Life's Engines: How Microbes Made Earth Habitable (Science Essentials)

Paul G. Falkowski
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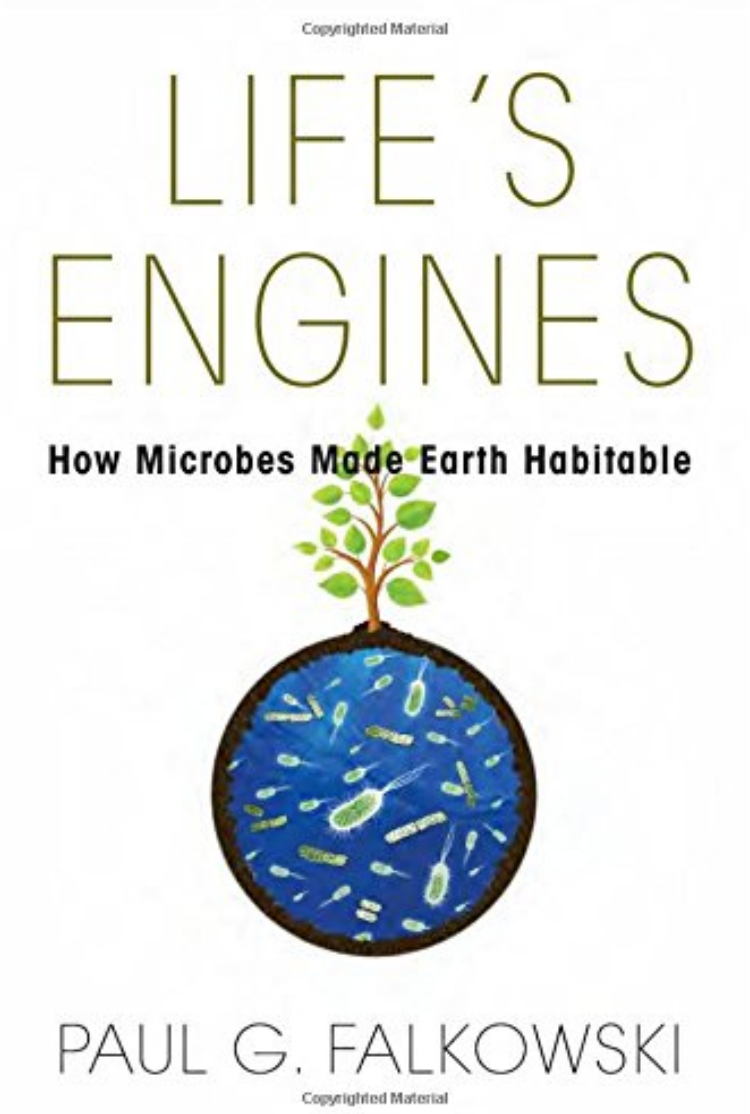

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Paul G. Falkowski : Life's Engines: How Microbes Made Earth Habitable (Science Essentials) before purchasing it in order to gage whether or not it would be worth my time, and all praised Life's Engines: How Microbes Made Earth Habitable (Science Essentials):

21 of 21 people found the following review helpful. Gaia's Anatomy: A Remarkable AchievmentBy j a haverstickFalkowski and I both had an aquarium and radio kits as youthful hobbies. I didnt see any connection at all

