



**Digital
Astrophotography:
The State of
the Art**

David Ratledge (Ed.)

With 125 Figures

 Springer

Cover illustrations: All images from the author. Background figure 3.3, Sun. Insets: top left: figure 3.9, Jupiter; top right: figure 3.14, Albireo; bottom left: 5.12, Andromeda Galaxy; bottom right: 5.13, Orion Nebula.

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Preface

In the years since *The Art and Science of CCD Astronomy* was first published, digital imaging has been transformed from what was, in reality, a minority interest to mainstream. Not even the most committed of CCD devotees could have predicted the few years it would take for digital imaging to supplant film. We all probably guessed that a new age was dawning, but the speed at which silicon sensors came to dominate the photography market was simply staggering. New areas also appeared. No one predicted webcams would become the instrument of choice for imaging the planets. Afocal photography re-emerged in digital format. For mainstream imaging, color has become almost the norm. It was therefore time for a new book – and one in color!

If you read the astronomical magazines, you are, no doubt, familiar with the names and images of our contributors. *Sky & Telescope*, *Astronomy*, *Night Sky*, *Astronomy Now* and other leading magazines from around the world have all included their work, in terms of both images for their gallery sections and feature articles.

The contributors have been selected for their expertise in a particular field although, in fact, most are multi-talented. First and foremost they are image takers – they are not writing about other people's images; they are writing about their own. You are hearing it from the horse's mouth! The big advantage of a book like this is that we have experts in each field rather than a single author who would perhaps be more familiar with some subjects than others. One person could never have the breadth of knowledge that we have incorporated here.

The book is divided into three sections, which broadly increase in sophistication and, unfortunately, in cost. The intention is to have something for every level of interest – and pocketbook! Topics range from using a consumer camera at the eyepiece of an ordinary telescope up to specialist multiple robotic telescopes searching for supernovae. Remember, even those with the most comprehensive setups started more modestly and got where they are today as their interest and knowledge developed over many years.

David Ratledge
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CHAPTER ONE

Introduction

David Ratledge

Background

There has never been a more exciting time to be an amateur astronomer. A new digital age has dawned, providing us with an arsenal of affordable imaging equipment, the power of which would have been unimaginable just 10 to 15 years ago. Those with the expertise and knowledge to exploit the digital tools are already reaping the rewards. This new generation is pushing forward further and further the bounds of what amateur astronomers can achieve.

At the heart of the digital revolution has been the silicon imaging chip. First on the scene was the CCD (charge coupled device) type but this has been joined, especially in the consumer market, by the CMOS (complementary metal oxide semiconductor) variety. Initially CCDs were only available in relatively expensive purpose-built astronomical cameras, but that has changed and even a humble \$100 webcam can boast a supersensitive CCD chip at its heart. Consumer digital cameras are taking over amateur photography, making off-the-shelf multi-megapixel devices commonplace. Digital SLR cameras with interchangeable lenses are now available from virtually all big camera manufacturers. Their prices have dropped dramatically, and several are now around the \$1000 price barrier. Even purpose-built cooled astronomical cameras have undergone a revolution, and the range now extends from \$500 to more than ten times that. There is certainly a state-of-the-art imaging device available to suit all budgets. The technological advance sees no sign of coming to an end. Already the new kid on the block, the CMOS sensor, is widespread in the consumer market and is being used for astronomical imaging too. For those willing and able to embrace the new technology, then, the sky is literally the limit!