Reflector

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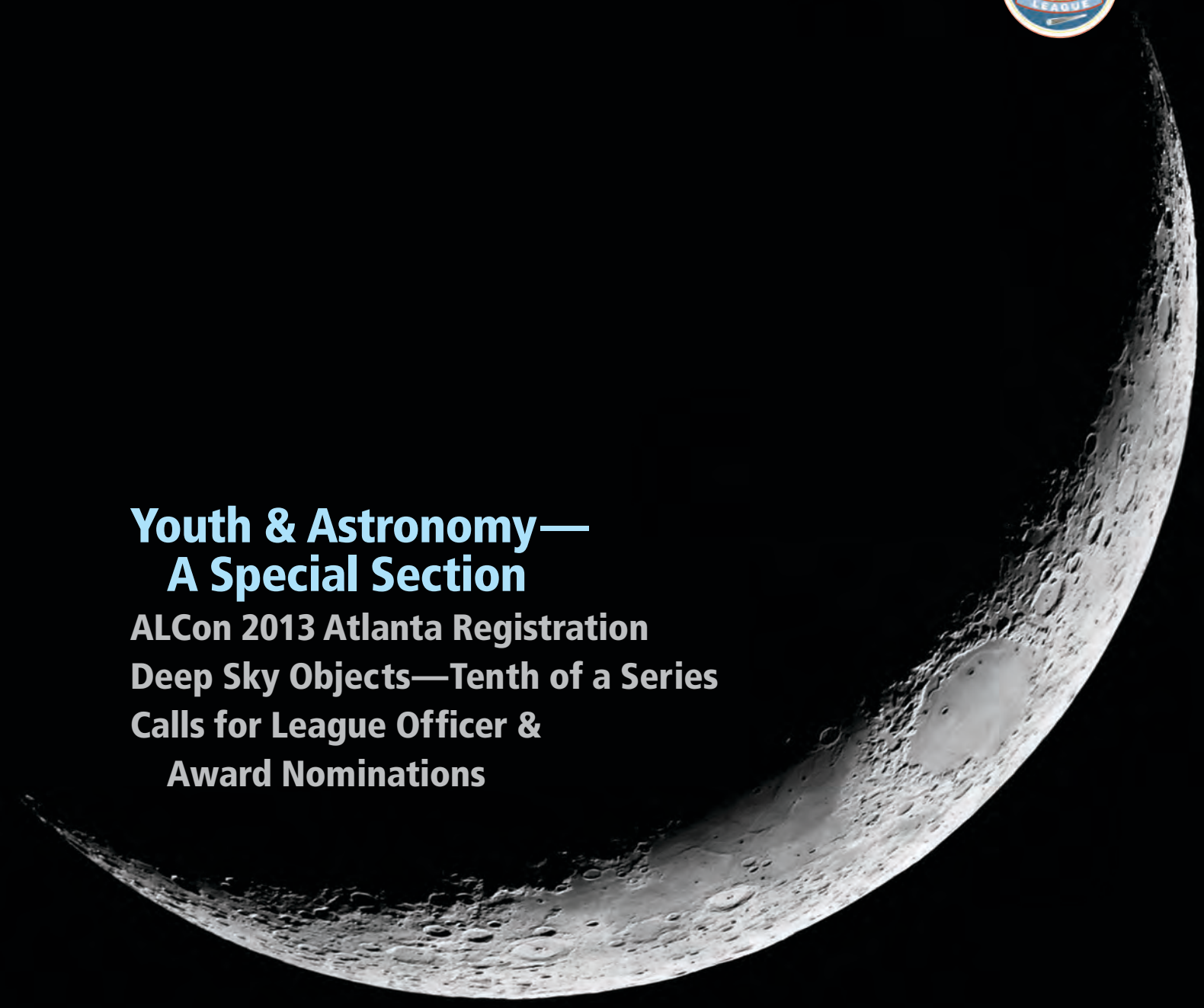

Youth & Astronomy—A Special Section

ALCon 2013 Atlanta Registration

Deep Sky Objects—Tenth of a Series

Calls for League Officer & Award Nominations

DEEP SKY OBJECTS
TENTH OF A SERIES
PLANETARY OBSERVATIONS FOR YOUNG ASTRONOMERS

By Dr. James Dire, Kauai Educational Association for Science & Astronomy

I am going to digress from my usual deep-space topics this month and contribute to this special issue on youths in astronomy. Since other pages of this issue address the challenges we face today motivating young people toward the sciences, I use this space to offer some simple astronomy projects to focus young minds and to keep their interest.

