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The Astrophotography Manual

The Astrophotography Manual is for those photographers who aspire to move beyond using standard SLR cameras and editing software, and who are ready to create beautiful images of nebulae, galaxies, clusters, and the solar system. Beginning with a brief astronomy primer, this book takes readers through the full astrophotography process, from choosing and using equipment through image capture, calibration, and processing. This combination of technical background information and the hands-on approach brings the science down to earth with a practical method to plan for success. Features include: Over 400 images, graphs, and tables to illustrate these concepts A wide range of hardware to be used, including smartphones, tablets, and the latest mount technologies How to utilize a variety of leading software such as Maxim DL, Nebulosity, Sequence Generator Pro, Photoshop, and PixInsight Case studies showing how and when to use certain tools and overcoming technical challenges How sensor performance and light pollution relate to image quality and exposure planning

The Astrophotography Manual

The Astrophotography Manual, Second Edition is for photographers ready to move beyond standard SLR cameras and editing software to create beautiful images of nebulae, galaxies, clusters, and the stars. Beginning with a brief astronomy primer, this book takes readers through the full astrophotography process, from choosing and using equipment to image capture, calibration, and processing. This combination of technical background and hands-on approach brings the science down to earth, with practical methods to ensure success. This second edition now includes: Over 170 pages of new content within 22 new chapters, with 600 full-color illustrations. Covers a wide range of hardware, including mobile devices, remote control and new technologies. Further insights into leading software, including automation, Sequence Generator Pro and PixInsight Ground-breaking practical chapters on hardware and software as well as alternative astrophotography pursuits

Making Beautiful Deep-Sky Images

This book is based around the author's beautiful and sometimes awe-inspiring color images and mosaics of deep-sky objects. The book describes how similar "Hubble class" images can be created by amateur astronomers in their back garden using commercially available telescopes and CCD cameras. Subsequent processing and image enhancement in the "electronic darkroom" is covered in detail as well. A range of telescopes and equipment is considered, from the author's 11-inch with Hyperstar camera, down to more affordable instruments. Appendices provide links to free software – not available from a single source – and are themselves an invaluable resource.

Inside PixInsight

In this book, Warren Keller reveals the secrets of astro-image processing software PixInsight in a practical and easy to follow manner, allowing the reader to produce stunning astrophotographs from even mediocre data. As the first comprehensive post-processing platform to be created by astro-imagers for astro-imagers, it has for many, replaced the generic graphics editors as the software of choice. With clear instructions from Keller, astrophotographers can get the most from its tools to create amazing images. Capable of complex post-processing routines, PixInsight is also an advanced pre-processing software, through which astrophotographers calibrate and stack their exposures into completed master files. Although it is extremely powerful, PixInsight has been inadequately documented in print--until now. With screenshots to help illustrate the process, it is a vital guide.

Using Sequence Generator Pro and Friends

This guide is specifically aimed at those who are using—or want to use—Sequence Generator Pro. SGP is a "session management" software package that controls the telescope, mount, camera, and ancillary equipment to target and secure images during a night of imaging astronomical objects. The book begins with a special tutorial to get up and running with SGP. With a comprehensive reference section, it takes the user in detail through the various aspects of user and equipment profiles, equipment definitions, the sequencer, and other essential elements of SGP. Finally, it focuses on how to get the most out of the ancillary programs—target databases, autoguider, plate solvers, planetarium software, and other applications. Oftentimes, technical guides can end up being far denser than the processes they intend to explain. Many of the insights provided by SGP expert Alex McConahay are beyond what can be found in the official program documentation. In this book, the reader will find in-depth, yet straightforward practical advice on how to automate nightly astroimaging sessions with Sequence Generator Pro.

The Deep-sky Imaging Primer

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.

The 100 Best Astrophotography Targets

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.

So You Want a Meade LX Telescope!

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.

The NexStar User's Guide II

Michael Swanson's online discussions with literally thousands of NexStar owners made it clear that there was a desperate need for a book such as this – one that provides a complete, detailed guide to buying, using and maintaining NexStar telescopes. Although this book is highly comprehensive, it is suitable for beginners – there is a chapter on "Astronomy Basics" – and experts alike. Celestron's NexStar telescopes were introduced in 1999, beginning with their first computer controlled "go to" model, a 5-inch. More models appeared in quick succession, and Celestron's new range made it one of the two dominant manufacturers of affordable "go to" telescopes.

