology of thought experiments.

Einstein's Generation Richard Staley 2008 'Einstein's Generation' offers a new approach to the origins of modern physics by exploring both the material culture that stimulated relativity and the reaction of Einstein's colleagues to his pioneering work.

Vermeer and Plato Robert D. Huerta 2005 There are thirty-six illustrations."--Jacket.

Science, History and Social Activism Garland E. Allen 2013-03-14 "To earn a degree, every doctoral candidate should go out to Harvard Square, find an audience, and explain his [or her] dissertation". Everett Mendelsohn's worldly advice to successive generations of students, whether apocryphal or real, has for over forty years spoken both to the essence of his scholarship, and to the role of the scholar. Possibly no one has done more to establish the history of the life sciences as a recognized university discipline in the United States, and to inspire a critical concern for the ways in which science and technology operate as central features of Western society. This book is both an act of homage and of commemoration to Professor Mendelsohn on his 70th birthday. As befits its subject, the work it presents is original, comparative, wide-ranging, and new. Since 1960, Everett Mendelsohn has been identified with Harvard Univer sity, and with its Department of the History of Science. Those that know him as a teacher, will also know him as a scholar. In 1968, he began- and after 30 years, has just bequeathed to others - the editorship of the Journal of the History of Biology, among the earliest and one of the most important publications in its field. At the same time, he has been a pioneer in the social history and sociology of science. He has formed particularly close working relationships with colleagues in Sweden and Germany - as witnessed by his editorial presence in the Sociology of Science Yearbook.

Thematic Origins of Scientific Thought Gerald James Holton 1973

Einstein, Picasso Arthur I Miller 2008-08-01 The most important scientist of the twentieth century and the most important artist had their periods of greatest creativity almost simultaneously and in remarkably similar circumstances. This fascinating parallel biography of Albert Einstein and Pablo Picasso as young men examines their greatest creations -- Picasso's Les Demoiselles d'Avignon and Einstein's special theory of relativity. Miller shows how these breakthroughs arose not only from within their respective fields but from larger currents in the intellectual culture of the times. Ultimately, Miller shows how Einstein and Picasso, in a deep and important sense, were both working on the same problem.

Natural and Artificial Reasoning Tom Addis 2014-10-20 What are the limitations of computer models and why do we still not have working models of people that are recognizably human? This is the principle puzzle explored in this book where ideas behind systems that behave intelligently are described and different philosophical issues are touched upon. The key to human behavior is taken to be intelligence and the ability to reason about the world. A strong scientific approach is taken, but first it was required to understand what a scientific approach could mean in the context of both natural and artificial systems. A theory of intelligence is proposed that can be tested and developed in the light of experimental results. The book illustrates that intelligence is much more than just behavior confined to a unique person or a single computer program within a fixed time frame. Some answers are unraveled and some puzzles emerge from these investigations and experiments. Natural and Artificial Reasoning provides a few steps of an exciting journey that began many centuries ago with the word ‘why?’

Time and the Metaphysics of Relativity W.L. Craig 2013-11-11 The larger project of which this volume forms part is an attempt to craft a coherent doctrine of divine eternity and God's relationship to time. Central to this project is the integration of the concerns of theology with the concept of time in relativity theory. This volume provides an accessible and philosophically informed examination of the concept of time in relativity, the ultimate aim being the achievement of a tenable theological synthesis.

A History of the Ideas of Theoretical Physics S. D'Agostino 2012-12-06 This book presents a perspective on the history of theoretical physics over the past two hundreds years. It comprises essays on the history of pre-Maxwellian electrodynamics, of Maxwell's and Hertz's field theories, and of the present century's relativity and quantum physics. A common thread across the essays is the search for and the exploration of themes that influenced significant con ceptual changes in the great movement of ideas and experiments which heralded the emergence of theoretical physics (hereafter: TP). The fun. damental change involved the recognition of the scien tific validity of theoretical physics. In the second half of the nine teenth century, it was not easy for many physicists to understand the nature and scope of theoretical physics and of its adept, the theoreti cal physicist. A physicist like Ludwig Boltzmann, one of the eminent contributors to the new discipline, confessed in 1895 that, "even the formulation of this concept [of a theoretical physicist] is not entirely without difficulty". 1 Although science had always been divided into theory and experiment, it was only in physics that theoretical work developed into a major research and teaching specialty in its own right. 2 It is true that theoretical physics was mainly a creation of tum of-the century German physics, where it received full institutional recognition, but it is also undeniable that outstanding physicists in other European countries, namely, Ampere, Fourier, and Maxwell, also had an important part in its creation.

