Books and Multimedia Reviews


The recent discoveries of Jovian-mass planets around other nearby solar type stars has completely revolutionized our understanding of the origin and evolution of planetary systems. We had previously thought that other solar systems would look like ours, with giant planets like Jupiter and Saturn found in nearly circular orbits at large distances from the star, and the inner regions filled with Earth-like rocky planets. Our experience has now shown that once again nature is more clever than scientists, and that the actual diversity of planetary systems is far wider than anybody had dared imagine. Bruce Dorminey has very nicely chronicled this sudden and dramatic change in our thinking with his book Distant Wanderers. This book, the most recent of a string of similar books over the past few years, is aimed at a wide and general audience. The technical details are set off in the text, and can easily be skipped by those who prefer. The narrative style is light and easy to read. The book was obviously put together from a long series of interviews with many of the leaders of the field, and Dorminey attempts to convey the personal reactions of the scientists involved.

The book begins with a quick overview of the niche of planets within our galaxy, and our understanding of the planet formation process. Even in this introductory section, Dorminey very adroitly works in the astonishing story of the discovery of Earth-mass planets around the millisecond pulsar PSR 1257+12. The following discussion of spectroscopy and the Doppler effect, which has been responsible for all of the subsequent detections of Jovian planets around solar-type stars, includes insightful interviews with Michel Mayor and Gordon Walker. The heart of the book, of course, details the spectacular success of Doppler spectroscopy in detecting extrasolar planets and the very lively competition among the various teams involved. The book then goes on to discuss other means of planet detection, including gravitational microlensing, transits of the planet across the disk of the star, direct imaging, astrometry, and interferometry. The last portions of the book emphasize the future where these other techniques, particularly interferometry, will undoubtedly take over the limelight from Doppler spectroscopy.

The narrative style of the book helps the reader avoid getting lost in many of the potentially messy details. Dorminey did a nice job of portraying the personalities of principals of the field without getting mired too deeply in some of the unfortunate controversies of the past several years. The book exhibited very few technical errors, and they were mostly minor (a mention of "creating" angular momentum, and confusing iron lines for hydrogen lines in stellar spectra). While the book was quite complete, there were some puzzling omissions. I would have preferred to see the detection of transits of the planet around HD209458 receive much more attention than the brief page or two in the text. In particular, the stunning Hubble Space Telescope data on the HD209458 transits offer dramatic and irrefutable proof that the objects detected by the Doppler surveys are indeed planets similar to Jupiter and Saturn, in spite of what some of the most vocal critics may claim. In the later parts of the book, Dorminey discusses several of the planned future space missions by both NASA and ESA to study extrasolar planets. Missing from this section was any mention at all of the Kepler mission (http://www.kepler.arc.nasa.gov/) which was recently selected as part of the NASA Discovery program. Kepler will use the technique of photometric transits to search 100,000 relatively nearby stars for Earth-sized planets in the habitable zones of those stars. This is truly the "Holy Grail" of planet detection. In spite of these minor drawbacks, I found Distant Wanderers to be well researched and to be quite well written and entertaining. I would recommend it for people who are not experts in this field, who want some insights into how a major change our understanding of the origin of planetary systems came about.

William Cochran
McDonald Observatory
The University of Texas at Austin
Austin, Texas 78712, USA


This 600-page graduate-level textbook (the first in a three-volume set covering, respectively, astrophysical processes, stars and stellar systems, and galaxies and cosmology) covers the subject from the viewpoint of an expert theoretician. Although it is advertised as requiring only an undergraduate background in physics to comprehend, my own opinion is that the U.S. undergraduates I know would have a very hard time with this textbook—third year graduate students might be more
comfortable with it. I myself (an observational astronomer) found it rather opaque.

The subject coverage is encyclopedic, going from dynamics to general relativity, with many exercises for the reader, some of them worked out. This coverage is designed to develop a theoretical toolkit for astrophysics in a self-contained manner. As the author says, any one of the major topics is fairly vast and often requires a full textbook to do them justice, whereas he devotes only ~60 pages to each. The author's treatment of polytrope theory, for example, takes three pages. This leads to a very steep learning curve! Perhaps an excellent instructor could ease the process?

