

## Autoguiding Stark Labs

Featuring detailed commented spectral profiles of more than one hundred astronomical objects, in colour, this spectral guide documents most of the important and spectroscopically observable objects accessible using typical amateur equipment. It allows you to read and interpret the recorded spectra of the main stellar classes, as well as most of the steps from protostars through to the final stages of stellar evolution as planetary nebulae, white dwarfs or the different types of supernovae. It also presents integrated spectra of stellar clusters, galaxies and quasars, and the reference spectra of some terrestrial light sources, for calibration purposes. Whether used as the principal reference for comparing with your recorded spectra or for inspiring independent observing projects, this atlas provides a breathtaking view into our Universe's past. The atlas is accompanied and supplemented by Spectroscopy for Amateur Astronomers, which explains in detail the methods for recording, processing, analysing and interpreting your spectra.

This book is not about imaging from the southern hemisphere, but rather about imaging those areas of the sky that lie south of the celestial equator. Many of the astronomical objects presented are also accessible to northern hemisphere imagers, including those in both the USA and Europe. Imaging the Southern Sky discusses over 150 of the best southern objects to image, including nebulae, galaxies, and planetaries, each one accompanied by a spectacular color image. This book also includes sections on both image capturing and processing techniques and so makes an ideal all-in-one introduction. Furthermore, because it contains an in-depth study of how to capture all the objects, many of which are rarely imaged by amateurs and professionals alike, it is also extremely useful for the more advanced imager. In The Art of Astrophotography, astronomer and Astronomy Now columnist Ian Morison provides the essential foundations of how to produce beautiful astronomical images. Every type of astroimaging is covered, from images of the Moon and planets, to the constellations, star clusters and nebulae within our Milky Way Galaxy and the faint light of distant galaxies. He achieves this through a series of worked examples and short project walk-throughs, detailing the equipment needed - starting with just a DSLR (digital single lens reflex) camera and tripod, and increasing in complexity as the book progresses - followed by the way to best capture the images and then how, step by step, these may be processed and enhanced to provide results that can rival those seen in astronomical magazines and books. Whether you are just getting into astrophotography or are already deeply involved, Morison's advice will help you capture and create enticing astronomical images.

Where do we come from? Diese Frage steht auf meiner Astronomie Homepage. [www.robani.ch](http://www.robani.ch) ...und befasst sich mit zwei der ganz grossen Fragen der Menschheit die auch mich beschäftigen: Woher kommen wir? Wohin gehen wir? Ich habe deshalb diese grossen Fragen auch zum Titel meines Buches gemacht, in welchem ich beschreiben möchte, weshalb und wie ich zu meinem Hobby, der Astronomie gekommen bin, welches mich in den vergangenen zehn Jahren immer mehr begeisterte. Das ist dabei auch zu einer richtigen Leidenschaft geworden, die mich dazu antreibt nächtelang den Sternenhimmel zu betrachten, wobei man dabei noch sehr viel mehr als nur Sterne zu sehen bekommt, wenn man sich eine entsprechende Ausrüstung anschafft. Aber dazu später....

The classic apocalyptic novel that stunned the world.

The book that taught thousands of people about astrophotography has been completely revised and updated in this second edition. It covers everything you need to know to capture stunning images of deep-sky objects with a DSLR or CCD camera: The fundamental concepts of

imaging and their impact on the final image How to pick a telescope and camera How to get set up and take the images Where and when to find the best objects in the night sky How to process images using Adobe Photoshop(R) and PixInsight(R) Start-to-finish examples of image processing Full-color with over 300 illustrations.

