

Reviews

A Creation of His Own: Tappan's Detroit Observatory, by Patricia S Whitesell (Bentley Historical Library, The University of Michigan, Ann Arbor, 1998), xx +236 pp., ISBN 0-472-59006-5, cloth US\$48.00 £37.50, ISBN 0-472-59007-3, paperback, US\$24.95 £18.95, 227 × 152 mm.

This well-illustrated and attractively-designed book highlights the early days of Detroit Observatory of the University of Michigan, an early and important American facility. Doctor Whitesell is not an astronomer, but she has recently supervised an elaborate and painstaking restoration of the building and surviving instruments. Her text outlines much of the interesting enterprise that led to the Observatory's creation, especially regarding Henry Philip Tappan, the first President of the University of Michigan, whose vision was so responsible for the establishment of the facility.

The Detroit Observatory (located in Ann Arbor) is so named because many of the original contributors were associated with the city of Detroit. It was equipped with a 12 5/8-inch aperture refractor with objective by Henry Fitz (1808-1863) and mounting by Jonas H Phelps (1809-1865). The other main instrument was a 6 1/2-inch aperture meridian circle by Pistor and Martins of Berlin. The total cost of the observatory was about \$22 000, of which \$6150 went for the refractor and \$4000 for the meridian circle. (In 1998 US dollars, these figures would be about \$329 000, \$92 000, and \$59 800, respectively.) Both of these instruments survive to this day in substantially unmodified form, though the refractor was somewhat modernized in 1907.

The author uncovered a number of very interesting details regarding these instruments and their makers. The refractor, which is believed to be the largest surviving Fitz that has not been refigured by another optician, was a problematic telescope to manufacture. It was delivered 19 months late in 1855 December. A temporary telescope had been lent to the observatory by Fitz during this delay, but details of this instrument are not given and perhaps do not survive. Unfortunately the mounting of the delivered telescope was considered unsatisfactory by Franz F E Brünnow, the Observatory's first director, and Fitz agreed to provide a new one for an additional \$600. The replacement mounting, actually made by Phelps, arrived in 1857 November, three years after the originally anticipated delivery date. Whitesell found evidence indicating that the objective was also replaced at this time. The technical circumstances of this purported lens exchange would be very interesting to understand, if such information can eventually be found.

Given Phelps' association with the Detroit equatorial, and the rarely-mentioned fact that he was also involved with other important early telescopes, he is something of an unsung hero in the history of American astronomy. Thus it is gratifying to read in this book a number of details about him, particularly regarding his early collaboration with the Gurleys, who went on to become famous makers of surveying instruments.

The author's special interest is history of higher education, so many details of Tappan, his work, family, and associates are included. These details, and others throughout the book, may seem of unimportance to an astronomical specialist, but indeed the information is helpful to understand the context of Detroit Observatory's creation. Thus, for example, we read much of Henry N Walker, a railroad lawyer, who donated the entire cost of the meridian circle. Walker was of course interested in the Observatory's potential for providing accurate time for the railroads. By 1863, a time ball in Detroit was triggered by telegraph signals from the new Ann Arbor facility, and an illustration of this ball is provided in the book.

A particularly interesting chapter relates to the controversial and complex Canadian-born astronomer James Craig Watson (1838-1880), the second director of Detroit Observatory (1864 to 1878). Watson discovered 22 asteroids and was respected as a brilliant mathematician. Often charming but also vain, he generally did

not welcome students at the observatory, and he was frequently distracted by personal financial difficulties and investment schemes. After his death, solar astronomer Charles A Young wrote that Watson's "treatment of his wife was simply abominable" and that "there is no need to expose his faults; but they should not be replaced by virtues he did not possess."

The book's 13 short chapters tend to repeat some details, and the chronology jumps around bit, but a benefit is that the chapters tend to stand on their own, and readers are reminded of important facts as they proceed through the text. As with any book of this nature, some technical details would have been clarified if the material had been reviewed by specialists. For example, there is a mention of Fitz and the warmth of his fingers, which "accelerated the flow and figure of the glass" – not the best way to describe the technique of local figuring. (Readers interested in Fitz should note John Lankford's excellent *Sky & Telescope* article, "In Search of Henry Fitz" [September, 1984, issue], which I do not believe is mentioned in this book, though many obscure references are.)

