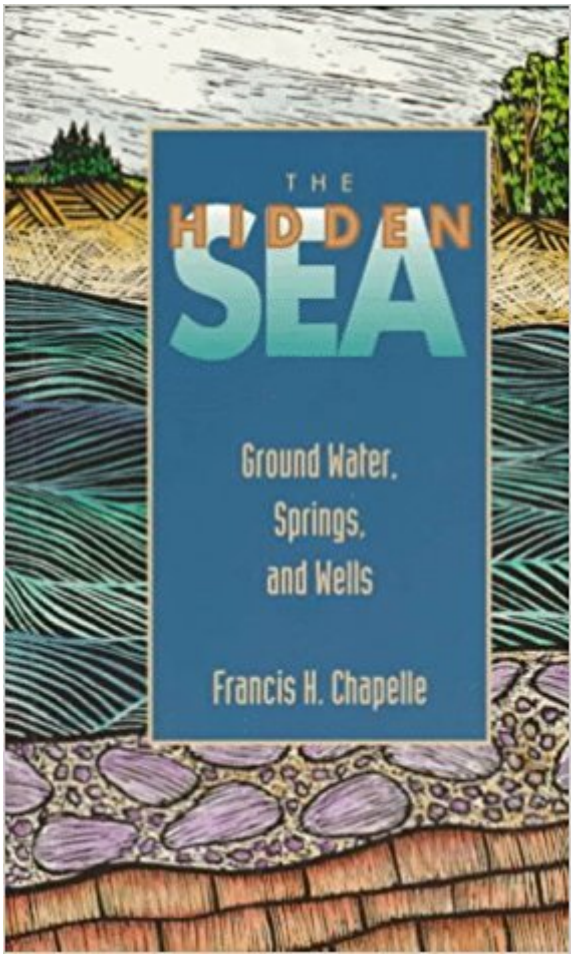
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The Hidden Sea: Ground Water, Springs, And Wells



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Customer Reviews

This book is an important contribution to earth science literature and should be read by everyone who ever drank a glass of water or took a shower. Chapelle is a well-known research hydrogeologist with the U.S. Geological Survey. He not only knows the subject very well, from his extensive research on ground water problems and solutions, but he describes and explains it in such an interesting and direct way that people can understand it and learn from it. A most fascinating aspect of the book is the author’s examples of ancient and modern ground water history. Earth’s extensive seas of ground water have been fought over and abused, have alternately been the subjects of history and mystery, of mythical and medical lore, of war and peace. Throughout this book Chapelle explores the custom of tossing coins into wells, the belief in healing spring waters, the relationship between peoples’ faiths and ground water, and he explains the art of water witching. Most importantly, Chapelle introduces us to scientists who have made major discoveries in how various types of aquifers work and which have been harmed or seriously threatened by carelessness, misunderstanding, and abuse due to ignorance....The book is well-illustrated with clever pictures and many charts and line drawings. Additional reading lists follow each chapter. Can we enjoy and protect our hidden seas? The author gives provocative questions, many examples, some solutions, and inevitably, leaves some questions unanswered. Who should read this book besides the general

public? Certainly captains of industry and those who work in any government agency that has any connection to ground water, and that means local, state and federal agencies. Unlike many nonfiction scientific books, this one is a real page-turner, especially for those of us who are interested in earth science. Personally, I'm waiting for a sequel. -- Lapidary Journal, March, 1998This is a delightful book that should be on the "must-read" list of every ground water scientist, engineer, and student, as well as those of environmentalists, public officials, and others with an interest in or concern about ground water resources. Astronomy and physics have long been noted for writers who were exceptionally skillful in explaining the discoveries and complex concepts of those sciences, both to other scientist and to laymen. Hydrogeology now has an equally skillful writer in Francis H. Chapelle. Chapelle's book is a masterful integration of the mystical, cultural, and technical aspects of ground water hydrology. The topics covered range from Moses" development of a limestone spring in the Sinai during the Exodus, to the mysticism of water watching, to the fundamental technical contributions of Darcy and Theis, to the modern-day plague of ground water contamination. Chapelle notes in the preface that "This is a book about how both mysticism and rationality have been used to understand the puzzling behavior of ground water (Part I). It is a book about the strikingly different characteristics of ground water systems found in different parts of the country, and how these differences affect the people who use them (Part 2). It is about the ground water systems can become contaminated by various waste disposal practices, and how perceptions of the contamination are so often different from reality (Part 3). But even more, this is a book about how human beings go about discovering the hidden secrets of the earth. It is about human imagination." Readers will find Chapelle's effective use of Bible stories, mythology, and case histories in his explanations of the basic principles and concepts of ground water hydrology a welcome relief from traditional ground water reports and textbooks. It is this feature that makes The Hidden Sea a unique contribution to popular scientific writing and which will enhance its interest to both professionals and to non-specialists. -- Ground Water, March/April, 1998

