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Buchbesprechungen • Bibliographies

Mitteilung der Redaktion:
Die in dieser Rubrik besprochenen Bücher erscheinen in verschiedenen Sprachen, namentlich in Englisch. Die Besprechungen wurden bis jetzt in einer unserer beiden wichtigsten Landessprachen abgefasst. Da sich die Rezensionen insbesondere an Personen wenden, die das betreffende Werk lesen können, hat die Redaktion sich entschlossen, auch Besprechungen in der Sprache des Buches zu veröffentlichen. Im Falle des Englischen dürfte dies sogar den Zugang zu jenen erleichtern, welche in einer unserer Landessprachen wenig zuhause sind. (Red.)

Communiqué de la rédaction:
Les livres reçus des éditeurs pour être évalués et critiqués dans cette rubrique de notre revue paraissent en diverses langues, notamment en anglais. Les critiques ont jusque ici été faites en nos deux principales langues nationales. Comme un compte-rendu de livre concerne en premier lieu les personnes susceptibles de lire l'ouvrage en question, la rédaction a décidé d'admettre également des critiques rédigées dans la langue du livre. Dans le cas particulier de l'anglais, ceci pourrait même faciliter l'accès aux lecteurs intéressés mais peu à l'aise dans une de nos langues nationales. (réd.)

ESPENAK, FRED, AND ANDERSON, JAY: *NASA Reference Publication 1369: Total Solar Eclipse of 1997 March 9.*

For over 40 years, the U.S. Naval Observatory in Washington published its Eclipse Circulars, but stopped these publications in 1992. Beginning with the Annular Solar Eclipse of 1994 May 10, Fred Espenak of Goddard Space Flight Center at Greenbelt, USA, and Jay Anderson of Environment Canada at Winnipeg, Canada, took over this task in co-operation with the Working Group on Eclipses of the International Astronomical Union. These Bulletins are provided as a public service to both the professional and lay communities and contain a multitude of helpful information for planning an eclipse expedition.

Included in the present 66 page Bulletin are information about Eclipse Predictions as umbral path and visibility, general and detailed maps of the eclipse path, local circumstances, mean lunar radius, lunar limb profile and limb corrections to the path limits. The chapter on Weather Prospects for the Eclipse discusses the climatic conditions of this winter eclipse in Mongolia, at the Lake Baikal Area and northeastern Siberia. Hints for visual and photographic observation are given in a third chapter. Detailed maps (scale 1:5,000,000) of the umbral path are included in a final chapter.

NASA Eclipse Bulletins are now available also via Internet. The bulletin gives the needed information. Single copies of the bulletin are available at no cost, the Request Form giving all the necessary details on how to proceed.

A. TARNUTZER

JEAN KOVALEVSKY: *Modern Astrometry.* «Astronomy & Astrophysics Library», Springer-Verlag, Berlin / Heidelberg 1995. XIV, 352 p. 137 Fig., ISBN 3-540-57023-3, Hardcover DM 98.– / Sfr 94.50.

Professor Jean Kovalevsky is one of the leading scientists in the field of positional astronomy. His activities on celestial mechanics and astrometry are well known.

The goal of the present book is to provide an up-to-date description of astrometric techniques, particularly the most recent and powerful ones, whether the instruments are on the ground or in space. A first draft - in French - of the material presented here was published by Springer in its Lecture Notes series in 1990. However, the present book is more than an updated and enlarged version of the latter. Several chapters are almost completely rewritten. New material is introduced in most sections and a chapter on future projects is added. Results from the Hubble Space Telescope and Hipparcos, now available, are presented as well as new developments in other techniques.

The book is devided in 12 chapters. The first four provide the basis (image formation, atmospheric effects, reduction of observations) necessary to understand the general properties of astrometric instruments and techniques. Chapters 5 and 9 are devoted to the techniques used in small-field and very small-field astrometry. In particular photographic and photoelectric (CCD) methods, astrometry with the HST as well as stellar amplitude and speckle interferometry are described. Classical methods using meridian circles and equal altitude instruments, especially the different astrolabes, are

presented in chapters 6 and 7. Chapter 8 is focused on the Hipparcos mission, its observation and reduction techniques including the astrometric parameter determination. Phase interferometry and different timing techniques as Laser Ranging and Global Positioning System are presented in chapters 10 and 11. In the last chapter the future achievements and prospects of ground-based and space astrometry are given. A nine-page reference list and an index finish the valuable book.

