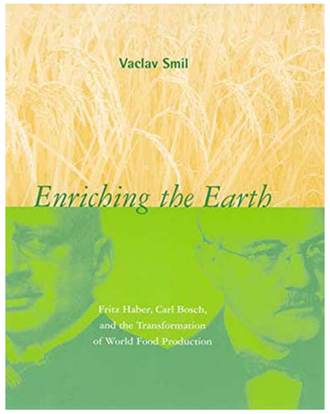

Kindle File Format Enriching The Earth: Fritz Haber, Carl Bosch, And The Transformation Of World Food Production (The MIT Press)

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Enriching the Earth-Vaclav Smil 2001 The compelling history of the long-sought discovery of ammonia synthesis and its vital role in the modern industrial world.

Fritz Haber-Dietrich Stoltzenberg 2004 This long-awaited biography of Fritz Haber, now abridged by the author and translated into English, illuminates the life of one of the most gifted yet controversial figures of the 20th century. Haber was a pioneer in electrochemistry and thermodynamics and won the Nobel Prize for his synthesis of ammonia, a process essential for both fertilizer and explosives. His dedication to work spurred his efforts to increase support for scientific study in Germany; yet it also helped cause the breakdown of his two marriages. His ardent patriotism led him to develop chemical weapons for World War I and to try to extract gold from seawater, to help pay for Germany's huge war reparations. Yet Haber, a Jew by birth, was exiled from his homeland in 1933 by the Nazi party and died shortly after.

Master Mind-Daniel Charles 2009-10-13 FRITZ HABER -- a Nobel laureate in chemistry, a friend of Albert Einstein, a German Jew and World War I hero -- may be the most important scientist you have never heard of. The Haber-Bosch process, which he invented at the turn of the twentieth century, revolutionized agriculture by converting nitrogen to fertilizer in quantities massive enough to feed the world. The invention has become an essential pillar for life on earth; some two billion people on our planet could not survive without it. Yet this same process supplied the German military with explosives during World War I, and Haber orchestrated Germany's use of an entirely new weapon -- poison gas. Eventually, Haber's efforts led to Zyklon B, the gas later used to kill millions -- including Haber's own relatives -- in Nazi concentration camps. Haber is the patron saint of guns and butter, a scientist whose discoveries transformed the way we produce food and fight wars. His legacy is filled with contradictions, as was his personality. For some, he was a benefactor of humanity and devoted friend. For others, he was a war criminal, possessed by raw ambition. An intellectual gunslinger, enamored of technical progress and driven by patriotic devotion to Germany, he was instrumental in the scientific work that inadvertently supported the Nazi cause; a Jew and a German patriot, he was at once an enabler of the Nazi regime and its victim. Master Mind is a thought-provoking biography of this controversial scientist, a modern Faust who personifies the paradox of science, its ability to create and to destroy. It offers a complete chronicle of his tumultuous and ultimately tragic life, from his childhood and rise to prominence in the heady days of the German Empire to his disgrace and exile at the hands of the Nazis; from early decades as the hero who eliminated the threat of starvation to his lingering legacy as a villain whose work led to the demise of millions.

Feeding the World-Vaclav Smil 2001 A realistic yet encouraging look at how society can change in ways that will allow us to feed an expanding global population. This book addresses the question of how we can best feed the ten billion or so people who will likely inhabit the Earth by the middle of the twenty-first century. He asks whether human ingenuity can produce enough food to support healthy and vigorous lives for all these people without irreparably damaging the integrity of the biosphere. What makes this book different from other books on the world food situation is its consideration of the complete food cycle, from agriculture to post-harvest losses and processing to eating and discarding. Taking a scientific approach, Smil espouses neither the catastrophic view that widespread starvation is imminent nor the cornucopian view that welcomes large population increases as the source of endless human inventiveness. He shows how we can make more effective use of current resources and suggests that if we increase farming efficiency, reduce waste, and transform our diets, future needs may not be as great as we anticipate. Smil's message is that the prospects may not be as bright as we would like, but the outlook is hardly disheartening. Although inaction, late action, or misplaced emphasis may bring future troubles, we have the tools to steer a more efficient course. There are no insurmountable biophysical reasons we cannot feed humanity in the decades to come while easing the burden that modern agriculture puts on the biosphere.