ELIA M. LEIBOWITZ Director, Wise Observatory Chair, Scientific Organizing Committee The international symposium on "Astronomical Time Series" was held at the Tel Aviv University campus in Tel Aviv, from December 30 1996 to January 11 1997. It was organized in order to celebrate the 25th anniversary of the Florence and George Wise Observatory (WO) operated by Tel Aviv University. The site of the 1 meter telescope of the observatory is near the town of Mitzpe-Ramon, some 220 km south of Tel Aviv, at the center of the Israeli Negev highland. There were two major reasons for the choice of Time Series as the subject matter for our symposium. One is mainly concerned with the subject matter itself, and one is related particularly to the Wise Observatory. There is hardly any doubt that astronomical time series are among the most ancient concepts in human civilization and culture. One can even say that astronomical time series preceded astronomy itself, as the impression of the day /night cycle on Earth is probably the first and most fundamental effect that impress a human being, or, in fact, most living creatures on this planet. An echo of this idea can be heard in the Biblical story of Creation, where the concept of night and day precedes the creation of the astronomical objects.

Choosing and Using the New CAT will supersede the author's successful Choosing and Using a Schmidt-Cassegrain Telescope, which has enjoyed enthusiastic support from the amateur astronomy community for the past seven years. Since the first book was published, a lot has changed in the technology of amateur astronomy. The sophistication and variety of the telescopes available to amateurs has increased dramatically. Computerized SCTs, Maksutov-Cassegrains, and most recently Meade's new and acclaimed Ritchey-Chrétiens have come to dominate the market. That means that all amateurs considering the purchase of a new telescope (not only a SCT, and not just beginners) will benefit from this detailed guide. Choosing the right telescope for particular kinds of observation (or even for general work) is far from easy – but Rod Mollise gives invaluable advice and guidance.

"The book provides invaluable information to scientists, engineers, and product managers involved with imaging CCDs, as well as those who need a comprehensive introduction to the subject."--Page 4 de la couverture

'Catchers of the Light' is a History of Astrophotography. It tells the true stories of the 46 pioneers who did most to master the art of celestial photography, as it was known during its early days; and whose efforts have made it possible for us to see the many magnificent pictures of the Universe featured in books, magazines and on the internet. In its TWO magnificent volumes is contained an unbelievable collection of tales of adventure, adversity and ultimate triumph and tells the uplifting stories of this small band of ordinary men and women, who did such extraordinary things; overcoming obstacles as diverse as war, poverty, cholera, death, very unfriendly cannibal natives and even exploding donkeys. It has been written with a no specific audience in mind - it is a book for anybody in fact - astronomers, photographers, historians, genealogists, art dealers, students, artists, doctors, farmers, builders, teachers & many more. If you like to read about the lives of special people - those who never give up - no matter what - and who succeed in achieving the seemingly impossible - then this is the book for you. This book of 1600 or so pages, with 1800 or more photographs/illustrations and over 2000 references/notes - represents the FIRST fully detailed and professionally researched book on the subject; and tells of the incredible lives of the pioneers of Astrophotography, each with their own incredible story to tell - they were the 'Catchers of the Light'. Catchers of the Light is divided into ten Parts (I-X), each covering a specific aspect of the subject- I: Origins of Astrophotography; II: Lunar Astrophotography; III: Solar Astrophotography; IV: Solar System

