

Jaap van Brakel

# PHILOSOPHY OF CHEMISTRY

Between the Manifest and the Scientific Image

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# Philosophy Of Chemistry Between The Manifest And The Scientific Image

**Jaap Brakel**



## **Philosophy Of Chemistry Between The Manifest And The Scientific Image:**

**Philosophy of Chemistry** Jaap Brakel, 2000 This book addresses themes in the newly emerging discipline of philosophy of chemistry in particular issues in connection with discussions in general philosophy of science on natural kinds reduction and ceteris paribus laws The philosophical issue addressed in all chapters is the relation between on the one hand the manifest image the daily practice or common sense life form and on the other the scientific image both of which claim to be the final arbiter of everything With respect to chemistry the question raised is this Where does this branch of science fit in with the manifest or scientific image Most philosophers and chemists probably would reply unhesitatingly the scientific image The aim of this book is to raise doubts about that self evidence It is argued that chemistry is primarily the science of manifest substances whereas micro or submicro scientific talk though important useful and insightful does not change what matters namely the properties of manifest substances These manifest substances their properties and uses cannot be reduced to talk of molecules or solutions of the Schrödinger equation If submicroscopic quantum mechanics were to be wrong it would not affect all or any microlevel chemical knowledge of molecules If molecular chemistry were to be wrong it wouldn't disqualify knowledge of say water not at the macrolevel e.g. its viscosity at 50 °C nor at the pre or protoscientific manifest level e.g. ice is frozen water

The Philosophy of Chemistry Jean-Pierre Llored, 2014-09-26 This volume connects chemistry and philosophy in order to face questions raised by chemistry in our present world The idea is first to develop a kind of philosophy of chemistry which is deeply rooted in the exploration of chemical activities We thus work in close contact with chemists technicians engineers researchers and teachers Following this line of reasoning the first part of the book encourages current chemists to describe their workaday practices while insisting on the importance of attending to methodological metrological philosophical and epistemological questions related to their activities It deals with sustainable chemistry chemical metrology nanochemistry and biochemistry among other crucial topics In doing so those chemists invite historians and philosophers to provide ideas for future developments In a nutshell this part is a call for forthcoming collaborations focused on instruments and methods that is on ways of doing chemistry The second part of the book illustrates the multifarious ways to study chemistry and even proposes new approaches to doing so Each approach is interesting and incomplete but the emergent whole is richer than any of its components Analytical work needs socio historical expertise as well as many other approaches in order to keep on investigating chemistry to greater and greater depth This heterogeneity provides a wide set of methodological perspectives not only about current chemical practices but also about the ways to explore them philosophically Each approach is a resource to study chemistry and to reflect upon what doing philosophy of science can mean In the last part of the volume philosophers and chemists propose new concepts or reshape older ones in order to think about chemistry The act of conceptualization itself is queried as well as the relationships between concepts and chemical activities Prefaced by Nobel Laureate in Chemistry Roald Hoffmann and by the President of the International

Society for the Philosophy of Chemistry Rom Harr this volume is a plea for the emergence of a collective cleverness and aims to foster inventiveness *Philosophy of Chemistry* Eric Scerri, Lee McIntyre, 2014-11-11 This volume follows the successful book which has helped to introduce and spread the Philosophy of Chemistry to a wider audience of philosophers historians science educators as well as chemists physicists and biologists The introduction summarizes the way in which the field has developed in the ten years since the previous volume was conceived and introduces several new authors who did not contribute to the first edition The editors are well placed to assemble this book as they are the editor in chief and deputy editors of the leading academic journal in the field *Foundations of Chemistry* The philosophy of chemistry remains a somewhat neglected field unlike the philosophy of physics and the philosophy of biology Why there has been little philosophical attention to the central discipline of chemistry among the three natural sciences is a theme that is explored by several of the contributors This volume will do a great deal to redress this imbalance Among the themes covered is the question of reduction of chemistry to physics the reduction of biology to chemistry whether true chemical laws exist and causality in chemistry In addition more general questions of the nature of organic chemistry biochemistry and chemical synthesis are examined by specialist in these areas **Scimat Anthology: Histophysics, Art, Philosophy, Science** Lui Lam, 2024-08-16 Scimat science of human is a new multidiscipline proposed by Lui Lam in 2007 Scimat treats all studies on human as a unified enterprise In terms of content Scimat Humanities Social Science Medical Science Scimat advocates the use of humanities science synthesis in understanding humans and collaboration between the humanists and natural scientists The ultimate aim of Scimat is to better humanity by bettering the humanities It has done so in the study of history art philosophy and science giving rise to some interesting and important results such as the appearance of a new discipline called Histophysics physics of history a new interpretation of art s origin and nature a better understanding of the differences between the philosophies of the West and East and a rigorous definition of science Scimat Anthology collects 27 original articles in the humanities published or unpublished from 2000 to 2024 with 26 by the founder of Scimat ending with an in depth analysis of Stephen Hawking and his legacy Readership ranges from high school students and laypeople to professors of all disciplines who are interested in what the humanities and science are about as well as new ideas in bridging them

