
Outsider Scientists Routes To Innovation In Biology

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*Outsider Scientists
Routes To Innovation In
Biology*

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HOBBS AYERS

Technocracy and the Epistemology of
Human Behavior Basic Books

Longer-term developments shape the present and endogenous futures of institutions and practices of science and technology in society and their governance. Understanding the patterns allows diagnosis and soft intervention, often linked to scenario exercises. The book collects six articles offering key examples of this perspective, addressing ongoing issues in the governance of science and technology, including nanotechnology and responsible research

and innovation. And adds two more articles that address background philosophical issues.

Routes of Learning Springer

For scholars working on almost any aspect of American thought, The Bloomsbury Encyclopedia to Philosophers in America presents an indispensable reference work. Selecting over 700 figures from the Dictionary of Early American Philosophers and the Dictionary of Modern American Philosophers, this condensed edition includes key contributors to philosophical thought. From 1600 to the present day, entries cover psychology, pedagogy, sociology, anthropology, education, theology and political science, before these disciplines came to be considered distinct from philosophy. Clear and

accessible, each entry contains a short biography of the writer, an exposition and analysis of his or her doctrines and ideas, a bibliography of writings and suggestions for further reading. Featuring a new preface by the editor and a comprehensive introduction, The Bloomsbury Encyclopedia to Philosophers in America includes 30 new entries on twenty-first century thinkers including Martha Nussbaum and Patricia Churchland. With in-depth overviews of Waldo Emerson, Margaret Fuller, Noah Porter, Frederick Rauch, Benjamin Franklin, Thomas Paine and Thomas Jefferson, this is an invaluable one-stop research volume to understanding leading figures in American thought and the development of American intellectual

history.

The Theory of Ecological Communities

(MPB-57) Princeton University Press
 Tauber, a leading figure in history and philosophy of science, offers a unique autobiographical overview of how science as a discipline of thought has been characterized by philosophers and historians over the past century. He frames his account through science's – and his own personal – quest for explanatory certainty. During the 20th century, that goal was displaced by the probabilistic epistemologies required to characterize complex systems, whether in physics, biology, economics, or the social sciences. This “triumph of uncertainty” is the inevitable outcome of irreducible chance and indeterminate causality. And beyond these epistemological limits, the interpretative faculties of the individual scientist (what Michael Polanyi called the “personal” and the “tacit”) invariably affects how data are understood. Whereas positivism had claimed radical objectivity, post-positivists have identified how a web of non-epistemic values and social forces profoundly influence the production of knowledge. Tauber presents a case study

of these claims by showing how immunology has incorporated extra-curricular social elements in its theoretical development and how these in turn have influenced interpretive problems swirling around biological identity, individuality, and cognition. The correspondence between contemporary immunology and cultural notions of selfhood are strong and striking. Just as uncertainty haunts science, so too does it hover over current constructions of personal identity, self knowledge, and moral agency. Across the chasm of uncertainty, science and selfhood speak.

Outsider Scientists Capitán Swing Libros
 This book offers an integrated historical and philosophical examination of the origin of genetics. The author contends that an integrated HPS analysis helps us to have a better understanding of the history of genetics, and sheds light on some general issues in the philosophy of science. This book consists of three parts. It begins with historical problems, revisiting the significance of the work of Mendel, de Vries, and Weldon. Then it turns to integrated HPS problems, developing an exemplar-based analysis of

the development and the progress in early genetics. Finally, it discusses philosophical problems: conceptual change, evidence, and theory choice. Part I lays out a new historiography, serving as a basis for the discussions in part II and part III. Part II introduces a new integrated HPS method to analyse and interpret the historiography in Part I and to re-examine the philosophical issues in Part III. Part III develops new philosophical accounts which will in turn make a better sense of the history of scientific practice more generally. This book provides a practical defence of integrated HPS: the best way to defend integrated HPS is to do it.

Domains and Major Transitions of Social Evolution UNC Press Books

This book offers a self-study program on how mathematics, computer science and science can be profitably and seamlessly intertwined. This book focuses on two variable ODE models, both linear and nonlinear, and highlights theoretical and computational tools using MATLAB to explain their solutions. It also shows how to solve cable models using separation of variables and the Fourier Series.