Among trivial things, I appreciated the author's tendency to be very particular regarding the inclusion of middle names and initials. In particular, she refers to Fitz as 'Henry N Fitz, Jr.,' and she carefully distinguishes between Fitz and his much more obscure son, 'Harry,' who also made telescopes at times until his death in 1939. Fitz did not use his middle initial 'N' in signatures on telescopes, and this initial is not mentioned in any prior writings about him that I have seen. As a telescope specialist, I am intrigued with a little detail like this.

Another trivial matter is that while an illustration on page 126 indeed shows an early form of lightweight Clark equatorial, the telescope itself is probably not a 6-inch, as described. But I must admit that another interpretation of this photo is that indeed the telescope is a 6-inch, while the mounting is a larger example of a common Clark design, which, in this expanded form, would be unique among any surviving examples today. The image, like many good points in the book, thus encourages further research for an interested specialist.

The later history of Detroit Observatory, especially regarding the 37½-inch reflector (1906) and its long-running programme of stellar spectroscopy, is not emphasized in this book. There is, however, a very helpful timeline extending into the present era, as well as other appendices including the scientific publications of the first two directors, asteroids and comets discovered at the Observatory, a listing of the all the scientific directors of the facility, important astronomers trained at the facility, etc. An index seems to err on the side of including everything – as I would prefer it!

The recent meticulous restoration of this facility is a credit to the University of Michigan and involved many caring people. Although expensive, the effort set an important example for all of us eager to preserve astronomical history and heritage. I have heard a charming anecdote describing a significant bequest to the University of Michigan to support this restoration, but it does not seem to be included in this book, and I hope it can be publicized later. I look forward to celebrating the more recent bequest to Detroit Observatory at its sesquicentennial in 2004, and I encourage any readers to visit and admire Detroit Observatory, whenever they can.

John W Briggs

Sky Dragons and Celestial Serpents, by Alastair McBeath (Dragon's Head Press, PO Box 3369, London, SW6 6JN, UK, 1998), 72 pp., ISBN 0 9524387 3 9, soft cover, £4.99 plus £0.50 post and packing, 205 × 145mm.

In his popular and influential *Outlines of Astronomy*, first published in 1849, Sir John Herschel grumbled memorably that the constellations:

... seem to have been almost purposely named and delineated to cause as much confusion and inconvenience as possible. Innumerable snakes twine through long and contorted areas of the heavens, where no memory can follow them; bears, lions, and fishes, large and small, confuse all nomenclature.

This short book is the story of those 'innumerable snakes'. It gives a comprehensive account of the lore and mythology associated with the serpentine constellations Draco, Cetus, Hydra, and Serpens and also covers the modern, southern hemisphere, Hydrus. The principal myths associated with these constellations in classical antiquity are described as is more recent Romanian folklore. Finding charts and instructions are included for the constellations described and the first chapter gives a general introduction to the constellations and related topics, such as precession. This latter material will probably already be familiar to most astronomers, though it would be useful to mythologists new to the subject. Other celestial phenomena which have draconic lore associated with them, such as comets, meteor showers, and the aurora, are also covered.

The book has two problems worth mentioning. One is that the author overestimates the number of non-zodiacal constellations which originated in ancient Mesopotamia, probably through relying too much on sources published in the first few decades of the twentieth century, when the extant Babylonian astronomical texts were less well understood than they are now. Secondly, having adopted a Mesopotamian origin for the serpentine constellations he then relates them to the Babylonian goddess Tiamat. In Babylonian mythology the sky was formed from half of Tiamat's corpse, but there is no evidence that she was ever represented as a constellation.

The book has extensive lists of references, though it is unfortunate that it went to press slightly too early to mention Roger's recent reviews of the current understanding of the origin of the constellations (*J. Brit. astr. Assoc.*, **108**:9-28, 79-89, 1998). The author is an amateur astronomer and mythologist and the book is produced by a 'small press' publisher specializing in dragon lore. Given the very reasonable price it is well worth buying a copy and enjoying reading the myths associated with the serpentine constellations. However, the thesis that these constellations are related to the Mesopotamian goddess Tiamat should be treated with a healthy dose of scepticism.