The Alchemy of Air-Thomas Hager 2009-08 A profile of pioneering scientists Fritz Haber and Carl Bosch describes their seminal discovery of a way to pull nitrogen out of the air to create synthetic fertilizer, a process that offered a solution to the critical food shortage confronting a growing global population but also led to the development of the gunpowder and explosives that killed millions during the World Wars. 30,000 first printing.

Catalysts for Nitrogen Fixation-Barry E. Smith 2013-03-20 Biological nitrogen fixation provides more than 50% of the total annual input of the essential element nitrogen to world agriculture. Thus, it is of immense agronomic importance and critical to food supplies, particularly in developing countries. This book, with chapters authored by internationally renowned experts, provides a comprehensive and detailed account of the fascinating history of the process - including the surprising discoveries of molybdenum-independent nitrogenases and superoxide-dependent nitrogenase; a review of Man's attempts to emulate the biological process - most successfully with the commercially dominant Haber-Bosch process; and the current state of the understanding art with respect to the enzymes - called nitrogenases - responsible for biological nitrogen fixation. The initial chapters use a historical approach to the biological and industrial processes, followed by an overview of assay methodologies. The next set of chapters focuses on the classical enzyme, the molybdenum nitrogenase, and details its biosynthesis, structure, composition, and mechanism of action as well as detailing both how variants of its two component proteins are constructed by recombinant DNA technology and how computational techniques are being applied. The sophisticated chemical modelling of the metal-containing clusters in the enzyme is reviewed next, followed by a description of the two molybdenum-independent nitrogenases - first, the vanadium-containing enzyme and then the iron-only nitrogenase - together with some thoughts as to why they exist! Then follows an up-to-date treatment of the clearly "non-classical" properties of the superoxide-dependent nitrogenase, which more closely resembles molybdenum-containing hydroxylases and related enzymes, like nitrate reductase, that it does the other nitrogenases. Each chapter contains an extensive list of references. This book is the self-contained first volume of a comprehensive seven-volume series. No other available work provides the up-to-date and in-depth coverage of this series and this volume. This book is intended to serve as an indispensable reference work for all scientists working in this area, including agriculture and the closely related metals-in-biology area; to assist students to enter this challenging area of research; and to provide science administrators easy access to vital relevant information.

Between Genius And Genocide-Daniel Charles 2011-03-31 In January 1934, as Hitler's shadow began to fall across Europe, a short, bald man carrying a German passport arrived at the Hotel Euler in Basle. He seemed haunted and restless, as though he urgently needed to be elsewhere. Fritz Haber, Nobel laureate in chemistry, confidante of Albert Einstein and German war hero, had arrived in Basle a broken man and, three days later, he died leaving an uncertain legacy. For some, the great German chemist was a benefactor of humanity, winner of a Nobel prize for inventing a way to nourish farmers' fields with nitrogen captured from the air. For others, he was a war criminal who personally supervised the unleashing of chlorine clouds against British, French and Canadian troops in World War I. Tragedy marked his life. A week after the first gas attack in 1915, Haber's wife took his pistol and shot herself. And in 1933, when Hitler came to power, 'the Jew Haber' was among the first scientists driven out of Germany. Within a year, Haber was dead - denied honour both in his homeland and abroad. No life reveals the moral paradox of science - its capacity to create and destroy - more clearly than Fritz Haber's. Between Genius and Genocide is a story filled with ambition, patriotism, hubris and tragedy, set amidst huge technological advances, arms races, mounting imperialism and war.

Global Ecology-Vaclav Smil 2003-09-02 The magnitude and rapidity of global environmental change threatens the perpetuation of life on Earth. Many aspects of this crisis are familiar to us - the destruction of tropical rainforests, the hole in the Antarctic ozone, desertification, soil erosion - yet we avoid the underlying challenge of a rapidly deteriorating ecological system and the breadth and complexity of responses demanded. Integrating an analysis of both social and environmental needs, the book explores the premises and problems of different paths towards global management. With its emphasis on flexible response, Global Ecology furthers our understanding of biospheric change and of our abilities and weaknesses in managing the transition to a sustainable society.

