Practical Amateur Astronomy

Digital SLR Astrophotography

Second Edition

Digital SLR cameras have made it easier than ever before to photograph the night sky. Whether you're a beginner, nature photographer, or serious astronomer, this is the definitive handbook to capturing the heavens. Starting with simple projects for beginners such as cameras on tripods, it then moves onto more advanced projects including telescope photography and methods of astronomical research. With 80% revised and updated material, this new edition covers nightscapes, eclipses, using cameras with sky trackers and telescopes, and tools for identifying celestial objects and investigating them scientifically. Image processing is discussed in detail, with worked examples from three popular software packages – *Nebulosity, Maxlm DL*, *PixInsight*, and *DeepSkyStacker*. Rather than taking a recipe-book approach, Covington explains how your equipment works as well as offering advice on many practical considerations, such as choice of set-up and the testing of lenses, making this a comprehensive guide for anyone involved in astrophotography.

Michael A. Covington is one of America's leading amateur astronomers and the author of the highly acclaimed *Astrophotography for the Amateur* (Cambridge University Press, second edition, 1999). He was a research scientist in computational linguistics and artificial intelligence at the University of Georgia. Now retired from academia, he runs a consulting business in Athens, Georgia, from where he continues to take pictures of the stars.

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Soli Deo gloria

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Preface

When I wrote the first edition of this book, I said that the time was not yet ripe for a comprehensive handbook of DSLR astrophotography. Now it is, and I have rewritten almost the entire book from scratch because so much has changed and so much more knowledge is available.

And the torrent of new developments never stops. Please check this book's web site, www.dslrbook.com, for updates and additional information immediately.

Not everyone will read all the chapters of the book straight through. To cover such a complicated, technical subject, I have had to spiral outward through the subject matter, passing through several regions more than once. Avid daytime DSLR photographers may go straight to Chapter 4, and experienced astrophotographers will find the later chapters more useful. Many readers will skim Chapter 2 on the first pass and then come back to it as needed.

Two notes about pictures:

- Throughout this book, if the caption of a picture specifies only a lens and its *f*-ratio, such as "300-mm *f*/4 lens," you can assume the lens was used wide open, as is usual in astrophotography. If it is stopped down, the caption will say so, such as "300-mm *f*/4 lens at *f*/5."
- You can assume that all the pictures in Chapter 5 and later were calibrated in the normal manner with dark frames, flats, and flat darks or bias frames, unless I say otherwise.

I want to thank my wife Melody and my daughter Sharon for their patience and for help with illustrations and URL checking. I thank several people who contributed images and data; they are acknowledged where their material appears. All the images not otherwise credited are my own work.

Michael Covington