*International Handbook of Research in History, Philosophy and Science Teaching* Michael R. Matthews, 2014-07-03 This inaugural handbook documents the distinctive research field that utilizes history and philosophy in investigation of theoretical curricular and pedagogical issues in the teaching of science and mathematics It is contributed to by 130 researchers from 30 countries it provides a logically structured fully referenced guide to the ways in which science and mathematics education is informed by the history and philosophy of these disciplines as well as by the philosophy of education more generally The first handbook to cover the field it lays down a much needed marker of progress to date and provides a platform for informed and coherent future analysis and research of the subject The publication comes at a time of

heightened worldwide concern over the standard of science and mathematics education attended by fierce debate over how best to reform curricula and enliven student engagement in the subjects There is a growing recognition among educators and policy makers that the learning of science must dovetail with learning about science this handbook is uniquely positioned as a locus for the discussion The handbook features sections on pedagogical theoretical national and biographical research setting the literature of each tradition in its historical context It reminds readers at a crucial juncture that there has been a long and rich tradition of historical and philosophical engagements with science and mathematics teaching and that lessons can be learnt from these engagements for the resolution of current theoretical curricular and pedagogical questions that face teachers and administrators Science educators will be grateful for this unique encyclopaedic handbook Gerald Holton Physics Department Harvard University This handbook gathers the fruits of over thirty years research by a growing international and cosmopolitan community Fabio Bevilacqua Physics Department University of Pavia *Philosophies of the Sciences* Fritz Allhoff, 2015-12-02 A collection of essays discussing a wide range of sciences and the central philosophical issues associated with them presenting the sciences collectively to encourage a greater understanding of their associative theoretical foundations as well as their relationships to each other Offers a new and unique approach to studying and comparing the philosophies of a variety of scientific disciplines Explores a wide variety of individual sciences including mathematics physics chemistry biology psychology sociology and economics The essays are written by leading scholars in a highly accessible style for the student audience Complements more traditional studies of philosophy of science Practical Realist Philosophy of Science Jaana Eigi-Watkin, Endla Lõhkivi, Ave Mets, Peeter Mürsepp, 2024-05-07 The Estonian philosopher of science Rein Vihalemm 1938 2015 left two prominent and fruitful philosophical methodological legacies that continue to captivate philosophers of science a methodological distinction of scientific disciplines and the practical realist philosophy of science Edited by Ave Mets Endla Lõhkivi Peeter Mürsepp and Jaana Eigi Watkin *Practical Realist Philosophy of Science Reflecting on Rein Vihalemm's Ideas* explores some of these fruits that have sprung from philosophy of science and the applications of those approaches through three main ideas back grounds of the practical approach metaphysics of practices and special sciences The first part features authors who juxtapose Vihalemm's approach with those of prominent philosophers on the practical and material basis of cognition providing support and refinement to his framework The second part delves into the metaphysical aspects of science and practices and comprehending them The third part centers around examples of Vihalemm's approach to specific scientific disciplines within chemistry biology and humanities These diverse implications outlined in this book supported by solid ground and compelling argumentation offer an original contribution to this field **Thomas Kuhn's Revolutions** James A. Marcum, 2015-10-22 This new edition of Thomas Kuhn's *Revolution* marks the 50th anniversary of the publication of Kuhn's most influential work Drawing on the rich archival sources at MIT and engaging fully with current scholarship James Marcum provides the historical background to the development of The

