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# Nationalizing Science Adolphe Wurtz And The Battle

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Early Responses to the Periodic System

Engineers and the Making of the Francoist Regime

Nationalizing Science

Science and Technology in the Global Cold War

Rational Action

The Cambridge History of Science: Volume 8, Modern Science in National,

Transnational, and Global Context

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*Nationalizing Science*  
*Adolphe Wurtz*  
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## **PERKINS CAREY**

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### **Early Responses to the Periodic System**

MIT Press  
Offering a comprehensive narrative of the early history of stereochemistry, Dr Ramberg explores the

reasons for and the consequences of the fundamental change in the meaning of chemical formulas with the emergence of stereochemistry during the last quarter of the nineteenth century. As yet relatively unexplored by historians, the development of stereochemistry - the

study of the three-dimensional properties of molecules - provides a superb case study for exploring the meaning and purpose of chemical formulas, as it entailed a significant change in the meaning of chemical formulas from the purely chemical conception of 'structure' to the physico-chemical conception of

molecules provided by the tetrahedral carbon atom. This study is the first to treat the emergence of the unique visual language of organic chemistry between 1830 and 1874 to place in context the near simultaneous proposal of the tetrahedral carbon atom by J.H. van 't Hoff and J.A. Le Bel in 1874. Dr Ramberg then examines the research programs in stereochemistry by Johannes Wislicenus, Arthur Hantzsch, Victor Meyer, Carl Bischoff, Emil Fischer and Alfred

Werner, showing how the emergence of stereochemistry was a logical continuation of established research traditions in chemistry. In so doing, he also illustrates the novel and controversial characteristics of stereochemical ideas, especially the unprecedented use of mechanistic and dynamic principles in chemical explanation.

**Engineers and the Making of the Francoist Regime** MIT Press

Not since the printing press has a media object been as celebrated for its role in the advancement of knowledge as the scientific journal. From open communication to peer review, the scientific journal has long been central both to the identity of academic scientists and to the public legitimacy of scientific knowledge. But that was not always the case. At the dawn of the nineteenth century, academies and societies dominated elite study of the natural world. Journals

were a relatively marginal feature of this world, and sometimes even an object of outright suspicion. The Scientific Journal tells the story of how that changed. Alex Csiszar takes readers deep into nineteenth-century London and Paris, where savants struggled to reshape scientific life in the light of rapidly changing political mores and the growing importance of the press in public life. The scientific journal did not arise as a natural solution to the problem of

communicating scientific discoveries. Rather, as Csiszar shows, its dominance was a hard-won compromise born of political exigencies, shifting epistemic values, intellectual property debates, and the demands of commerce. Many of the tensions and problems that plague scholarly publishing today are rooted in these tangled beginnings. As we seek to make sense of our own moment of intense experimentation in publishing platforms, peer review, and information

curation, Csiszar argues powerfully that a better understanding of the journal's past will be crucial to imagining future forms for the expression and organization of knowledge.

Nationalizing Science MIT Press

The life and work of a leading Soviet physicist and an exploration of the strengths and weaknesses of Soviet science from Stalin through Gorbachev. In 2000, Russian scientist Zhores Alferov shared the Nobel Prize for Physics for his discovery of the

heterojunction, a semiconductor device the practical applications of which include LEDs, rapid transistors, and the microchip. The Prize was the culmination of a career in Soviet science that spanned the eras of Stalin, Khrushchev, and Gorbachev—and continues today in the postcommunist Russia of Putin and Medvedev. In Lenin's Laureate, historian Paul Josephson tells the story of Alferov's life and work and examines the bureaucratic, economic, and ideological obstacles

to doing state-sponsored scientific research in the Soviet Union. Lenin and the Bolsheviks built strong institutions for scientific research, rectifying years of neglect under the Czars. Later generations of scientists, including Alferov and his colleagues, reaped the benefits, achieving important breakthroughs: the first nuclear reactor for civilian energy, an early fusion device, and, of course, the Sputnik satellite. Josephson's account of Alferov's career reveals the

strengths and weaknesses of Soviet science—a schizophrenic environment of cutting-edge research and political interference. Alferov, born into a family of Communist loyalists, joined the party in 1967. He supported Gorbachev's reforms in the 1980s, but later became frustrated by the recession-plagued postcommunist state's failure to fund scientific research adequately. An elected member of the Russian parliament since 1995, he uses his prestige as a Nobel laureate to

protect Russian science from further cutbacks. Drawing on extensive archival research and the author's own discussions with Alferov, Lenin's Laureate offers a unique account of Soviet science, presented against the backdrop of the USSR's turbulent history from the revolution through perestroika.

