



DEEP-SKY OBSERVING

This inventory of 109 deep-sky treasures rivals Charles Messier's list in diversity and delight. /// TEXT BY MICHAEL E. BAKICH /// IMAGES BY ADAM BLOCK

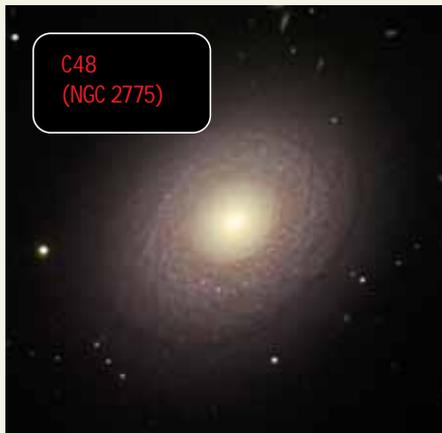
The Caldwell Catalog

M11. M20. M31. Every amateur astronomer recognizes these designations because this trio of deep-sky objects is found on the list of 18th-century comet hunter Charles Messier. M11 is the Wild Duck Cluster in Scutum; M20 is the Trifid Nebula in Sagittarius; and M31 is the Andromeda Galaxy. But what if the letter C replaces the

M in front of those numbers? Would you recognize C11, C20, and C31? This trio of deep-sky objects is also well known, but perhaps not by these designations. The C stands for Caldwell, or more specifically, for Caldwell-Moore, the full surname of well-known British astronomy popularizer Sir Patrick Moore. When it came time to place an identifier by each of the numbered objects in his list, he couldn't use M for Moore because that letter was taken already (by Messier), so he chose the next best thing. Oh, and in case you're still wondering, C11 is the Bubble Nebula (NGC 7635) in Cassiopeia, C20 is the North America Nebula (NGC 7000) in Cygnus, and C31 is the Flaming Star Nebula (IC 405) in Auriga.

Moore devised his list in 1995 as a grand tour of celestial objects similar to Messier's. But where Messier's list is limited to objects that can be seen from the latitude of Paris (+48°51'), where Messier made his observations, Moore expanded his candidates to those ranging from high northern latitudes (+85°20') to low southern latitudes (-81°). This somewhat evens the score between Northern and Southern Hemisphere observers because 34 Caldwell objects are invisible from Paris's latitude, and five others never climb more than 3°

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above the southern horizon there. Included in this "invisible from Paris" group are standout objects such as the Tarantula Nebula (C103), the Coal Sack (C99), and the two finest globular clusters in the sky, 47 Tucanae (C106) and Omega Centauri (C80).

What was he thinking?

When the Caldwell Catalog made its initial appearance, some amateur astronomers railed at the audacity of Moore to name the list after himself:

"How dare he!"

"Many of these objects have names!"

My reaction was somewhat different: "Why didn't I think of that?" The *Bakich Catalog*. Now that has a nice ring, don't you think? Whatever your opinion is about it, the Caldwell Catalog contains 109 great deep-sky objects to observe.

Regarding object selection, relative to Messier's list, Moore slightly reduced the numbers in certain categories while increasing others. So the number of star clusters (both open and globular) and galaxies was reduced slightly, but the number of nebulae was increased. Only four planetary nebulae made Messier's list, but Moore placed 13 in the Caldwell Catalog. Likewise, Moore increased the number of bright nebulae from five to 12.

Moore also distributed his objects more widely across the sky. Sagittarius and Virgo, which have 15 and 11 Messier objects, respectively, have only one Caldwell object each. Perhaps Moore thought most of the great objects in those constellations were taken. In fact, you'll find more Messier objects per constellation than Caldwell objects. Cassiopeia, Centaurus, and Cygnus each contain six Caldwell objects — the most found in any constellation. Fifty of the 88 constellations contain Caldwell objects as opposed to 34 that contain Messier objects.

Moore numbered the objects in his catalog by declination. He started in the northernmost region of the sky with C1 (NGC 188, an open cluster in Cepheus) and ended near the South Celestial Pole with C109 (NGC 3195, a planetary nebula in Chamaeleon).

Moore's final stipulation was that each of the Caldwell objects be observable with a 4-inch telescope from a dark location. In fact, many of the objects on Moore's list are visible in binoculars, and some even can be seen with the unaided eye. Others are more difficult to see, and although they can be glimpsed through a 4-inch scope, a larger instrument brings out their subtle details. ■



