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The Biosphere Carbon Sequestration in the Biosphere **General Energetics** *The Biosphere* **The Earth's Biosphere The Biosphere Biodiversity and Climate Change Ecological Stoichiometry** *Dreaming the Biosphere* **Primary Productivity of the Biosphere** *Harvesting the Biosphere Primary Productivity of the Biosphere Recarbonization of the Biosphere* **The Biosphere Energy Exchange in the Biosphere How the Biosphere Works The Earth as Transformed by Human Action** Earth's Biosphere Microbes: The Foundation Stone of the Biosphere *The Deep Hot Biosphere The Biosphere and Civilization: In the Throes of a Global Crisis* **Bringing the Biosphere Home Coviability of Social and Ecological Systems: Reconnecting Mankind to the Biosphere in an Era of Global Change** The Biosphere and the Bioregion **Ecosystem Services and Carbon Sequestration in the Biosphere** The Evolution of the Biosphere **Ecology** *The Global Carbon Cycle and Climate Change Stratospheric Ozone Depletion/UV-B Radiation in the Biosphere* **Matter and Energy in the Biosphere Ecosystem Services and Carbon Sequestration in the Biosphere Stable Isotopes and Biosphere - Atmosphere Interactions** Interactions Between Biosphere, Atmosphere and Human Land Use in the Amazon Basin Food Chains in the Biosphere Human Population Problems in the Biosphere **Pushing Our Limits The Biosphere and Noosphere Reader** *Problems of Biosphere Origin and Evolution* **The Biosphere and the Bioregion Radioactive Substances in the biosphere**

The Biosphere Nov 03 2022 "Vladimir Vernadsky was a brilliant and prescient scholar-a true scientific visionary who saw the deep connections between life on Earth and the rest of the planet and understood the profound implications for life as a cosmic phenomenon." -DAVID H. GRINSPOON, AUTHOR OF VENUS REVEALED "The Biosphere should be required reading for all entry level students in earth and planetary sciences." -ERIC D. SCHNEIDER, AUTHOR OF INTO THE COOL: THE NEW THERMODYNAMICS OF CREATIVE DESTRUCTION

Radioactive Substances in the biosphere Jun 25 2019

The Earth's Biosphere Jun 29 2022 A comprehensive overview of Earth's biosphere, written with scientific rigor and essay-like flair. In his latest book, Vaclav Smil tells the story of the Earth's biosphere from its origins to its near and long-term future. He explains the workings of its parts and what is known about their interactions. With essay-like flair, he examines the biosphere's physics, chemistry, biology, geology, oceanography, energy, climatology, and ecology, as well as the changes caused by human activity. He provides both the basics of the story and surprising asides illustrating critical but often neglected aspects of biospheric complexity. Smil begins with a history of the modern idea of the biosphere, focusing on the development of the concept by Russian scientist Vladimir Vernadsky. He explores the probability of life elsewhere in the universe, life's evolution and metabolism, and the biosphere's extent, mass, productivity, and grand-scale organization. Smil offers fresh approaches to such well-known phenomena as solar radiation and plate tectonics and introduces lesser-known topics such as the quarter-power scaling of animal and plant metabolism across body sizes and metabolic pathways. He also examines two sets of fundamental relationships that have profoundly influenced the evolution of life and the persistence of the biosphere: symbiosis and the role of life's complexity as a determinant of biomass productivity and resilience. And he voices concern about the future course of human-caused global environmental change, which could compromise the biosphere's integrity and threaten the survival of modern civilization.