Energy Transitions-Vaclav Smil 2010 This bold and controversial argument shows why energy transitions are inherently complex and prolonged affairs, and how ignoring this fact raises unrealistic expectations that the United States and other global economies can be weaned quickly from a primary dependency on fossil fuels. * Includes case studies of energy transitions in eight nations * Presents graphs of energy transitions on global and national scales, showing both common features and idiosyncratic patterns * Features photographs of the containment vessel of America's first nuclear reactor and of a stationary gas turbine * Provides a thorough bibliography

Nitrogen Capture-Anthony S. Travis 2018-04-24 This monograph provides an account of how the synthetic nitrogen industry became the forerunner of the 20th-century chemical industry in Europe, the United States and Asia. Based on an earlier SpringerBrief by the same author, which focused on the period of World War I, it expands considerably on the international aspects of the development of the synthetic nitrogen industry in the decade and a half following the war, including the new technologies that rivalled the Haber-Bosch ammonia process. Travis describes the tremendous global impact of fixed nitrogen (as calcium cyanamide and ammonia), including the perceived strategic need for nitrogen (mainly for munitions), and, increasingly, its role in increasing crop yields, including in Italy under Mussolini, and in the Soviet Union under Stalin. The author also reviews the situation in Imperial Japan, including the earliest adoption of the Italian Casale ammonia process, from 1923, and the role of fixed nitrogen in the industrialization of colonial Korea from the late 1920s. Chemists, historians of science and technology, and those interested in world fertilizer production and the development of chemical industry during the first four decades of the twentieth century will find this book of considerable value.

Fifty Things that Made the Modern Economy-Tim Harford 2017-07-06 Based on the series produced for the BBC World Service Who thought up paper money? How did the contraceptive pill change the face of the legal profession? Why was the horse collar as important for human progress as the steam engine? How did the humble spreadsheet turn the world of finance upside-down? The world economy defies comprehension. A continuously-changing system of immense complexity, it offers over ten billion distinct products and services, doubles in size every fifteen years, and links almost every one of the planet's seven billion people. It delivers astonishing luxury to hundreds of millions. It also leaves hundreds of millions behind, puts tremendous strains on the ecosystem, and has an alarming habit of stalling. Nobody is in charge of it. Indeed, no individual understands more than a fraction of what's going on. How can we make sense of this bewildering system on which our lives depend? From the tally-stick to Bitcoin, the canal lock to the jumbo jet, each invention in Tim Harford's fascinating new book has its own curious, surprising and memorable story, a vignette against a grand backdrop. Step by step, readers will start to understand where we are, how we got here, and where we might be going next. Hidden connections will be laid bare: how the barcode undermined family corner shops; why the gramophone widened inequality; how barbed wire shaped America. We'll meet the characters who developed some of these inventions, profited from them, or were ruined by them. We'll trace the economic principles that help to explain their transformative effects. And we'll ask what lessons we can learn to make wise use of future inventions, in a world where the pace of innovation will only accelerate.

Reactions at Solid Surfaces-Gerhard Ertl 2010-06-17 Expanding on the ideas first presented in Gerhard Ertl's acclaimed Baker Lectures at Cornell University, Reactions at Solid Surfaces comprises an authoritative, self-contained, book-length introduction to surface reactions for both professional chemists and students alike. Outlining our present understanding of the fundamental processes underlying reactions at solid surfaces, the book provides the reader with a complete view of how chemistry works at surfaces, and how to understand and probe the dynamics of surface reactions. Comparing traditional surface probes with more modern ones, and bringing together various disciplines in a cohesive manner, Gerhard Ertl's Reactions at Solid Surfaces serves well as a primary text for graduate students in introductory surface science or chemistry, as well as a self-teaching resource for professionals in surface science, chemical engineering, or nanoscience.

Properties and Management of Soils in the Tropics-Pedro A. Sanchez 2019-01-31 Long-awaited second edition of classic textbook, brought completely up to date, for courses on tropical soils, and reference for scientists and professionals.

