Observing the Sun with Coronado™ Telescopes

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Springer

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Cover Illustration: Amazing Grace by Larry Alvarez

Library of Congress Control Number: 2006940069

Patrick Moore's Practical Astronomy Series ISSN 1617-7185

ISBN-13: 978-0-387-68126-9 e-ISBN-13: 978-0-387-68127-6

Printed on acid-free paper.

9 8 7 6 5 4 3 2 1

springer.com

This book is dedicated to my wife, Helga, and daughter, Marcela, who gave me a Coronado Personal Solar Telescope (PST) as a 50th birthday present.

Preface

Scientists will often tell you that now is the most exciting time for a particular interest. We will always have just discovered or invented something that will "revolutionize" something or the other. The computer on which I am typing this, for example, is four times faster than its predecessor and slightly cheaper.

However, the last decade or so has seen some advances that have changed the face of amateur solar astronomy. Professional researchers have been using many of the tools and techniques for years but now they are available to amateurs as well.

The use of digital photography and computers has changed all astronomy, not just amateur solar astronomy, and it has certainly made a lot more techniques available for photographing the Sun.

Secondly, the use of "white light" solar filters has improved the detail that can be seen on the solar surface. In the past, the only technique that was available was projection onto a piece of white paper or card.

Thirdly, the use of hydrogen alpha filters has recently hit the "affordability barrier" of $500 or £500 for many amateur astronomers. The Coronado Personal Solar Telescope (PST) is a real breakthrough product that has now brought a fascinating branch of astronomy within the reach of many people. In recent months, the same technique has been applied to calcium K filters.

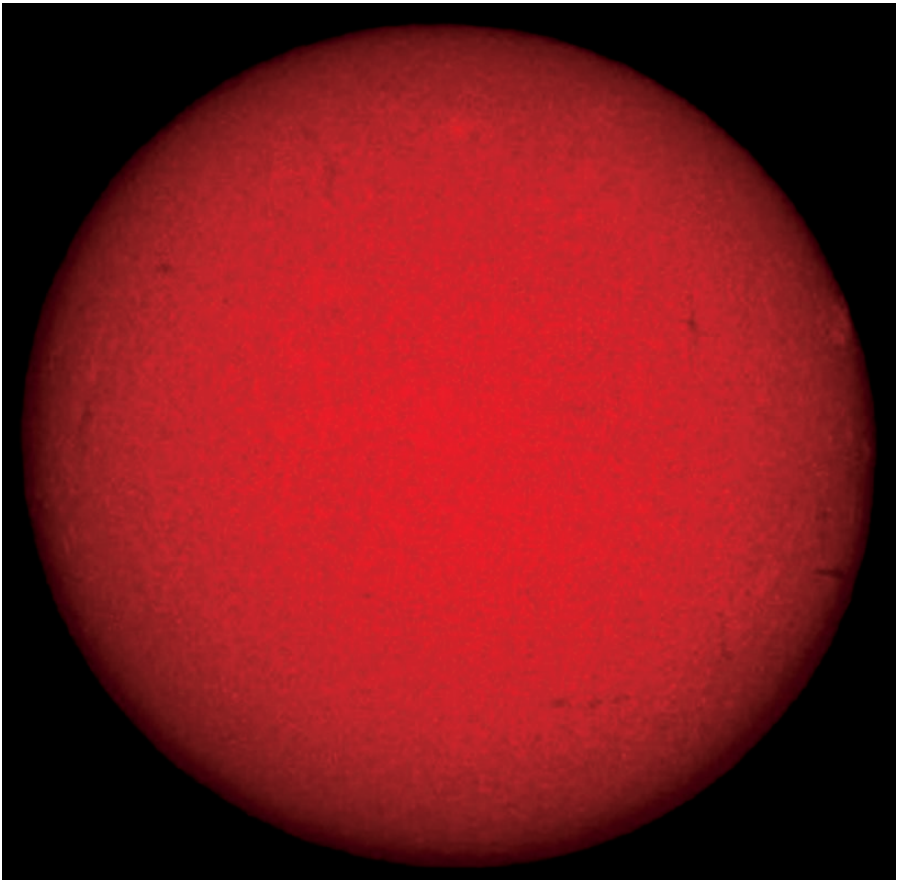
Like many amateur astronomers, I became interested in the Sun as an afterthought. Living in southern England, there is a period of about 7 weeks (more if you live in the Midlands or North) where there is little astronomical darkness at night. If you are at work or in education, it is practical to observe only on Friday and Saturday nights unless you have the ability to forgo sleep. The Moon and the Venus can sometimes be viewed in daylight and the brighter

planets and double stars can be viewed in twilight, yet the main object viewable in the day has to be the Sun itself.