Futures of Science and Technology in

Society John Wiley & Sons

Around Christmas of 1882, while peering through a microscope at starfish larvae in which he had inserted tiny thorns, Russian zoologist Elie Metchnikoff had a brilliant insight: what if the mobile cells he saw gathering around the thorns were nothing but a healing force in action? Metchnikoff's daring theory of immunity—that voracious cells he called phagocytes formed the first line of defense against invading bacteria—would eventually earn the scientist a Nobel Prize, shared with his archrival, as well as the unofficial moniker "Father of Natural Immunity." But first he had to win over skeptics, especially those who called his theory "an oriental fairy tale." Using previously inaccessible archival materials, author Luba Vikhanski chronicles Metchnikoff's remarkable life and discoveries in the first modern biography of this hero of medicine. Metchnikoff was a towering figure in the scientific community of the early twentieth century, a tireless humanitarian who, while working at the Pasteur Institute in Paris, also strived to curb the spread of cholera, syphilis, and other deadly diseases. In his later years, he startled the

world with controversial theories on longevity, launching a global craze for yogurt, and pioneered research into gut microbes and aging. Though Metchnikoff was largely forgotten for nearly a hundred years, Vikhanski documents a remarkable revival of interest in his ideas on immunity and on the gut flora in the science of the twenty-first century.

Tiene la sonrisa de su madre

Cambridge University Press

Integrated Science: Science without Borders is the first volume of the INTEGRATED SCIENCE Book series, aiming to publish the results of the most updated ideas and reviews in transdisciplinary fields and to highlight the integration of discrete disciplines, including formal sciences, physical-chemical sciences and engineering, biological sciences, medical sciences, and social sciences. This volume primarily focuses on the research involving the integration of two or more academic fields offering an innovative, borderless view, which is one of the main focuses of the Universal Scientific Education and Research Network (USERN). The whole world is suffering from complex problems; these are borderless problems; thus, a

borderless solution could merely solve such complex issues. Transdisciplinarity is a domain, that researchers work jointly, using a shared conceptual framework, drawing together disciplinary-specific theories, concepts, and approaches to address common problems. Lack of confidence, lack of expertise, complexities of healthcare, the confusing nature of healthcare environments, and lack of organization and standardization are the obstacles of successful scientific communication. Consequently, this book provides an overview of the essential elements of transdisciplinary studies and integrated science. The unique aspect of this book—privileging it from other books—is covering all aspects of science as harmonies of a single symphony.

Life's Greatest Secret Springer

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.

Rebels, Mavericks, and Heretics In Biology

University of Chicago Press

Incorporating HCP 1647-i, session

2005-06, previously unpublished

New Perspectives on the History of Life

Sciences and Agriculture University of Chicago Press

A plethora of different theories, models, and concepts make up the field of community ecology. Amid this vast body of work, is it possible to build one general theory of ecological communities? What other scientific areas might serve as a guiding framework? As it turns out, the core focus of community ecology—understanding patterns of diversity and composition of biological variants across space and time—is shared by evolutionary biology and its very coherent conceptual framework, population genetics theory. The Theory of Ecological Communities takes this as a starting point to pull together community ecology's various perspectives into a more unified whole. Mark Vellend builds a theory of ecological communities based on four overarching processes: selection among species, drift, dispersal, and speciation. These are analogues of the four central processes in population genetics theory—selection within species, drift, gene flow, and mutation—and together they subsume almost all of the many dozens of more specific models built to

describe the dynamics of communities of interacting species. The result is a theory that allows the effects of many low-level processes, such as competition, facilitation, predation, disturbance, stress, succession, colonization, and local extinction to be understood as the underpinnings of high-level processes with widely applicable consequences for ecological communities. Reframing the numerous existing ideas in community ecology, *The Theory of Ecological Communities* provides a new way for thinking about biological composition and diversity.

The Cambridge Companion to Chomsky

Chicago Review Press

The life and work of a scientist who spent his career crossing disciplinary boundaries—from experimental neurology to psychiatry to cybernetics to engineering. Warren S. McCulloch (1898-1969) adopted many identities in his scientific life—among them philosopher, poet, neurologist, neurophysiologist, neuropsychiatrist, collaborator, theorist, cybernetician, mentor, engineer. He was, writes Tara Abraham in this account of McCulloch's life

and work, “an intellectual showman,” and performed this part throughout his career. While McCulloch claimed a common thread in his work was the problem of mind and its relationship to the brain, there was much more to him than that. In *Rebel Genius*, Abraham uses McCulloch's life as a window on a past scientific age, showing the complex transformations that took place in American brain and mind science in the twentieth century—particularly those surrounding the cybernetics movement. Abraham describes McCulloch's early work in neuropsychiatry, and his emerging identity as a neurophysiologist. She explores his transformative years at the Illinois Neuropsychiatric Institute and his work with Walter Pitts—often seen as the first iteration of “artificial intelligence” but here described as stemming from the new tradition of mathematical treatments of biological problems. Abraham argues that McCulloch's dual identities as neuropsychiatrist and cybernetician are inseparable. He used the authority he gained in traditional disciplinary roles as a basis for posing big questions about the brain and mind as a cybernetician. When

McCulloch moved to the Research Laboratory of Electronics at MIT, new practices for studying the brain, grounded in mathematics, philosophy, and theoretical modeling, expanded the relevance and ramifications of his work. McCulloch's transdisciplinary legacies anticipated today's multidisciplinary field of cognitive science.