The Biosphere and the Bioregion Jul 27 2019 "As one of the originators of the concept of bioregionalism, Peter Berg (1937-2011) is a founding figure of contemporary environmental thought. As arguably the nation's first post-environmentalist, in the 1970s Berg perceived the negative direction the environmental movement was taking and began to articulate a more positive and pro-active alternative, centred on the concept of bioregions. This book introduces readers to the biospheric vision and post-environmental genius of Berg, with original tributes from sixteen prominent writers and thinkers, whose reflections illuminate facets of Berg's continuing importance and offer fresh angles on bioregionalism"--

Food Chains in the Biosphere Jan 01 2020

The Biosphere Jul 31 2022 The Biosphere Second Edition Ian K. Bradbury Department of Geography. University of Liverpool, UK The Biosphere provides a comprehensive introductory overview of functional, historical and geographical aspects of the 'living world'. It has been written particularly for first and second year students of geography and environmental science in higher education with little background in biology but whose interests in the environment and environmental problems requires some knowledge of organisms and ecosystems. The first part of the book provides an accessible introduction to life on earth, covering such key topics as levels of organization in the biosphere, the chemical make up of organisms and energy and life. The second part of the book emphasizes functional aspects of the biosphere, particularly the ways in which organisms acquire and process energy and materials and how these are transferred through ecological systems. Special attention is paid to 'applied' aspects, particularly crop and livestock production. The third part of the book provides an overview of the history of life on earth, emphasizing major evolutionary 'events' and their significance for the biosphere. This part begins with a consideration of life's origins and concludes with a section on the evolution of hominids. The fourth part of the book focuses on geographical aspects of the biosphere. The principles of species distribution are discussed and different approaches to the zonation of the biota are introduced. A final chapter deals with biodiversity, emphasizing its geographical variation. Throughout The Biosphere, the links between 'natural' processes and environmental issues such as pollution, climatic change and conservation are emphasized. The extensive use of cross referencing makes this book very helpful for the non specialist.

Dreaming the Biosphere Feb 23 2022 "Biosphere 2" rises from southern Arizonas high desert like a bizarre hybrid spaceship and greenhouse. Packed with more than 3,800 carefully selected plant, animal, and insect species, this mega-terrarium is one of the world's most biodiverse, lush, and artificial wildernesses. Only recently transformed from an abandoned ghost dome to a University of Arizona research center, the site was the setting of a grand drama about humans and ecology at the end of the twentieth century. The seeds of Biosphere 2 sprouted in the 1970s at Synergia, a desert ranch in New Mexico where John Allen and a handful of dreamers united to create a self-reliant utopia centered on ecological work, study, and their traveling experimental theater troupe, "The Theater of All Possibilities." At a time of growing tensions in the American environmental consciousness, the Synergians took on varied projects around the world that sought to mend the rift between humans and nature. In 1984, they bought a piece of desert to build Biosphere 2. Eco-enthusiasts competed to become the eight "biospherians" who would lock themselves inside the giant greenhouse world for two years to live in harmony with their wilderness, grow their own food, and recycle all their air, water, and wastes. Thin and short on oxygen, the biospherians stoically completed their survival mission, but the communal spirit surrounding Biosphere 2 eventually dissolved into conflict--ultimately the facility would be seized by armed U.S. Marshals. Yet for all the story's strangeness, perhaps strangest of all was how normal Biosphere 2 actually was. The story of this grand eco-utopian adventure (and misadventure) becomes a parable about the relationship between humans and nature in postmodern America. Visit the authors' website at www.dreamingthebiosphere.com

Coviability of Social and Ecological Systems: Reconnecting Mankind to the Biosphere in an Era of Global Change Dec 12 2020 This book considers the principle of 'sustainable development' which is currently facing a growing environmental crisis. A new mode of thinking and positioning the ecological imperative is the major input of this volume. The prism of co-viability is not the economics of political agencies that carry the ideology of the dominant/conventional economic schools, but rather an opening of innovation perspectives through science. This volume, through its four parts, more than 40 chapters and a hundred authors, gives birth to a paradigm which crystallizes within a concept that will support in overcoming the ecological emergency deadlock.

