

Introduction

He who gazes at the stars unavoidably starts thinking.

— Gerhard Staguhr

You're on a deserted beach at night staring into a crackling driftwood campfire, the sound of the rhythmic breakers in your ears, the air soft but scented with the tang of wood smoke and sea. Perhaps you are alone, or perhaps a few good friends are with you. It doesn't matter, because now you look upward. The sky is clear, the stars are out, and you can trace the Milky Way arching overhead and plunging to the horizon. After the wows have been voiced, the inevitable deep thoughts begin to come unbidden, conveyed as a chordal blend of emotion and reflection. What to make of it all? What, indeed.

Most people find the starry sky a vast meditation, but a meditation on what exactly? That depends on the individual, but whatever the mantra of the day, it is probably existential in nature. What is the meaning of life? Why am I here? Is there, or is there not, a supreme being? Is anyone or anything out there looking back?

Of course, if you're an amateur astronomer, you might also look at the stars and think, *the transparency is good tonight but the seeing is dreadful*, which is only natural. Nevertheless, we wager that most if not all astronomers, whether they are amateurs or professionals, occasionally step back from their empirical appraisals to dwell on the mystery and grandeur of the universe. Experience tells us that wonderment arises in the afterglow of scientific discovery, and is the heady incentive for further research. You can't have one without the other.

While it is good for the soul, wonderment is also fun to pass along, like offering someone their first glimpse of Saturn or the Moon through a telescope. Toward that end, we are happy to present volume 5 of *Annals of the Deep Sky*. We think our selection of stars and nonstellar objects will compel you to revisit and reappraise old celestial acquaintances, as well as seek out new ones for first-time scrutiny. Along the way, we hope you will find yourself delighted and enlightened and, of course, full of wonder.

We begin in Centaurus, a largely southern constellation that can be appreciated from southerly latitudes in the Northern Hemisphere. Two of the Centaur's most prominent, sought-after observing targets are Omega Centauri (NGC 5139) and Centaurus A (NGC 5128). Once considered just a globular cluster, albeit the brightest in the night sky, Omega Cen is now seen as the former nucleus of a dwarf spheroidal galaxy. In fact, it may be just one example of many globular clusters-cum-galactic nuclei in the Milky Way. As an object of beauty there is no question, and we have the images to prove it. But check out Bertrand Laville's amazing eyepiece impression on **page 69**. One can easily mistake it for a photograph in negative format.

If you are a fan of deconstructing peculiar galaxies, Centaurus A is for you, beginning with that mind-blowing broad belt of dark equatorial dust, which immediately sets it apart from every other galaxy. But when you also toss in jets and counterjets, a population of young stars coincident with the equatorial dust, nested radio lobes and shells, and an active nucleus, you end up with a galaxy that is decidedly *recherché*.

There are, of course, plenty of other celestial vistas in Centaurus, including the Scorpius-Centaurus Association with its flock of moving stars; NGC 5367, a star-forming region floating high above the Galactic plane; NGC 5286, perhaps one of the oldest globular clusters in the Milky Way; and NGC 5253, a nearby starburst galaxy.

Moving well into the northern sky, we explore the constellation Cepheus, which, although it doesn't offer much to the unaided eye, is no wallflower in the telescope. We profile Mu (μ) Cephei, also known as Herschel's Garnet Star and famous

for its deep red hue. Double-star aficionados will also appreciate Xi (ξ) Cephei, one of the finest multiple stars in that part of the sky. Star-forming regions are arrayed throughout the constellation like steppingstones. One of the most notable of these is IC 1396, home of the Elephant Trunk Nebula and numerous embedded young stellar objects. Other stellar hotbeds include NGC 7380 (stars and associated nebulae), Sh 2-155 (involved with the Cepheus OB3 association), and the emission region NGC 7822, consisting of hot, young stars and dust pillars. Any of these are perfect for imagers looking to bring out the delicate structures inherent within these objects.

Cetus the Whale's most famous luminary, Omicron (\omicron) Ceti, is the prototype for its class of pulsating, long-period variable stars, with exceedingly rarefied outer atmospheres. Mira is remarkable for having a companion and for being enveloped in a circumstellar envelope 10 to 20 times larger than the star itself. Later, we explore the sun-like star Tau Ceti and recollect its role in the first active search for extraterrestrial intelligence, Project Ozma. Cetus is also known for some of its prized galactic specimens, including the Magellanic dwarf irregular IC 1613 and the nearest Seyfert 2 system, M77. Amateur astronomer Isaac Roberts took one of the first photographs of this galaxy in 1892, and we offer a sidebar on this pioneering astrophotographer.

Finally, we dive back into the southern sky with Chamaeleon, the Chameleon. It would be a mistake to ignore this humble constellation, as it hosts the spectacular Chamaeleon Molecular Cloud complex, a nearby region of ongoing active star formation and an imager's delight. Other objects of interest include the reflection nebula IC 2631; NGC 3195, a smaller version of the Dumbbell Nebula; NGC 3620, a nearly edge-on galaxy; and NGC 2915, a challenging but intriguing dwarf spiral.

Inspiration and transcendence may be found anywhere in nature, from the grandeur of a mountain scene and stunning rock formations to a sunset or sunrise over an expansive ocean. It may even be apprehended in the subatomic universe, where the idea of infinity is just as overwhelming as on the macroscopic level. But we think nothing beats a sky full of stars, with

or without optical aid, for stimulating the muse in us all. Clearly, there is more than enough wonderment to go around.

Note to readers: We are now sufficiently far enough along in this series that we should alert first-time readers, and those who have not read the introduction in volume 1 (page 2), about how *Annals* arranges its object profiles. Apart from the stars in each constellation, the Galactic and extragalactic nonstellar objects are organized, whenever possible, by distance — with the objects nearest the Sun profiled first, then proceeding to ones that are more distant. We realize this goes against typical conventions of compiling objects either by right ascension or by brighter to faintest, but we believe this imparts a sense of spatial dimension as to where these objects are located in the universe with respect to our solar neighborhood and each other.



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