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Reflector

PHOTOGRAPHING THE ENTIRE MILKY WAY
BUILDING A PERSONAL OBSERVATORY
EDWIN HUBBLE'S "EUREKA" MOMENT
AMATEUR SLEUTHING FOR EXOPLANETS



ing hemisphere. Ultraviolet light from the Sun darkened this material. Once enough material had accumulated, the process of sublimating ice would continue without accumulating any additional material.

Iapetus is one of the most bizarre moons in the Solar System. Its striking albedo contrast along with the equatorial ridge and lack of hydrostatic equilibrium makes Iapetus a true moon of mystery.

—Berton Stevens

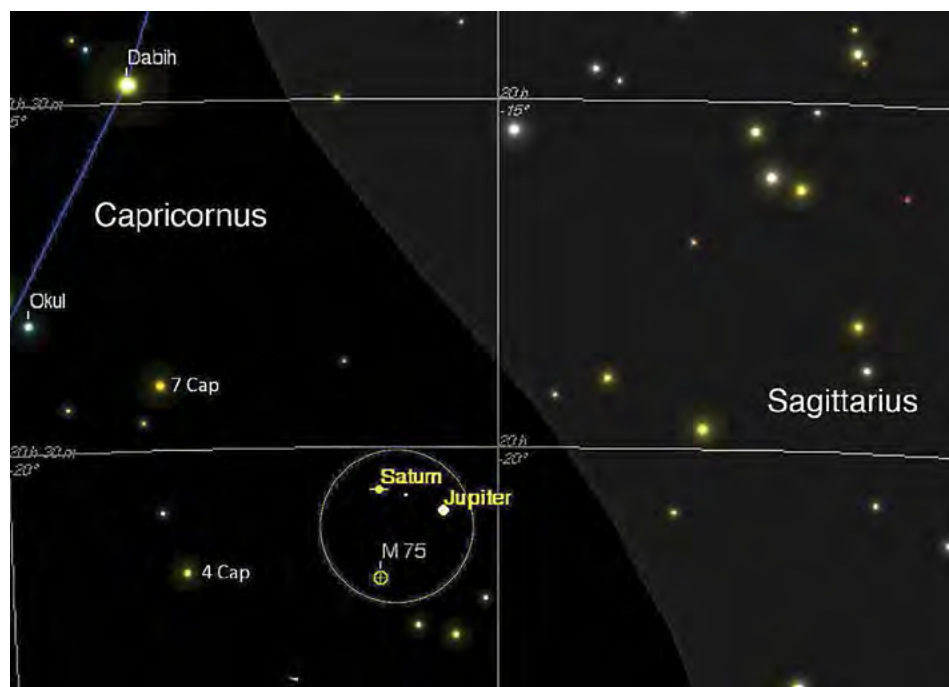
Editorial note: We have processed the images in this article to make low-contrast features more visible in the printed magazine.

Deep-Sky Objects

GLOBULAR CLUSTER MEETS GAS GIANT PLANETS

One of my favorite classes of deep-space objects to view in telescopes is globular star clusters. Globular clusters contain a hundred thousand to millions of stars in one collection. Unlike galactic or open star clusters that contain many fewer stars, the mass contained in globular clusters is sufficient for the gravitational force to keep all of the stars bound together. The Milky Way Galaxy may contain close to two hundred globular clusters. Unlike most objects in the galaxy that orbit in the galactic disks, globular clusters form a spherical halo in the outer reaches of the galaxy and circle the galaxy in random orbits. Most globular clusters are very old, dating back to the formation of the galaxy.

What is great about globular clusters is they



can be seen in any size of telescope. In small telescopes, they may appear as unresolved "globs" (the nickname for these clusters). Small telescopes may begin to resolve individual stars in the nearest globular clusters using higher magnifications. Many of the Milky Way's globular clusters are resolved into hundreds or thousands of stars with an 8-inch telescope. The view is especially exciting in even larger-aperture telescopes.

Near the end of summer and early fall, the constellation Sagittarius rides above the southern horizon as twilight fades to darkness. Most globular clusters are listed in the New General Catalog (NGC). A scan of the NGC list shows there are more globular clusters in Sagittarius (21) than in any

other constellation.

The easternmost globular cluster in Sagittarius is M75 (NGC 6864). M75 is neither the largest nor the brightest of the globular clusters in Sagittarius. But its location along the border of Sagittarius and Capricornus means that it is outside of the glow of the Milky Way. Thus, its stars are not lost among the countless stars in the galactic plane. M75 shines at magnitude 9.1 and is roughly 6.8 arcminutes in diameter. Compare this to Sagittarius's best globular cluster, M22, which is magnitude 5.1 and 32 arcminutes in size. M75's smaller and dimmer stars are a result of its distance, 67,000 light-years; M22 is only 10,400 light-years away. Were M75 as close as M22, the two clusters would be comparable in brightness and size.