Science Teaching Michael R. Matthews 2014-09-19 Science Teaching explains how history and philosophy of science contributes to the resolution of persistent theoretical, curricular, and pedagogical issues in science education. It shows why it is essential for science teachers to know and appreciate the history and philosophy of the subject they teach and how this knowledge can enrich science instruction and enthuse students in the subject. Through its historical perspective, the book reveals to students, teachers, and researchers the foundations of scientific knowledge and its connection to philosophy, metaphysics, mathematics, and broader social influences including the European Enlightenment, and develops detailed arguments about constructivism, worldviews and science, multicultural science education, inquiry teaching, values, and teacher education. Fully updated and expanded, the 20th Anniversary Edition of this classic text, featuring four new chapters—The Enlightenment Tradition; Joseph Priestley and Photosynthesis; Science, Worldviews and Education; and Nature of Science Research—and 1,300 references, provides a solid foundation for teaching and learning in the field.

Planetary Motions Norriss S. Hetherington 2006-07-30 Students in an introductory physics class learn a variety of different, and seemingly unconnected, concepts. Gravity, the laws of motion, forces and fields, the mathematical nature of the science - all of these are ideas that play a central role in understanding physics. And one thing that connects all of these physical concepts is the impetus the great scientists of the past had to develop them - the desire to understand the motion of the planets of the solar system. This desire led to the revolutionary work of Copernicus and Galileo, Kepler and Newton. And their work forever altered how science is practiced and understood.

The Social Process of Scientific Investigation W.R. Knorr 2012-12-06 practice, some of which is translated into the

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standard forms of public discourse, in publication, and then retranslated by readers and adapted again to local practice at self-selected other sites. Less may be left implicit, and additional personal and contextual information is carried, by the "informal" methods of communication which mediate local projects and international publication. But both methods of communication are screens as well as conduits of information. History and Background of the Volume When the planning of this volume began in the spring of 1977, it seemed a natural part of the mandate for the Yearbook. There had also been a number of more specific calls for deeper studies of research in social and historical context (3). These calls can be seen as giving permission and legitimacy to ask questions otherwise seen as irrelevant, or even disrespectful, and as attempts to develop new perspectives from which to ask and to answer them. The implied and expressed irreverence toward traditions and institutions of great respect may have prolonged this process of initial apologetics. In any case, in May 1977 the theme of 'The Social Process of Scientific Investigation' was proposed to the Editorial Board for Volume IV as "the heart of the subject. " That is, the ethnographic and detailed historical study of actual scientific activity and thinking at or close to the work site.

Interpreting Mach John Preston 2021-03-18 A collection of new essays on Ernst Mach's scientific and philosophical thought by leading Mach scholars.

Fire in the Crucible John Briggs 2000-11-01 What makes a genius different? Is a genius born or made? In this exploration of creativity, the author reveals that there is no special trait of genius. Rather than being gifted above ordinary people, a genius will give expression to subtle nusances, and perceptions that others ignore.

The Scientific Imagination Gerald James Holton 1998 Using firsthand accounts gleaned from notebooks, interviews, and correspondence of such twentieth-century scientists as Einstein, Fermi, and Millikan, Holton shows how the idea of the scientific imagination has practical implications for the history and philosophy of science and the larger understanding of the place of science in our culture.

Theoretical Concepts in Physics Malcolm S. Longair 2020-04-16 In this original and integrated approach to theoretical reasoning in physics, Malcolm Longair illuminates the subject from the perspective of real physics as practised by research scientists. Concentrating on the basic insights, attitudes and techniques that are the tools of the modern physicist, this approach conveys the intellectual excitement and beauty of the subject. Through a series of seven case studies, an undergraduate course in classical physics and the discovery of quanta are reviewed from the point of the view of how the great discoveries and changes of perspective came about. This approach illuminates the intellectual struggles needed to attain understanding of some of the most difficult concepts in physics. Longair's highly acclaimed text has been fully revised and includes new studies on the physics of fluids, Maxwell's great paper on equations for the electromagnetic field and problems of contemporary cosmology and the very early universe.

Reader's Guide to the History of Science Arne Hessenbruch 2013-12-16 The Reader's Guide to the History of Science looks at the literature of science in some 550 entries on individuals (Einstein), institutions and disciplines (Mathematics), general themes (Romantic Science) and central concepts (Paradigm and Fact). The history of science is construed widely to include the history of medicine and technology as is reflected in the range of disciplines from which the international team of 200 contributors are drawn.