*Science and Technology in the Global Cold War*

Routledge

Nineteenth-century chemists were faced with a particular problem: how to depict the atoms and

molecules that are beyond the direct reach of our bodily senses. In visualizing this microworld, these scientists were the first to move beyond high-level philosophical speculations regarding the unseen. In *Image and Reality*, Alan Rocke focuses on the community of organic chemists in Germany to provide the basis for a fuller understanding of the nature of scientific creativity. Arguing that visual mental images regularly assisted many of these scientists in

thinking through old problems and new possibilities, Rocke uses a variety of sources, including private correspondence, diagrams and illustrations, scientific papers, and public statements, to investigate their ability to not only imagine the invisibly tiny atoms and molecules upon which they operated daily, but to build detailed and empirically based pictures of how all of the atoms in complicated molecules were interconnected. These portrayals of "chemical

structures," both as mental images and as paper tools, gradually became an accepted part of science during these years and are now regarded as one of the central defining features of chemistry. In telling this fascinating story in a manner accessible to the lay reader, Rocke also suggests that imagistic thinking is often at the heart of creative thinking in all fields. *Image and Reality* is the first book in the Synthesis series, a series in the history of chemistry, broadly

construed, edited by Angela N. H. Creager, John E. Lesch, Stuart W. Leslie, Lawrence M. Principe, Alan Rocke, E.C. Spary, and Audra J. Wolfe, in partnership with the Chemical Heritage Foundation.

**Rational Action** JHU Press

This book uses history to introduce central issues in the philosophy of chemistry. Mobilizing the theme of impurity, it explores the tradition of chemistry's negative image. It then argues for the positive philosophical

value of chemistry, reflecting its characteristic practical engagement with the material world. The book concludes with some ethical reflections concerning chemistry's orientations in the twenty-first century. The authors have previously both offered significant contributions to the history and philosophy of chemistry. /a [The Cambridge History of Science: Volume 8, Modern Science in National, Transnational, and Global Context](#)



Routledge  
Chemistry as it is known today is deeply rooted in a variety of thought & action, dating back at least as far as the fifth century B.C. In this book, Joseph Fruton weaves together the history of scientific investigation with social, religious, philosophical, & other events & practices that have contributed to the field of modern chemistry. The story begins with the influence of alchemy on early Greek numerology and philosophy, followed by the historical account

of chemical composition and phlogiston. The life and work of Antoine Lavoisier receive extensive coverage in Chapter Three, with the remaining six chapters devoted to atoms, equivalents, and elements; radicals and types; valence and molecular structure; stereochemistry and organic synthesis; forces, equilibria, and rates; and electrons, reaction mechanisms, and organic synthesis.

**Science and Spirituality** MIT Press

Polymer science is now an active and thriving community of scientists, engineers and technologists, but there was a time, not so long ago, when there was no such community. The prehistory of polymer science helps to provide key insights into current issues and historical problems. The story will be divided into an ancient period ( from Greek times to the creation of the molecular consensus), a nascent period (from Dalton to Kekule to van't Hoff) and a period of

paradigm formation and controversy (from Staudinger to Mark to Carothers). The prehistory concludes with an account of the epochal 1935 Discussion of the Faraday Society on “Polymerization”. After this meeting an active community engaged in trying to solve the central problems defined by the discussions.

**Tools and Modes of Representation in the Laboratory Sciences**

MIT Press

The evolution of a set of fields—including

operations research and systems analysis—intended to improve policymaking and explore the nature of rational decision-making. During World War II, the Allied military forces faced severe problems integrating equipment, tactics, and logistics into successful combat operations. To help confront these problems, scientists and engineers developed new means of studying which equipment designs would best meet the military's requirements and how the

military could best use the equipment it had on hand. By 1941 they had also begun to gather and analyze data from combat operations to improve military leaders' ordinary planning activities. In *Rational Action*, William Thomas details these developments, and how they gave rise during the 1950s to a constellation of influential new fields—which he terms the “sciences of policy”—that included operations research, management science, systems analysis, and decision theory.