Solidly researched, balanced, well written, and supplied with numerous explanatory figures, Kovalevsky's book is a pleasure to read and recommended for all interested in modern astrometry.

ANDREAS VERDUN

TOM GEHRELS (ED.): *Hazards due to Comets and Asteroids,* The University of Arizona Press, (1290 N. Park Avenue, Suite 102, Tucson, Arizona 95719-4140), 1995, 1300 pp., Hardbound, ISBN 0-8165-1505-0, $75.00.

PAUL HODGE: *Meteorite Craters and Impact Structures of the Earth,* Cambridge University Press, 1994, 124 pp., Hardbound, ISBN 0-521-36092-7, £25.00, $49.95.

TJEERD H. VAN ANDEL: *New Views on an Old Planet (2nd Edition) - A History of Global Change,* Cambridge University Press, 1994, 440 pp., P/b: ISBN 0-521-44755-0, £16.95, $24.95, H/b: ISBN 0-521-44243-5, £40.00, $59.95.

F. HEIDE, F. WLOTZKA: *Meteorites - Messengers from Space,* 1995, 111 illustr., 22 tables, 231 pp, Springer-Verlag, Softbound, ISBN 3-540-58105-7, DM 38.00, öS 296.40, sFr 38.-

Here, we present four new books which, taken together, provide the reader with a good background for evaluating the importance of collisions between the Earth and objects orbiting in our interplanetary neighbourhood.

In the first book, the editor Tom Gehrels adds a new topic to his remarkable « Space Science Series ». The former book in the series covered the problem of the exploitation of resources in Near-Earth space (see review in ORION 261), and was not entirely unrelated to the present volume that examines the potential hazards of such « exploitable » objects as comets and Earth-Crossing asteroids. This rightly fashionable subject is now gaining in importance as several new potentially dangerous asteroids are discovered each year, leading to a better evaluation of the true probability of a « bad » encounter, and as evidence for catastrophic events due to impacts of such objects in the past is increasingly revealed by geological and palaeontological investigation. The book is a collective work that benefits from the collaboration of an impressive number of 120 authors. The coverage of the subject is thorough and subdivided into 8 parts: Small Bodies - Searches, Orbit Determination, and Prediction - NEO (Near-Earth Objects) Populations and Impact Flux - Physical Properties - Space Exploration - Effects of NEO Impact - Hazard Mitigation - Considerations for Future Work. An appendix lists the currently known Earth-Crossing asteroids, and an extensive glossary and index conclude this work. The essential merit of this book is the fact that it collects in a single volume recent specialised articles which would have otherwise been dispersed in the general literature. The fifteen articles of the last two parts discuss the various defence strategies and problems inherent to the types of action that could be taken regarding a potential threat, and thus open up an unsuspected aspect of astronomical literature.

The book by Paul Hodge concentrates on the impacts that have occurred throughout our Earth's history, and describes the more than 150 impact craters and crater -producing events presently known and properly identified as such, world-wide. The presentation is systematic and thorough, organised by continent, and for each crater the geographical co-ordinates, diameter, estimate of age and condition of conservation are given. A great number of illustrations and drawings accompany the text. This is an excellent first initiation to the study of impact craters on Earth, and should supplement the travel guides of any astronomer, amateur or professional, who intends to undertake a journey far abroad.

The book by T.H. van Andel looks at the evolution of the Earth and of the Biosphere from the geologist's and biologist's points of view. This is necessary in view of putting the « catastrophic » implications of asteroid and comet impacts on Earth into their proper perspective. This book stands among the best introductions to the mechanisms of « global change » currently available. The text is thought-provoking and provides much insight into the way life has contributed to fashion the atmosphere and the first few kilometres of the Earth's crust. The main points of interest for the astronomically-oriented reader lie in the 19th section entitled « Crises and Catastrophes » and in the Epilogue. The author discusses the long standing quarrel between « gradualism » and « catastrophism » in the natural sciences, and points out their respective virtues and shortcomings. The recent infatuation regarding the catastrophic meteoritic event that has most probably caused the Cretaceous-Tertiary extinction is dealt with in a somewhat ironical manner, but the discussion is nevertheless fair and well balanced. In the Epilogue, the author delves into some metaphysical considerations concerning the uniqueness of our universe and our significance within it, and briefly alludes to the philosophical approach which is sometimes named as the Anthropic Principle. The amateur- or professional astronomer will greatly benefit by reading this book which will help him to avoid acquiring too simple an outlook regarding the history of life on our planet.

