

The Art of Astrophotography

In *The Art of Astrophotography*, astronomer and *Popular Astronomy* contributor 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.

IAN MORISON is Emeritus Gresham Professor of Astronomy at the University of Manchester's Jodrell Bank Observatory. In addition to his academic credentials, he is a lifelong amateur astronomer, a founding member and patron of Macclesfield Astronomy Society and a past president of the UK's Society for Popular Astronomy, one of the country's largest amateur astronomy organisations. He has written four previous popular astronomy books, as well as an undergraduate astronomy textbook.

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Ian Morison

Jodrell Bank, University of Manchester



CAMBRIDGE
UNIVERSITY PRESS

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University Printing House, Cambridge CB2 8BS, United Kingdom
One Liberty Plaza, 20th Floor, New York, NY 10006, USA
477 Williamstown Road, Port Melbourne, VIC 3207, Australia
4843/24, 2nd Floor, Ansari Road, Daryaganj, Delhi – 110002, India
79 Anson Road, #06–04/06, Singapore 079906

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning and research at the highest international levels of excellence.

www.cambridge.org

Information on this title: www.cambridge.org/9781316618417

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First published 2017

Printed in the United Kingdom by Clays, St Ives plc

A catalogue record for this publication is available from the British Library

Library of Congress Cataloging-in-Publication Data

Names: Morison, Ian, 1943–

Title: The art of astrophotography / Ian Morison, Jodrell Bank [Centre for Astrophysics], University of Manchester.

Description: Cambridge : Cambridge University Press, 2017. |

Includes bibliographical references and index.

Identifiers: LCCN 2016047965 | ISBN 9781316618417 (pbk. : alk. paper)

Subjects: LCSH: Astronomical photography. | Solar system—Pictorial works.

Classification: LCC QB121 .M67 2017 | DDC 522/.63—dc23

LC record available at <https://lcn.loc.gov/2016047965>

ISBN 978-1-316-61841-7 Paperback

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Cambridge University Press
978-1-316-61841-7 — The Art of Astrophotography
Ian Morison
Frontmatter
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This book is dedicated to my many friends at the Macclesfield
Astronomical Society, which has been a most rewarding part of
my life for over 25 years. Their encouragement
has helped lead to this book.

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Preface

The first point to address is why the title ‘The Art of Astrophotography’ was chosen for this book. As one finds when setting out to produce beautiful astronomical images, as much, or even more, time is spent processing the data as acquiring the raw data. There are many image processing tools available, some of which will be applicable to a particular image, and the appropriate ones need to be chosen and applied to give the desired result. Different images will require a different sequence of processes and rarely will these be the same, so there are no rigid rules as to how to go about it. There is thus some ‘art’ required to choose the appropriate tools to produce a particular image. But then, having produced an image, artistry is often required to make it aesthetically pleasing, so this is perhaps a further and more common use of the word ‘art’ as applied to astrophotography. Two examples of, hopefully, applying artistry in the production of an image are seen in the ‘Star Trails’ and ‘Composite Meteor Trails’ images in Chapters 1 and 17 respectively.

Software is extensively used not just for image acquisition but for processing the captured images. Happily, many of the required software tools are free, such as *Deep Sky Stacker* (DSS) and *Registax*, but specialist programs that are used to process astronomical data such as *Pixinsight* need to be purchased. One often finds that, having done the major part of the image processing in a specialist program, *Adobe Photoshop* is used to carry out the final editing of the image. The important point about *Photoshop* is that it can handle 16-bit data which less expensive programs such as *Photoshop Elements* cannot do. At the time of writing, the free program *GIMP* can also only handle 8-bit data, but it is said that the next version will be able to do so and thus this may then become an alternative to the use of *Photoshop*.

In this book all the image processing is handled in *Photoshop*. Adobe no longer sell the CS6 version (or any previous versions) of the program and it is leased on a month to month basis, so, at least, there is no large upfront cost. All of the capabilities required for the image processing techniques used in this book are found in the versions from CS2 onwards (I use an ‘academic’ version of CS4). It is sometimes possible to buy new copies of these older versions by searching on the Internet and,

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should you not have a copy of *Photoshop*, I would encourage you to search for ‘*Adobe Photoshop CS2*’ to see what might be available.

The structure of the book is very simple. Relatively short chapters are used to illustrate virtually all aspects of astrophotography and are used essentially as ‘worked examples’, first describing the hardware that would be needed to capture a particular image and then describing, step by step, how the image is processed to produce the final result. As the chapters progress, the equipment required will become more complex, but they start with two chapters whose images require only the use of a DSLR (digital single lens reflex camera) and a tripod.

A few chapters introduce techniques that can aid all aspects of astroimaging, such as Chapter 10, which describes how DSLRs can be cooled to enhance their performance in summer, and Chapter 12, which shows how filters can be used to combat light pollution.

Gradually, all of the processing steps needed to create images are covered – in detail when first applied in the early chapters, and then with a summary of their use in later chapters. So even if one only wishes to use, for example, a telescope, equatorial mount and cooled CCD (charge-coupled device) camera, the earlier chapters should at least be read lightly.

The book’s chapters are supplemented with a set of appendices to cover in more depth aspects of astroimaging that are briefly summarised within some of the chapters. Examples of appendices where introductory chapters are included in the main text are Appendices A and D relating to telescopes and autoguiding. A further appendix, Appendix B, discusses in some depth the mounts, alt/az or equatorial, that are such an important part of an imaging system.

The world’s top astrophotographers tend to concentrate on one aspect of the hobby – and do it supremely well. Damian Peach’s planetary images come to mind. Over the past few years I have been writing books and articles – most recently a series entitled ‘Imaging for Beginners’ for the UK magazine *Astronomy Now* – which have had to cover all aspects of astroimaging, so in one sense I am a ‘jack of all trades’ but master of none. (But, having said that, one of my lunar images has been awarded a trophy and a variety of others have been used in books and magazines to illustrate articles other than those of my own.)

I can only offer one piece of evidence that the advice given in this book can be useful to others. A friend of mine who is a superb natural history photographer asked me for advice as to how begin to take astroimages. I explained to him how I thought one could best image the Orion nebula region (which, as Chapter 7 explains, is not that trivial) and then process the set of images taken to produce a good final result. He submitted his image to the ‘Insight Astronomy Photographer of the Year’ competition organised by the Royal Observatory Greenwich and won the 2015 Sir Patrick Moore Prize for Best Newcomer award!

With a little application, anyone could easily achieve images similar to those shown in this book, and my sincere hope is that many of you who use it to learn about astroimaging will, in time, achieve images far better than any of those that I have made.

Acknowledgements

My friends at the Macclesfield Astronomical Society have been a great source of help and encouragement, and I offer particular thanks to Roy Sturmy for the loan of equipment and to Christopher Hill and Christopher Heapy for the use of images to help illustrate the book. Peter Shah and Damian Peach have also kindly allowed me to use their superb images. My thanks go also to them.

I would like to thank Vince Higgs, Lucy Edwards and the team at Cambridge University Press who have steered this book through to publication and to Linda Paulus at OOH Publishing who prepared this complex book for publication. Particular thanks go to Peter Gill, who copy-edits my articles for the magazine *Astronomy Now* and who has greatly helped me to improve my writing skills, and to Chris Cartwright, who has carried out a superb task in copy-editing what is a challenging and technical text.

Finally, but not least, I must thank my wife for supporting me through too many hours spent at the computer, and for graciously accepting the fact that, far too often, mounts and telescopes have been spread over the lounge and dining room ready for use and that one bedroom has been taken over for their storage.