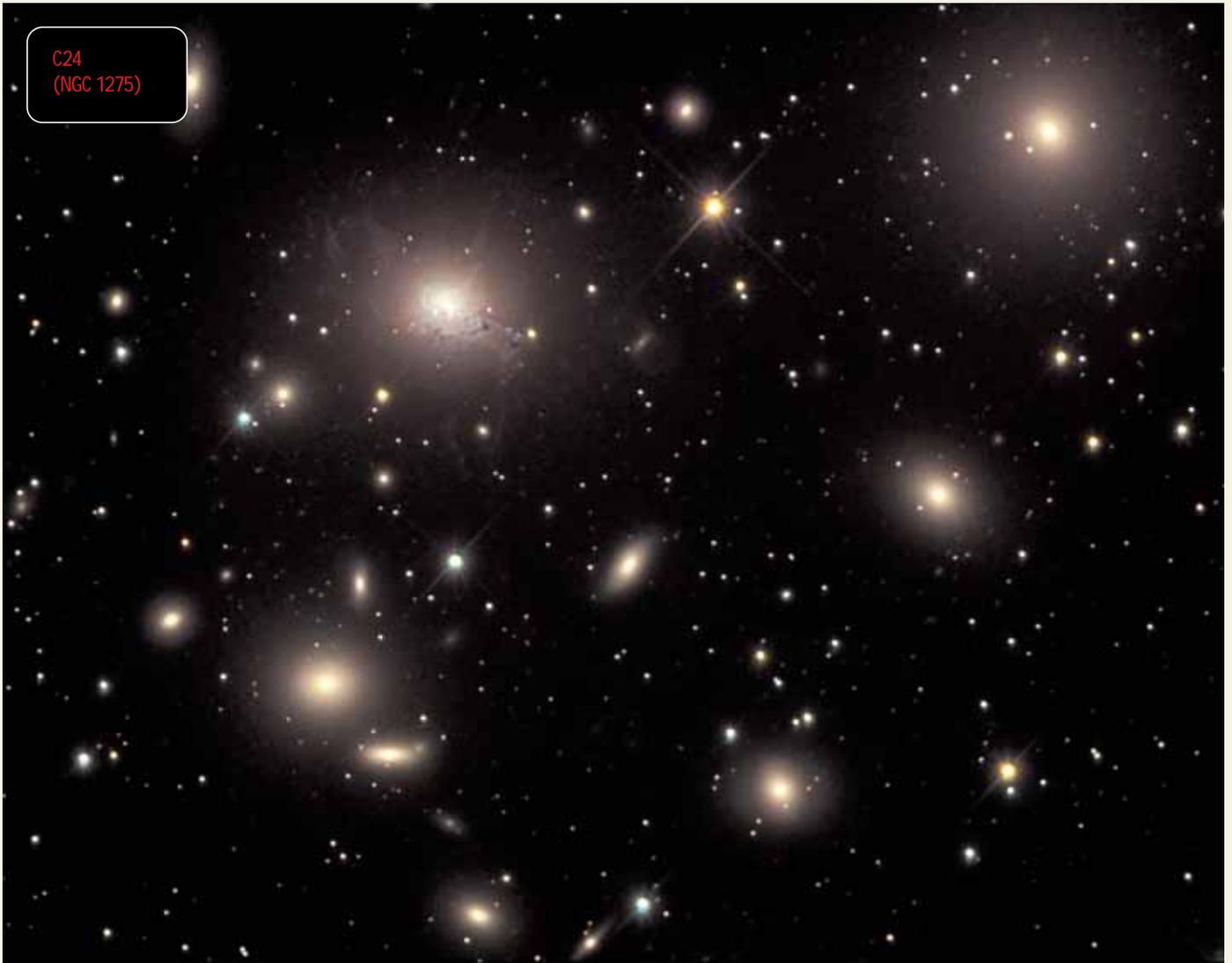
Download a Caldwell object checklist and finder chart at www.astronomy.com/toc

C20
(NGC 7000)

C21
(NGC 4449)



C24
(NGC 1275)



/// THE BAKICH TOP 10 CALDWELL OBJECTS

In the spirit of my favorite late night talk show host — and fellow amateur astronomer — David Letterman, I put together my Top-10 favorite Caldwell Objects. To help you find these and the rest of the Caldwell objects, visit www.astronomy.com/toc for a Caldwell checklist and maps showing the Caldwell object locations.

C #	NGC/IC	Const.	Type	R.A.	Dec.	Mag.	Size	Description
14	869/884	Per	OC	2h20m	57°08'	5.7	29' and 29'	Double Cluster
22	7662	And	PN	23h26m	42°33'	8.3	0.3'	Blue Snowball
53	3115	Sex	E6G	10h05m	-07°43'	8.9	8.1' x 2.8'	Spindle Galaxy
59	3242	Hya	PN	10h25m	-18°38'	7.8	0.3'	Ghost of Jupiter
63	7293	Aqr	PN	22h30m	-20°48'	7.3	13'	Helix Nebula
80	5139	Cen	GC	13h27m	-47°29'	3.5	36.3'	Omega Centauri
92	3372	Car	BN	10h44m	-59°52'	3	120' x 120'	Eta Car Nebula
94	4755	Cru	OC	12h54m	-60°20'	4.2	10'	Jewel Box
99	—	Cru	DN	12h53m	-63°00'	—	400' x 300'	Coal Sack
106	104	Tuc	GC	00h24m	-72°05'	3.8	30.9'	47 Tucanae

Key to object types: BN = Bright nebula GC = Globular cluster OC = Open cluster EG = Elliptical (type) galaxy
DN = Dark nebula PN = Planetary nebula

C65
(NGC 253)



/// THE ADVANCED OBSERVING PROGRAM

Images like the ones in this story are among the finest taken by amateur astronomers, and now you can learn how to capture similar high-quality pictures. The Kitt Peak National Observatory Visitor Center offers an advanced observing program (AOP) geared toward amateur astronomers and others interested in using a large telescope with state-of-the-art instruments. No previous experience in astronomy is necessary. You can observe at the world's largest optical observatory under the superb sky of the southwestern United States. Guests who participate in this program are treated as visiting astronomers with complete access to the Visitor Center's considerable resources. Observe from an excellent site, dine with other astronomers, and above all, enjoy exploring the universe.

When you sign up for the AOP, the options available in the course of a night are quite diverse. The program's friendly staff will help you learn everything you might want to know. Create beautiful color CCD images of galactic nebulae; photograph star clusters; record video footage of the Moon and planets; take colorful, wide-field images of the night sky using film and a 35mm camera; perform a supernova or asteroid search; or just enjoy visual observing through large telescopes equipped with high-quality eyepieces.

If you are interested in this program, e-mail Adam Block at ablock@noao.edu, or call 520.318.8728. See full details at www.noao.edu/outreach/aop.

