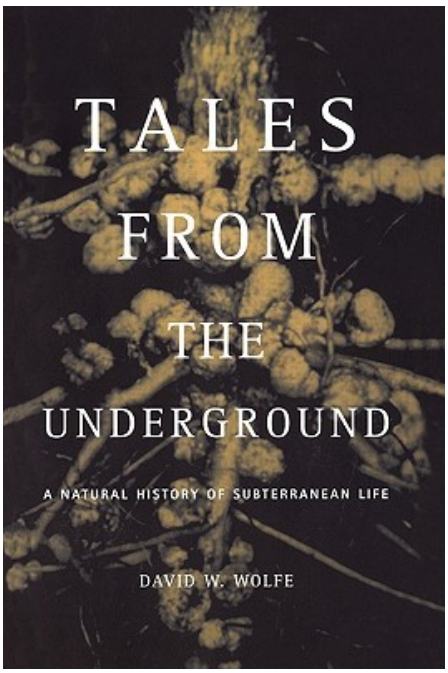

Tales From The Underground: A Natural History Of Subterranean Life

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There are over one billion organisms in a pinch of soil, and many of them perform functions essential to all life on the planet. Yet we know much more about deep space than about the universe below. In Tales from the Underground, Cornell ecologist David W. Wolfe lifts the veil on this hidden world, revealing for the first time what makes subterranean life so unique and so precious. Home to miniscule water bears and microscopic bacteria, mole rats and burrowing owls, the underground reigns supreme as it produces important pharmaceuticals, recycles life's essential elements, and helps plants gather nutrients. An original, awe-inspiring journey through a strange realm, Tales from the Underground will forever alter our appreciation of the natural world around-and beneath-us.

Tales From The Underground: A Natural History Of Subterranean Life Details

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From Reader Review Tales From The Underground: A Natural History Of Subterranean Life for online ebook

Correen says

Even though this book is more than 10 years old, I found it had fascinating information that was new to me. I especially enjoyed his early chapters on ancient life -- Bacteria, Eukarya, and Archaea. His discussion of Archaea and its extremeophiles sparked my imagination and could have well been the focus on the entire book. I would have preferred that he had stayed with his title and confined his stories to the "Underground."

A good book spurs one to want to read more on the topic. Before finishing the first section, I was checking to see what my local library had on Archaea and other such creatures and then began to look at the internet. I did not find a wealth of literature for lay persons. Etremeopiles are briefly discussed in many books but usually just briefly.

Florence Millo says

Excellent book!! Some of this may be old hat to others, but I certainly learned a lot about life underground!! We really are connected to everything and it is mostly bacteria and fungi holding it all together. Very interesting!! The last chapters on humanity's devastation of underground life were pretty depressing and I can't help wondering if we will continue to be so stupid!!

Sarah says

This is a great book for an overview of soil biology. It ranges from the origins of life to the lives of soil-dwellers to the future of our planet's soil (and what it means for us and everything else).

I think my favorite part was actually the section on the origin of life. It is still taught (even in advanced-level evolution courses...) that life probably evolved in some watery environment. In this book, it is argued that life probably evolved within the soil -- and I can really see the appeal of that argument. It is also fascinating to think that clay can serve as a template for nucleotides, and that replication of a nucleotide-clay complex is chemically feasible.

Of course, reading and thinking about the future is always depressing. I am more and more convinced with every book I read that agriculture will be our downfall. This book did not alter that trend.

Overall, a very good read (for non-scientists too) who are interested in what lies beneath the surface of the earth.

Elentarri says

The subterranean is not one world but many. It is filled with many unique habitats, and the occupants of these habitats range in size from the microscopic bacteria to the easily visible earth worms and burrowing animals. **Tales from the Underground** is not intended as a comprehensive treatment of the subject of soil ecology. The author's goal is to introduce the reader to a few of the most intriguing creatures on the underground and to the sometimes equally intriguing scientists and explorers who have studied them. With the many interesting creatures and scientists discussed in this book, I feel the author has achieved his goals.