between the two. I guess thats why Im reading his book and hes not reading mine.There was a positive review in the NYRB, but with a warning that this was for the scientifically informed. Im an interested layman and didnt find it difficult. Its only 180 pages long, well spaced. The first 50 pages are a breeze, and though a good background, could have easily been condensed. They relate the history of the microscope and how our knowledge has depended upon our ability to visualize microbes. Then we get into the chapter on nanomachines. This is where the speed bumps appear. At this point I had to Google some basic concepts, you know, nucleic acid, sulfide/sulphate, and the like; but only a dozen times. And frankly Falkowski does such a good job laying out the story, its really a matter of how deep the reader wants to go. Perhaps a glossary would have been helpful. The graphs and diagrams are also extremely well presented and helpful.If I had to pick one main topic its the evolution of the nanomachines as the energy producing artifacts in all life on earth. And our old friend ATP plays a large part as well. This is a great overview of the discoveries of the last decades of the tine mechanics of life. Additionally, the subtext is the recognition - angelfish and whisker radios - that the system as a whole is like, no, IS, an incredibly large, complex, interconnected chemo-electrical system.The gene transfers between species of microbes are explained and, very interesting to me, as I had not heard of it before, the notion of a concordium consisting of many microbial species. The subject ot gut microbes, which were hearing a lot about lately, figures in.From here each chapter makes giant leaps, the incorporation of microbes to create eukaryotic cells, the consortia of eucaryia to make plants and animals, snowball earth, the great oxygen event, and life elsewhere in our solar system. I consider my self an informed layman, but I learned something new every couple of pages.This is truly an overview of the development of life on Earth. We are constantly reminded of the feedback loops and how we can consider the whole as an immense electro-chemical system. It is a wonderful achievement and I would highly recommend it to anyone who is comfortable with Scientific American. It changed my naive view of life as a series of bags of chemicals gradually being refined by the environment, thats for sure.I was reminded over and over again of the Gaia Hypothesis. Falkowski doesnt mention it, probably because it has an unscientific ring. I never thought of it myself as a giant individual with a soul but more as an organizing construct, And I wasnt sure how organized the whole was, anyway. But believe me, after reading this wonderful book, Im a lot more sympathetic.9 of 9 people found the following review helpful. Best written description and explanations in this areaBy Robert J. KremerBest written description and explanations in this area, which should be beneficial to those not intensively educated in the area of environmental and applied microbiology but who wish to have an accurate yet understandable overview of the principles involved.3 of 3 people found the following review helpful. Life's Engines: How Microbes Made Earth HabitableBy Rick BProfessor Falkowski, has followed science history to explain the reality of microbes present on our planet. It is an exceptional read by a very qualified scientist. To understand his full message, read this book cover to cover without passing any chapters. The author has revealed evidence that my be difficult to accept, but is backed up by the most accurate data currently available. I especially liked his personal story from a young boy learning about science through the lens of a microscope observing the unseen lives that grew, reproduced and died scooped from his simple fish tank. Gaining more and more need to understand all the hidden possibilities, he researched as many books about his microscopic subjects to eventually his professorship. It all started by a chance meeting. Read this book if you enjoy adventure, intrigue a journey into the improbable.

For almost four billion years, microbes had the primordial oceans all to themselves. The stewards of Earth, these organisms transformed the chemistry of our planet to make it habitable for plants, animals, and us. Life's Engines takes readers deep into the microscopic world to explore how these marvelous creatures made life on Earth possibleand how human life today would cease to exist without them.Paul Falkowski looks "under the hood" of microbes to find the engines of life, the actual working parts that do the biochemical heavy lifting for every living organism on Earth. With insight and humor, he explains how these miniature engines are builtand how they have been appropriated by and assembled like Lego sets within every creature that walks, swims, or flies. Falkowski shows how evolution works to maintain this core machinery of life, and how we and other animals are veritable conglomerations of microbes.A vibrantly entertaining book about the microbes that support our very existence, Life's Engines will inspire wonder about these elegantly complex nanomachines that have driven life since its origin. It also issues a timely warning about the dangers of tinkering with that machinery to make it more "efficient" at meeting the ever-growing demands of humans in the coming century.

One of Choice's Outstanding Academic Titles for 2015"[Life's Engines] is full of surprises . . . [I]mmensely rewarding."--Tim Flannery, New York of Books"Entertaining, easy-to-read and historically rich."--Adrian Wolfson, Nature"Personal stories, hard facts, and illuminative illustrations each contribute to this engaging examination of our microbial overlords . . . Paul Falkowski's decades of study in various earth and life sciences fuel this excellent addition. . . . Falkowski effectively uses analogies to convey abstract and complicated ideas."--Rachel Jagareski, Foreword s"Falkowski's loving examination sets out, life on this planet is organized by and for bacteria--the rest of us are just along for the ride."--Brian Bethune, Macleans"Falkowski brings a formidable breadth of scientific understanding to the task of explaining this, having worked as a biologist, an oceanographer and an astrobiologist. He