Astrophography; V: Deep Space Astrophotography; VI: Photographic Astronomical Spectroscopy; VII: Photographic Sky Surveys; VIII: Astrographs; IX: Modern Digital Age; X: Appendices. The following men and women are to be found in the pages of the book; who are the 'Catchers of the Light': Louis Jacques Mande Daguerre (1787-1851); Joseph Nicephore Niepce (1765-1833); Frederick Scott Archer (1814-1857); Richard Leach Maddox (1816-1902); John William Draper (1811-1882); Maurice Loewy (1833-1907); Pierre Henri Puiseux (1855-1928); William Henry Pickering (1858-1938); Armand Hippolyte Leon Fizeau (1819-1896); Jean Bernard Leon Foucault (1819-1868); Warren De La Rue (1815-1889); Pierre Jules Cesar Janssen (1824-1907); John Adams Whipple (1822-1891); William Usherwood (1821-1915); Pierre Paul Henry (1848-1905); Mathieu Prosper Henry (1849-1903); Maximillian Franz Joseph Cornelius Wolf (1863-1932); William Cranch Bond (1789-1859); George Phillips Bond (1825 -1865); Benjamin Apthorp Gould (1824-1896); Henry Draper (1837-1882); Isaac Roberts (1829-1904); William Edward Wilson (1851-1908); James Edward Keeler (1857-1900); Edward Emerson Barnard (1857-1923); Williamina Paton Stevens Fleming (1857-1911); Lewis Morris Rutherfurd (1816-1892); Father Pietro Angelo Secchi (1818-1878); William Huggins (1824-1910); Margaret Lindsay Murray (1848-1915); Edward Charles Pickering (1846 - 1919); Hermann Vogel (1841-1907); Wilhelm Oswald Lohse (1845-1915); Julius Scheiner (1858-1913); Edwin Powell Hubble (1889-1953); Milton Lasell Humason (1891-1972); Amedee Ernest Barthelemy Mouchez (1821-1892); David Gill (1843-1914); William Parsons (1800-1867); Andrew Ainslie Common (1841-1903); George Willis Ritchey (1864 1945); Henri Chretien (1879-1956); Bernhard Voldemar Schmidt (1879-1935); . Eugen von Gothard (1857-1909); Alfred Rordame (1862-1931); Marcel De Kerolyr (1873-1969). If you have seen or read 'Longitude' the story of John Harrison, the country carpenter who built the first clock that could accurately tell the time at sea, and who also made 'Del Boy' a 'millionaire', then you will love the 'Catchers of the Light'.

In the last few years, digital SLR cameras have taken the astrophotography world by storm. It is now easier to photograph the stars than ever before! They are compact and portable, flexible to adapt with different lenses and for telescope use, and above all DSLR cameras are easy and enjoyable to use. In this concise guide, experienced astrophotography expert Michael Covington outlines the simple, enduring basics that will enable you to get started, and help you get the most from your equipment. He covers a wide selection of equipment, simple and advanced projects, technical considerations and image processing techniques. Unlike other astrophotography books, this one focuses specifically on DSLR cameras, not astronomical CCDs, non-DSLR digital cameras, or film. This guide is ideal for astrophotographers who wish to develop their skills using DSLR cameras and as a friendly introduction to amateur astronomers or photographers curious about photographing the night sky.

This Festschrift is a collection of essays contributed by students, colleagues, and admirers to honor an eminent scholar on a special anniversary: Charles Hard Townes on the occasion of his 80th birthday, July 28, 1995. In 1964, Townes shared the Nobel Prize in physics with Alexander Mikhailovich Prokhorov and Nikolai Gen nadyevich Basov "for fundamental work in the field of quantum electronics, which has led to the construction of oscillators and amplifiers based on the maser-laser principle. " His contributions have covered a much wider area, however. His fruitful interests spanning several decades have included many scientific subjects, including, microwave spectroscopy and astrophysics (other articles in this volume will expand further on this point). He has also contributed to public service, having served as the chairman of the Science and Technology Advisory Committee for NASA's Apollo program, and as a member and vice chairman of the President's Science Advisory Committee. As the enormous breadth of contributions from his students shows, he has educated scholars who are now in a wide range of fields. The contributions from his many admirers, among whom are nine fellow Nobel laureates, attest to his

impact on many disciplines ranging from electrical engineering to medicine. His influence extends even to theology, as is indicated by one essay. The broadly international character of this Festschrift reflects his deep belief in the international, universal nature of science. Any amateur astronomer who is interested in astrophotography, particularly if just getting started, needs to know what objects are best for imaging in each month of the year. These are not necessarily the same objects that are the most spectacular or intriguing visually. The camera reveals different things and has different requirements. What objects in the sky tonight are large enough, bright enough, and high enough to be photographed? This book reveals, for each month of the year, the choicest celestial treasures within the reach of a commercial CCD camera. Helpful hints and advice on framing, exposures, and filters are included. Each deep sky object is explained in beautiful detail, so that observers will gain a richer understanding of these astronomical objects. This is not a book that dwells on the technology of CCD, Webcam, wet, or other types of astrophotography. Neither is it a book about in-depth computer processing of the images (although this topic is included). Detailed discussions of these topics can be found in other publications. This book focuses on what northern latitude objects to image at any given time of the year to get the most spectacular results.