Fritz Haber-Dietrich Stoltzenberg 2004 This long-awaited biography of Fritz Haber, now abridged by the author and translated into English, illuminates the life of one of the most gifted yet controversial figures of the 20th century. Haber was a pioneer in electrochemistry and thermodynamics and won the Nobel Prize for his synthesis of ammonia, a process essential for both fertilizer and explosives. His dedication to work spurred his efforts to increase support for scientific study in Germany; yet it also helped cause the breakdown of his two marriages. His ardent patriotism led him to develop chemical weapons for World War I and to try to extract gold from seawater, to help pay for Germany's huge war reparations. Yet Haber, a Jew by birth, was exiled from his homeland in 1933 by the Nazi party and died shortly after.

The Green Revolution in the Global South-R. Douglas Hurt 2020-03-03 A synthesis of the agricultural history of the Green Revolution The Green Revolution was devised to increase agricultural production worldwide, particularly in the developing world. Agriculturalists employed anhydrous ammonia and other fertilizing agents, mechanical tilling, hybridized seeds, pesticides, herbicides, and a multitude of other techniques to increase yields and feed a mushrooming human population that would otherwise suffer starvation as the world's food supply dwindled. In The Green Revolution in the Global South: Science, Politics, and Unintended Consequences, R. Douglas Hurt demonstrates that the Green Revolution did not turn out as neatly as scientists predicted. When its methods and products were imported to places like Indonesia and Nigeria, or even replicated indigenously, the result was a tumultuous impact on a society's functioning. A range of factors—including cultural practices, ethnic and religious barriers, cost and availability of new technologies, climate, rainfall and aridity, soil quality, the scale of landholdings, political policies and opportunism, the rise of industrial farms, civil unrest, indigenous diseases, and corruption—entered into the Green Revolution calculus, producing a series of unintended consequences that varied from place to place. As the Green Revolution played out over time, these consequences rippled throughout societies, affecting environments, economies, political structures, and countless human lives. Analyzing change over time, almost decade by decade, Hurt shows that the Green Revolution was driven by the state as well as science. Rather than acknowledge the vast problems with the Green Revolution or explore other models, Hurt argues, scientists and political leaders doubled down and repeated the same missteps in the name of humanity and food security. In tracing the permutations of modern science's impact on international agricultural systems, Hurt documents how, beyond increasing yields, the Green Revolution affected social orders, politics, and lifestyles in every place its methods were applied—usually far more than once.

Carbon-Nitrogen-Sulfur-V. Smil 2012-12-06 ica, I considered myself an old hand: when I started to study the environment of the North Bohemian region in 1963, the ecosystemic changes and health effects result ing from extremely high concentrations and deposition of sulfurous and nitrogenous air pollutants and particulate matter could not be ignored. When I returned to the area in 1966 to work there for nearly three years as a consultant in energy and environmental affairs, I came to realize the difficulties of efficiently controlling the problem. Hiking on the crest of the Ore Mountains overlooking the valley, I saw much destruction and degradation of coniferous plantings-but I was also repeatedly surprised by the contrast of the withering tops and stunted dried-out growth of spruces and firs with the magnificent beech trees and the healthy understory of shrubs and wild flowers. I recall this impressive lesson of ecosystemic vulnerability and resistance every time I read sweeping generalizations about the environmental effects of acid deposition. At the same time, in the second half of the 1960s, I was introduced by a friend, an engineer working in analytical chemistry and biochemistry, to some of the mysteries of enzymes; this led me to nitrogenase, one of the most incredible sub stances on this planet, and to an interest in various aspects of the nitrogen cycle, which was further strengthened by my later work on the energy cost of crop production, involving inevitable comparisons between natural nitrogen fixation and Haber-Bosch ammonia synthesis.

