

# ***Secrets of the Deep Sky***

***by***

***The Editors of  
One-Minute Astronomer***

P-59856

NGC 4278

γ Com

14 Com

16 Com

12 Com

7 Com

NGC 4559

NGC 4494

NGC 4565

23 Com

GC 4725

11 Com

M85

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## Introduction

Most new stargazers aim their telescopes at bright, nearby celestial objects like the moon, Jupiter, Mars, and Saturn. This is perfectly natural, of course, since these objects are easy to find and present a wealth of detail in a small telescope. And these bright sights, along with others in the solar system, can easily provide a lifetime of exploration and enjoyment for a backyard astronomer. If that's all there was to see, amateur astronomy would still be a challenging and worthy pastime.

Of course, there is more to see beyond our solar system... a whole universe of sights of stunning beauty and infinite variety. That's why it's not long before a backyard astronomer feels the deep desire to look beyond our own celestial backyard into the deep sky, the realm of our own Milky Way galaxy and beyond into the reaches of intergalactic space.

But finding and seeing faint objects in deep space is a little more challenging than observing the moon or Saturn. Many new stargazers are intimidated by finding faint galaxies and nebulae and star clusters with their telescopes. What's worse, upon finding these sights, many beginners are disappointed by the appearance of these objects because they haven't learned to see fine detail through a telescope. And they may not appreciate the awesome natural forces at work in the dim objects in their field of view of their telescope.

This book helps solve these problems. It presents the basics of how and where to find and observe faint objects in the deep sky beyond our solar system, including galaxies, nebulae, star clusters, and multiple and peculiar stars. And it goes through a little of the science behind these objects, so an observer's imagination and intellect can fill in the details a telescope leaves out. A dim, tiny smudge in your eyepiece is so much more impressive when you know it's the sum total of the light from a trillion stars.

For beginning stargazers, or those whose knowledge has lapsed from years away from the telescope, the first sections of this book start out with the basics of the layout and apparent movement of the sky. It covers the main points and planes of reference and the system of celestial coordinates used to locate and specify the positions of objects in the sky. Some tips are also given about how to read star maps, and how to estimate angular distances in the sky. Then, short tours of the night sky get the reader oriented to

what constellations are visible in each season in both the north and south hemispheres, and what types of deep sky objects are generally visible at each time of year.

The next section presents basic information on equipment for the deep-sky observer: telescopes, binoculars, filters, finders, and mounts. And since the best equipment in the world isn't worth much unless the observer has the skill to use it, this section presents the key techniques for seeing faint objects in a telescope.

Then it's time for a bit of science. A little about variable stars and binary stars and the two main types of star clusters. How stars form and evolve and die. How different sorts of nebulae generate light. And a little about galaxies and galaxy shapes. This isn't a comprehensive view, just enough to get a taste of the physical nature of the main types of deep sky objects.

The last section of the book presents detailed summaries and tours of more than 40 deep-sky objects that present excellent views in a small telescope, or in some cases, simply with binoculars or the unaided eye. Almost all of the objects can be seen from most populated areas of the world; a few, as indicated, can be seen only from the northern or only from the southern hemisphere. Objects of all types are chosen: open and globular star clusters, spiral and elliptical galaxies, double, triple, and multiple stars, pulsating and eclipsing variable stars, and diffuse and planetary nebulae where stars are born and die. They're all here. The list is but a short sampling of the thousands of deep-sky objects (or DSO's) visible to backyard astronomers, but it gives a taste of what can be seen by a skillful and enthusiastic observer with modest instruments.

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Observing the wonders of the deep sky takes a little effort. But it's worth it. If you read this book carefully, and get out with your telescope to practice what you learn, you will develop a level of expertise that few can match, and see sights that most can scarcely imagine.