The Deep Hot Biosphere Mar 15 2021 This book sets forth a set of truly controversial and astonishing theories: First, it proposes that below the surface of the earth is a biosphere of greater mass and volume than the biosphere the total sum of living things on our planet's continents and in its oceans. Second, it proposes that the inhabitants of this subterranean biosphere are not plants or animals as we know them, but heat-loving bacteria

that survive on a diet consisting solely of hydrocarbons that is, natural gas and petroleum. And third and perhaps most heretically, the book advances the stunning idea that most hydrocarbons on Earth are not the byproduct of biological debris ("fossil fuels"), but were a common constituent of the materials from which the earth itself was formed some 4.5 billion years ago. The implications are astounding. The theory proposes answers to often-asked questions: Is the deep hot biosphere where life originated, and do Mars and other seemingly barren planets contain deep biospheres? Even more provocatively, is it possible that there is an enormous store of hydrocarbons upwelling from deep within the earth that can provide us with abundant supplies of gas and petroleum? However far-fetched these ideas seem, they are supported by a growing body of evidence, and by the indisputable stature and seriousness Gold brings to any scientific debate. In this book we see a brilliant and boldly original thinker, increasingly a rarity in modern science, as he develops potentially revolutionary ideas about how our world works.

Matter and Energy in the Biosphere May 05 2020

Earth's Biosphere May 17 2021 The biosphere refers to the parts of Earth where life exists or where known life has existed in the past. The biosphere is comprised of the atmosphere, geosphere, and hydrosphere because life exists in each of those three spheres, from birds in the sky to fish in the water to worms in the dirt. Food chains represent interconnected life cycles in the biosphere. Energy is transferred from one organism to the next and, as apex predators die, nutrients are returned to the soil. Readers will learn how people affect the biosphere and how life and energy are maintained in the biosphere.

The Biosphere and Noosphere Reader Sep 28 2019 The Reader is the first comprehensive history of the noosphere and biosphere. Drawing on classical influences, modern parallels, and insights into the future, the Reader traces the emergence of noosphere and biosphere concepts within the concept of environmental change. Reproducing material from seminla works, both past and present, key ideas and writings of prominent thinkers are presented, including Bergson, Vernadsky, Lovelock, Russell, Needham, Huxley, Medawar, Toynbee and Boulding, and extensive introductory pieces bu the editors drawattention to common themes and competing ideas. Focussing on issues of origins, theories, parallels and potential, the discussions place issues in a broad context, compare and contrast central concepts with those of the Gaia hypothesis, sustainability and global change, and examine the potential application of noospheric ideas to current debates about culture, education and technology in such realms as the Internet, space exploration, and the emergence of super-consciousness. Literally the `sphere of mind or intellect', the noosphere is aprt of the `realm of the possible' in human affairs, where there is a conscious effort to tackle global issues The noosphere concept captures a number of key contemporary issues - social evolution, global ecology, Gaia, deep ecology and global environmental change - contributing to ongoing debates concerning the implications of emerging technologies.

Ecology Aug 08 2020 Eleven plants were chosen so as to cover a wide range of biological characteristics (perennial, annual, autogamous, allogamous, etc.) in this study. Three chapters on methodology complement these studies. The first is devoted to the use of biological and molecular markers to analyse the diversity of collections, the second addresses data analysis, and the third describes a method for constituting core collectaions based on maximization of variability.

The Earth as Transformed by Human Action Jun 17 2021 The Earth as Transformed by Human Action is the culmination of a mammoth undertaking involving the examination of the toll our continual strides forward, technical and social, take on our world. The purpose of such a study is to document the changes in the biosphere that have taken place over the last 300 years, to contrast global patterns of change to those appearing on a regional level, and to explain the major human forces that have driven these changes. The first section deals strictly with the major human forces of the past 300 years and the second is a detailed account of the transformations of the global environment wrought by human action. The final section examines a range of perspectives and theories that purport to explain human actions with regard to the biosphere.