Francis H. Chapelle, Ph.D., is a research hydrogeologist with the U. S. Geological Survey in Columbian, SC. His work has focused on how microorganisms affect ground-water chemistry in pristine and contaminated aquifers. Hie is the author of the textbook, Ground-Water Microbiology and Geochemistry and in 1996 his research received a National Award for Environmental Sustainability given by Renew America, Washington, DC.

This is a very good introduction to ground water issue not only for laymen, but also for ground water

professionals. The author has an extensive experience in the field and oustanding writting skills.

Francis Chapelle’s book is accessible to the average reader and is recommended for anyone unfamiliar with the basic principles of groundwater. The historical sections and references throughout the book tend to give the reader more insight into the author’s personal interests and beliefs than one might care for, but the case studies, the simple explanations, and the refreshing brevity, make the book worth the effort. However, given the books limitations described below, I would urge caution in using it as a supplemental college text.Chapelle uses the theme of the hidden nature of groundwater systems to discuss groundwater mythology and history. The origins of wishing wells, healing waters, and old theories of groundwater flow are discussed with examples. The second chapter has an explanation of the biblical story of how water issued forth from a rock when Moses struck it that is relevant and elegant. By contrast, the story of Abraham’s wells, which occurs in a later chapter, could have been left out of the book entirely. The story was so full of superfluous biblical passages that I thought I was reading a religious text. Likewise a story about irrigation in the San Joaquin Valley makes unnecessary references to the biblical story of Job. If you are familiar with the Book of Job, the allegorical reference is tenuous; if you are not, it’s even more confusing.Unfortunately, throughout the course of reading the book, it becomes evident that the author is sticking to rather narrow cultural tracks. The historical stories appear to be primarily from the Bible, the British Isles, and the Southeastern US. Chapelle makes a few journeys into continental Europe and the rest of the United States, but there is very little mention of the ancient hydrological practices of Chinese, African, Indian, Native American, or Pacific Island cultures. Given this rather incomplete treatment of the world’s largest and oldest cultures, the "Myths and Models" section of the book feels haphazard. Chapelle should expand the historical hydrology section, cut it out altogether, or restrict the entire book to the US and acknowledged the limited scope.This book could use a better editor. Not only would the book flow more logically if some chapters were rearranged, but the author should have been warned against overreaching while attempting to segue between chapters or summarize chapter themes. For example, the last sentence of Chapter 8 is an interesting but unsupported statement. "In a very real sense, ground water models are the technological equivalent of myths." Hmm.Although it’s difficult to find fault with the technical details of such an accomplished hydrogeologist, Dr. Chapelle’s public policy pronouncements are not as unassailable. The chapter on the Ogallala aquifer would lead the reader to believe that a combination of USGS warnings, improved irrigation technology, and basic economic pricing will save the Ogallala aquifer. However, there are many who would disagree with this optimistic

