Meteoritics & Planetary Science 36, 1411–1414 (2001)
Available online at http://www.uark.edu/meteor

Books and Multimedia Reviews

The Oxford Companion to the Earth edited by Paul L. Hancock, Brian J. Skinner and David L. Dineley. Oxford University Press, New York, New York, USA, 2000, 1176 pp., $75.00 cloth (ISBN 0-19-854039-6).

The book is a collection of geological definitions, terms and some short biographies. The individual entries (about 900) typically occupy about a page and so fall somewhere between the abbreviations of a dictionary and the authority of an encyclopedia such as the *Britannica*. How does one review such a collection, that is really an extended dictionary? One is reminded of the comment by Samuel Johnson (author of *A Dictionary of the English Language*, 1755) in his Preface that while "every other author may aspire to praise; the lexicographer can only hope to escape reproach" while defining a lexicographer as "a maker of dictionaries, a harmless drudge". So compiling such a work has its hazards, certain to displease the specialist who finds the labors of a lifetime reduced to half a page.

The wide variety of entries include "wine and geology" and "creationism" and range from "acid rain" to "zoogeomorphology". They are well written and would be understandable to any educated person. There are short readable biographies of various eminent geologists. Appendices include the Periodic Table, scientific units and a Phanerzoic timescale. There are usually a few suggestions for "Further reading", mostly to secondary sources, after each entry. The "Companion" is thus really a tertiary source, useful for the curious and uninformed to dip into, but not a truly serious work of scholarship. It is intended, I suspect, for public libraries, science journalists, undergraduate students in geology and others needing a quick readable account of geological phenomena.

It is a pity that the book is too heavy for bedside reading, as like encyclopedias, one can find something of interest on every page. So one may shine at dinner parties with a knowledge of such disparate topics as "Medieval mineralogy and figured stones", "landscape sensitivity", "medical geology", "rain splash" and "ecclesiastical geology" (that deals with church building stones).

Although the entries in the book are arranged alphabetically, "planets", for example, are to be found under "T" for "terrestrial planets and under "G" for "giant planets" while the solar system itself appears under "Age and early evolution of the Earth and solar system" and "Solar system abundances of the elements". So I found it more convenient to use the index to find subjects.

Given this book's emphasis on the Earth, readers of this journal will find a rather meagre diet here. Meteorites appear under "Asteroids and comets" and take up half a page. The Moon is described on page 490 as forming from "an ejected molten chunk of the planet" (Earth) while on page 702, the correct account of the Cameron model, that derives the Moon from the rocky mantle of the impacting body, is given. Pluto continues to be listed as a planet, although its true position is not as an eccentric dwarf among the planets, but as the king of the Edgeworth–Kuiper Belt.

I found very few typos. Asa Gray, the 19th century Harvard scientist appears as "Grey". He attempted to reconcile science and religion, a gray or grey area indeed. Two figures on pp. 538–539 are unlabelled.

Stuart Ross Taylor
Department of Geology
Australian National University
Canberra, Australia 0200

—♦♦♦—

Molecular Hydrogen in Space edited by F. Combes and G. Pineau des Forets. Cambridge University Press, New York, New York, USA, 2000, 326 pp., $69.95 cloth (ISBN 0-521-78224-4).

This book gathers all the contributions made to the International Conference on "Molecular Hydrogen in Space," which was held in Paris, France on September 28 to October 1, 1999. Superficially, it may seem that having an entire meeting, or book, devoted to the simplest molecule in the universe is excessive. However, the H_2 molecule is deceptively complex. Its electronic ground state is separated from its excited states by a very large energy gap and it is such a light molecule that its rotational lines are often so widely spaced that it is not obvious they form a progression; deviations from Born–Oppenheimer are prominent and non-adiabatic interactions shift the energy levels to the point that the molecule's ro-vibrational structure becomes confused. As a result, assignment of the observed spectral lines with specific transitions is not straightforward despite the simple appearance of the molecule. H_2 is also worthy of special consideration because it is an important molecule in astrophysics—it was the Universe's first molecule and remains its most abundant. It also mediates many of the chemical and physical processes that occur in the interstellar medium. Finally, this molecule serves as a very useful astronomical tool for probing a wide range of environmental conditions in space. For example, measurement of the ortho/para ratio of H_2 provides temperature information, with the value being set either by the gas temperature or the

molecule's temperature of formation, depending on the conditions.

The goal of the meeting from which this book arose was to gather representatives of three different communities: experts in the physics of the H_2 molecule, astronomers who study the interstellar medium, and theoreticians interested in the formation and cooling of H_2 in astrophysical environments. This is a laudable goal given that these different scientific communities apparently have much to tell each other, but do not mingle as much as they should. The book, to some extent, reflects this very point. It contains a number of very interesting chapters, but it is not always easy to see how they relate to each other and it quickly becomes apparent that the different groups approach this molecule in very different ways.