Getting Started

Astrophotography can be one of the most rewarding pursuits of a lifetime, it can also be one of the most daunting. This book uses over 200 illustrations, images, charts and graphs in addition to the text to help you understand what equipment you will need and how to make it all work so you can create breathtaking images of the heavens. From purchasing your first astrophotography telescope, hooking up your camera, taking long exposure images, and finally processing that finished image, this book will be your indispensable guide. If you have ever wanted to take photographs of glowing nebulae, spiral galaxies and shimmering star clusters, this is the reference you want on your desk as well as with you out under the stars. I will take you on a journey exploring in-depth details of field rotation and focusing methods, as well as explaining not just the what and how, but the ever important why. Actually see why you stack multiple images and what effect it has. Don't just read about how the atmosphere affects imaging, see it through experimentation that you can do at home on your own!

Lessons from the Masters

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.

The NexStar User's Guide

Michael Swanson's online discussions with literally thousands of NexStar owners made it clear that there was a desperate need for a book such as this – one that provides a complete, detailed guide to buying, using and maintaining NexStar telescopes. Although this book is highly comprehensive, it is suitable for beginners – there is a chapter on "Astronomy Basics" – and experts alike. Celestron's NexStar telescopes were introduced in 1999, beginning with their first computer controlled "go to" model, a 5-inch. More models appeared in quick succession, and Celestron's new range made it one of the two dominant manufacturers of affordable "go to" telescopes.

Astrophotography for the Amateur

First published in 1999, this is an expanded and updated edition of the best-selling, standard handbook on astrophotography for amateurs.

The 2007 ESO Instrument Calibration Workshop

The 2007 ESO Instrument Calibration workshop brought together more than 120 participants with the objective to a) foster the sharing of information, experience and techniques between observers, instrument developers and instrument operation teams, b) review the actual precision and limitations of the applied instrument calibration plans, and c) collect the current and future requirements by the ESO users. These present proceedings include the majority of the workshop's contributions and document the status quo of instrument calibration at ESO in large detail. Topics covered are: Optical Spectro-Imagers, Optical Multi-Object Spectrographs, NIR and MIR Spectro-Imagers, High-Resolution Spectrographs, Integral Field Spectrographs, Adaptive Optics Instruments, Polarimetric Instruments, Wide Field Imagers, Interferometric Instruments as well as other crucial aspects such as data flow, quality control, data reduction software and atmospheric effects. It was stated in the workshop that "calibration is a life-long learning process". In this sense, this book will be a reference point for all future efforts to improve instrument calibration procedures in astronomy.

Digital SLR Astrophotography

A definitive handbook to photographing the night sky using DSLR cameras, including projects for both beginners and more advanced enthusiasts.

5th World Forum for Motor Museums

Arditti's approachable work covers 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.

Setting-Up a Small Observatory: From Concept to Construction

Welcome to the first comprehensive guide to one of the world's most popular telescopes: the ShortTube 80 refractor. With its ultra-portability, versatility, and relatively low cost, this telescope continues to delight generations of stargazers. Starting in the field under a dark sky, the author walks the reader through a typical evening of stargazing, where the ShortTube 80 brings many astronomical treasures into focus. From there, he provides an in-depth account of the optical properties of the ShortTube 80 refractor and the accessories and mounting arrangements that maximize its potential both as a spotting 'scope by day and an astronomical 'scope by night. The main text discusses how the versatile ShortTube 80 can be used to study deep sky objects, the Sun, the Moon, bright planets and even high-resolution projects, where the instrument's features can be optimized for the observation of tight double and multiple stars. It explores how the ShortTube 80 can image targets using camera phones, DSLRs and dedicated astronomical CCD imagers. Packed with practical advice gained from years of firsthand stargazing experience, this book demonstrates exactly why ShortTube 80 has remained a firm favorite among amateur astronomers for over three decades, and why it is likely to remain popular for many years to come.

The ShortTube 80 Telescope

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.

Choosing and Using a Refracting Telescope

The original, classic Guardians of the Galaxy return! Vance Astro, Yondu, Martinex, Starhawk and Charlie-27 fight to save the 31st century from the Badoon. But they soon discover an even worse threat! Time is collapsing, the very future is in danger, and the only possibility of salvation relies on the Guardians' shoulders. But as the team finds themselves caught in a deathtrap, and Vance encounters a Guardian that has been wiped from all memory, they must find a doorway into the past to save the future — and that means striking a deal with the most dangerous being in the galaxy! Even with allies like Star-Lord and the last Nova, can the Guardians meet their greatest challenge: not just guarding the galaxy, but saving the universe? Collecting Guardians 3000 (2014) #1-5 and material from Guardians of the Galaxy (2013) #14.