Proponents of these new sciences embraced a variety of agendas. Some aimed to improve policymaking directly, while others theorized about how one decision could be considered more rational than another. Their work spanned systems engineering, applied mathematics, nuclear strategy, and the philosophy of science, and it found new niches in universities, in businesses, and at think tanks such as the RAND Corporation. The sciences of policy also took a

prominent place in epic narratives told about the relationships among science, state, and society in an intellectual culture preoccupied with how technology and reason would shape the future. Thomas follows all these threads to illuminate and make new sense of the intricate relationships among scientific analysis, policymaking procedure, and institutional legitimacy at a crucial moment in British and American history. *Scientific Babel* Routledge This volume brings

together the people, events, and discoveries of 19th century science into a lively narrative. It places particular emphasis on the new forms in which scientists communicated with the public, in the context of increasing urbanization, globalization and industrialization. The Matter Factory MIT Press The Heavens on Earth explores the place of the observatory in nineteenth-century science and culture. Astronomy was a core pursuit for observatories, but usually

not the only one. It belonged to a larger group of “observatory sciences” that also included geodesy, meteorology, geomagnetism, and even parts of physics and statistics. These pursuits coexisted in the nineteenth-century observatory; this collection surveys them as a coherent whole. Broadening the focus beyond the solitary astronomer at his telescope, it illuminates the observatory’s importance to

technological, military, political, and colonial undertakings, as well as in advancing and popularizing the mathematical, physical, and cosmological sciences. The contributors examine “observatory techniques” developed and used not only in connection with observatories but also by instrument makers in their workshops, navy officers on ships, civil engineers in the field, and many others. These techniques included the calibration and

coordination of precision instruments for making observations and taking measurements; methods of data acquisition and tabulation; and the production of maps, drawings, and photographs, as well as numerical, textual, and visual representations of the heavens and the earth. They also encompassed the social management of personnel within observatories, the coordination of international scientific collaborations, and interactions with

dignitaries and the public. The state observatory occupied a particularly privileged place in the life of the city. With their imposing architecture and ancient traditions, state observatories served representative purposes for their patrons, whether as symbols of a monarch's enlightened power, a nation's industrial and scientific excellence, or republican progressive values. Focusing on observatory techniques in settings from Berlin, London, Paris, and Rome to Australia,

Russia, Thailand, and the United States, The Heavens on Earth is a major contribution to the history of science. Contributors: David Aubin, Charlotte Bigg, Guy Boistel, Theresa Levitt, Massimo Mazzotti, Ole Molvig, Simon Schaffer, Martina Schiavon , H. Otto Sibum, Richard Staley, John Tresch, Simon Werrett, Sven Widmalm  
**Popularizing Science and Technology in the European Periphery, 1800-2000** World Scientific  
 The reception of the

periodic system of elements has received little attention among scientists and historians alike. While many historians have studied Mendeleev's discovery of the periodic system, few have analyzed the ways in which the scientific community perceived and employed it. American historian of science Stephen G. Brush concluded that the periodic law had been generally accepted in the United States and Britain, and has suggested the need to extend this study

to other countries. In *Early Responses to the Periodic System*, renowned historians of science Masanori Kaji, Helge Kragh, and Gábor Palló present the first major comparative analysis on the reception, response, and appropriation of the periodic system of elements among different nation-states. This book examines the history of its pedagogy and popularization in scientific communities, educational sectors, and popular culture from the 1970s to the 1920s. Fifteen notable

historians of science explore the impact of Mendeleev's discovery in eleven countries (and one region) central to chemical research, including Russia, Germany, the Czech lands, and Japan, one of the few nation-states outside the Western world to participate in the nineteenth-century scientific research. The collection, organized by nation-state, explores how local actors regarded the new discovery as law, classification, or theoretical interpretation.