moves easily between biological and earth sciences to help us understand the steps microscopic single-celled organisms took to make the planet habitable."--Cosmos"[The] wonderful and awe-inspiring universe of the microbes, unseen creatures that have shaped the planet such that we may live in it, is engagingly presented by Paul Falkowski in a remarkable text entitled Life's Engines. . . . The book's success is its utter simplicity. It tells the story of the history of life on our planet from a very personal perspective. . . . I was so enthralled by this book from the get-go that I invite you to have a short taste of it."--Roberto Kolter, Cell"A pleasure to read, the book touches on virtually every topic covered in a college biology curriculum by seamlessly weaving concepts with personal anecdotes and analogies. Presenting scientific facts and the fascinating history of their discovery, Falkowski (Rutgers Univ.) intersperses evolutionary theory with biochemistry, ecology, microbiology, molecular biology, anatomy, and even anthropology and economics. He also presents a fact-based, nonpolitical vision for the future of biotechnology. . . . This reviewer came away inspired to learn more. Easily understood by anyone with a passing knowledge of science, this volume poses innumerable questions for further investigation."--Choice"What is known about the hidden world of the microbes and their fundamental roles in sustaining planetary habitability is insightfully revealed by Paul Falkowski in this authoritative, comprehensive, and delightful book. The author is uniquely qualified, perhaps singularly so, to cover topics ranging over broad time and space scales with a scholarly, transdisciplinary perspective that ranges from fundamental physics and chemistry, to Earth and ocean sciences. I cannot think of any other scientist who would accept such a challenge. . . . He is a gifted scientist and writer, and legendary storyteller."--David M. Karl, Association for the Sciences of Limnology and Oceanography Bulletin "Not a microbial biologist, I approached this book with a bit of trepidation, imaging lengthy discussions of biochemistry. Instead, I was immediately engaged by Falkowski's conversational, fluid writing, personal anecdotes, and interesting choice of topics. . . . Life's Engines [is] easily accessible to the lay reader but engaging for the scientist as well."--American Biology Teacher"An outstanding attempt to popularize the role of microbes, especially bacteria and archaea, in making multicellular eukaryotic life possible. . . . A superb introduction to the broader consequences of life and its study."--Elof Axel Carlson, Quarterly of BiologyFrom the Back Cover"In this brilliant book, Falkowski explores the hidden world of microbes from the intertwined perspectives of a researcher deeply versed in both Earth and life sciences, taking us on an epic journey from the origins of life to the birth of our own species. Life's Engines is an engaging, revelatory read."--Robert M. Hazen, author of The Story of Earth"Falkowski reminds us that we are living off the kindness of strangers--small ones, the microbes that are the very foundation of all life on this planet. He describes a hidden world of extraordinary complexity, taking us through the great discoveries that have taught us the rules. Life's Engines is a treasure trove of science and history that sounds a strong cautionary note about our future."--Martin J. Blaser, author of Missing Microbes: How the Overuse of Antibiotics Is Fueling Our Modern Plagues"In this engaging book, Paul Falkowski presents an authoritative and highly personal account of microbes, the tiny organisms that shape the world. From the inner workings of the cell to the broad sweep of Earth history, Falkowski weaves a tale of discovery that has profound consequences for understanding our past, our future, and, not least, our own bodies."--Andrew H. Knoll, Harvard University and author of Life on a Young Planet: The First Three Billion Years of Evolution on Earth"This is a microbial world, and we live here subject to microbial consent. In this perceptive and intriguing work, noted biophysicist and evolutionary biologist Paul Falkowski provides a grand tour of the intricacies of microbial life, from how they function to their role in making this a habitable planet. Falkowski has had a remarkable research career, and the rich diversity of his work provides a wonderful framework for this book."--Douglas H. Erwin, author of Extinction: How Life on Earth Nearly Ended 250 Million Years Ago"Life's Engines provides a unique perspective on the micro and macro worlds that comprise the living Earth system. A very good read."--Edward F. DeLong, Massachusetts Institute of Technology"Life's Engines is a distinct, engaging, and very worthwhile contribution."--Roger Summons, Massachusetts Institute of TechnologyAbout the AuthorPaul G. Falkowski holds the Bennett L. Smith Chair in Business and Natural Resources at Rutgers University, where he studies how microbes have shaped the history of Earth.