Guardians 3000 Vol. 1

This book is based around the author's beautiful and sometimes awe-inspiring color images and mosaics of deep-sky objects. The book describes how similar "Hubble class" images can be created by amateur astronomers in their back garden using commercially available telescopes and CCD cameras. Subsequent processing and image enhancement in the "electronic darkroom" is covered in detail as well. A range of telescopes and equipment is considered, from the author's 11-inch with Hyperstar camera, down to more affordable instruments. Appendices provide links to free software – not available from a single source – and are themselves an invaluable resource.

Making Beautiful Deep-Sky Images

Provides easy to understand information and guidelines about the design and construction of binoscopes Focusing on both homemade and commercial products, this book provides the reader with simple and straightforward information about the modelling and building of binoscopes. Binoscopes can be thought of as binoculars enlarged to the size of telescopes: essentially, a combination of the two. Constructing a binoscope is easier than most people think, but it still demands attention to detail and proper background knowledge. The author goes on to provide additional information about how to understand the products currently on the market, should the reader choose to purchase a binoscope instead of building one. Lastly, the book also compares binoscopes with telescopes in great detail, outlining the differences the reader can expect to see in the night sky from using both. The celestial

views obtained with a binoscope, compared to a single telescope of the same aperture, are a very different experience and well worth the effort.

Building and Using Binoscopes

This is the must-have guide for all amateur astronomers who double as makers, doers, tinkerers, problem-solvers, and inventors. In a world where an amateur astronomy habit can easily run into the many thousands of dollars, it is still possible for practitioners to get high-quality results and equipment on a budget by utilizing DIY techniques. Surprisingly, it's not that hard to modify existing equipment to get new and improved usability from older or outdated technology, creating an end result that can outshine the pricey higher-end tools. All it takes is some elbow grease, a creative and open mind and the help of Chung's hard-won knowledge on building and modifying telescopes and cameras. With this book, it is possible for readers to improve their craft, making their equipment more user friendly. The tools are at hand, and the advice on how to do it is here. Readers will discover a comprehensive presentation of astronomical projects that any amateur on any budget can replicate – projects that utilize leading edge technology and techniques sure to invigorate the experts and elevate the less experienced. As the "maker" community continues to expand, it has wonderful things to offer amateur astronomers with a willingness to get their hands dirty. Tweaking observing and imaging equipment so that it serves a custom purpose can take your observing options to the next level, while being fun to boot.

National Optical Astronomy Observatories Newsletter

This book provides a thorough introduction to and exploration of deep sky astrophotography for the digital photographer. With over 280 images, graphs, and tables, this introductory book uses a progressive and practical style to teach readers how to image the night sky using existing, affordable equipment. The book opens with a brief astronomy primer, followed by chapters that build progressively to explain the challenges, offer solutions, and provide invaluable information on equipment choice through image capture, calibration, and processing in affordable software. The book's focus ranges from how to image sweeping vistas and star trails using only a camera body, lens and tripod, to more advanced methods suitable for imaging galaxies, clusters, nebulae, and stars. Other features of the book include: Real-world assignments showing how and when to use certain tools and how to overcome challenges and setbacks Practical construction projects Evaluations of the most recent developments in affordable hardware and software Exploration on how sensor performance and light pollution relate to image quality and exposure planning Ground-breaking practical chapters on lucky imaging and choosing and using the latest CMOS cameras Written in an accessible, easy to follow format, this comprehensive guide equips readers with all the necessary skills to progress from photographer to astrophotographer.

Astro-Imaging Projects for Amateur Astronomers

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.

Catalog of Lunar and Mars Science Payloads

The book you are about to read is remarkable in the sense that it makes the foundations of astronomical spectroscopy accessible to all and provides practical advice for its application. It will without doubt give you the desire to embark on this great adventure and provides you the means to achieve it.