This book takes a look at the Earth's most ancient life forms, the extremophiles; bacterium; fungi; earthworms; the dual nature of soils with regards to deadly plant and animal diseases; the tragic history of human interactions with prairie dogs, burrowing owls and the black-footed ferret. This book also explores the impact of human activities on the soil resources important to our food security and the potential for using soil microbes for bioremediation of damaged soil. The author also takes a look at the various hypothesis that try to explain the origin of life in which dirt or soil play a role e.g. the "clay-gene" theory in which clay crystals act as a catalyst and gene precursors.

The author states that he hopes that as more of us become aware of the life beneath our feet, we will be inclined to work together to maintain the biological integrity of the underground, an preserve some of what we find there for future generations.

"With each new subterranean discovery, it becomes more apparent that the niche occupied by Homo sapiens is more fragile and much less central than we once thought."

This book contains diagrams where relevant and a decent reference section. However, the author tends to select too many examples and creatures from the U.S.A, which is a bit annoying, since there is an entire planet full of underground creatures and humans that interact with them. The book is well written without excessive biographical detail and a fair amount of detailed information on each topic. I believe this book is easy to understand for the general reader. **Tales of the Underground provides an enjoyable look at some of the interesting underground citizens**.

Tim Martin says

Tales from the Underground by David W. Wolfe is an excellent though rather brief introduction to the organisms that live underground; it is only 188 pages long, 206 if one count's the end notes and bibliography (which are quite worthwhile to at least browse). One of the things I liked about the book was that Wolfe was clearly enthusiastic about his subject and expressed a real sense of wonder for the fascinating organisms that dwell under the earth's surface.

He began the book with a nice overall introduction to the subject, more than sufficient to grab my attention. In one just pinch of soil from your backyard, you will be holding close to one billion individual living organisms, including quite a few that are not named, classified, or in any way studied, animals ranging in size from the tiniest of microbes to microscopic threads of fungal hyphae, the total length of which might be best measured in miles, not inches. In a handful of soil there are more creatures than humans currently alive. A typical square yard of soil contains billions of microscopic roundworms called nematodes, a dozen to several hundred earthworms, 100,000 to 500,000 insects and other arthropods, and staggering numbers of single-celled organisms. After reviewing some basics about soil layers and types, he went into more detail about this subterranean world.

The first chapter discussed the origins of life on earth, much of which had to do with life in the soil. The complex structure and chemistry of clay crystals may have played a vital role in the development of life, perhaps initially serving as the "infrastructure" of the first, most primitive organisms, this infrastructure eventually being discarded as more and more organic molecules such as those in amino and nucleic acids took over clay's replication and synthesis functions. According to some theorists clay made possible the very first sequencing of simple proteins and genes thanks to its unique properties.

Chapter two introduced the "extremophiles," organisms that live in hostile environments, many of which exist in subterranean conditions. Some organisms "breathe in" iron oxide (rust) as a substitute for oxygen, while others are able to incorporate cobalt and even uranium into their biological processes. Much of the chapter gave the history of the study of extremophiles, as biologists continually had to revise their notions of what life could tolerate as they found organisms living at ever higher temperatures and depths (with organism at 9,000 foot depths and at temperatures higher than 160 degrees Fahrenheit having been discovered). Of further interest, these organisms may be the most common in the world, with some calculations showing that their total biomass exceeds that of all surface life. Study of one group, lithotrophic microbes, which live buried in basalt rock deep beneath the surface, has been vital in the search for life on other planets.

Chapter three focused primarily on Dr. Carl Woese of the University of Illinois, a researcher who discovered an entire new microbial superkingdom of organisms, the Archaea, a finding that radically changed how the various kingdoms of organisms were classified, a discovery that was highly controversial, as he changed the tree of life from one based primarily on visual characteristics to one based on his molecular approach. Woese found that a number of organisms assumed to be bacteria were something entirely different, as different from bacteria at least as plants are from animals. In the end the new tree of life consists of three superkingdoms or domains, Bacteria, Archaea (which includes many extremophiles), and Eukarya (which encompasses plants, animals, fungi, and protozoa).