Global Catastrophes and Trends-Vaclav Smil 2012-09-21 A wide-ranging, interdisciplinary look at global changes that may occur over the next fifty years—whether sudden and cataclysmic world-changing events or gradually unfolding trends. Fundamental change occurs most often in one of two ways: as a "fatal discontinuity," a sudden catastrophic event that is potentially world changing, or as a persistent, gradual trend. Global catastrophes include volcanic eruptions, viral pandemics, wars, and large-scale terrorist attacks; trends are demographic, environmental, economic, and political shifts that unfold over time. In this provocative book, scientist Vaclav Smil takes a wide-ranging, interdisciplinary look at the catastrophes and trends the next fifty years may bring. Smil first looks at rare but cataclysmic events, both natural and human-produced, then at trends of global importance, including the transition from fossil fuels to other energy sources and growing economic and social inequality. He also considers environmental change—in some ways an amalgam of sudden discontinuities and gradual change—and assesses the often misunderstood complexities of global warming. Global Catastrophes and Trends does not come down on the side of either doom-and-gloom scenarios or techno-euphoria. Instead, Smil argues that understanding change will help us reverse negative trends and minimize the risk of catastrophe.

The Synthetic Nitrogen Industry in World War I-Anthony S. Travis 2015-07-03 This concise brief describes how the demands of World War I, often referred to as the Chemists' War, led to the rapid emergence of a new key industry based on fixation of atmospheric nitrogen. Then, as now, nitrogen products, including nitric acid, and nitrates, were essential for both fertilizers and in the manufacture of modern explosives. During the first decade of the twentieth century, this stimulated research into and application of novel processes. This book illustrates how from late 1914 the relations and developments in the first modern military-industrial complex enabled the great capital expenditures and technological advances that accelerated massive expansion, particularly of the BASF Haber-Bosch high-pressure process, that determined the direction of the post-war chemical industry.

The Omnivore's Dilemma-Michael Pollan 2006 An ecological and anthropological study of eating offers insight into food consumption in the twenty-first century, explaining how an abundance of unlimited food varieties reveals the responsibilities of everyday consumers to protect their health and the environment. By the author of The Botany of Desire. 125,000 first printing.

One Hundred Years of Chemical Warfare: Research, Deployment, Consequences-Bretislav Friedrich 2017-11-26 This book is open access under a CC BY-NC 2.5 license. On April 22, 1915, the German military released 150 tons of chlorine gas at Ypres, Belgium. Carried by a long-awaited wind, the chlorine cloud passed within a few minutes through the British and French trenches, leaving behind at least 1,000 dead and 4,000 injured. This chemical attack, which amounted to the first use of a weapon of mass destruction, marks a turning point in world history. The preparation as well as the execution of the gas attack was orchestrated by Fritz Haber, the director of the Kaiser Wilhelm Institute for Physical Chemistry and Electrochemistry in Berlin-Dahlem. During World War I, Haber transformed his research institute into a center for the development of chemical weapons (and of the means of protection against them). Bretislav Friedrich and Martin Wolf (Fritz Haber Institute of the Max Planck Society, the successor institution of Haber's institute) together with Dieter Hoffmann, Jürgen Renn, and Florian Schmaltz (Max Planck Institute for the History of Science) organized an international symposium to commemorate the centenary of the infamous chemical attack. The symposium examined crucial facets of chemical warfare from the first research on and deployment of chemical weapons in WWI to the development and use of chemical warfare during the century hence. The focus was on scientific, ethical, legal, and political issues of chemical weapons research and deployment — including the issue of dual use — as well as the ongoing effort to control the possession of chemical weapons and to ultimately achieve their elimination. The volume consists of papers presented at the symposium and supplemented by additional articles that together cover key aspects of chemical warfare from 22 April 1915 until the summer of 2015.

Livestock's Long Shadow-Henning Steinfeld 2006 "The assessment builds on the work of the Livestock, Environment and Development (LEAD) Initiative"--Pref.

