

Observing the Solar System The Modern Astronomer's Guide

Written by a well-known and experienced amateur astronomer, this is a practical primer for all aspiring observers of the planets and other Solar System objects. Whether you are a beginner or more advanced astronomer, you will find all you need in this book to help develop your knowledge and skills, and move on to the next level of observing.

This up-to-date, self-contained guide provides a detailed and wide-ranging background to Solar System astronomy, along with extensive practical advice and resources.

Topics covered include: traditional visual observing techniques using telescopes and ancillary equipment; how to go about imaging astronomical bodies; how to conduct measurements and research of scientifically useful quality; the latest observing and imaging techniques.

Whether your interests lie in observing aurorae, meteors, the Sun, the Moon, asteroids, comets, or any of the major planets, you will find all you need here to help you get started.

GERALD NORTH graduated in physics and astronomy. He was a former teacher and lecturer in both subjects, a former Guest Observer at the Royal Greenwich Observatory, and is now a freelance astronomer and writer. He is a long-term member of the British Astronomical Association and has served in several senior posts in their Lunar Section. He has published widely over the years and is the author of this book's popular companion volume *Observing the Moon: The Modern Astronomer's Guide* (Cambridge University Press, Second Edition 2007).

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Observing the **Solar System**

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GERALD NORTH B.Sc



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To
Mrs Joan E. North
my wonderful Mother
and to the memory of
Mr Gordon S. North
precision engineer,
horologist, man of many other skills,
and my much-missed Father.

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PREFACE

I still have my copy of the second edition of *Practical Amateur Astronomy*, the 'how to' book on astronomy that my parents bought me for the Christmas of 1971. The book was edited by Patrick Moore and contained chapters on practical astronomy written by British expert practitioners of the day covering their specialist fields. At the time I was thirteen years old and had already been interested in all the sciences, and particularly astronomy, for many years. However, my practical experience of astronomy at that time was limited to locating some of the more prominent astronomical objects and peering at them through the eyepieces of binoculars, a small terrestrial refractor, and a 3-inch (76 mm) Newtonian reflector. Back then that book seemed very advanced but I took what instruction I could from it and continued to pursue my interest in practical astronomy.

Practical Amateur Astronomy was a very useful book in 1971, giving the reader instruction in the then current activities of the more advanced amateur practitioners. In the main, the chapters were written by the directors of the various observing sections of the British Astronomical Association (BAA). Today that book looks very simple and quaintly old-fashioned, thanks to modern advances. A year earlier, I remember borrowing an early edition of Patrick Moore's *The Amateur Astronomer* from the local library. That book struck me as being extremely light on practical advice but it nonetheless provided a narrative of elementary general astronomy told from the perspective of the amateur. Despite my young age I had no trouble in understanding everything in that book, so it also helped me on my way. Other borrowed books, such as Nigel Calder's *Violent Universe* rounded out my knowledge and gave me some inkling as to professional astronomical researches carried out in the world-class observatories of the time.

Four decades later the whole amateur astronomical scene has changed beyond recognition. In addition, the gap in knowledge and expertise between beginners in astronomy and today's most-advanced practitioners has widened to a veritable chasm. A large range of equipment is now on offer to the prospective amateur astronomer at a vast range of prices. The unwary could waste much money if the wrong

equipment is chosen for given types of observing. There is also the question of what observational projects are possible and how does one best go about them, anyway?

I have written this book with the intention of it being most useful to those who perhaps already have a limited amount of knowledge and experience but wish to move up to the next level of observing, to the point at which some scientifically useful observing projects can be undertaken.

I should add that you don't have to do serious research work to enjoy astronomy as a hobby. In fact, only a small minority of practising amateurs submit observations to the observing sections of any of the national astronomical societies. Even if you have no desire to submit your own observations, astronomy is a hobby which becomes so very much more interesting and rewarding with just a little increase in effort and sophistication of approach. So, whether you want to raise your game to the point where you can begin to submit scientifically useful observations, or just enjoy your hobby a whole lot more, I have written this book for you.

Mindful of my own introduction to practical amateur astronomy via the books of Patrick Moore and other authors, I decided at the outset that part of this book should be given over to a general account of Solar System astronomy, though heavily biased towards the viewpoint of the amateur observer. Such knowledge will give meaning and purpose to the observational tasks I describe. Without that background knowledge the practical work would be sterile and pointless. Of course the purpose of this book **is** to be a practical guide and so the majority of the material in it does actually concern the mechanics, equipment and techniques of observing.

As well as being a member of the BAA since the late 1970s, I have for the last decade also been a member of a large and active local astronomical society. That society contains many members – some old and some young, some advanced and some at the beginner level. It has been very instructive for me to witness how many enthusiastic beginners, especially the youngest of them, are great with computer software and all things Internet but are very lacking in some of the basic theory and practice of astronomy. They can very quickly learn a plethora of things technical but remain ignorant of many of the basics of setting up and handling telescopes.

Even what seemed to me to be obvious techniques that allowed me to see things to the best effect through telescopes back in the 1970s remain a closed book to many of today's apprentice astronomers. That is not due to any failing on their part. It is a combination of there being

so much to learn these days, blended with today's fashion for all things push-button and computer-related. If I was starting out today in astronomy I am sure I would be bewildered, maybe even intimidated, without some sage advice from a friend or perhaps a friendly book.

That observation has informed how I selected the material for this book and how I have organised that material within it. I have, for instance, given more space in this book to basic techniques of visual observing than would be justified if the book was proportioned to reflect the average of the activities of the more advanced amateurs today. Today's advanced practitioners heavily use imaging devices and computers with their computer-controlled telescopes and seldom, in many cases never, observe visually. However, even the most advanced of them started out as beginners, undoubtedly then spending a great many pleasurable hours peering through telescope eyepieces.

Please, dear reader, do not be insulted or irritated when you come across materials which you find very elementary, as I have no doubt you will. I have done my best to make this book useful for the maximum number of its readers – and that must include those who already know quite a lot, those who currently know not much, and those who know a lot but still have gaps in their knowledge and experience.

As much as is possible I have organised the book with the easiest topics first. Indeed, you can undertake the practical work described in Chapter 1 even if you do not own a telescope. To a large extent the chapters that follow each build on the earlier ones, in the process covering the fullest range of activities you might wish to undertake.

I have been observing the skies for four decades and still find the experience immensely enjoyable and rewarding. I hope that you, too, will enjoy the views of the alien worlds and other celestial bodies and phenomena that our Solar System has on offer. Perhaps this book can help along your way towards maximising that enjoyment. I hope that it may also help you undertake work that is scientifically useful, if that is your desire. It might even lead to a consuming interest that will last you for a very long time to come. Whatever your desires, I hope that you enjoy reading this book and I wish you the best of luck in your future endeavours.

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