The small book by F. Heide and F. Wlotzka is the translation from German of a work that has already met with considerable success in its original language. The subject is not, in this case, the cataclysmic effects of major impacts, but an introduction to the study of moderate-sized meteorites that survive the penetration into the Earth's atmosphere. It is essentially descriptive by its treatment of fall phenomena, chemical and mineralogical composition and classification of meteorites. The authors present a good discussion of the formation and origin of these objects in relation to the initial formation of our solar system. The appendix informs the reader about, among other subjects, the commercial exchange value of meteorites among the community of collectors, the major falls that have occurred between 1985 and 1993, the relation between the composition of meteorites and that of the Earth's crust, and refers the reader to the specialised literature.

NOËL CRAMER

MICHAEL E. BAKICH: *The Cambridge Guide to the Constellations,* Cambridge University Press, 1995, 320 pp.,P/b: ISBN 0-521-44921-9, £14.95 ($19.95), H/b: ISBN 0-521-46520-6, £35.00 ($49.95)

DAVID K. LYNCH, WILLIAM LIVINGSTON: *Color and Light in Nature,* Cambridge University Press, 1995, 254 pp.,P/b: ISBN 0-521-46836-1, £17.95 ($29.95), H/b: ISBN 0-521-43431-9, £40.00 ($69.95)

STEPHEN J. EDBERG, DAVID H. LEVY: *Observing Comets, Asteroids, Meteors, and the Zodiacal Light (Practical Astronomy Handbooks 5),* Cambridge University Press, 1994, 243 pp., H/b ISBN 0-521-42003-2, £19.95 ($29.95)

JOHN H. ROGERS: *The Giant Planet Jupiter (Practical Astronomy Handbooks 6),* Cambridge University Press, 1995, 418 pp, H/b ISBN 0-521-41008-8, £50.00 ($89.95)

JEAN DRAGESCO: *High Resolution Astrophotography (Practical Astronomy Handbooks 7),* Cambridge University Press, 1995, 158 pp, H/b ISBN 0-521-41588-8, £24.95 ($39.95)

We present here five new books published by Cambridge University Press which directly concern the amateur astronomer as well as many professionals.

The presentation text of the book by M.E. Bakich designates that work as the « ...most complete reference to date covering all factual aspects of the constellations... ». This statement is on the whole true if one considers the very few books of it's kind that go beyond a superficial description of the constellations, and that are available on the market today. The book is essentially divided into two parts. The first provides the reader with a rich collection of data in the form of lists. Some of these are for example: *Alphabetical list of constellations, Asterisms within the constellations, Biblical references to constellations and stars, The 200 brightest stars, Extinct constellations, The Magnitude system, Messier objects, Meteor showers, Names of constellations around the world, The navigational stars, The 200 nearest stars, The « new » constellations, The « original » 48 constellations, The 200 stars with largest proper motion, Solar conjunction dates for the constellations, Star designations, Star names, The visibility of constellations*, and several other lists. Many of the lists are repeated and ordered by different criteria, e.g. the Messier objects that are first presented in numerical order, then by constellation and finally ranked by right ascension. The only case where this is lacking is in the list of Star names. The star αCMa, for instance, appears in the list at five different locations (*Aschere, Canicula, Isis, Osiris, Sirius*) under its various historical designations. Some form of a cross-referencing scheme would have been useful in similar cases of multiple nomenclature in that table. The second part systematically examines the constellations one-by-one. A star chart is accompanied in each case by the reproduction of the oldest surviving illustration of each constellation. The text gathers all the relevant data contained in the lists of Part 1, and adds comments regarding non-traditional « mythology » and interesting facts concerning the constellation. An instructive glossary and some references end the book. This book is a valuable reference source, and well deserves its place on the bookshelf of any person who is interested in the appearance of the night sky and by the origins of the names used to describe it. It is ideally complementary to *Star Names and their Meanings* by R.H. Allen, a book on their lore and meaning written in 1899, reprinted in 1962 by Dover Publications, but now unfortunately out of print and very difficult to come across.