Carbon Sequestration in the Biosphere Oct 02 2022 Anthropogenic release of carbon dioxide into the atmosphere has been recognized as the primary agent in global climate change. The volume discusses the possibilities for limiting that increase by the long-term storage of carbon in soils, vegetation, wetlands and oceans. Each of these storage media is analysed in detail to elucidate those processes responsible for the uptake and release of carbon. Several chapters address the practical prospects for deliberate interventions aimed at adjusting the balance in favour of uptake over release, i.e. sequestration, while having regard to simultaneous changes in the various environments.

Primary Productivity of the Biosphere Nov 22 2021 The period since World War II, and especially the last decade influenced by the International Biological Program, has seen enormous growth in research on the function of ecosystems. The same period has seen an exponential' rise in environmental problems including the capacity of the Earth to support man's population. The concern extends to man's effects on the "biosphere"-the film of living organisms on the Earth's surface that supports man. The common theme of ecologic research and environmental concerns is primary production the binding of sunlight energy into organic matter by plants that supports all life. Many results from the IBP remain to be synthesized, but enough data are available from that program and other research to develop a convincing sum mary of the primary production of the biosphere-the purpose of this book. The book had its origin in the parallel interests of the two editors and Gene E. Likens, which led them to prepare a symposium on the topic at the Second Biological Congress of the American Institute of Biological Sciences in Miami, Florida, October 24, 1971. Revisions of the papers presented at that symposium appear as Chapters 2, 8, 9, 10, and 15 in this book. We have added other chapters that complement this core; these include discussion and evaluation of methods for measuring productivity and regional production, current findings on tropical productivity, and models of primary productivity.

The Global Carbon Cycle and Climate Change Jul 07 2020 The Global Carbon Cycle and Climate Change examines the global carbon cycle and the energy balance of the biosphere, following carbon and energy through increasingly complex levels of metabolism from cells to ecosystems. Utilizing scientific explanations, analyses of ecosystem functions, extensive references, and cutting-edge examples of energy flow in ecosystems, it is an essential resource to aid in understanding the scientific basis of the role played by ecological systems in climate change. This book addresses the need to understand the global carbon cycle and the interrelationships among the disciplines of biology, chemistry, and physics in a holistic perspective. The Global Carbon Cycle and Climate Change is a compendium of easily accessible, technical information that provides a clear understanding of energy flow, ecosystem dynamics, the biosphere, and climate change. "Dr. Reichle brings over four decades of research on the structure and function of forest ecosystems to bear on the existential issue of our time, climate change. Using a comprehensive review of carbon biogeochemistry as scaled from the physiology of organisms to landscape processes, his analysis provides an integrated discussion of how diverse processes at varying time and spatial scales function. The work speaks to several audiences. Too often students study their courses in a vacuum without necessarily understanding the relationships that transcend from the cellular process, to organism, to biosphere levels and exist in a dynamic atmosphere with its own processes, and spatial dimensions. This book provides the template whereupon students can be guided to see how the pieces fit together. The book is self-contained but lends itself to be amplified upon by a student or professor. The same intellectual quest would also apply for the lay reader who seeks a broad understanding." --W.F. Harris| Deputy Assistant Director, Biological Sciences, National Science Foundation (Retired); Associate Vice Chancellor for Research, University of Tennessee, Knoxville (Retired) Provides clear explanations, examples, and data for understanding fossil fuel emissions affecting atmospheric CO2 levels and climate change, and the role played by ecosystems in the global cycle of energy and carbon Presents a comprehensive, factually based synthesis of the global cycle of carbon in the biosphere and the underlying scientific bases Includes clear illustrations of environmental processes