Structure of Scientific Revolutions Exploring the shift Kuhn makes from a historical to an evolutionary philosophy of science and examining Kuhn's legacy in depth Marcum answers key questions What exactly was Kuhn's historiographic revolution and how did it come about Why did it have the impact it did What will its future impact be for both academia and society Marcum's answers build a new portrait of Kuhn his personality his pedagogical style and the intellectual and social context in which he practiced his trade Thomas Kuhn's Revolution shows how Kuhn transcends the boundaries of the philosophy of science influencing sociologists economists theologians and even policy makers and politicians This is a comprehensive historical and conceptual introduction to the man who changed our understanding of science Science after the Practice

Turn in the Philosophy, History, and Social Studies of Science Léna Soler, Sjoerd Zwart, Michael Lynch, Vincent

Israel-Jost, 2014-03-21 In the 1980s philosophical historical and social studies of science underwent a change which later evolved into a turn to practice Analysts of science were asked to pay attention to scientific practices in meticulous detail and along multiple dimensions including the material social and psychological Following this turn the interest in scientific practices continued to increase and had an indelible influence in the various fields of science studies No doubt the practice turn changed our conceptions and approaches of science but what did it really teach us What does it mean to study scientific practices What are the general lessons implications and new challenges This volume explores questions about the practice turn using both case studies and theoretical analysis The case studies examine empirical and mathematical sciences including the engineering sciences The volume promotes interactions between acknowledged experts from different often thought of as conflicting orientations It presents contributions in conjunction with critical commentaries that put the theses and assumptions of the former in perspective Overall the book offers a unique and diverse range of perspectives on the meanings methods lessons and challenges associated with the practice turn **Controversy Spaces** Oscar Nudler, 2011 The

notion of controversy space is the key element of the new model of scientific and philosophical change introduced in this book Devised as an alternative to classical models the model of Controversy Spaces is a heuristic tool for the reconstruction of processes of conceptual change in the history of science and philosophy The first chapter of this volume outlines in its initial section the historical trajectory of the dialectical adversarial approach to the progress of knowledge from its ancient flourishing and its almost complete oblivion in modernity up to its contemporary revival Then the main features that characterize the structure and dynamics of controversy spaces are identified and examined In the rest of the book the reader will find a detailed fascinating series of case studies that apply the CS model in a variety of scientific areas ranging from physics to linguistics as well as the philosophy of mind and the philosophy of historiography **ELEMENTS OF HISTORY**

**AND PHILOSOPHY OF SCIENCE** Ephraim-Stephen Essien and Iniobong Umotong (Eds.), 2013-10-10 This book introduces students to the history and philosophy of the natural sciences The book examines major topics in the history and philosophy of science including among others the meaning nature goal and method of science the meaning nature and goal of philosophy

of science the problems of induction and causation and the inductive reasoning as the primary logic of science The book also examines positivism logical positivism and the analytic philosophical tradition falsificationism of Karl Popper within the context of his grand philosophy of critical rationalism methodology of scientific research programme of Imre Lakatos scientific revolution of Thomas Kuhn methodological anarchism of Paul Feyerabend the history of the Western sciences and the philosophical issues associated with them The origin theories of the universe and by implication of man are also analysed here in perspective Issues on the environment its sustainability and renewability are sufficiently adumbrated in this book

**Our Common Cosmos** Zoë Lehmann Imfeld, Andreas Losch, 2018-12-27 This volume collects an international body of voices as a timely response to a rapidly advancing field of the natural sciences The contributors explore how the disciplines of theology earth and space sciences contribute to the debate on constantly expanding ethical challenges and the prospect of humanity's future The discussions offered in this volume see the community as central to a sustainable and ethical approach to earth and space sciences examining the role of theology in this communal approach but also recognizing theology itself as part of a community of humanity disciplines Examining the necessity for interaction between disciplines this collection draws on voices from biodiversity studies geology aesthetics literature astrophysics and others to illustrate precisely why a constructive and sustainable dialogue is needed within the current scientific climate