The book is divided into four main sections dealing with the physics of H_2 and HD, the formation and destruction of H_2, observations and models of H_2 in various interstellar environments, and extragalactic H_2 and cosmology. As is common for books of this type, the quality of the contents vary from chapter to chapter. Only a few of the chapters suffered from inexpert use of English. However, many of the authors appear to have made little or no attempt to make the language in their sections accessible to the more diverse audience the meeting was intended to attract. Thus, I think many readers will find that some of the chapters outside their area of expertise are difficult to understand.

The book abounds with new and exciting results from various space observatories, particularly the ESA's Infrared Space Observatory (ISO). Workers interested in interstellar shocks and photodissociation regions will find a great deal of interesting material in this book.

As I read the book, I was occasionally struck by a feeling of general dissatisfaction with the lack of a comprehensive outlook on the field. For example, while there are multiple chapters that deal with one or more specific transition bands of the molecule, nowhere can one find anything like a comprehensive listing of the spectral, chemical, or physical properties of this molecule. I hesitate to make too much of this, however; this lack of continuity and comprehensive approach is a fairly normal occurrence for conference-based books. However, I think this could have been partially solved with a few appendices summarizing some of the more relevant properties of the H_2 molecule.

My biggest complaint with the book is that it completely lacks any kind of subject index. Given that the book attempts to cover laboratory, theoretical, and observational aspects of the subject, this is a serious inconvenience. I first noted the lack of an index when, shortly after starting to read the book, someone asked me if it contained anything about H_2 in the outer planets. I discovered that it was not possible to answer the question without first reading the *entire* book. In the end I did, in fact, discover that several of the chapters referred to H_2 on the outer planets, but none of these were obvious from the Table of Contents. Ultimately, I found the book to be full of interesting facts and discussions, but the lack of an index makes them extremely hard to find initially, and almost as hard to find again when you want to return to them. I predict that owners of this book will find that they will have to stick a lot of bookmarks in it if they wish to use it routinely.

In summary, this is not a book I would recommend for someone who is interested in getting a first look into the basics of molecular hydrogen and its uses in astronomy. However, workers in the field, or savvy outsiders desiring to enter deeper into it mysteries, should find that this book serves as a useful reference.

Scott Sandford
Astrophysics Branch
NASA - Ames Research Center
Moffett Field, California, 94035, USA

—♦♦♦—

The Cambridge Handbook of Physics Formulas by G. Woan. Cambridge University Press, New York, New York, USA, 2000, 219 pp., $19.95 paper (ISBN 0-521-57507-9).

When you first pick up this book you may wonder, as I did, "What use is a book full of formulas and little else?" However, after becoming familiar with the contents of this little book, I have found myself returning to it again and again. It is not, as the author explicitly states, a book from which to learn the meaning of equations. For that, there are numerous textbooks that the reader is presumed to have studied previously, but if you need a quick way to find a vaguely-remembered formula or a confirmation of a trigonometric half-angle formula, this is the place to go. For years, I have kept a bulky copy of the CRC math tables on my shelf primarily for the trigonometric identities (I have used them so much that the book naturally falls open at this section). Most of the content of the CRC tables is now obsolete—who now looks up tables of logarithms, interest tables or tabulated values of special functions? Most scientific calculators can reproduce such numerical data in less time than it takes to find in the book. *The Cambridge Handbook of Physics Formulas* is a modern recreation of the classic mathematical handbook that contains just the kind of data that you cannot find on a calculator or even on most computers.

In addition to the useful formulas, one can spend pleasurable hours browsing. For example, you can scan the unusually complete tabulation of arcane as well as common measures. Here we find the distinction between the US and UK Firkin, the true difference between hartrees and kaysers, and enumerate the four varieties of horsepower. I am sure each reader will find new and unfamiliar units to marvel at. On the more serious side, I have used the book as a desktop reference for six months and it has not yet failed to yield a useful formula. A colleague specializing in plasma physics also touts this book as invaluable in his own area of expertise.

Which book review and book rating sites are worth considering? Here are the best ones. 1. Goodreads.Ä The site publishes reviews for both children's books and adults' books. It has a book of the month section, a rating system of 0 to 10 for books it's reviewed, and a continually updated list of must-read books for each year. You can search through the old must-read archives, going right back to 1980. 7. LoveReading. - Mass media - Transmission media - Storage media - Interaction media. What are four fundamental multimedia attributes for multimedia computing? Digitized - All media including audio/video are represented in digital format. Distributed - The information conveyed is remote, either pre-produced and stored or produced in real-time, distributed over networks. Interactive - It is possible to affect the information received, and send own information, in a non-trivial way beyond start, stop, fast forward. Integrated - The media are treated in a uniform way, presented in an orchestrated way, but are possible to manipulate independently. Describe a typical wireless multimedia system architecture. https://ibb.co/gi5E2U. What is bandwidth to deliver multimedia? These reviews from the July issue feature audio performances of books by Nic Stone, Melissa Albert, Nikki Grimes, and Walter Dean Myers, among others.Â News, opinion, features, and breaking stories. Exclusive video library and multimedia content. Full, searchable archives of more than 300,000 reviews and thousands of articles. Research reports, data analysis, white papers, and expert opinion. New Password Show.