Human Population Problems in the Biosphere Nov 30 2019

Stable Isotopes and Biosphere - Atmosphere Interactions Mar 03 2020 The emerging multidisciplinary field of earth system science sets out to improve our understanding functioning ecosystems, at a global level across the entire planet. Stable Isotopes and Biosphere - Atmosphere Interactions looks to one of its most powerful tools — the application of stable isotope analyses — to understanding biosphere-atmosphere exchange of the greenhouse gases, and synthesizes much of the recent progress in this work. Stable Isotopes and Biosphere - Atmosphere Interactions describes recent progress in understanding the mechanisms, processes and applications of new techniques. It makes a significant contribution to the

emerging, multidisciplinary study of the Earth as an interacting system. This book will be an important reference for students and researchers in biology, ecology, biogeochemistry, meteorology, and atmospheric science and will be invaluable for anyone with any interest in the future of the planet. Describes applications of new stable isotope techniques to the emerging fields of earth system science and global change Illustrates advances in scaling of physiological processes from leaf/soil to the global scale Contains state-of-the-art, critical reviews written by international researchers and experts

Interactions Between Biosphere, Atmosphere and Human Land Use in the Amazon Basin Jan 31 2020 This book offers a panorama of recent scientific achievements produced through the framework of the Large-Scale Biosphere-Atmosphere programme (LBA) and other research programmes in the Brazilian Amazon. The content is highly interdisciplinary, with an overarching aim to contribute to the understanding of the dynamic biophysical and societal/socio-economic structure and functioning of Amazonia as a regional entity and its regional and global climatic teleconnections. The target readership includes advanced undergraduate and post-graduate students and researchers seeking to untangle the gamut of interactions that the Amazon’s complex biophysical and social system represent.

The Evolution of the Biosphere Sep 08 2020 THE STUDY OF THE BIOSPHERE The term 'biosphere' first appeared in the works of the French biologist 1.-B. Lamarck and the Austrian geologist E. Suess in the 19th century. In the 20th century, the study of the biosphere attracted considerable attention, largely due to the research of V. I. Vernadsky (1863- 1945). The results Qf Vernadsky's investigations have appeared in a number of publications, including the monograph The Biosphere published in 1926. This work consists of two parts, The Biosphere in Cosmos' and The Zone of Life', written in a form of speculation and reflection that is rarely used in modern studies. This work concerns the distinguishing properties of the space occupied by organisms and the exceptional importance of the activities of these organisms in the formation of their environment. In this and subsequent studies, Vernadsky has laid the foundations of the science of the biosphere, which today plays an important role in th.c many branches of science concerned with the Earth. Several terms have been suggested for the science of the biosphere, including global ecology (a discipline studying the global ecological system, whose meaning is close to that of the biosphere). One of the most prominent predecessors of Vernadsky was his teacher V.

Stratospheric Ozone Depletion/UV-B Radiation in the Biosphere Jun 05 2020

How the Biosphere Works Jul 19 2021 "This book offers a simple and novel theoretical approach to understanding the history of the biosphere, including humanity's place within it. It also helps to clarify what the possibilities and limitations are for future action. This is a subject of wide interest, because today we are facing a great many environmental issues, many of which may appear unconnected. Yet all these issues are part of our biosphere. For making plans for the future and addressing our long-term survival and well-being, an integrated knowledge of our biosphere and its history is therefore indispensable"--

The Biosphere May 29 2022 "Vladimir Vernadsky was a brilliant and prescient scholar-a true scientific visionary who saw the deep connections between life on Earth and the rest of the planet and understood the profound implications for life as a cosmic phenomenon." -DAVID H. GRINSPOON, AUTHOR OF VENUS REVEALED "The Biosphere should be required reading for all entry level students in earth and planetary sciences." -ERIC D. SCHNEIDER, AUTHOR OF INTO THE COOL: THE NEW THERMODYNAMICS OF CREATIVE DESTRUCTION