The main drawback of viewing the Sun is safety. The Sun is not just bright, it is very bright and even looking straight at it without telescope or binoculars can damage your eyesight. Using a telescope or pair of binoculars without due care can cause blindness, and lack of attention can cause damage to your telescope.

Apart from being a welcome distraction that can be enjoyed during daylight without the need for pristine viewing conditions, the Sun is an interesting object in its own right. It may appear predictable but unlike the Moon and many other objects, it is anything but. It might follow certain patterns but its exact appearance on a day-to-day basis is far from predictable. Indeed, the hydrogen alpha view of the Sun can change in minutes, rather than hours or days, unlike most astronomical objects.

Figure P.1. Sun through a hydrogen alpha PST. Photo by Nick Howes.



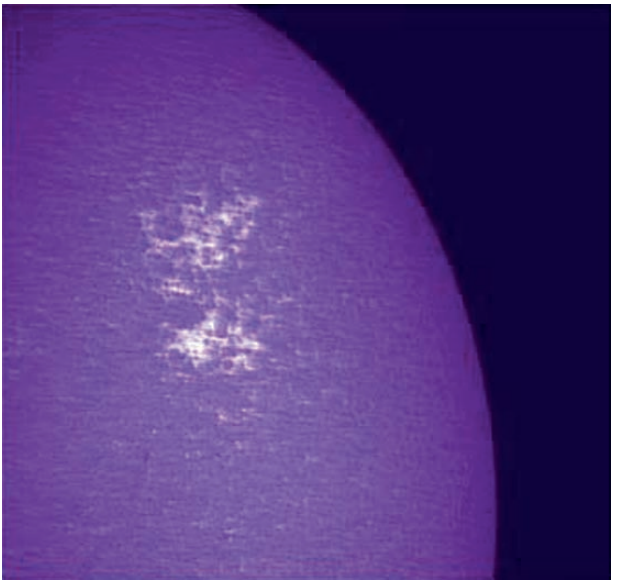


Figure P.2. Sun through a calcium K PST. Photo by Hiram Villarreal.

The Sun is the only chance for amateurs to see a star close-up. Over the past few years, the discs of relatively nearby red giant stars have been imaged with professional telescopes, but this is not available to amateur astronomers (at least not yet).

Whether you are interested in looking at the Sun from a scientific point of view or are interested in what is visible in amateur equipment, it is something you can get hours of enjoyment out of.

I have actually been amazed myself what it is possible to do with even a limited budget. Just as enterprising amateurs have taken some great photos of the night sky objects, so many have turned their attention to the Sun. The ability to buy and use expensive telescopes and photographic equipment is an advantage, but nice photographs can be obtained with modest equipment, as Figures P.1 and P.2 show.

Purpose

This book discusses the various options available for viewing and imaging the Sun using Coronado equipment. It covers the telescopes from the entry-level PST for the keen but financially challenged amateur to the top of the range MaxScope 90. It is the PST and MaxScope 90 that I have chosen to analyze in detail, but I have also provided sufficient information about the other telescopes to help you decide which purchase is most appropriate for you and how to get the best use out of it.

Apart from the convenience of ownership, I have covered the PST in detail, as it is the telescope that people are most likely to buy. To demonstrate the top of the range, Larry Alvarez has done a full write-up on the MaxScope 90.

Although the subject of the book is the Coronado range of telescopes and filters, I have included information about other manufacturers' equipment that can be used separately or in conjunction with Coronado products.

Neither myself nor my coauthors have been able to test every possible combination of equipment with accessories, but we have tried a reasonable amount of ideas that will help you to decide on a purchase and get the most from it.

Even if you are not interested in an imminent purchase, you may find the pictures interesting and you may get the opportunity to see through the telescopes at a public event.

Areas of Expertise

As most of my experience has been with the PST, eight coauthors have added information in their specialist areas in the following table.

CoAuthor	Areas of Expertise
Larry Alvarez	MaxScope 90
Cameran Ashraf	Double-Stacked PST
Marcello Lugli	Separate non-Coronado filters
Nick Howes	Imaging, PST CaK
Jeff Pettit	DayStar filters
Mike Taormina	CaK 70
Hiram Villarreal	PST CaK
John Watson	Mounting bracket for the PST