Intellectual Mastery of Nature. Theoretical Physics from Ohm to Einstein, Volume 2 Christa Jungnickel 1990-09-24 Winner of the 1987 Pfizer Award of the History of Science Society "A majestic study of a most important spoch of intellectual history."—Brian Pippard, Times Literary Supplement "The authors' use of archival sources hitherto almost untouched gives their story a startling vividness. These volumes are among the finest works produced by historians of physics."—Jed Z. Buchwald, Isis "The authors painstakingly reconstruct the minutiae of laboratory budgets, instrument collections, and student numbers; they disentangle the intrigues of faculty appointments and the professional values those appointments reflected; they explore collegial relationships among physicists; and they document the unending campaign of scientists to wring further support for physics from often reluctant ministries."—R. Steven Turner, Science "Superbly written and exhaustively researched."—Peter Harman, Nature

Teaching and Learning about Science Derek Hodson 2009-01-01 Findings generated by recent research in science education, international debate on the guiding purposes of science education and the nature of scientific and technological literacy, official and semi-official reports on science education (including recommendations from prestigious organizations such as AAAS and UNESCO), and concerns expressed by scientists, environmentalists and engineers about current science education provision and the continuing low levels of scientific attainment among the general population, have led to some radical re-thinking of the nature of the science curriculum.

Physics, the Human Adventure Gerald James Holton 2001 Of Some Trigonometric Relations -- Vector Algebra.

Science in Culture Stephen R. Graubard 2018-04-27 Twenty-five years ago, Gerald Holton's Thematic Origins of Scientific Thought introduced a wide audience to his ideas. Holton argued that from ancient times to the modern period, an astonishing feature of innovative scientific work was its ability to hold, simultaneously, deep and opposite commitments of the most fundamental sort. Over the course of Holton's career, he embraced both the humanities and the sciences. Given this background, it is fitting that the explorations assembled in this volume reflect both individually and collectively Holton's dual roots. In the opening essay, Holton sums up his long engagement with Einstein and his thematic commitment to unity. The next two essays address this concern. In historicized form, Lorraine Daston returns the question of the scientific imagination to the Enlightenment period when both sciences and art feared imagination. Daston argues that the split whereby imagination was valued in the arts and loathed in the sciences is a nineteenth-century divide. James Ackerman on Leonardo da Vinci meshes perfectly with Daston's account, showing a form of imaginative intervention where it is irrelevant to draw analogies between art and science. Historians of religion Wendy Doniger and Gregory Spinner pursue the imagination into the bedroom with literary-theological representations. Science, culture, and the imagination also intersect with biologist Edward Wilson and physicist Steven Weinberg. Both tackle the big question of the unity of knowledge and worldviews from a scientific perspective while art historian Ernst Gombrich does the same from the perspective of art history. To emphasize the nitty-gritty of scientific practice, chemists Bretislav Fredrich and Dudley Herschback provide a remarkable historical tour at the boundary of chemistry and physics. In the concluding essay, historian of education Patricia Albjerg Graham addresses pedagogy head-on. In these various reflections on science, art, literature, philosophy, and education, this volume gives us a view in common: a deep and abiding respect for Gerald Holton's contribution to our understanding of science in culture. Peter Galison is Mallinckrodt Professor of History of Science and of physics at Harvard University. Stephen R. Graubard is editor of the American Academy of Arts and Sciences and its journal, Daedalus, and professor of history emeritus at Brown University. Everett Mendelsohn is director of the History of Science Program at Harvard University.

Ideas Have a History F. G. Oosterhoff 2001 Ideas Have a History offers a history of ideas from ancient Greece to postmodern times. From the time of the Greeks, the West has experienced a dramatic transition in the way it views "truth." For there no longer exists a blind faith in the objective truth, but, rather a denial of the possibility of truth. What role have religion, philosophy, and science played in this transition? Ideas Have a History should be of interest to all those who are interested in the relationship between science and religion, in the role that theory of knowledge plays in human thought and action belief systems, and in the manner in which a study of the past helps elucidate the present.

God, Time, and Eternity W.L. Craig 2013-03-14 In this highly original and ground-breaking work, the author brings together discussions in the philosophy of time and space, philosophy of language, phenomenology, philosophy of science, Special and General Relativity, classical cosmology, quantum mechanics, and so forth, with the concerns of philosophy of religion and theology, in order to craft a philosophically informed and scientifically tenable doctrine of divine eternity and God's relationship to time.