Bringing the Biosphere Home Jan 13 2021 A guide for understanding the ecological and existential aspects of global environmental change. This book shows how to make global environmental problems more tangible, so that they become an integral part of everyday awareness. At its core is a simple assumption: that the best way to learn to perceive the biosphere is to pay close attention to our immediate surroundings. Through local natural history observations, imagination and memory, and spiritual contemplation, we develop a place-based environmental view that can be expanded to encompass the biosphere. Interweaving global change science, personal narrative, and commentary on a wide range of scientific and literary works, the book explores both the ecological and existential aspects of urgent issues such as the loss of biodiversity and global climate change. Written in a warm, engaging style, Bringing the Biosphere Home considers the perceptual connections between the local and global, how the ecological news of the community is of interest to the world, and how the global movement of people, species, and weather systems affects the local community. It shows how global environmental change can become the province of numerous educational initiatives—from the classroom to the Internet, from community forums to international conferences, from the backyard to the biosphere. It explains important scientific concepts in clear, nontechnical language and provides dozens of ideas for learning how to practice biospheric perception.

Pushing Our Limits Oct 29 2019 Biospherian Mark Nelson offers insider perspectives on Biosphere 2 and bold insights into today's global ecological challenges--Provided by publisher.

Biodiversity and Climate Change Apr 27 2022 An essential, up-to-date look at the critical interactions between biological diversity and climate change that will serve as an immediate call to action The physical and biological impacts of climate change are dramatic and broad-ranging. People who care about the planet and manage natural resources urgently need a synthesis of our rapidly growing understanding of these issues. In this all-new sequel to the 2005 volume Climate Change and Biodiversity, leading experts in the field summarize observed changes, assess what the future holds, and offer suggested responses. Edited by distinguished conservationist Thomas E. Lovejoy and climate change biologist Lee Hannah, this comprehensive volume includes the latest research and explores emerging topics. From extinction risk to ocean acidification, the future of the Amazon to changes in ecosystem services, and geoengineering to the power of ecosystem restoration, this volume captures the sweep of climate change transformation of the biosphere. An authoritative, up-to-date reference, this is the new benchmark synthesis for climate change scientists, conservationists, managers, policymakers, and educators.

Ecological Stoichiometry Mar 27 2022 Biochemistry, energy flow.

Ecosystem Services and Carbon Sequestration in the Biosphere Apr 03 2020 Ecological functions and human wellbeing depend on ecosystem services. Among the ecosystem services are provisional (food, feed, fuel, fiber), regulating (carbon sequestration, waste recycling, water cleansing), cultural (aesthetic, recreational, spiritual), and supporting services (soil formation, photosynthesis, nutrient cycling). Many relationships of various degree exist among ecosystem services. Thus, land use and soil management to enhance biospheric carbon sinks for carbon sequestration requires a comprehensive understanding on the effects on ecosystem services. Payments for ecosystem services including carbon pricing must address the relationship between carbon sequestration and ecosystem services to minimize risks of overshoot, and promote sustainable use of land-based carbon sinks for human wellbeing.

The Biosphere and the Bioregion Nov 10 2020 Bioregionalism asks us to reimagine ourselves and the places where we live in ecological terms and to harmonize human activities with the natural systems that sustain life. As one of the originators of the concept of bioregionalism, Peter Berg (1937-2011) is a founding figure of contemporary environmental thought. The Biosphere and the Bioregion: Essential Writings of Peter Berg introduces readers to the biospheric vision and post-environmental genius of Berg. From books and essays to published interviews, this selection of writings represents Berg's bioregional vision and its global, local, urban, and rural applications. The Biosphere and the Bioregion provides a highly accessible introduction to bioregional philosophy, making Berg's paradigm available as a guiding vision and practical "greenprint" for the twenty-first century. This valuable compilation lays the groundwork for future research by offering the first-ever comprehensive bibliography of Berg's publications and should be of interest to students and scholars in the interdisciplinary fields of environmental humanities, environment and sustainability studies, as well as political ecology, environmental sociology and anthropology.