A History of Biology Princeton University Press

In *Power Without Knowledge: A Critique of Technocracy* (2019), Jeffrey Friedman presented a sweeping reinterpretation of modern politics and government as technocratic, even in many of its democratic dimensions. Building on a new definition of technocracy as governance aimed at solving social and economic problems, Friedman showed that the epistemic demands that such governance places on political elites and ordinary people alike may be overwhelming if technocrats fail to attend to the ideational heterogeneity of the human beings whose control is the object of technocratic power. Yet a recognition of ideational heterogeneity considerably complicates the task of predicting behavior, which is

essential to technocratic control—as Friedman demonstrated with pathbreaking critiques of the homogenizing strategies of neoclassical economics, positivist social science, behavioral economics, and populist democratic politics. In *Technocracy and the Epistemology of Human Behavior*, thirteen political theorists, including Friedman himself, debate the implications of Power Without Knowledge for social science, modern governance, the politics of expertise, post-structuralism, anarchism, and democratic theory; and Friedman responds to his critics with an expansive defense of his vision of contemporary politics and his political epistemology of ideationally diverse human beings. This book was originally published as a special issue of the *Critical Review*.

Canguilhem and Continental Philosophy of Biology Springer

This volume explores problems in the history of science at the intersection of life sciences and agriculture, from the mid-eighteenth to the mid-twentieth century. Taking a comparative national perspective, the book examines agricultural practices in a broad sense,

including the practices and disciplines devoted to land management, forestry, soil science, and the improvement and management of crops and livestock. The life sciences considered include genetics, microbiology, ecology, entomology, forestry, and deal with US, European, Russian, Japanese, Indonesian, Chinese contexts. The book shows that the investigation of the border zone of life sciences and agriculture raises many interesting questions about how science develops. In particular it challenges one to re-examine and take seriously the intimate connection between scientific development and the practical goals of managing and improving – perhaps even recreating – the living world to serve human ends. Without close attention to this zone it is not possible to understand the emergence of new disciplines and transformation of old disciplines, to evaluate the role and impact of such major figures of science as Humboldt and Mendel, or to appreciate how much of the history of modern biology has been driven by national ambitions and imperialist expansion in competition with rival nations.

Collecting Experiments Springer Nature Intellectual property law has been interacting with nature for over two centuries. Despite this long history, this relationship has largely been ignored. *Intellectual Property and the Design of Nature* fills this gap by bringing together scholars from different disciplines to examine the important role that nature plays in intellectual property law. Based on the idea that many contemporary issues require a better understanding of these historical interactions, the book reflects on the ways intellectual property law has engaged with and understood nature in the past. The varied contributions show how the relationship between nature and intellectual property law is often more complex, permeable, and porous than is commonly recognized. *Intellectual Property and the Design of Nature* demonstrates the complex and changing role that nature has played in the history of intellectual property law. Each of the chapters casts a new light on these connections. A compelling read for everyone interested in exploring new perspectives in the field of intellectual property.

[Doing Integrated History and Philosophy of Science: A Case Study of the Origin of Genetics](#) Springer Nature

Biodiversity has been a key concept in international conservation since the 1980s, yet historians have paid little attention to its origins. Uncovering its roots in tropical fieldwork and the southward expansion of U.S. empire at the turn of the twentieth century, Megan Raby details how ecologists took advantage of growing U.S. landholdings in the circum-Caribbean by establishing permanent field stations for long-term, basic tropical research. From these outposts of U.S. science, a growing community of American "tropical biologists" developed both the key scientific concepts and the values embedded in the modern discourse of biodiversity. Considering U.S. biological fieldwork from the era of the Spanish-American War through the anticolonial movements of the 1960s and 1970s, this study combines the history of science, environmental history, and the history of U.S.-Caribbean and Latin American relations. In doing so, Raby sheds new light on the origins of contemporary scientific and environmentalist thought

and brings to the forefront a surprisingly neglected history of twentieth-century U.S. science and empire.

American Tropics Farrar, Straus & Giroux
What are the conditions that foster true novelty and allow visionaries to set their eyes on unknown horizons? What have been the challenges that have spawned new innovations, and how have they shaped modern biology? In *Dreamers, Visionaries, and Revolutionaries in the Life Sciences*, editors Oren Harman and Michael R. Dietrich explore these questions through the lives of eighteen exemplary biologists who had grand and often radical ideas that went far beyond the run-of-the-mill science of their peers. From the Frenchman Jean-Baptiste Lamarck, who coined the word "biology" in the early nineteenth century, to the American James Lovelock, for whom the Earth is a living, breathing organism, these dreamers innovated in ways that forced their contemporaries to reexamine comfortable truths. With this collection readers will follow Jane Goodall into the hidden world of apes in African jungles and Francis Crick as he attacks the problem of consciousness. Join Mary Lasker on her

campaign to conquer cancer and follow geneticist George Church as he dreams of bringing back woolly mammoths and Neanderthals. In these lives and the many others featured in these pages, we discover visions that were sometimes fantastical, quixotic, and even threatening and destabilizing, but always a challenge to the status quo.