Chapter four emphasized the importance of "nitrogen-fixers," a small group of bacteria and archaea that are able to convert nitrogen gas in the atmosphere into a form the rest of life on earth can use, a biological innovation every bit as important as the advent of photosynthesis to the history of life on earth. Wolfe showed the rather intricate symbiosis between nitrogen-fixers and plants as well their complex biology. He also discussed the role of denitrifiers, organisms that aid in the recycling of nitrogen on earth as they are able to convert soil nitrates back into atmospheric nitrogen.

Chapter five dealt with the equally important symbiosis between plants and highly specialized underground fungi, vital in enabling plants to obtain water and nutrients from the soil (and occasionally other plants). More than 90% of the higher plants on the planet today benefit from their association with the delicate threadlike hyphae in their roots, a group known as mycorrhizal fungus. Wolfed discussed the two types, arbuscular mycorrhizae (so named because their unique branching, tree-shaped hyphal structures) and the ectomycorrhizae, both of which are the foundation of most terrestrial ecosystems.

Chapter six dealt with earthworms, much of it providing information and anecdotes about Charles Darwin's decades long study of them. Also vital to ecosystems, they act as biological blenders, fragmenting plant debris and mixing it with the soil and living and dead microbial biomass, creating more surface area for further production of humus.

The next chapter discussed some of the good and bad effects on human health of soil organisms. The passages on the soil-borne pathogen _Clostridium tetani_, the cause of tetanus, made for chilling reading. Wolfe also related information about the fungus-like _Phytopthora infestans_, which causes potato late blight, source of the 1840s potato famine in Ireland (and a disease that may be making a comeback). Soil organisms have also done a lot of good; the root fungus _Trichoderma harzianum_ targets a variety of disease-causing soil microbes, and working in the 1940s soil biologist Dr. Selman Waksman discovered a

number of potent antibiotics from soil bacteria.

Chapter eight was quite interesting, dealing with the interesting life history and often tragic human history of three animals, the prairie dog, black-footed ferret, and burrowing owl.

The final chapter dealt with the primary threats to soil ecology, notably soil erosion, toxic waste, and climatic change (both acid rain and global warming).

A great introduction to subterranean life, worthwhile reading.

Mark says

It's been too long for me to remember all the details, but I recall the sense of delight I had in learning that clay, rock and dirt could be so interesting and have so many fascinating aspects to them. And it's short, and it's educational.

Carol Surges says

This book is a revelation to all of us land dwellers; walking around and thinking we've got it all figured out while underneath our feet an entire other life system is churning away. The next time you stoop to dip a shovel or trowel into the soil take heed. Be aware of all those billions of microorganisms that are hard at work. It's more than worms carrying on down below - and take note: for them coitus lasts a good hour. There's so much to learn from our lowly neighbors! Who would have thought that clay may be the source of life? Who knew that homo has the same Latin root as humus? Or that Adam from the book of Genesis comes from a Greek word for soil? David Wolfe spins a sense of wonder as he takes us on this journey into the hidden world beneath our feet. You'll come away amazed.

Grady McCallie says

Fifteen years old, but still fascinating, the chapters of this book are a series of linked essays about microbes and larger organisms (plants, nematodes, prairie dogs) under the Earth's surface. Wolfe divides the chapters into three board categories: the evolutionary history of life underground; the role of underground life (bacteria, fungi, earthworms) in Earth's natural systems today; and the ways humans have modified these natural systems, for better sometimes, but mostly for worse. Every chapter drops interesting insights; one overarching point of the book is that the total life underground is vastly larger that humans have usually imagined - enough to cover the land surface of the planet some four feet deep, if it were all brought up to the surface at once. The author makes a strong case that, although the underground portion of the web of life is often overlooked, it's a thing of great beauty and vitality.