No longer are heavy, sturdy, expensive mounts and tripods required to photograph deep space. With today's advances in technology, all that is required is an entry-DSLR and an entry level GoTo telescope. Here is all of the information needed to start photographing the night sky without buying expensive tracking mounts. By using multiple short exposures and combining them with mostly 'freeware' computer programs, the effect of image rotation can be minimized to a point where it is undetectable in normal astrophotography, even for a deep-sky object such as a galaxy or nebula. All the processes, techniques, and equipment needed to use inexpensive, lightweight altazimuth and equatorial mounts and very short exposures photography to image deep space objects are explained, step-by-step, in full detail, supported by clear, easy to understand graphics and photographs. Currently available lightweight mounts and tripods are identified and examined from an economic versus capability perspective to help users determine what camera, telescope, and mount is the best fit for them. A similar analysis is presented for entry-level telescopes and mounts sold as bundled packages by the telescope manufacturers. This book lifts the veil of mystery from the creation of deep space photographs and makes astrophotography affordable and accessible to most amateur astronomers. Driven by discoveries, and enabled by leaps in technology and imagination, our understanding of the universe has changed dramatically during the course of the last few decades. The fields of astronomy and astrophysics are making new connections to physics, chemistry, biology, and computer science. Based on a broad and comprehensive survey of scientific opportunities, infrastructure, and organization in a national and international context, *New Worlds, New Horizons in Astronomy and Astrophysics* outlines a plan for ground- and space- based astronomy and astrophysics for the decade of the 2010's. Realizing these scientific opportunities is contingent upon maintaining and strengthening the foundations of the research enterprise including technological development, theory, computation and data handling, laboratory experiments, and human resources. *New Worlds, New Horizons in Astronomy and Astrophysics* proposes enhancing innovative but moderate-cost programs in space and on the ground that will enable the community to respond rapidly and flexibly to new scientific discoveries. The book recommends beginning construction on survey telescopes in space and on the ground to investigate the nature of dark energy, as well as the next generation of large ground-based giant optical telescopes and a new class of space-based gravitational observatory to observe the merging of distant black holes and precisely test theories of gravity. *New Worlds, New Horizons in Astronomy and Astrophysics* recommends a balanced and executable program that will support research surrounding the most profound questions about the cosmos. The discoveries ahead will facilitate the search for habitable planets, shed light on dark energy and dark matter, and aid our

understanding of the history of the universe and how the earliest stars and galaxies formed. The book is a useful resource for agencies supporting the field of astronomy and astrophysics, the Congressional committees with jurisdiction over those agencies, the scientific community, and the public.

Agricultural Internet of Things and Decision Support for Smart Farming reveals how a set of key enabling technologies (KET) related to agronomic management, remote and proximal sensing, data mining, decision-making and automation can be efficiently integrated in one system. Chapters cover how KETs enable real-time monitoring of soil conditions, determine real-time, site-specific requirements of crop systems, help develop a decision support system (DSS) aimed at maximizing the efficient use of resources, and provide planning for agronomic inputs differentiated in time and space. This book is ideal for researchers, academics, post-graduate students and practitioners who want to embrace new agricultural technologies. Presents the science behind smart technologies for agricultural management Reveals the power of data science and how to extract meaningful insights from big data on what is most suitable based on individual time and space Proves how advanced technologies used in agriculture practices can become site-specific, locally adaptive, operationally feasible and economically affordable

Roland Störmer zeigt Ihnen, wie Sie mit Ihrem vorhandenen Foto-Equipment Zeuge beeindruckender Himmelsphänomene wie Gewitter oder Polarlichter werden und sagenhafte Aufnahmen machen können. Sie brauchen für den Anfang weder ein teures Teleskop noch eine professionelle Kamera. Kleine Exkurse zu High Dynamic Range und Zeitraffer-Fotografie lassen Ihre Fotos zu etwas Besonderem werden. Nachts entdeckt der Autor mit Ihnen Motive wie die ISS, Kometen, Sternschnuppen und Sternbilder.