Thematic Origins of Scientific Thought Gerald Holton 1988-05-25 The highly acclaimed first edition of this major work convincingly established Gerald Holton’s analysis of the ways scientific ideas evolve. His concept of “themata,” induced from case studies with special attention to the work of Einstein, has become one of the chief tools for understanding scientific progress. It is now one of the main approaches in the study of the initiation and acceptance of individual scientific insights. Three principal consequences of this perspective extend beyond the study of the history of science itself. It provides philosophers of science with the kind of raw material on which some of the best work in their field is based. It helps intellectual historians to redefine the place of modern science in contemporary culture by identifying influences on the scientific imagination. And it prompts educators to reexamine the conventional concepts of education in science. In this new edition, Holton has masterfully reshaped the contents and widened the coverage. Significant new material has been added, including a penetrating account of the advent of quantum physics in the United States, and a broad consideration of the integrity of science, as exemplified in the work of Niels Bohr. In addition, a revised introduction and a new postscript provide an updated perspective on the role of themata. The result of this thoroughgoing revision is an indispensable volume for scholars and students of scientific thought and intellectual history.

A Cultural History of Physics Karoly Simonyi 2012-01-25 While the physical sciences are a continuously evolving source of technology and of understanding about our world, they have become so specialized and rely on so much prerequisite knowledge that for many people today the divide between the sciences and the humanities seems even greater than it was when C. P. Snow delivered his famous 1959 lecture,

Thought Experiments in Science, Philosophy, and the Arts Melanie Frappier 2012-09-10 From Lucretius throwing a spear beyond the boundary of the universe to Einstein racing against a beam of light, thought experiments stand as a fascinating challenge to the necessity of data in the empirical sciences. Are these experiments, conducted uniquely in our imagination, simply rhetorical devices or communication tools or are they an essential part of scientific practice? This volume surveys the current state of the debate and explores new avenues of research into the epistemology of thought experiments.

The Scientific Imagination Arnon Levy 2019-11-01 The imagination, our capacity to entertain thoughts and ideas "in the mind's eye," is indispensable in science as elsewhere in human life. Indeed, common scientific practices such as modeling and idealization rely on the imagination to construct simplified, stylized scenarios essential for scientific understanding. Yet the philosophy of science has traditionally shied away from according an important role to the imagination, wary of psychologizing fundamental scientific concepts like explanation and justification. In recent years, however, advances in thinking about creativity and fiction, and their relation to theorizing and understanding, have prompted a move away from older philosophical perspectives and toward a greater acknowledgement of the place of the imagination in scientific practice. Meanwhile, psychologists have engaged in significant experimental work on the role of the imagination in causal thinking and probabilistic reasoning. The Scientific Imagination delves into this burgeoning area of debate at the intersection of the philosophy and practice of science, bringing together the work of leading researchers in philosophy and psychology. Philosophers discuss such topics as modeling, idealization, metaphor and explanation, examining their role within science as well as how they affect questions in metaphysics, epistemology and philosophy of language. Psychologists discuss how our imaginative capacities develop and how they work, their relationships with processes of reasoning, and how they compare to related capacities, such as categorization and counterfactual thinking. Together, these contributions combine to provide a comprehensive and exciting picture of the scientific imagination.

Einstein, History, and Other Passions Gerald James Holton 2000 "[The] book makes a wonderfully cohesive whole. It is rich in ideas, elegantly expressed. I highly recommend it to any serious student of science and culture."--Lucy Horwitz, Boston Book Review "An important and lasting contribution to a more profound understanding of the place of science in our culture."--Hans C. von Baeyer, Boston Sunday Globe "[Holton's] themes are central to an understanding of the nature of science, and Holton does an excellent job of identifying and explaining key features of the scientific enterprise, both in the historical sense and in modern science...I know of no better informed scientist who has studied the nature of science for half a century."--Ron Good, Science and Education Through his rich exploration of Einstein's thought, Gerald Holton shows how the best science depends on great intuitive leaps of imagination, and how science is indeed the creative expression of the traditions of Western civilization.

Thematic Origins of Scientific Thought Gerald Holton 1988-05-25 The highly acclaimed first edition of this major work convincingly established Gerald Holton’s analysis of the ways scientific ideas evolve. His concept of “themata,” induced from case studies with special attention to the work of Einstein, has become one of the chief tools for understanding scientific progress. It is now one of the main approaches in the study of the initiation and acceptance of individual scientific insights. Three principal consequences of this perspective extend beyond the study of the history of science itself. It provides philosophers of science with the kind of raw material on which some of the best work in their field is based. It helps intellectual historians to redefine the place of modern science in contemporary culture by identifying influences on the scientific imagination. And it prompts educators to reexamine the conventional concepts of education in science. In this new edition, Holton has masterfully reshaped the contents and widened the coverage. Significant new material has been added, including a penetrating account of the advent of quantum physics in the United States, and a broad consideration of the integrity of science, as exemplified in the work of Niels Bohr. In addition, a revised introduction and a new postscript provide an updated perspective on the role of themata. The result of this thoroughgoing revision is an indispensable volume for scholars and students of scientific thought and intellectual history.

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