Capturing the Universe

Astronomy is a scientific discipline that has developed a rapid and impressive growth in Spain. Thirty years ago, Spain occupied a purely anecdotal presence in the international context, but today it occupies the eighth position in the world in publication of astronomical articles, and, among other successes, owns and operates ninety per cent of the world's largest optical telescope GTC (Gran Telescopio Canarias). The Eighth Scientific Meeting of the Spanish Astronomical Society (Sociedad Española de Astronomía, SEA), held in Santander in July 7–11 2008, whose proceedings are in your hands, clearly shows the enthusiasm, motivation and quality of the present Spanish astronomical community. The event brought together 322 participants, who represent almost 50% of Spanish professional astronomers. This percentage, together with the continuously increasing, with respect to previous SEA meetings, number of oral presentations and poster contributions (179 and 127 respectively), confirms that the SEA conferences have become a point of reference to assess the interests and achievements of astrophysical research in Spain. The most important and current topics of modern Astrophysics were taken into account at the preliminary meeting, as well as the number and quality of participants and their contributions, to select the invited speakers and oral contributors. We took a week to enjoy the high quality contributions submitted by Spanish astronomers to the Scientific Organizing Committee. The selection was difficult. We wish to acknowledge the gentle advice and commitment of the SOC members.

Astronomy Now

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-Chrétien's 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.

Astrophotography on the Go

J. Andersen
Niels Bohr Institute for Astronomy Physics and Geophysics
Astronomical Observatory
Copenhagen
ja@astro.ku.dk

The development of astronomy worldwide begins at the roots: Already from childhood, humans of all nations and civilizations seem to share an innate fascination with the sky. Yet, people in different regions of the world have vastly different possibilities for pursuing this interest. In wealthy, industrialised societies the way is open to a school or higher education in science, possibly leading to a career in astronomy or basic or applied space science for the benefit of the country as well as the individual. In other regions, neither the financial nor the trained human resources are sufficient to offer that avenue to the future of the young generation, or those intellectual resources to the development of their country. This book addresses ways and means by which these obstacles can be, if not fully overcome, then at least significantly reduced.

Successfully Starting in Astronomical Spectroscopy

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.

Highlights of Spanish Astrophysics V

Spiral binding. A guide to amateur astronomy with advice on equipment and information on photographing the night sky.

Choosing and Using a New CAT

Serves as a useful reference guide to stargazers around the world.

International Aerospace Abstracts

L'apprentissage d'une langue étrangère peut s'aborder de différentes, toutes variant en fonction de la demande précise de l'apprenant. C'est en s'apercevant de ce fait que Hani Qotb insiste sur l'enseignement du français spécialisé, par domaine de prédilection, c'est-à-dire sur objectifs spécifiques. De l'état des lieux de cette technique, en passant par l'analyse des publics y faisant appel, jusqu'à l'étude du système d'apprentissage collaboratif, tout est passé au tamis critique, pour décortiquer les mouvements à mettre en place.

Wil Tirion's Bright Star Atlas 2000.0

In the Victorian era – or for non-British readers, the mid-to-late nineteenth century – amateur astronomy tended to center on Solar System objects. The Moon and planets, as well as bright comets, were the key objects of interest. The brighter variable stars were monitored, but photography was in its infancy and digital imaging lay a century in the future. Today, at the start of the twenty-first century, amateurs are better equipped than any professionals of the mid-twentieth century, let alone the nineteenth. An amateur equipped with a 30-cm telescope and a CCD camera can easily image objects below magnitude 20 and, from very dark sites, 22 or 23. Such limits would have been within the realm of the 100- and 200-inch reflectors on Mount Wilson and Mount Palomar in the 1950s, but no other observatories. However, even those telescopes took hours to reach such limits, and then the photographic plates had to be developed, fixed, and examined by eye. In the modern era digital images can be obtained in minutes and analyzed 'on the fly' while more images are being downloaded. Developments can be e-mailed to other interested amateurs in real time, during an observing session, so that when a cataclysmic event takes place amateurs worldwide know about it. As recently as the 1980s, even professional astronomers could only dream of such instantaneous communication and processing ability.

Developing Basic Space Science World-Wide

This book offers a comprehensive introductory guide to "choosing and using" a series LXD55 or LXD75 computer-controlled ("goto") telescope, containing a wealth of useful information for both beginners and more advanced practical amateur astronomers. The manufacturer's manuals are not nearly detailed enough to be of real help to beginners. No other book offers advanced techniques for more experienced LXD series users.

Encyclopedia of Twentieth-Century Photography, 3-Volume Set

NightWatch