Color and Light in Nature broaches a very different subject that carries, however, much weight in the eyes of natural scientists, be they amateur or professional. The book is written by two professional astronomers who were inspired by Marcel Minnaert's classical work *The Nature of Light and Colour in the Open Air* first published in 1937 in Holland. The present work essentially covers the same field, though in a more concise and altogether accessible manner. The physical basis of each optical phenomenon is qualitatively explained with great clarity, often by means of well-conceived drawings that effectively replace a mathematical treatment. A large number of illustrations, most of them recent and presented here for the first time, provide the reader with the best possible description of each phenomenon. The great number of phenomena are discussed in chapters concerning shadows, clear air, water and light, water drops, ice and halos, naked eye astronomy and observing. The latter section treats the subjects of human vision, subtleties of vision, and gives advice regarding observing tools and observing techniques. Readers of our journal (see ORION 265) will appreciate the reference to the subject of naked-eye observation of sunspots studied by H.U. Keller and T.K. Friedli (the latter author is unfortunately misquoted as 'J.' Friedli). An extensive glossary and index conclude this interesting work.

The three following books belong to the « Practical Astronomy Handbooks » series published by Cambridge University Press (The former titles in the series were: *A Portfolio of Lunar Drawings, Messier's Nebulae and Star Clusters, Observing the Sun, The Observers Guide to Astronomy - Vols 1 & 2*). The series is intended for the active amateur who wants to make the most of his opportunities to observe. The first of these books is written by two acknowledged experts of the observation of comets, asteroids and meteors. The text gives a concise though informative description of each type of object, but is essentially practically oriented, giving advice for preparing observations and describing techniques and strategies of observing. The largest section is devoted to comets, hunting strategies, visual studies, photographic observations and electronic imaging. Asteroids are treated in a similar manner, with descriptions of modern search techniques and of the observation of occultations. The special techniques and methods for documenting the observation of meteors are developed in another chapter, and a short but informative section is devoted to the difficult observation of the zodiacal light. The book concludes with a discussion of advanced observing techniques (astrometry, spectroscopy, photoelectric photometry) and six appendixes and an index. We note in the latter sections a good glossary, examples of report forms, a reduction program for astrometry written in Basic, and two useful lists giving addresses of organisations and publications and a very complete compilation of bibliographical references.

The Giant Planet Jupiter is an impressively documented work that summarises all that is presently known about Jupiter and its moons. The bulk of its presentation lies in the exhaustive treatment of the visible structure of Jupiter's atmosphere and of its observational record built up over more than a century by means of Earth-based telescopic work. A large number of illustrations help the reader to understand the analysis of motions in the planet's upper atmosphere. The last chapters discuss the physics and chemistry of the atmosphere, Jupiter's electromagnetic environment, and give the reader a detailed and interesting description of the satellites as revealed by their exploration by spacecraft. In the appendices, we note a very complete bibliography followed by a rather concise index. The only

critical remark that comes to mind concerning this work (published in 1995) is that the final draft of the text seems to date back to late 1993: the Shoemaker-Levy impact event and the encounter of the Galileo probe with Ida are mentioned in the future tense throughout the book. This is, nevertheless, the first full account of Jupiter to appear since more than 35 years, and addresses advanced amateurs as well as professional planetary scientists.

In the last book (which is also the latest addition to the *Practical Astronomy Handbooks series*), Jean Dragesco presents us with a summary of his considerable experience in the field of astrophotography. Readers of ORION will remember many of his fine high resolution photographs of the Moon and Sun, as well as his impressive photography of star fields done under adverse observing conditions (city-light pollution, etc.). This book concentrates on classical high resolution photography of the Sun, Moon and Planets. It is important in the sense that it is very much practically oriented, covering: atmospheric turbulence and the choice of the observing site - properties of the telescope, and proper choice of the equipment - techniques of photography, equipment, emulsions, filters, processing, special techniques for enlarging - instrumental, atmospheric, optical and photographic considerations for high resolution photography of solar system objects. The last pages of the text present some short biographies of specialists in the field. The presentation is supported by an unusually large number of (often comparative) photographs illustrating points made by the author. This much awaited work discusses all the basic techniques, and effectively sums up what an amateur can achieve in the field of classical solar system photography. It cannot be ignored by any serious astrophotographer, whether a CCD adept or not.

NOËL CRAMER

DANIEL FISCHER / HOLGER HEUSELER: *Der Jupiter-Crash,* Originalausgabe, Birkhäuser Verlag Basel – Berlin – Boston 1994. 240 Seiten mit 45 Farb- und 59 sw-Abbildungen, gebunden, sFr. 42.– / DM 49.80 / ÖS 388.40. ISBN 3-7643-5116-0

Die aufregensten und denkwürdigsten Tage in der Geschichte der beobachtenden Astronomie waren der Sturz des Kometen Shoemaker-Levy auf den Jupiter. Als erster und einziger umfassender Bericht, der in Buchform vorliegt, verfolgen die beiden Autoren die Entdeckung des Kometen, seine Unterscheidung von bislang bekannten Kometen und die überraschende Feststellung, dass sich Shoemaker-Levy auf Kollisionskurs mit dem Jupiter befindet. Es werden die weltweiten Vorbereitungen für die Beobachtung der spektakulären Einschläge der über 20 Fragmente in den Gasriesen beschrieben und diskutiert. Geschildert werden auch die verschiedenen Versuche, die möglichen Auswirkungen auf den Jupiter vorauszusagen.