Clive Davenhall

Calendars and Constellations of the Ancient World, by Emmeline Plunkett, 1997 (Senate, an imprint of Random House UK Ltd, London), 255 pp., ISBN 1 85958 488 8, soft cover, £1.99, 215 × 134mm.

This book is a facsimile edition of *Ancient Calendars and Constellations*, originally published in 1903. It consists of two parts. Part I comprises a series of papers, all of which appeared in the *Proceedings of the Society of Biblical Archaeology*, between 1892 and 1901, apart from one which was published in a set of conference proceedings. Part II is original material.

The book is broadly about the origins of the classical Grecian constellations and also the calendars used by various ancient peoples. A number of such books were published in the decades around 1900, stimulated in part no doubt by the archaeological excavations in Mesopotamia following Botta's discovery of Nineveh in the 1840s, the decipherment of the cuneiform texts found there, and the discovery of unmistakable references to the zodiacal constellations in them. The book examines the archaeological and mythological evidence for knowledge of the zodiacal constellations in the Mesopotamian, Egyptian, Indian, and Chinese civilisations. It also proposes dates for the origins of several ancient calendars according to similarities between

images found in mythology and symbolic art and the traditional representations of various constellations, together with the dates when these constellations marked the solstitial and equinoctial points. Part II similarly dates various constellations according to the simple criterion of when precession made them prominent and upright in the sky.

The underlying theme is that the zodiacal constellations had a truly ancient origin in the civilization which preceded the Biblical fall of the Tower of Babel and that they were preserved by the various civilizations that eventually emerged after the races of mankind were "scattered abroad upon the faces of the whole Earth" (Gen. 11:4), though this is not explicitly stated until the end of Part I. In *The Search for the Perfect Language and Serendipities*, Umberto Eco has described the search, which exercised scholars for centuries, for the common, perfect, ancestor of all the world's languages, which was spoken before the Tower of Babel fell. There is an echo of this quest in the attempt to show a similar origin and diaspora for the zodiacal constellations.

Much scholarship is displayed, though many of the arguments deployed have been superseded by more recent work and, indeed, some would have been controversial when the book was written (a circumstance which the author does not try to hide). For example, it is not generally accepted that the zodiacal constellations were known to Indian astronomy before the conquests of Alexander. It is surprising to find a reference to the various estimates for the length of time which has elapsed since the Biblical creation, though it is unclear whether this argument is intended to be taken literally, or is merely being used as a literary and rhetorical device.

The style is of its time: courteous and well written. Passages from modern works which were not originally in English are quoted untranslated in the original German or French. The book is not really suitable for anyone new to the topic of the origin of the constellations, and it could be misleading if taken at face value. However, for anyone interested in the development of ideas about the origins of the constellations it is a fascinating and thought-provoking read. The publishers are to be applauded for making this little-known and difficult-to-obtain work available again, particularly given the extremely low price.

Clive Davenhall

From White Dwarfs to Black Holes: The Legacy of S. Chandrasekhar, edited by G Srinivasan (University of Chicago Press, Chicago, 1999), xiii + 240 pp., ISBN 0-226-76996-8, US\$40.00 £31.95, cloth.

Subrahmanyan Chandrasekhar, through his brilliance, industry and many students, will be remembered as one of the most powerful and influential mathematical theorists in 20th century astrophysics. His life was a complex web of social privilege, racial discrimination, professional hostility, and spectacular achievement that has already been the subject of biography (K. C. Wali, *Chandra*. Chicago, 1991) and personal commentary (S. Chandrasekhar. *Truth and Beauty*. Chicago: 1987). He was managing editor of *The Astrophysical Journal* from 1952 to 1971, and in that capacity touched the professional lives of a great many astronomers.

Under review here is a collection of essays that reflect the major themes of Chandrasekhar's scientific life. It is well known, as the editor points out, that from 1929 until his death in 1995, Chandrasekhar migrated in a conscious and visible way through a series of major problem areas in theoretical astrophysics, mathematical physics, and relativity, defining their boundaries, rationalizing their operational venues, and establishing the methods by which they could be further studied. In the first six areas, he typically capped his work by publishing a seminal text, usually a compilation of his papers, but in every case an astounding example of the seamlessness of his style.