assessment. A story produced by the BBC in 2000, the year of the book printing, used the Ogallala as the prime American example of a water source in crisis. If Chapelle was looking for a success story, he probably should have used a smaller aquifer system with fewer stakeholders where the line between success and failure was clearer.Criticism aside, the chapter discussing the technological development of wells and modern well technology has the elements lacking in some of the early chapters: multicultural references and a chronological flow of incremental technological development. It is interesting to note that the most technical chapters are the most clearly written and show off the author’s potential talent for writing textbooks.When Chapelle restricts his narrative to hydrogeological case studies, he appears to be on solid ground. A book of nothing but case studies would be a winning approach for Chapelle. The recounting of the groundwater dispute that arose between Hilton Head, NC and Savannah, GA is reason alone to read the book. The entire last third of the book contains various case studies of groundwater pollution and is clearly Chapelle’s best writing. In these case studies, it’s as if the author is recounting the details of old projects he has worked on and has gotten good at telling the story. Sadly, some of them could be horror stories that one could tell sitting around a campfire of environmentalists, but they are well told nonetheless.

U.S. Geological Survey researcher Francis Chapelle has written a citizen’s guide to the mysteries and science of groundwater that is probably more timely now than when it was published a decade ago.Although the reasons are widely misunderstood, water shortages really are going to be a more intense issue than even in the past, when they were intense enough. (It has nothing to do with climate change. Rich people want to use more water than poor people, and the world is getting richer, while the amount of fresh water is going to stay about the same.)Therefore, good citizens will want to have some background for assessing the coming proposals, and "The Hidden Sea" is a good place to get it.Francis Chapelle’s approach is idiosyncratic but accessible. He starts with the mystery. Since aquifers cannot be seen or felt directly, humans first imagined a history and process to explain springs and seeps.It was thousands of years later, in Europe, that measurements and theories displaced sacred springs, water witching and miracle cures as practical explanations. But just because they did not have a scientific method, that does not mean our ancestors were incapable of practical exploitation of hidden water.In Chapelle’s interpretation of the Old Testament, Abraham and his kin were able to penetrate hostile Canaan because they knew how to dig wells on the dry ridges that Canaanites treated as wasteland. Abraham’s flocks increased, then his family. Eventually, the Canaanites made terms.Few archaeologists or historians would buy this -- it no longer seems likely that the Hebrews were immigrants -- but it’s an interesting idea and worth

thinking about.Groundwater is important because 98 percent of all the fresh water in North America is below ground. Measurements, hypotheses and theory help to understand this water, but it still takes an act of imagination to follow its path through rocks and sands, up pumps or out to the ocean in unseen rivers.Chapelle says that short-term overpumping of groundwater "is no big deal."Continued endlessly, "the net result is precipitous groundwater level declines (as the aquifer is drained) and, inevitably, land subsidence." As an example, he gives Phoenix and Tucson, where overpumping has altered the land surface so much that buildings have cracked.Chapelle provides a number of instructive and, in one case, amusing case studies of how Mainland aquifers were damaged or imagined to be damaged.In the amusing one, a Maryland woman was certain her well had been poisoned by an industrial operation several hundred yards away. Though Chapelle says the woman never believed it, her problem was actually a decaying tree that had been buried eons ago. Her well happened to hit it.Of these aquifers at risk, some were successfully rehabilitated, others not. "Well-intentioned people sometimes make bad situations substantially worse," writes Chapelle.

This is perhaps the best book I have found to introduce undergraduate students to groundwater hydrology, let alone environmental scientists, lawyers and lay people. Written clearly and in a highly accessible fashion, the book covers the gamut of topics from contamination,to water supplies to mythology (water witches!) in an engaging and provocative manner. I suggest making this required reading for anyone taking a groundwater or environmental science course at certainly the undergraduate level--and I give free copies to all my graduate students besides! Bravo to Frank for putting out this excellent book for all of us.

I thoroughly enjoyed this book. It’s "bite-sized" chapters and smooth flow made it hard to put down. It’s narrative style made it easy reading, but it brought out some useful scientific concepts. It took a lot of ideas and looked at them from a new perspective. After thinking about it, I found myself thinking, "Hey, I knew that, but never thought about it from that angle." This would be a good supplementary text for any aquatic studies course. There are even some math problems you can develop if you like quantitative stuff.

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