In addition to discussing the appropriation of the periodic system, the book examines meta-physical reflections of nature based on the periodic system outside the field of chemistry, and considers how far humans can push the categories of "response" and "reception." *Early Responses to the Periodic System* provides a compelling read for anyone with an interest in the history of chemistry and the Periodic Table of Elements.  
*Nationalizing Science*

Cambridge University Press

An examination of how the scientific study of sound sensation became increasingly intertwined with musical aesthetics in nineteenth-century Germany and Austria. In the middle of the nineteenth century, German and Austrian concertgoers began to hear new rhythms and harmonies as non-Western musical ensembles began to make their way to European cities and classical music introduced new

compositional trends. At the same time, leading physicists, physiologists, and psychologists were preoccupied with understanding the sensory perception of sound from a psychophysical perspective, seeking a direct and measurable relationship between physical stimulation and physical sensation. These scientists incorporated specific sounds into their experiments—the musical sounds listened to by upper middle class, liberal Germans and Austrians. In

The Psychophysical Ear, Alexandra Hui examines this formative historical moment, when the worlds of natural science and music coalesced around the psychophysics of sound sensation, and new musical aesthetics were interwoven with new conceptions of sound and hearing. Hui, a historian and a classically trained musician, describes the network of scientists, musicians, music critics, musicologists, and composers involved in this redefinition of listening. She identifies a

source of tension for the psychophysicists: the seeming irreconcilability between the idealist, universalizing goals of their science and the increasingly undeniable historical and cultural contingency of musical aesthetics. The convergence of the respective projects of the psychophysical study of sound sensation and the aesthetics of music was, however, fleeting. By the beginning of the twentieth century, with the professionalization of such fields as experimental

psychology and ethnomusicology and the proliferation of new and different kinds of music, the aesthetic dimension of psychophysics began to disappear.

**Lenin's Laureate** MIT Press

Investigations of how the global Cold War shaped national scientific and technological practices in fields from biomedicine to rocket science. The Cold War period saw a dramatic expansion of state-funded science and technology research. Government and military

patronage shaped Cold War technoscientific practices, imposing methods that were project oriented, team based, and subject to national-security restrictions. These changes affected not just the arms race and the space race but also research in agriculture, biomedicine, computer science, ecology, meteorology, and other fields. This volume examines science and technology in the context of the Cold War, considering whether the new institutions and



institutional arrangements that emerged globally constrained technoscientific inquiry or offered greater opportunities for it. The contributors find that whatever the particular science, and whatever the political system in which that science was operating, the knowledge that was produced bore some relation to the goals of the nation-state. These goals varied from nation to nation; weapons research was emphasized in the United States and the Soviet Union, for

example, but in France and China scientific independence and self-reliance dominated. The contributors also consider to what extent the changes to science and technology practices in this era were produced by the specific politics, anxieties, and aspirations of the Cold War. Contributors Elena Aronova, Erik M. Conway, Angela N. H. Creager, David Kaiser, John Krige, Naomi Oreskes, George Reisch, Sigrid Schmalzer, Sonja D. Schmid, Matthew Shindell, Asif A. Siddiqi,

Zuoyue Wang, Benjamin Wilson

### **Islamic Science and the Making of the European Renaissance**

MIT Press

A microhistory of eighteenth-century systemic change that places ordinary French lives alongside global advances Provincializing Global History explores the subtle transformation of the coastal province of the Languedoc in the eighteenth century. Mining a wealth of archival sources, James Livesey unveils how

provincial elites and peasant households unwittingly created new practices. Managing local political institutions, establishing new credit systems, building networks of natural historians, and introducing new plants and farm machinery to the region opened up the inhabitants of the province to new norms and standards. The practices were gradually embedded in daily life and allowed the province to negotiate the new worlds of industrial society and

capitalism.  
The Making of Modern Science MIT Press  
 This volume in the highly respected Cambridge History of Science series is devoted to exploring the history of modern science using national, transnational, and global frames of reference. Organized by topic and culture, its essays by distinguished scholars offer the most comprehensive and up-to-date nondisciplinary history of modern science currently available. Essays are grouped

together in separate sections that represent larger regions: Europe, Africa, the Middle East, South Asia, East and Southeast Asia, the United States, Canada, Australia, New Zealand, Oceania, and Latin America. Each of these regional groupings ends with a separate essay reflecting on the analysis in the preceding chapters. Intended to provide a balanced and inclusive treatment of the modern world, contributors analyze the history of science not only in local,

national, and regional contexts but also with respect to the circulation of knowledge, tools, methods, people, and artifacts across national borders.

The Scientific Journal MIT Press

How engineers and agricultural scientists became key actors in Franco's regime and Spain's forced modernization. In this book, Lino Camprubí argues that science and technology were at the very center of the building of Franco's Spain.