Catalytic Ammonia Synthesis-J.R. Jennings 2013-06-29 The phenomenon of catalysis is found in many homogeneous and heterogeneous systems undergoing chemical change, where it effects the rates of approach to the equilibrium state in processes as diverse as those found in the stars, the earth's mantle, living organisms, and the various chemistries utilized by industry. The economies and the living standards of both developed and developing countries depend to varying degrees upon the efficacy of their chemical industries. Con sequently, this century has seen a wide exploration and expansion of catalytic chemistry together with an intensive investigation of specific, essential processes like those contributing to life-supporting agricultures. Prime among the latter must surely be the "fixation" of atmospheric nitrogen by catalytic hydrogenation to anhydrous ammonia, still the preferred synthetic precursor of the nitrogenous components of fertilizers. In each decade contemporary concepts and techniques have been used to further the understanding, as yet incomplete, of the catalyst, the adsorbates, the surface reactions, and the technology of large-scale operation. The contributors to the present volume review the state of the art, the science, and the technology; they reveal existing lacunae, and suggest ways forward. Around the turn of the century, Sabatier's school was extending the descriptive catalytic chemistry of hydrogenation by metals to include almost all types of multiple bond. The triple bond of dinitrogen, which continued to be more resistant than the somewhat similar bonds in carbon monoxide and ethyne, defied their efforts.

Robert Le Rossignol-Deri Sheppard 2020-02-06 A principal aim of this first biography of Robert Le Rossignol, engineer of the Haber process, is to bring new evidence to the attention of the scientific community allowing a re-assessment of the origins of the 'Haber' process. However, the scope of the book is much wider and goes beyond the discovery of 'fixation' to account for a life distinct from Haber, one full of remarkable science, cruel circumstance, personal tragedy and amazing benevolence, the latter made possible by Haber's generous financial arrangement with Le Rossignol regarding his royalties from the BASF.

Ecology of Harmful Algae-E. Granéli 2007-10-04 Harmful algal can cause a variety of deleterious effects, including the poisoning of fish and shellfish, habitat disruptions for many organisms, water discoloration, beach fouling, and even toxic effects for humans. In this volume, international experts provide an in-depth analysis of harmful algae topics and offer a comprehensive synthesis of the latest research in the field.

Making the Modern World: Materials and Dematerialization-Vaclav Smil 2016-12-04 How much further should the affluent world push its material consumption? Does relative dematerialization lead to absolute decline in demand for materials? These and many other questions are discussed and answered in Making the Modern World: Materials and Dematerialization. Over the course of time, the modern world has become dependent on unprecedented flows of materials. Now even the most efficient production processes and the highest practical rates of recycling may not be enough to result in dematerialization rates that would be high enough to negate the rising demand for materials generated by continuing population growth and rising standards of living. This book explores the costs of this dependence and the potential for substantial dematerialization of modern economies. Making the Modern World: Materials and Dematerialization considers the principal materials used throughout history, from wood and stone, through to metals, alloys, plastics and silicon, describing their extraction and production.

Surface Chemistry and Catalysis-Albert F. Carley 2002-09-30 Exciting results are still emerging from the many research groups working in this fertile area and the book is an excellent stimulus to researchers at the start of the 21st century."--BOOK JACKET.

One Hundred Years at the Intersection of Chemistry and Physics-Jeremiah James 2011-10-27 This volume, occasioned by the centenary of the Fritz Haber Institute, formerly the Institute for Physical Chemistry and Electrochemistry, covers the Institute's scientific and institutional history from its founding in 1911 as one the earliest institutes of the Kaiser Wilhelm Society, through its renaming for its founding director in 1952 and incorporation in the Max Planck Society, until the present. The Institute's pace-setting research in physical chemistry and chemical physics has been shaped by dozens of distinguished scientists, among them seven Nobel Laureates.