In his first decade of work, Chandra, as his colleagues and students called him later in life, entered the field of stellar structure, the central thread of theoretical astrophysics, contributing to the theory of white dwarfs. His interests reflected those of his mentors R H Fowler and E A Milne, but he soon found his work the subject of sharp criticism by A S Eddington, who dominated theoretical astrophysics in a manner unknown today. Chandra's work was not to be denied, however, though his perceptions were heavily influenced by the resistance of most astronomers to rigorous mathematical theory. Even those who sympathized with Chandra in the 1930s were unable to assure him that he was a fully accepted colleague in the field. W H McCrea, then an editor of *The Observatory* and rough contemporary to Chandra, wrote to console his passionate and deeply sensitive friend over a rejected paper: "There is always a feeling in the Society that we normally publish too much mathematics, so we sometimes have to decline to publish a paper in which the proportion of mathematics to astronomy seems too great." (McCrea to Chandrasekhar, 14 September 1937. *Chandrasekhar Papers*, University of Chicago)

Such explanations were of little consolation to Chandra, who devoted his enormous energies to the elucidation of mathematical theory and its application to astronomical problems. Although the essays published in this commemorative volume do not adequately reflect this historical context for appreciating Chandra's contributions, they do provide insight into how he influenced each problem area he entered. Most of the chapters provide a bit of biographical background, establishing the relationship the author had with Chandra, and most offer a brief historical introduction to the problem area, its state before Chandra's entry, and its state after his attentions had run their cycle. The bulk of each chapter, however, save one, deals with the contemporary state of the fields of stellar structure and evolution, neutron stars, stellar dynamics, radiative transfer, magnetohydrodynamics, and the theory of black holes. The one chapter that does offer some historical context, by Donald Osterbrock, covers the critical and captivating subject of Chandra as a teacher, reviewing the scientific collaborations and mentoring he provided his many graduate and postdoctoral students.

Typical for a collection of lightly-edited essays, the book lacks an index.

D. H. DeVorkin

The Message of the Angles – Astrometry from 1798 to 1998, proceedings of the international spring meeting of the Astronomische Gesellschaft, held during 11-15 May 1998, edited by P. Brosche, W.R. Dick, O. Schwartz and R. Wielen, *Acta Historica Astronomiae*, 3 (Verlag Harri Deutsch: Thun and Frankfurt am Main, 1999), 276 pp., ISBN 3-8171-1588-1, soft cover, DM 60.30, about £20, 147 × 208 mm.

What can reasonably be considered to be the first international meeting of astronomers, and thus the predecessor of subsequent astronomical conferences, occurred over several months during the summer and autumn of 1798 at the Seeberg Observatory in Gotha, Thuringia, under the auspices of its celebrated director, Franz Xaver von Zach. To commemorate the two hundredth anniversary of this assembly the spring meeting of the Astronomische Gesellschaft was held in Gotha during 1998 May. The present volume is the proceedings of that meeting. In a deliberate reprise of an earlier astronomical tradition the papers are presented in several languages. However, in practice, most are in English, though the reports of the opening ceremonies are in German.

The two main topics of the meeting were astrometry and the history of astronomy. These topics are well-matched: astrometry was long the pre-eminent branch of astronomy and it is a subject where the re-use of historical observations continues to be

important in contemporary studies. In addition, astrometry has undergone something of a renaissance in recent years, largely due to the results from the Hipparcos satellite.

The proceedings are divided into four parts: I – the history of astronomy since the enlightenment; II – old and new observations; III – Hipparcos and beyond, and IV – other topics. Each section comprises a few longer papers and a number of shorter ones, typically about a page in length. Many of the papers are informative, useful and interesting, particularly the longer ones. Unsurprisingly, the papers in the historical section concentrate on the original meeting at the Seeberg Observatory and related events and personalities. The second section, about combining historical and contemporary observations, includes contributions on using historical eclipse records to measure changes in the Earth's rate of rotation, various aspects of catalogues in the FK (Fundamental Catalogue) series and on the *Carte du Ciel* project. The third section has papers discussing the effects of the Hipparcos results on the calibration of the distance scale and on knowledge of nearby stars. It also has contributions looking forward to the proposed DIVA and GAIA astrometric satellites. As its name suggests, the final section is something of a mixed bag, but includes, for example, an interesting paper on early studies of the Orion nebula.