In *The Art of Astrophotography*, astronomer and Popular Astronomy columnist Ian Morison provides the essential foundations of how to produce beautiful astronomical images. Every type of astroimaging is covered, from images of the Moon and planets, to the constellations, star clusters and nebulae within our Milky Way Galaxy and the faint light of distant galaxies. He achieves this through a series of worked examples and short project walk-throughs, detailing the equipment needed – starting with just a DSLR (digital single lens reflex) camera and tripod, and increasing in complexity as the book progresses - followed by the way to best capture the images and then how, step by step, these may be processed and enhanced to provide results that can rival those seen in astronomical magazines and books. Whether you are just getting into astrophotography or are already deeply involved, Morison's advice will help you capture and create enticing astronomical images.

*The Handbook of Astrophotography* is the first book dedicated to Astronomical Imaging through modest equipment, and the first to be published in India. It is a chronicle of the techniques learnt and employed by the author and by no means are proprietary. It is assumed that the reader is equipped with the basic knowledge to use a digital camera. After showing the many methods to capture the Cosmos, the book shows how to process these images. It is designed to be a handbook and not a user manual. The author hopes that the reader will be confident in astronomical imaging and develop his/her own techniques after reading the book.

*The Encyclopedia of Twentieth-Century Photography* explores the vast international scope of twentieth-century photography and explains that history with a wide-ranging, interdisciplinary manner. This unique approach covers the aesthetic history of photography as an evolving art and documentary form, while also recognizing it as a developing technology and cultural force. This Encyclopedia presents the important developments, movements, photographers, photographic institutions, and theoretical aspects of the field along with information about equipment, techniques, and practical applications of photography. To bring this history alive for the reader, the set is illustrated in black and

white throughout, and each volume contains a color plate section. A useful glossary of terms is also included.

**ABSTRACT** Molecular regulation of the genome is the primary mechanism of developmental constraints and disease phenotype. Gene disruptions sculpt human developmental diseases and provide an opportunity to hypothesize a functional role for molecular regulation of genome in cell and tissue. For example, an important paradigm in understanding nervous system development is the mechanism of neurodevelopmental disorders and analyzing the role of risk genes in disease etiology. In this work, I decided to tackle genetic instability in autism spectrum disorder (ASD), employing embryonic stem cell and human neural cell system, previously established at Wernig laboratory. I studied transcription, chromatin structure, and cellular signaling, employing a conditional knockout (KO) model of the causative gene in autism. To model the pathophysiology of autism, I choose to study CHD8, a gene with the highest number of discovered mutations in trio-families (parents and the affected child). My initial characterization of CHD8 knockout revealed a stark difference in apoptosis induction between embryonic stem cells and neurons. Similarly, the analysis of genomic bindings suggested that the interaction of CHD8 with the genome is not conserved between the cell types. In neurons, activating bindings of CHD8 seem to be near the promoters, but in embryonic stem cells, the binding shifts to distal-promoter regions, potentially to the elements of silent enhancers. Analysis of chromatin structure in knockout cells similarly revealed cell-type-specific changes in CHD8 knockout, even at the common targets. In neurons, CHD8 is a strong chromatin activator, but in embryonic stem cells regulates the distant upstream of promoters. A critical observation in embryonic stem cells revealed a group of genes with CHD8 regulated distal promoters distinctly relate to neuronal cell function (e.g., GO:0045211; postsynaptic membrane); however, I did not observe a term for another specialized cell type. These findings proved to me that CHD8 distinctly regulates neuronal genes from the early stages of development. Another insightful result obtained from the chromatin interaction experiment revealed the genomic bindings of CHD8, enriched for the motif of a MAPK/ERK effector molecular-ELK1. The motif is overrepresented at the strong binding sites, but the composite motif for ELK1 and SRF is presented at the weak bindings. This finding shows the relevance of ELK1 to play a biological role at CHD8 binding sites, as the composite motif is a regulatory element by which the serum response factor regulates target genes in partnership with ELK1. The ELK1 binding at these sites is transient and signal-dependent; thus, CHD8 binding should also reflect low affinity and transient interactions at ELK1-SRF motif sites. That is indeed what we observed: the composite motif of SRF-ELK1 enriches at the 'weak' binding sites of CHD8. Finally, the examination of ELK1 knockdown in the context of CHD8 knockout out showed a remarkable cellular phenotype. First, I observed that ELK1 knockdown rescues CHD8 mediated apoptosis in embryonic stem cells. Similar but slightly indirect results revealed a neurogenesis role, as I observed the pro-neural function of ELK1 in wild-type ES cells diminishes in CHD8 knockout cells. This finding shows that cooperativity between ELK1 and CHD8 is molecularly conserved, but it is also cell-type dependent. Altogether, my observations suggest kinase signaling not only activates effector molecules for chromatin binding but also regulates the co-partner chromatin network. Since chromatin factors generally do not have sequence specificity on binding sites, the kinase effector molecular plays a role in guiding the chromatin factor's specificity on the genome. In conclusion, my thesis provides insights into cell type and cell-state-dependent activities of CHD8 within a kinase pathway for gene and chromatin regulation. Additionally, I found that ASD genes, within a functionally related module, significantly overlap with targets of CHD8.