**A Companion to Naturalism** David Papineau, David Macarthur, Mario De Caro, Flávia Carvalho Chagas, Clademir Luís Araldi, José Eduardo Porcher, Nythamar de Oliveira, Fabrício Pontin, Felipe Karasek, Adriano Naves de Brito, Sofia Albornoz Stein, Ruth Garret Millikan, Evandro Barbosa, João Hobuss, Susana Nucettelli, Thomas Sukopp, Luís Rosa, Jack Ritchie, Offering an engaging and accessible portrait of the current state of the field A Companion to Naturalism shows students how to think about the relation between Philosophy and Science and why is both essential and fascinating to do so All the authors in this collection reconsider the core questions in Philosophical Naturalism in light of the challenges raised in Contemporary Philosophy They explore how philosophical questions are connected to vigorous current debates including complex questions about metaphysics semantics religion intentionality pragmatism reductionism ontology metaethics mind science belief and delusion among others showing how these issues and philosopher's attempts to answer them matter in the Philosophy In this sense this collection is also compelling and illuminating reading for philosophers philosophy students and anyone interested in Naturalism and their place in current discussions

**Fundamentals of Comparative and Intercultural Philosophy** Lin Ma, Jaap van Brakel, 2016-03-25 This innovative book explores the preconditions necessary for intercultural and comparative philosophy Philosophical practices that involve at least two different traditions with no common heritage and whose languages have very different grammatical structure such as Indo Germanic languages and classical Chinese are a particular focus Lin Ma and Jaap van Brakel look at the necessary and not so necessary conditions of possibility of interpretation comparison and other forms of interaction and how we can speak of similarities and differences in this context The authors posit that it is necessary

to dissolve the question of universalism versus relativism by replacing the ideal language paradigm with a paradigm of family resemblances and that it is not necessary to share a common language to engage in comparison Numerous case studies are presented including many comparisons of Western and Chinese concepts

**Community and Identity in Contemporary Technosciences** Karen Kastenhofer, Susan Molyneux-Hodgson, 2021-03-22 This open access edited book provides new thinking on scientific identity formation It thoroughly interrogates the concepts of community and identity including both historical and contemporaneous analyses of several scientific fields Chapters examine whether and how today's scientific identities and communities are subject to fundamental changes reacting to tangible shifts in research funding as well as more intangible transformations in our society's understanding and expectations of technoscience In so doing this book reinvigorates the concept of scientific community Readers will discover empirical analyses of newly emerging fields such as synthetic biology systems biology and nanotechnology and accounts of the evolution of theoretical conceptions of scientific identity and community With inspiring examples of technoscientific identity work and community constellations along with thought provoking hypotheses and discussion the work has a broad appeal Those involved in science governance will benefit particularly from this book and it has much to offer those in scholarly fields including sociology of science science studies philosophy of science and history of science as well as teachers of science and scientists themselves

Transforming Teacher Education Through the Epistemic Core of Chemistry Sibel Erduran, Ebru Kaya, 2019-06-10 This book synthesizes theoretical perspectives empirical evidence and practical strategies for improving teacher education in chemistry Many chemistry lessons involve mindless cookbook activities where students and teachers follow recipes memorise formulae and recall facts without understanding how and why knowledge in chemistry works Capitalising on traditionally disparate areas of research the book investigates how to make chemistry education more meaningful for both students and teachers It provides an example of how theory and practice in chemistry education can be bridged It reflects on the nature of knowledge in chemistry by referring to theoretical perspectives from philosophy of chemistry It draws on empirical evidence from research on teacher education and illustrates concrete strategies and resources that can be used by teacher educators The book describes the design and implementation of an innovative teacher education project to show the impact of an intervention on pre service teachers The book shows how by making use of visual representations and analogies the project makes some fairly abstract and complex ideas accessible to pre service teachers

**All About Science: Philosophy, History, Sociology & Communication** Lui Lam, Maria Burguete, 2014-10-15 There is a lot of confusion and misconception concerning science The nature and contents of science is an unsettled problem For example Thales of 2 600 years ago is recognized as the father of science but the word science was introduced only in the 14th century the definition of science is often avoided in books about philosophy of science This book aims to clear up all these confusions and present new developments in the philosophy history sociology and communication of science It also aims to showcase the achievement of

China's top scholars in these areas. The 18 chapters divided into five parts are written by prominent scholars including the Nobel laureate Robin Warren, sociologist Harry Collins, and physicist turned historian Dietrich Stauffer.