Previous histories of early Francoist science and technology have described scientists and engineers as working “under” Francoism, subject to censorship and bound by politically mandated research agendas. Camprubí offers a different perspective, considering instead scientists' and engineers' active roles in producing those political mandates. Many scientists and engineers had been exiled, imprisoned, or executed by the regime. Camprubí argues that

those who remained made concrete the mission of “redemption” that Franco had invented for himself. This gave them the opportunity to become key actors—and mid-level decision makers—within the regime. Camprubí describes a series of projects across Spain undertaken by the civil engineers and agricultural scientists who placed themselves at the center of their country's forced modernization. These include a coal silo, built in 1953, viewed as an

embodiment of Spain's industrialized landscape; links between laboratories, architects, and the national Catholic church (and between technology and authoritarian control); vertically organized rice production and research on genetics; river management and the contested meanings of self-sufficiency; and the circulation of construction standards by mobile laboratories as an engine for European integration. Separately, each chapter offers a fascinating

microhistory that illustrates the coevolution of Francoist science, technology, and politics. Taken together, they reveal networks of people, institutions, knowledge, artifacts, and technological systems woven together to form a new state.

**Provincializing Global History** University of Chicago Press  
During the 19th century, much of the modern scientific enterprise took shape: scientific disciplines were formed, institutions and

communities were founded and unprecedented applications to and interactions with other aspects of society and culture occurred. taught us about this exciting time and identify issues that remain unexamined or require reconsideration. They treat scientific disciplines - biology, physics, chemistry, the earth sciences, mathematics and the social sciences - in their specific intellectual and sociocultural contexts as

well as the broader topics of science and medicine; science and religion; scientific institutions and communities; and science, technology and industry. From Natural Philosophy to the Sciences should be valuable for historians of science, but also of great interest to scholars of all aspects of 19th-century life and culture.

*Chemical Structure, Spatial Arrangement*  
Springer Science & Business Media

The vast majority of European countries have

never had a Newton, Pasteur or Einstein. Therefore a historical analysis of their scientific culture must be more than the search for great luminaries. Studies of the ways science and technology were communicated to the public in countries of the European periphery can provide a valuable insight into the mechanisms of the appropriation of scientific ideas and technological practices across the continent. The contributors to this volume each take as their

focus the popularization of science in countries on the margins of Europe, who in the nineteenth and twentieth centuries may be perceived to have had a weak scientific culture. A variety of scientific genres and forums for presenting science in the public sphere are analysed, including botany and women, teaching and popularizing physics and thermodynamics, scientific theatres, national and international exhibitions, botanical and zoological gardens,

popular encyclopaedias, popular medicine and astronomy, and genetics in the press. Each topic is situated firmly in its historical and geographical context, with local studies of developments in Spain, Portugal, Italy, Hungary, Denmark, Belgium and Sweden. *Popularizing Science and Technology in the European Periphery* provides us with a fascinating insight into the history of science in the public sphere and will contribute to a better understanding of the

circulation of scientific knowledge. *Materials in Eighteenth-century Science* Oxford University Press Following on from *Recent Developments in the History of Chemistry*, this book aims to familiarise newcomers to the history of chemistry.

**The Savant and the State** Yale University Press

The history of the CCR5 gene as a lens through which to view such issues as intellectual property, Big Pharma, personalized medicine, and race and

genomics. In *The Genealogy of a Gene*, Myles Jackson uses the story of the CCR5 gene to investigate the interrelationships among science, technology, and society. Mapping the varied “genealogy” of CCR5—intellectual property, natural selection, Big and Small Pharma, human diversity studies, personalized medicine, ancestry studies, and race and genomics—Jackson links a myriad of diverse topics. The history of CCR5 from the 1990s to the present

offers a vivid illustration of how intellectual property law has changed the conduct and content of scientific knowledge, and the social, political, and ethical implications of such a transformation. The CCR5 gene began as a small sequence of DNA, became a patented product of a corporation, and then, when it was found to be an AIDS virus

co-receptor with a key role in the immune system, it became part of the biomedical research world—and a potential moneymaker for the pharmaceutical industry. When it was further discovered that a mutation of the gene found in certain populations conferred near-immunity to the AIDS virus, questions

about race and genetics arose. Jackson describes these developments in the context of larger issues, including the rise of “biocapitalism,” the patentability of products of nature, the difference between U.S. and European patenting approaches, and the relevance of race and ethnicity to medical research.