This paper considers the interception of an exoatmospheric target with a ship-based interceptor which employs both midcourse and terminal guidance. Before and during the midcourse phase of flight the target is tracked with a ship-based

radar. With target state estimates derived from the radar measurements, the interceptor is launched at the expected intercept point. The inevitable intercept point prediction errors are reduced during the interceptor's flight with midcourse guidance updates from the ship. When the interceptor's seeker acquires the target, noise free terminal guidance information is assumed for guiding on the actual target. The purpose of this paper is to briefly investigate various midcourse guidance strategies which will influence the missile's terminal performance.

Neutral krypton atoms were excited from the ground state  $4p^6 1S_0$  to the  $4p^5 6p(3/2)_2$  state by a resonant two-photon absorption from a line-narrowed ArF excimer laser operating at 193.41 nm. A third photon, absorbed while the atom is in the excited state, ionizes it. Excited state and ion densities were theoretically computed using a standard rate-equation analysis. The irradiance levels used ( $1 - 5 \times 10^8 \text{ W/cm}^2$ ) were too low for significant ground and excited state ac Stark and Rabi effects. The photon detection system was calibrated with a standard tungsten lamp. Ion signals were measured with known electrical components. The resonance results were compared with predictions of non-resonant ionization based on a standard formulation. The ion and excited state densities have been used with a modified electron beam propagation code (IPROP) to model such propagation in a low pressure laser-excited krypton channel. The modifications included the effects to field ionization of the excited krypton atoms. Implications for guiding of e-beams using ArF excited krypton are discussed. 12 refs., 1 tab.

Capturing the Cosmic Light - A Handbook of Astrophotography, published by Manipal Universal Press Manipal Universal Press

Written for amateur astronomers just getting into this area of the subject, this is the perfect companion for first-time spectroscope users, with no heavy mathematics and with information on how to buy and use an entry-level spectroscope costing around \$150.

Charge-coupled Devices (CCDs) have revolutionised astronomy. Even affordable CCD cameras can be ten times as sensitive as photographic film, and they deliver a digitised image that is easy to enhance using a personal computer. David Ratledge has brought together contributions from twelve leading amateurs from around the world, people who are routinely producing astronomical images of a quality that rivals those of professional observatories only of 10 years ago. These experts describe their techniques and solutions, and offer essential tips and advice for anyone who is choosing or using a CCD camera. Now glance through the Colour Gallery at the back of this book to see just what they have done! There are currently thousands of amateur astronomers around the world engaged in astrophotography at a sophisticated level. Their ranks far outnumber professional astronomers doing the same and their contributions both technically and artistically are the dominant drivers of progress in the field today. This book is a unique collaboration of individuals world-