Lindsey says

I was a little skeptical about an entire book on soil microbiology, but WOW. I had some idea of the complex nature in which microbes, fungi, and plants interact, but this book is much more than that. I loved his chapter

on how archaea bacteria were first discovered, how long it took the scientific community to believe in their existence (until the '80s!), and how that discovery redefined the evolutionary tree of life. The chapters on microbes providing our most precious medicinal compounds were equally fascinating. There was also a chapter on extremophiles and though I was aware of them, I did not realize that they actually are oldest form of life- makes sense that as the earth cooled, life evolved to suit a more temperate environment and those extremophiles are actually us looking into the past.

Normally, I prefer to science writing when written by knowledgeable journalists as opposed to actual scientists. In general, most scientists are horrible at turning what they know into an engaging page turner and instead feels like I'm reading a really long journal article. But this author is an exception, he incorporates the most lovely Walt Whitman excerpts at the start of each chapter (sidenote: I love when authors do this!), and very seamlessly, moves from the abstract to the very detailed. If you have the time, it's not too long and might give you a better appreciation for the "world beneath your feet."

Kishnan says

this book is really good to read

P. says

There is more to life below the surface than was ever expected or considered. The various organisms and wholly unappreciated life forms are necessary to all human and most animal life in the world. If the Nitrogen fixing organisms do not exist, most life on earth will not exist. This book is an amusingly written discussion of these facts.

Lois Bujold says

"Step out into your backyard...and bring up a pinch of earth," Wolfe writes. "You will likely be holding close to one billion individual living organisms, perhaps ten thousand distinct species of microbes, most of them not yet named, cataloged, or understood."

Pretty good introduction to an area of the natural world few of us think about, and usually take for granted. The book is divided into three sections, of which the first, on ancient life, I found the most fascinating, although the later chapter on Darwin and earthworms was fun. And the one on soil pathogens the most creepy -- is your tetanus shot up-to-date? That's one disease (of many, actually) that, due to its natural reservoirs, isn't ever going to be eradicate-able the way smallpox was.

It was amusing to compare and contrast the author's enthusiasm for his subject with the bad rap things underground involved with rot and decay -- without which life cycles on the planet would come to a halt -- get from, say, Tolkien or the makers of the animated movie *Epic*. The subject apparently needs an artist to speak up for it.

Copyright date 2001, which from 2015 is many hundred generations of fruit flies and not a few generations of microbiologists, so this is doubtless not the latest word on its several subjects, but it gives some good

directions to go on with.

Contemplating the race of bioscience since the turn of the millennium always reminds me of this Updike poem --

http://hellopoetry.com/poem/10236/vb-...

I swear they must all be moving just like that.

Ta, L.

(Later note: the Updike poem in my copy has an explanatory header between title and text that the version to which I linked lacks, to wit: "*Science, Pure and Applied*, by V. B. Wiggleworth, F.R.S., Quick Professor of Biology in the University of Cambridge. -- *a talk listed in the B.B.C. Radio Times*)

Sara Van Dyck says

Written by professor plant ecology at Cornell. Each of the nine chapters focuses on one aspect of life underground – from soil creatures and habitable zone, Woese's work with archaea, to how humans interact with this life – germs, nitrogen problems, loss of soil, endangered black-footed ferrett. Excellent. This book its enjoyable for the non-scientist because it offers – as the title promises – "tales" from the earth, with frequent mention of activities of individual scientists and reference to current issues. The "Germ Warfare" chapter discusses the discovery and use of antibiotics from the soil, including Waksman's work at Rutgers. One thing I learned: better wash those veggies before you eat them, even the organic ones. There are some strange microorganisms hiding in the soil! This reads not like a comprehensive text but a series of fascinating views of specific ecological concerns.

My name is incorrect on most reviews so for the recorde it's Sara van Dyck -last name begins with van.

Jackson Matthews says

Well, I DO love worms, described as biological blenders -- and these water bears are something that I'd not heard of yet. I love that there is so much exploration to be found right in one's backyard. This is a great read for gardeners who love earthy things as much as the above-ground flora.