Problems of Biosphere Origin and Evolution Aug 27 2019 By definition, biosphere is the Earth's geological shell populated by living organisms. Therefore, the biosphere's origin and evolution is primarily a geological problem. At present geological problems are solved using methods of physics, chemistry, biology, and mathematics. The multidisciplinary approach is a basis of this book. Life origin problems occupy the main part of the book. What is life, and can we understand its origin and evolution on the basis of laws of physics and chemistry? A number of works are dedicated to experimental study of the synthesis of organic compounds of the prebiotic significance, including ATP and photoactive systems. The characteristic

feature of our scientific approach is to consider the problem of life origin in the context of the origin and evolution of the solar system, beginning with the protoplanetary stage and including the events of the Earth's early history. The last chapter comprises papers that concern modern problems and approaches to the study of various aspects of biological evolution. The present edition is a collection of articles by scientists representing more than 20 institutes of the Russian Academy of Sciences and other organizations, joined by the science program "Problems of Biosphere Origin and Evolution". This book will be interesting for a wide range of researchers: physicists, chemists, biologists, mathematicians. The book represents the stance of the Russian scientific school on the problem of life origin, which does not always coincide with opinions of other scientific schools.
The Biosphere and Civilization: In the Throes of a Global Crisis Feb 11 2021 This monograph explores the dire ecological, social, and economic situations facing mankind through comprehensive analyses of global ecological issues, poverty, environmental stability and regulation, and sustainable development. Drs. Victor Danilov-Danil'yan and Igor Reyf discuss the development of ecology as a science, the increasing concern among scientists and public servants for the unsustainability of current economic and demographic trends, and the dire consequences our planet and civilization are already suffering as a result of the ongoing environmental and social crisis. They also address the philosophical implications of the crisis, and suggest possible solutions. The book conveys complex objects of study, namely the biosphere and the harmful anthropogenic processes it has been experiencing for decades, so that the work is accessible without omitting key components of the subject matter. Readers will learn about the social and economic contributors to a threatened biosphere, the mechanisms that maintain the stability of the global environment, and the scales at which sustainable development and preservation can be applied to initiate environmental regulation. Though intended to appeal to the general public and non-specialists, environmental researchers, organizations involved in sustainable development and conservation, and students engaged in ecology, environment, and sustainability studies will also find this book of interest.
General Energetics Sep 01 2022 Presented here for the first time is a comprehensive, single-volume treatment of all the important aspects of biospheric civilizational energetics. The author uses measurements of energy and power densities and intensities throughout to provide an integrated framework of analysis. All segments of energetics are examined, including planetary energetics (solar radiation and geomorphic processes) and bioenergetics (photosynthesis) to human energetics (metabolism and thermoregulation) traced from hunting-gathering and agricultural societies through modern day industrial civilization. Concludes with general patterns, trends and socio-economic considerations of energy use today plus their impact on the environment.
Microbes: The Foundation Stone of the Biosphere Apr 15 2021 This collection of essays discusses fascinating aspects of the concept that microbes are at the root of all ecosystems. The content is divided into seven parts, the first of those emphasizes that microbes not only were the starting point, but sustain the rest of the biosphere and shows how life evolves through a perpetual struggle for habitats and niches. Part II explains the ways in which microbial life persists in some of the most extreme environments, while Part III presents our understanding of the core aspects of microbial metabolism. Part IV examines the duality of the microbial world, acknowledging that life exists as a balance between certain processes that we perceive as being environmentally supportive and others that seem environmentally destructive. In turn, Part V discusses basic aspects of microbial symbioses, including interactions with other microorganisms, plants and animals. The concept of microbial symbiosis as a driving force in evolution is covered in Part VI. In closing, Part VII explores the adventure of microbiological research, including some reminiscences from and perspectives on the lives and careers of microbe hunters. Given its mixture of science and philosophy, the book will appeal to scientists and advanced students of microbiology, evolution and ecology alike.