Caesar's Last Breath-Sam Kean 2017-07-18 The Guardian's Best Science Book of 2017: the fascinating science and history of the air we breathe. It's invisible. It's ever-present. Without it, you would die in minutes. And it has an epic story to tell. In Caesar's Last Breath, New York Times bestselling author Sam Kean takes us on a journey through the periodic table, around the globe, and across time to tell the story of the air we breathe, which, it turns out, is also the story of earth and our existence on it. With every breath, you literally inhale the history of the world. On the ides of March, 44 BC, Julius Caesar died of stab wounds on the Senate floor, but the story of his last breath is still unfolding; in fact, you're probably inhaling some of it now. Of the sextillions of molecules entering or leaving your lungs at this moment, some might well bear traces of Cleopatra's perfumes, German mustard gas, particles exhaled by dinosaurs or emitted by atomic bombs, even remnants of stardust from the universe's creation. Tracing the origins and ingredients of our atmosphere, Kean reveals how the alchemy of air reshaped our continents, steered human progress, powered revolutions, and continues to influence everything we do. Along the way, we'll swim with radioactive pigs, witness the most important chemical reactions humans have discovered, and join the crowd at the Moulin Rouge for some of the crudest performance art of all time. Lively, witty, and filled with the astounding science of ordinary life, Caesar's Last Breath illuminates the science stories swirling around us every second.

UNEP Year Book 2009-United Nations 2009-02 UNEP Year Book 2009: New Science and Developments in our Changing Environment presents work in progress on scientific understanding of global environmental change, as well as foresight about possible issues on the horizon. The aim is to raise awareness of the interlinkages among environmental issues that can accelerate the rates of change and threaten human wellbeing. The chapters of the Year Book track the same trajectory as our awareness of environmental change. Transformations are inherent to this trajectory and are taking place on many fronts: from industrial agriculture to eco-agriculture; from a wasteful society towards a resource efficient one; and from a triad of competing interests among civil society, the private sector, and governments to a more cooperative model based on mutual benefits.

Energy-Vaclav Smil 2017-01-05 With one famous equation, E=mc2, Einstein proved all matter can be described as energy. It is everywhere and it is everything. In this newly updated and engaging introduction, renowned scientist Vaclav Smil explores energy in all its facets – from the inner workings of the human body to what we eat, the car we drive and the race for more efficient and eco-friendly fuels. Energy: A Beginner's Guide highlights the importance of energy in both past and present societies, by shedding light on the science behind global warming and efforts to prevent it, and by revealing how our daily decisions affect energy consumption. Whether you're looking for dinner table conversation or to further your own understanding, this book will amaze and inform, uncovering the truths and exposing the myths behind one of the most important concepts in our universe.

Goethe Contra Newton-Dennis L. Sepper 2003-02-13 Sepper shows that the condemnation of Goethe's attacks on Newton has been based on erroneous assumptions about the history of Newton's theory.

From Stars to Stalagmites-Paul S. Braterman 2012 Explains the essence of chemistry to the layman while exploring such topics as the noble gases, wave-particle duality, and bonds.

Swallows and Settlers-Thomas R. Gottschang 2020-06-01 Between the 1890s and the Second World War, twenty-five million people traveled from the densely populated North China provinces of Shandong and Hebei to seek employment in the growing economy of China's three northeastern provinces, the area known as Manchuria. This was the greatest population movement in modern Chinese history and ranks among the largest migrations in the world. Swallows and Settlers is the first comprehensive study of that migration. Drawing methods from their respective fields of economics and history, the coauthors focus on both the broad quantitative outlines of the movement and on the decisions and experiences of individual migrants and their families. In readable narrative prose, the book lays out the historical relationship between North China and the Northeast (Manchuria) and concludes with an examination of ongoing population movement between these regions since the founding of the People's Republic in 1949.

Thermodynamics of Technical Gas-reactions-Fritz Haber 1908

Oil-Vaclav Smil 2017-11-02 World acclaimed scientist Vaclav Smil reveals everything there is to know about nature's most sought-after resource Oil is the lifeblood of the modern world. Without it, there would be no planes, no plastic, no exotic produce, and a global political landscape few would recognise. Humanity's dependence upon oil looks set to continue for decades to come, but what is it? Fully updated and packed with fascinating facts to fuel dinner party debate, Professor Vaclav Smil's Oil: A Beginner's Guide explains all matters related to the 'black stuff', from its discovery in the earth right through to the controversy that surrounds it today.