Grosse Aufregungen und freudige Überraschungen gab es dann bei den Astronomen, als die ersten Fragmente mit ungeheurer Wucht in die Jupiteratmosphäre eingeschlagen waren und entsprechende Spuren hinterlassen hatten. Der Leser wird über die ausserordentlich erfolgreiche internationale Zusammenarbeit bei der Beobachtung dieser spektakulären Ereignisse und die ersten Erklärungsversuche über den Ablauf dieser komplexen Phänomene informiert.

Die wissenschaftliche Bearbeitung des riesigen Datenberges wird noch Jahre in Anspruch nehmen. Den Autoren ist es aber trotzdem gelungen, bereits kurz nach dem letzten Einschlag einen ersten Überblick über das Geschehene zu beschaffen und spektakuläres Bildmaterial, unter anderem vom Hubble Space Teleskop und von der Raumsonde Galileo erstmals zu veröffentlichen.

Trotz der hektischen Aktivitäten in den Medien während dieses Jahrhundertereignisses war der interessierte Laie kaum in der Lage, sich einen klaren Überblick über das ganze Geschehen zu verschaffen. Hier wird ihm nicht nur ein umfassender Bericht über die Entdeckungsgeschichte, das Bombardement auf den Jupiter und die zu ziehenden Schlüsse angeboten. Es werden zu den aktuellen Informationen auch kosmische Bombardements der Vergangenheit auf die Erde und deren Auswirkungen analysiert und die Zukunft der Kometenforschung aufgezeigt.

ARNOLD VON ROTZ

GÜNTER D. ROTH (ED.): *Compendium of Practical Astronomy:*

Vol 1: Instrumentation and reduction techniques, 1994, 153 illustr., 51 tables, 540 pp, Springer-Verlag, Softbound, ISBN 3-540-53596-9, DM 98.00, öS 764.40, sFr 98.-

Vol 2: Stars and Stellar Systems, 1994, 128 illustr., 54 tables, 321 pp, Springer-Verlag, Softbound, ISBN 3-540-54886-6, DM 68.00, öS 530.40, sFr 68.-

Vol 3: Earth and Solar System, 1994, 181 illustr., 25 tables, 362 pp, Springer-Verlag, Softbound, ISBN 3-540-54885-8, DM 68.00, öS 530.40, sFr 68.-

Springer-Verlag provides here an English translation of the well-known « Handbuch für Sternfreunde » edited by Günter Roth, of which the first edition appeared more than 30 years ago. Needless to say, the present translation (based on, and expanded from the fourth German edition) is very different in its contents. This is a collective work gathering related articles written by 21 authors, each one a specialist in his subject though not necessarily a professional astronomer. This work is essentially the product of serious amateur- and professional astronomers addressing themselves to practically oriented serious amateur astronomers. This is well illustrated by the titles of the chapters of Volume 1: Introduction to Astronomical Literature and Nomenclature - Fundamentals of Spherical Astronomy - Applied Mathematics and Error Theory - Optical Telescopes and Instrumentation - Telescope Mountings, Drives, and Electrical Equipment - Astrophotography - Fundamentals of Spectral Analysis - Principles of Photometry - Fundamentals of Radio Astronomy - A Historical Exploration of Modern Astronomy - Astronomy Education and Instructional Aids - Educational Resources in Astronomy. Volume 2 introduces the reader to the observation of the Sun, Moon (eclipses, occultation of stars), artificial satellites, planets, comets, meteors, zodiacal light, terrestrial atmospheric effects (noctiluscent clouds, auroras, influence on astronomical observations). Volume 3 covers the observation of stars, variable stars, binary stars, the Milky Way Galaxy and the objects composing it, Extragalactic objects. An appendix of 65 pages provides fundamental astronomical data.

This important source-book should figure in the library of any serious amateur (or professional observational astronomer...), or in that of the local Astronomical Society (and Astronomical Institute...). It is certainly not a work for the amateur at the « beginner » level !

NOËL CRAMER