renowned in their particular area and covers in detail each of the major sub-disciplines of astrophotography. This approach offers the reader the greatest opportunity to learn the most current information and the latest techniques directly from the foremost innovators in the field today. "Lessons from the Masters" includes a brilliant body of recognized leaders in astronomical imaging, assembled by Robert Gendler, who delivers the most current, sophisticated and useful information on digital enhancement techniques in astrophotography available today. Each chapter focuses on a particular technique, but the book as a whole covers all types of astronomical image processing, including processing of events such as eclipses, using DSLRs, and deep-sky, planetary, widefield, and high resolution astronomical image processing. Recognized contributors include deep-sky experts such as Jay GaBany, Tony Hallas, and Ken Crawford, high-resolution planetary expert Damian Peach, and the founder of TWAN (The World at Night) Babak A. Tafreshi. A large number of illustrations (150, 75 in color) present the challenges and accomplishments involved in the processing of astronomical images by enthusiasts.

Computers and Astronomy Perhaps every generation of astronomers believes that their telescopes are the best that have ever been. They are surely all correct! The great leap of our time is that computer-designed and machined parts have led to more accurately made components that give the astronomer ever better views. The manual skills of the craftsman mirror grinder have been transformed into the new-age skills of the programmer and the machine maker. (The new products did not end the work of craftsman telescope makers, though. Many highly skilled amateur/professional opticians continued to produce good-quality mirrors that are still seen today.) Amateur-priced telescopes are now capable of highly accurate tracking and computer control that were once only the province of professionals. This has greatly increased the possibilities of serious astronomy projects for which tailor-made software has been developed. Add a CCD camera to these improved telescopes (see Chap. 3), and you bring a whole new dimension to your astronomy (see Fig. 1. 1). Look Before You Leap! But first, a word of caution. Unless you are already familiar with astronomy and basic telescopes, it is not wise to start spending large amounts of money on a featured telescope. Such an instrument might otherwise be subsequently abandoned due to a perceived overcomplexity coupled with a waning interest. Choosing and Using a Refracting Telescope has been written for the many amateur astronomers who already own, or are intending to purchase, a refracting telescope – perhaps to complement their existing arsenal of larger reflecting telescopes – or for the specialist who requires a particular refractor for serious astronomical applications or nature studies. Four hundred year ago, during the winter of 1609, a relatively unknown Italian scientist, Galileo Galilei designed a spyglass with two crude lenses and turned it skyward. Since then, refractors have retained their dominance over all types of reflector in studies of the Moon, planets and double stars because of the precision of their optics and lack of a central obstruction in the optical path, which causes

diffraction effects in all commercially-made reflectors. Most mature amateur astronomers got started with a 60mm refractor, or something similar. Thirty years ago, there was little choice available to the hobbyist, but in the last decade long focus crown-flint achromats have moved aside for some exquisitely crafted apochromatic designs offered by leading commercial manufacturers. There has been a huge increase in the popularity of these telescopes in the last few years, led by a significant increase in the number of companies (particularly, William Optics, Orion USA, StellarVue, SkyWatcher and AstroTech) who are now heavily marketing refractors in the amateur astronomical magazines. In *Choosing and Using a Refracting Telescope*, well-known observer and astronomy writer Neil English celebrates the remarkable history and evolution of the refracting telescope and looks in detail at the instruments, their development and their use. A major feature of this book is the way it compares not only different classes of refractor, but also telescopes of each class that are sold by various commercial manufacturers. The author is perhaps uniquely placed to do this, having used and tested literally hundreds of different refracting telescopes over three decades. Because it includes many diverse subjects such as imaging with consumer-level digital cameras, imaging with webcams, and imaging with astronomical CCD cameras – that are not covered together in equal depth in any other single volume – *Choosing and Using a Refracting Telescope* could become the ‘refractor bible’ for amateur astronomers at all levels, especially those who are interested in imaging astronomical objects of every class.