The Soil and Health-Albert Howard 2011-01-23 During his years as a scientist working for the British government in India, Sir Albert Howard conceived of and refined the principles of organic agriculture. Howard's The Soil and Health became a seminal and inspirational text in the organic movement soon after its publication in 1945. The Soil and Health argues that industrial agriculture, emergent in Howard's era and dominant today, disrupts the delicate balance of nature and irrevocably robs the soil of its fertility. Howard's classic treatise links the burgeoning health crises facing crops, livestock, and humanity to this radical degradation of the Earth's soil. His message—that we must respect and restore the health of the soil for the benefit of future generations—still resonates among those who are concerned about the effects of chemically enhanced agriculture.

The Chemical Element-Javier García-Martínez 2011-09-19 In the International Year of Chemistry, prominent scientists highlight the major advances in the fight against the largest problems faced by humanity from the point of view of chemistry, showing how their science is essential to ensuring our long-term survival. Following the UN Millennium Development Goals, the authors examine the ten most critical areas, including energy, climate, food, water and health. All of them are opinion leaders in their fields, or high-ranking decision makers in national and international institutions. Intended to provide an intellectual basis for the future development of chemistry, this book is aimed at a wide readership including students, professionals, engineers, scientists, environmentalists and anyone interested in a more sustainable future.

A Vision for NSF Earth Sciences 2020-2030-National Academies of Sciences, Engineering, and Medicine 2020-08-31 The Earth system functions and connects in unexpected ways - from the microscopic interactions of bacteria and rocks to the macro-scale processes that build and erode mountains and regulate Earth's climate. Efforts to study Earth's intertwined processes are made even more pertinent and urgent by the need to understand how the Earth can continue to sustain both civilization and the planet's biodiversity. A Vision for NSF Earth Sciences 2020-2030: Earth in Time provides recommendations to help the National Science Foundation plan and support the next decade of Earth science research, focusing on research priorities, infrastructure and facilities, and partnerships. This report presents a compelling and vibrant vision of the future of Earth science research.

Growth-Vaclav Smil 2020-12 A systematic investigation of growth in nature and society, from tiny organisms to the trajectories of empires and civilizations. Growth has been both an unspoken and an explicit aim of our individual and collective striving. It governs the lives of microorganisms and galaxies; it shapes the capabilities of our extraordinarily large brains and the fortunes of our economies. Growth is manifested in annual increments of continental crust, a rising gross domestic product, a child's growth chart, the spread of cancerous cells. In this magisterial book, Vaclav Smil offers systematic investigation of growth in nature and society, from tiny organisms to the trajectories of empires and civilizations. Smil takes readers from bacterial invasions through animal metabolisms to megacities and the global economy. He begins with organisms whose mature sizes range from microscopic to enormous, looking at disease-causing microbes, the cultivation of staple crops, and human growth from infancy to adulthood. He examines the growth of energy conversions and man-made objects that enable economic activities--developments that have been essential to civilization. Finally, he looks at growth in complex systems, beginning with the growth of human populations and proceeding to the growth of cities. He considers the challenges of tracing the growth of empires and civilizations, explaining that we can chart the growth of organisms across individual and evolutionary time, but that the progress of societies and economies, not so linear, encompasses both decline and renewal. The trajectory of modern civilization, driven by competing imperatives of material growth and biospheric limits, Smil tells us, remains uncertain.

Fertility and Public Policy-Noriyuki Takayama 2010-12-17 Experts discuss the appropriateness and effectiveness using public policy to influence fertility decisions. In 2050, world population growth is predicted to come almost to a halt. Shortly thereafter it may well start to shrink. A major reason behind this shift is the fertility decline that has taken place in many developed countries. In this book, experts discuss the appropriateness and effectiveness of using public policy to influence fertility decisions. Contributors discuss the general feasibility of public interventions in the area of fertility, analyze fertility patterns and policy design in such countries as Japan, South Korea, China, Sweden, and France, and offer theoretical analyses of parental fertility choices that provide an overview of a broad array of child-related policy instruments in a number of OECD and EU countries. The chapters show that it is difficult to gauge the effectiveness of such policy interventions as child-care subsidies, support for women's labor-force participation, and tax incentives. Data are often incomplete, causal relations unproved, and the role of social norms and culture difficult to account for. Investigating reasons for the decline in fertility more closely will require further study. This volume offers the latest work on this increasingly important subject.