M75 does not lie near any bright stars. It is located roughly eight degrees south-southwest of the third-magnitude star Dabih (Beta Capricorni). To star hop to it, start at Dabih and move 4.5 degrees south to magnitude 5.2 Sigma Capricorni (7 Capricorni). Another 2.75 degrees south and slightly west of 7 Capricorni lies 4 Capricorni (magnitude 5.8). M75 is 2.75 degrees due west of 4 Capricorni.

My image of M75 was taken with a 10-inch f/6 Newtonian with a Paracorr Type-2 coma corrector and an SBIG ST-2000 XCM CCD camera. The exposure was 40 minutes. The brightest star in the image on the lower left (southeast) edge shines at magnitude 10.6. The faintest stars are magnitude 18.

M75 is a dense cluster with a relatively bright core and circular appearance. The core may appear east of the center, an artifact of brighter stars on



the west side from our vantage point. The best views will be at magnifications between 100x and 200x, which will allow more stars to be resolved.

M75 lies close to the ecliptic and has been doing a dance with the giant planets Jupiter and Saturn since the spring. Outer planets trend eastward along the ecliptic, except when approaching opposition when they begin retrograde (westward) motion. Jupiter made it almost as far east as M75 last May before it began moving west. Saturn, on the other hand, passed east of M75 in March, turned around and then passed west of it in July.

After reaching their respective oppositions, Jupiter and Saturn continue their prograde motion along the ecliptic and catch up to M75 in December. For a few days around December 12, both planets will be in the same telescopic field of view with M75 low in the southwest as astronomical twilight ends. The accompanying finder chart for M75 shows the positions of Jupiter and Saturn on December 12, 2020. The circle around M75 and the planets is the field of view through my William Optics 132 mm f/6 APO with a 26 mm Tele Vue Nagler eyepiece. All three objects will be visible simultaneously in the 2.3-degree true field of view.

Whether you are in Sagittarius this autumn hunting star clusters or just viewing the gas giant planets, it's worth making a short hop over to M75. The eyepiece that provides the best detail on Jupiter and Saturn will likely be the best eyepiece to spy this distant globular star cluster.

—Dr. James R. Dire
Kauai Educational Association
for Science and Astronomy

Library Telescopes

YOUR ASTRONOMICAL LEAGUE JUST GAVE AWAY SIX LIBRARY TELESCOPES!

Through the vision of the Horkheimer Charitable Fund, the Astronomical League again offered a free Library Telescope to a lucky Astronomical League club in each region, plus one to a Member-at-Large.

The Library Telescope consists of a 4.5 inch Dobsonian reflector fitted with an 8–24 mm zoom eyepiece, and a name plate commemorating the late Jack Horkheimer. The value of this opportunity is approximately \$300; the potential is enormous.

The Library Telescope program was initiated

twelve years ago by the New Hampshire Astronomical Society and has grown into a nationwide presence. Clubs donate an easy-to-use portable telescope with quality optics and a sturdy mount to their local library. Patrons can then check it out as they do books.

Thank you to the Horkheimer Charitable Fund, Orion Telescopes, and Celestron for making this wonderful program possible!

CONGRATULATIONS TO THE 2020 WINNERS:

Tucson Amateur Astronomy Association, WRAL
Howard Astronomical League, MERAL
Island County Astronomical Society, NWRAL
Lowcountry Stargazers, SERAL
Door Peninsula Astronomical Society, NCRAL
Amateur Observers' Society of New York, NERAL

New AL Award

THE ASTRONOMICAL LEAGUE HAS RECENTLY APPROVED A LIBRARY TELESCOPE AWARD

This is similar to the highly successful Outreach Award. A Library Telescope is a telescope owned by a library that is made available to adult library patrons for borrowing just like a book. Generally, the telescope is a modified Orion StarBlast 4.5-inch reflector. The new award recognizes the activities that Astronomical League members perform in promoting and assisting successful Library Telescope programs.

The Library Telescope Award has two levels: silver and gold. The silver level requires 20 hours

of Library Telescope activities and is recognized with a certificate. The gold level requires an additional 80 hours (100 hours total) of Library Telescope activities and is recognized with a certificate and pin.



I can't think of a better way to promote astronomy than to make a reasonably high-quality, yet relatively inexpensive, telescope available to the public. Enabling library patrons to use a telescope, maybe for the first time, and maybe with their children, may spark the passion that we all have for this great hobby.

For more information on the Library Telescope program see LibraryTelescope.org and the Library Telescope Facebook page (facebook.com/LibraryTelescope). In addition, we expect to have a video event describing the Library Telescope Award sometime in September. Further details on the award are available on the Astronomical League website in the Observing Programs and Awards section.

As the initial Library Telescope Award coordinator, I am looking forward to receiving your submissions.

—Tom Lynch

This sketch of M83 was submitted by member-at-large Roy Troxel of Taos, New Mexico. It was made using an 18-inch f/4.5 reflector, operating at 171x in 3/5 seeing, with a field of view of 0.4°.