Capturing the serene beauty of planets, stars, and celestial bodies is both fine art and scientific discovery. Fascinating, challenging, and extremely rewarding, astrophotography is a pursuit that is greatly enhanced by gaining access to the type of detailed instruction this book offers, with charts, tables, over (number of TK) images, and real-life troubleshooting advice in detailed case studies. The *Astrophotography Manual* is for those astrophotographers who wish to swiftly move beyond using standard SLR cameras and Photoshop, and who are ready to create beautiful images of nebulas, galaxies, clusters, and the solar system. Beginning with a brief astronomy primer, this book takes readers through the full astrophotography process, from equipment choice and set-up, through image acquisition, image calibration, and processing. Along the way it explains how sensor performance and light pollution relate to image quality and exposure planning. This book will satisfy the technical and practical reader and uses case studies to illustrate the entire process, using a range of equipment (including tablets and smartphones), exploring deep sky and planetary objects, and utilizing a variety of software, including Maxim, Nebulosity, Photoshop, RegiStax and PixInsight.

Arditti’s approachable work covers the all the details of design, siting and construction – once a basic type has been decided upon. It is written in a way that is equally applicable to the USA and UK (where there are slightly different building regulations) and deals with matters that are basic to building and commissioning any amateur observatory. Uniquely, David Arditti also considers the aesthetics of amateur observatories – fitting them in with family and neighbors, and maybe disguising them as more common garden buildings if necessary. Every amateur astronomer who wants a purpose-built observatory (and let’s face it, which one of them doesn’t?) will find this book invaluable.

The Definitive Resource for Viewing the Night Sky David Dickinson, Earth science teacher and backyard astronomer, and Fraser Cain, publisher of Universe Today, have teamed up to provide expert guidance on observing the night sky. The Universe Today Ultimate Guide to Viewing the Cosmos features the best tips and tricks for viewing our solar system and deep sky objects, as well as detailed charts, graphs and tables to find must-see events for years to come. This comprehensive guide is complete with stunning and exclusive photography from top night sky photographers, as well as advice on how to take your own incredible photos. Take your recreational viewing to the next level with activities like: Finding comets and asteroids Tracking variable stars Monitoring meteor showers Following solar activity Tracking satellites Timing lunar and asteroid occultations With star charts, practical background information, technological resources and telescope and astrophotography guides, this is the ultimate resource for any backyard space enthusiast.

The Biographical Encyclopedia of Astronomers is a unique and valuable resource for historians and astronomers alike. The two volumes include approximately 1550 biographical sketches on astronomers from antiquity to modern times. It is the collective work of about 400 authors edited by an editorial board of 9 historians and astronomers, and provides additional details on the nature of an entry and some summary statistics on the content of entries. This new reference provides biographical information on astronomers and cosmologists by utilizing contemporary historical scholarship. Individual entries vary from 100 to 1500 words, including the likes of the superluminaries such as Newton and Einstein, as well as lesser-known astronomers like Galileo's acolyte, Mario Guiducci. A comprehensive contributor index helps researchers to identify the authors of important scientific topics and treatises.

A guide to constellations, stars, and other celestial objects reveals the mythology surrounding the star groups and the star movement through the sky

Scientific Astrophotography is intended for those amateur astronomers who are looking for new challenges, once they have mastered visual observing and the basic imaging of various astronomical objects. It will also be a useful reference for scientifically inclined observers who want to learn the fundamentals of astrophotography with a firm emphasis on the discipline of scientific imaging. This book is not about making beautiful astronomical images; it is about recording astronomical images that are scientifically rigorous and from which accurate data can be extracted. This book is unique in that it gives readers the skills necessary for obtaining excellent images for scientific purposes in a concise and procedurally oriented manner. This not only gets the reader used to a disciplined approach to imaging to maximize quality, but also to maximize the success (and minimize the frustration!) inherent in the pursuit of astrophotography. The knowledge and skills imparted to the reader of this handbook also provide an excellent basis for "beautiful picture" astrophotography! There is a wealth of information in this book – a distillation of ideas and data presented by a diverse set of sources and based on the most recent techniques, equipment, and data available to the amateur astronomer. There are also numerous practical exercises. Scientific Astrophotography is perfect for any amateur astronomer who wants to go beyond just astrophotography and actually contribute to the science of astronomy.

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