**The Routledge Companion to Environmental Ethics** Benjamin Hale, Andrew Light, Lydia Lawhon, 2022-07-29

Written for a wide range of readers in environmental science, philosophy, and policy-oriented programs, *The Routledge Companion to Environmental Ethics* is a landmark comprehensive reference work in this interdisciplinary field. Not merely a review of theoretical approaches to the ethics of the environment, the Companion focuses on specific environmental problems and other concrete issues. Its 65 chapters, all appearing in print here for the first time, have been organized into the following eleven parts: I Animals, II Land, III Water, IV Climate, V Energy and Extraction, VI Cities, VII Agriculture, VIII Environmental Transformation, IX Policy Frameworks and Response Measures, X Regulatory Tools, XI Advocacy and Activism. The volume not only explains the nuances of important core philosophical positions but also cuts new pathways for the integration of important ethical and policy issues into environmental philosophy. It will be of immense help to undergraduate students and other readers coming up to the field for the first time but also serve as a valuable resource for more advanced students as well as researchers who need a trusted resource that also offers fresh policy-centered approaches.

*Neither Physics nor Chemistry* Kostas Gavroglu, Ana Simoes, 2011-10-07

The evolution of a discipline at the intersection of physics, chemistry, and mathematics. Quantum chemistry, a discipline that is not quite physics, not quite chemistry, and not quite applied mathematics, emerged as a field of study in the 1920s. It was referred to by such terms as mathematical chemistry, subatomic theoretical chemistry, molecular quantum mechanics, and chemical physics until the community agreed on the designation of quantum chemistry. In *Neither Physics Nor Chemistry*, Kostas Gavroglu and Ana Simoes examine the evolution of quantum chemistry into an autonomous discipline, tracing its development from the publication of early papers in the 1920s to the dramatic changes brought about by the use of computers in the 1970s. The authors focus on the culture that emerged from the creative synthesis of the various traditions of chemistry, physics, and mathematics. They examine the concepts, practices, languages, and institutions of this new culture as well as the people who established it, from such pioneers as Walter Heitler and Fritz London, Linus Pauling, and Robert Sanderson Mulliken to later figures including Charles Alfred Coulson, Raymond Daudel, and Per Olov Löwdin. Throughout, the authors emphasize six themes: epistemic aspects and the dilemmas caused by multiple approaches; social issues, including academic politics, the impact of textbooks, and the forging of alliances; the contingencies that arose at every stage of the developments in quantum chemistry; the changes in the field when computers were available to perform the extraordinarily cumbersome calculations required; issues in the philosophy of science and different styles of reasoning.

**Materials in Eighteenth-century Science** Ursula Klein, Wolfgang Lefèvre, 2007

In this history of materials, the authors link chemical science with chemical technology, challenging our current understandings of objects in the history of science and the distinction between scientific and technological objects. They further show that chemists' experimental

production and understanding of materials changed over time first in the decades around 1700 and then around 1830 when mundane materials became clearly distinguished from true chemical substances

## **Philosophy Of Chemistry Between The Manifest And The Scientific Image** Book Review: Unveiling the Power of Words

In some sort of driven by information and connectivity, the power of words has are more evident than ever. They have the capacity to inspire, provoke, and ignite change. Such is the essence of the book **Philosophy Of Chemistry Between The Manifest And The Scientific Image**, a literary masterpiece that delves deep into the significance of words and their effect on our lives. Published by a renowned author, this captivating work takes readers on a transformative journey, unraveling the secrets and potential behind every word. In this review, we will explore the book is key themes, examine its writing style, and analyze its overall effect on readers.

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