English is presumably not the first language of most of the authors, but nonetheless the papers are largely well written and also there are relatively few typographical errors. Any set of conference proceedings is necessarily a collection of disparate papers, rather than a coherent narrative with a developed theme, which some people might find a disincentive for private purchase. However, in the present case, the very reasonable price may mitigate this objection. Also, the volume would be a valuable addition to the library of any department specialising in either the history of astronomy or in astrometry, and, indeed, would be useful in a general astronomical library.

Clive Davenhall

Eclipse, The celestial phenomenon which has changed the course of history, by Duncan Steel (Headline Book Publishing, London, 1999), xvi + 368 pp., ISBN 0 7472 7385 5, cloth, AU\$34.95, 183 × 130 mm.

I noticed a display of this book in Waterstone's, Eastbourne, UK, whilst staying there during early July this year, the timing of the book being for the eclipse of August 11. The unusual part is that I received a review copy in early August with an embargo date of August 13, two days after the eclipse, perhaps it is just the tyranny of distance.

As suggested in the title, it deals with "... not only solar and lunar eclipses, and related events such as transits and occultations of planets and asteroids, but also the great influence these events have had upon the advance of civilization." This it does when the reader is taken gently through the four kinds of eclipses, gently, because there is a fifty-page appendix on calculating eclipses. Thus the reader may continue through the book without having to concentrate on mathematics instead of the interwoven historical events. The four kinds of eclipses are solar, lunar, planetary occultations, and transits, with each explained, shown to be useful, and related to an historical event. Although not put into a fifth kind of eclipse, the gravitational lensing by a galaxy is discussed and called an eclipse.

For those more interested in historical events, there are many examples of the use of eclipses both forward and backward. The knowledge that an eclipse was to occur on such a date was used by those with the data to impress, persuade, or defeat those without the knowledge. Many examples of this are given throughout the text. The recording of an eclipse in the past has enabled astronomers to calculate the exact date

or year of the related event. A good example of this is the determination of the date of the Crucifixion of Jesus which can be associated with the lunar eclipse of AD 33 April 3 to coincide with the Jewish Passover which is at Full Moon.

The final chapter lists total solar eclipses for the next twenty years and where to view them. Of the forty-eight solar eclipses for the period, thirteen are total, fifteen annular, two hybrid (changing between annular and total along the track), and eighteen are partial. For total lunar eclipses only the first ten of the twenty are listed up to 2008.

The disappointing point about the book is the poor reproductions of the figures which could have been greatly improved with very little increase in price, resulting in a much better publication. The other annoying point which took some time to come to terms with was the use of the Roman I instead of the Arabic 1 mixed up in dates, such as "I987" or "20I2". The book is written in an easy, pleasing style and should make an enjoyable read for both astronomers and others.

John Perdrix

Publications received

Galileo's Planet, Observing Jupiter Before Photography by Thomas Hockey (Institute of Physics Publishing, Bristol, 1999), xvii + 217 pp., ISBN 0 7503 0448 0, cloth, £29.95, US\$49.50, 240 × 160 mm.

Seven Wonders of the Cosmos, by Jayant V Narlikar (Cambridge University Press, Cambridge, 1999), x + 324 pp., cloth ISBN 0 521 63087 8 AU\$110.00, paper ISBN 0 521 63898 4 AU\$34.95, 228 × 152 mm.

Guido Horn d'Arturo e lo specchio a tasselli, edited by Marina Zuccoli e Fabrizio Bònoli 103 pp., paper ISBN 88-491-1292-0, 240 × 172 mm.

Guido Horn d'Arturo: astronomo e uomo di cultura, by Alberto Rossi (Cooperativa Libreria Universitaria Editrice Bologna, Bologna, 1994), 85 pp. paper, 235 × 155 mm.