Dreamers, Visionaries, and Revolutionaries in the Life Sciences Bloomsbury Publishing
Modern immunology traditionally conceives of the immune system as providing defense against pathogens. Alfred I. Tauber criticizes this conception of immunity as too narrow, because it discounts much of the immune system's other normal functions. These include active tolerance of nutritional exchanges with the environment and the stabilization of cooperative relationships with resident micro-organisms. An expanded account extends immunity's functional role from singular 'defense' to broadened discernment of environmental 'exchange.' This ecological perspective has profound theoretical implications, for the basic notion of immune identity is reconfigured: highlighting the organism as a holobiont (a

consortium of diverse organisms living in cooperative relationships) challenges prevailing concepts of individuality and the self/nonself dichotomy heretofore organizing immune theory. Indeed, if theoretical interest is focused on the challenges of maintaining immune balance in the full ecological context of the organism, then immune regulation assumes new complexity. Tauber maintains that the key to unravelling that puzzle requires a critical re-assessment of the cognitive processes that underlie immune effector functions. Accordingly, he provides the outline of a re-formulated 'cognitive paradigm' that dispenses with agent-based models and adopts an ecologically conceived understanding of perception and information processing. The implications of this revised configuration of immunity and its deconstructed notions of individuality and selfhood have wide significance for philosophers and life scientists working in immunology, ecology, and the cognitive sciences.

Rebel Genius Penguin

"An artful exploration of how the language of science has replaced old mythologies" --

Synthetic Biology Analysed Harvard University Press

Evolutionary change is usually incremental and continuous, but some increases in organizational complexity have been radical and divisive. Evolutionary biologists, who refer to such events as "major transitions", have not always appreciated that these advances were novel forms of pairwise commitment that subjugated previously independent agents. Inclusive fitness theory convincingly explains cooperation and conflict in societies of animals and free-living cells, but to deserve its eminent status it should also capture how major transitions originated: from prokaryote cells to eukaryote cells, via differentiated multicellularity, to colonies with specialized queen and worker castes. As yet, no attempt has been made to apply inclusive fitness principles to the origins of these events. *Domains and Major Transitions of Social Evolution* develops the idea that major evolutionary transitions involved new levels of informational closure that moved beyond looser partnerships. Early neo-Darwinians understood this principle, but later social

gradient thinking obscured the discontinuity of life's fundamental organizational transitions. The author argues that the major transitions required maximal kinship in simple ancestors - not conflict reduction in already elaborate societies. Reviewing more than a century of literature, he makes testable predictions, proposing that open societies and closed organisms require very different inclusive fitness explanations. It appears that only human ancestors lived in societies that were already complex before our major cultural transition occurred. We should therefore not impose the trajectory of our own social history on the rest of nature. This thought-provoking text is suitable for graduate-level students taking courses in evolutionary biology, behavioural ecology, organismal developmental biology, and evolutionary genetics, as well as professional researchers in these fields. It will also appeal to a broader, interdisciplinary audience, including the social sciences and humanities.

Making Sense of Genes Springer Nature
This book is the first devoted to modern biology's innovators and iconoclasts: men

and women who challenged prevailing notions in their fields. Some of these scientists were Nobel Prize winners, some were considered cranks or gadflies, some were in fact wrong. The stories of these stubborn dissenters are individually fascinating. Taken together, they provide unparalleled insights into the role of dissent and controversy in science and especially the growth of biological thought over the past century. Each of the book's nineteen specially commissioned chapters offers a detailed portrait of the intellectual rebellion of a particular scientist working in a major area of biology--genetics, evolution, embryology, ecology, biochemistry, neurobiology, and virology as well as others. An introduction by the volume's editors and an epilogue by R. C. Lewontin draw connections among the case studies and illuminate the nonconforming scientist's crucial function of disturbing the comfort of those in the majority. By focusing on the dynamics and impact of dissent rather than on winners who are credited with scientific advances, the book presents a refreshingly original perspective on the history of the life sciences. Scientists featured in this

volume: Alfred Russel Wallace Hans
Driesch Wilhelm Johannsen Raymond Arthur
Dart C. D. Darlington Richard

Goldschmidt Barbara McClintock Oswald T.
Avery Roger Sperry Leon Croizat Vero
Copner Wynne-Edwards Peter
Mitchell Howard Temin Motoo

Kimura William D. Hamilton Carl
Woese Stephen Jay Gould Thelma
Rowell Daniel S. Simberloff