Harvesting the Biosphere Dec 24 2021 An interdisciplinary and quantitative account of human claims on the biosphere's stores of living matter, from prehistoric hunting to modern energy production. The biosphere—the Earth's thin layer of life—dates from nearly four billion years ago, when the first simple organisms appeared. Many species have exerted enormous influence on the biosphere's character and productivity, but none has transformed the Earth in so many ways and on such a scale as Homo sapiens. In Harvesting the Biosphere, Vaclav Smil offers an interdisciplinary and quantitative account of human claims on the biosphere's stores of living matter, from prehistory to the present day. Smil examines all harvests—from prehistoric man's hunting of megafauna to modern crop production—and all uses of harvested biomass, including energy, food, and raw materials. Without harvesting of the biomass, Smil points out, there would be no story of human evolution and advancing civilization; but at the same time, the increasing extent and intensity of present-day biomass harvests are changing the very foundations of civilization's well-being. In his detailed and comprehensive account, Smil presents the best possible quantifications of past and current global losses in order to assess the evolution and extent of biomass harvests. Drawing on the latest work in disciplines ranging from anthropology to environmental science, Smil offers a valuable long-term, planet-wide perspective on human-caused environmental change.
Energy Exchange in the Biosphere Aug 20 2021
Ecosystem Services and Carbon Sequestration in the Biosphere Oct 10 2020 Ecological functions and human wellbeing depend on ecosystem services. Among the ecosystem services are provisional (food, feed, fuel, fiber), regulating (carbon sequestration, waste recycling, water cleansing), cultural (aesthetic, recreational, spiritual), and supporting services (soil formation, photosynthesis, nutrient cycling). Many relationships of various degree exist among ecosystem services. Thus, land use and soil management to enhance biospheric carbon sinks for carbon sequestration requires a comprehensive understanding on the effects on ecosystem services. Payments for ecosystem services including carbon pricing must address the relationship between carbon sequestration and ecosystem services to minimize risks of overshoot, and promote sustainable use of land-based carbon sinks for human wellbeing.
Primary Productivity of the Biosphere Jan 25 2022 The period since World War II, and especially the last decade influenced by the International Biological Program, has seen enormous growth in research on the function of ecosystems. The same period has seen an exponential' rise in environmental problems including the capacity of the Earth to support man's population. The concern extends to man's effects on the "biosphere"-the film of living organisms on the Earth's surface that supports man. The common theme of ecologic research and environmental concerns is primary production the binding of sunlight energy into organic matter by plants that supports all life. Many results from the IBP remain to be synthesized, but enough data are available from that program and other research to develop a convincing sum mary of the primary production of the biosphere-the purpose of this book. The book had its origin in the parallel interests of the two editors and Gene E. Likens, which led them to prepare a symposium on the topic at the Second Biological Congress of the American Institute of Biological Sciences in Miami, Florida, October 24, 1971. Revisions of the papers presented at that symposium appear as Chapters 2, 8, 9, 10, and 15 in this book. We have added other chapters that complement this core; these include discussion and evaluation of methods for measuring productivity and regional production, current findings on tropical productivity, and models of primary productivity.
The Biosphere Sep 20 2021 Describes the attributes of the biosphere, the animal and plant life that live in the biosphere, and how fragile and dynamic it is.
Recarbonization of the Biosphere Oct 22 2021 Human activities are significantly modifying the natural global carbon (C) cycles, and concomitantly influence climate, ecosystems, and state and function of the Earth system. Ever increasing amounts of carbon dioxide (CO_2) are added to the atmosphere by fossil fuel combustion but the biosphere is a potential C sink. Thus, a comprehensive understanding of C cycling in the biosphere is crucial for identifying and managing biospheric C sinks. Ecosystems with large C stocks which must be protected and sustainably managed are wetlands, peatlands, tropical rainforests, tropical savannas, grasslands, degraded/desertified lands, agricultural lands, and urban lands. However, land-based sinks require long-term management and a protection strategy because C stocks grow with a progressive improvement in ecosystem health.