Claud H. Sandberg Lacy
Arkansas–Oklahoma Center for
Space and Planetary Science
Department of Physics
University of Arkansas
Fayetteville, Arkansas 72701, USA


Tektites have been a geological puzzle that resisted clear, straightforward explanations for generations of geologists. Tektites are small, shiny and smooth glass objects of greenish, brownish, or grayish-black color, which have fascinated humans from early in our history. They seem to have been of great interest even to our early predecessors, as tektite fragments were found with fossils of primitive humans in Indochina. More recently, many mineral collectors proudly display their tektites, lured in part by the long-lasting debate about their origin. Tektites received their name from E. Suess in 1900 (in Vienna); the word is derived from the Greek term for "molten", indicating their glassy nature. At that time, their origin was not well understood. During most of the twentieth century, a widely held hypothesis postulated that tektites are glass that was ejected at high velocities from giant volcanoes on the Moon and thrown all the way to the Earth. For many years, this was a valid hypothesis, because not much was known about lunar rocks and craters on the Moon, and mineral collectors liked the idea that they owned an inexpensive piece of the Moon.

The recovery locations for tektites on Earth are not much help in figuring out their source because, unlike volcanic glasses that are tied to specific source volcanoes, tektites are found in geographically large areas around the world. Today, four such tektite strewn fields are known: the 35 Ma North American, the 15 Ma Central European, the 1.07 Ma Ivory Coast, and the 0.8 Ma Australasian strewn field. The last one covers about one-tenth of the surface of the Earth. Around the time of the first landing on the Moon, by Apollo 11 in 1969, the interpretation of the origin of tektites changed, as most researchers had come to the conclusion that most, if not all, craters visible on the surface of the Moon were formed by meteorite impact, and there was no credible evidence of recent violent and large-scale volcanic activity. In addition, studies of lunar rocks quickly showed that their chemical composition is completely unlike that of tektites. At that time, an alternative hypothesis gained ground, namely that tektites are, in fact, quenched fragments of melted rock that were ejected during the catastrophic impact of an asteroid or comet on the Earth. During the last 30 years, chemical and isotopic studies have left hardly any doubt that tektites have formed during catastrophic hypervelocity impact events, when many cubic kilometers of terrestrial rocks were vaporized and melted, and small glassy fragments were ejected halfway across the globe.

Joe McCall has written a book that summarizes the history of tektite research and lays out our current knowledge on the subject. He mostly succeeds in his task, which he defined for himself in the preface: "This volume does, I believe, present an up-to-date picture of what is known, what is likely, what is guessed at globally, and above what is still not known concerning these enigmatic glass bodies. My aim is to present an all encompassing view of tektites at a level that will attract as readers, geologists, geochemists, geophysicists, astronomers, planetologists and also the general reader with an interest in science." Thus, the present volume should not be mistaken as a highly technical treatise and comprehensive data repository on tektites. Rather, it provides an overview of the subject with a very detailed and comprehensive reference list, which should enable the interested reader to find whatever technical aspect they are looking for. There are nine chapters. The book begins with an "Historical perspective", which is followed by descriptive chapters on "The strewn fields", "Microtektites", and "Muong Nong-type tektites". An important chapter discusses the so-called "Age paradox". Next is a discussion that brings our current knowledge on "The source of tektites". Then McCall switches to a description of tektite-like glasses in "Glasses related to tektites: Darwin Glass and Libyan Desert Glass" and in "Other related occurrences of natural glass". The latter chapter only deals with impact-related glasses (not all sorts of natural glasses) and even includes a description of crystalline impact-related deposits, such as the Late Eocene clinopyroxene-bearing spherules and the Cretaceous–Tertiary boundary. A "Discussion" is the last chapter, which is followed by an appendix on "Applications of isotope geochemistry", a glossary, the excellent reference list, and a comprehensive and useful index.

It is always possible to quibble with an author's choice of the order in which he presents his subject, and I probably would have chosen a different way to present the material, but this is not really the point. In the end, McCall presents most of what is important on tektites. His approach is a more historic one, in