I began my career in amateur astronomy at the age of 13, when I purchased a 60 mm f/10 refractor. This was the first thing I ever purchased with money I earned. Unfortunately, this telescope had very poor optics, terrible eyepieces, and a very flimsy alt-azimuth mount and tripod. But the box it came in said it could achieve 650x and it had fascinating pictures of planets and galaxies on the cover, which I was sure meant they were visible in this telescope. How many of those have been purchased over the decades and ended up collecting dust in basements after a few fruitless and disappointing attempts using them?

Fortunately mine didn't! While I never spied a deep-space object in this telescope, I used it regularly to view the Moon, Jupiter and its four Galilean moons, Saturn with its splendid rings, and the changing phases of Venus. I used the telescope to find Mars, too, its disk distinguishing it from a red star, but I never resolved its polar ice caps or other surface details. My less-than-stellar telescope (just had to throw in this pun) did have one superb accessory: a small white metal screen attached to a rod that clamped onto the focuser to allow solar projection. It was fascinating focusing a solar image onto this screen and viewing sunspots.

In my early teen years, I began following the paths of Mars, Jupiter, and Saturn across the constellations. Later I learned how to identify Venus as the morning or evening star, and not long after that how to identify Mercury in morning or evening twilight whenever it was present. Eight years after purchasing the refractor, I upgraded to a superb Criterion 6-inch Newtonian. Now I was able to find Uranus and Neptune, too. To this day, I still follow where the seven planets are in the heavens.

Jupiter and Hyades star cluster. Photo by Dr. James Dire

One of the most important things required to keep a young person's interest in astronomy is an adult mentor. I had a great mentor in my early teen years: past Astronomical League president and solar eclipse enthusiast, Russell C. Maag. Russ was the director of my hometown's college planetarium and throughout my teen years he gave me lots of pointers on using telescopes, astrophotography, and viewing eclipses. On Russell's advice, I studied as much science and math in high school as I could and majored in physics and chemistry in college, which were important precursors to my professional career in astronomy.

I started experimenting with astrophotography as a teen, using a 35 mm SLR camera attached to my 60 mm refractor at prime focus. The easiest objects for a beginner to image through a telescope are the Moon and Sun (with an appropriate solar filter over the aperture). The exposures are short enough so that telescope tracking is not necessary. To keep the shutter from vibrating the telescope on my flimsy mount and blurring the image, I usually had the camera attached to a separate tripod when it was connected to the telescope. While my early results were not impressive enough to make the cover of this magazine, I was proud to have images of lunar craters and sunspots to call my own.

I progressed to doing piggyback photography with the camera and lens riding atop my polar-aligned and tracking Newtonian. This was great for capturing whole constellation pictures or parts of the Milky Way with a 28 mm or 50 mm lens, or large nebulae and galaxies like M32 and M42 with 100 to 300 mm lenses.

With today's vast selection of digital SLR cameras, a beginning astronomer can capture pretty cool images with just the camera (and lens) on a tripod—no telescope required. Consider the accompanying image of Jupiter and the Hyades star cluster. I acquired this image in December 2012 with a Canon 30D SLR camera with a 100 mm f/2 lens (set at f/4) on a tripod. As always, I used a shutter release cable to actuate the shutter so as to not vibrate the camera during an exposure. I set the camera's ISO to the maximum (1600 for this camera, newer cameras can go much higher) and determined the maximum exposure I could take without the stars forming trails was 5 seconds. I then took twelve 5-second exposures and aligned and combined them to create the image here. You don't need a 100 mm lens to duplicate my efforts. A 50 mm lens would still work great. If your DSLR camera has a stock 18–55 mm lens, you will have a range of focal lengths with which to experiment. A middle school student should easily be able to master how to take and process digital images such as mine here!

While the naked-eye planets are easy to find and image in this manner, if you know where in the sky Uranus or Neptune reside, they can be imaged using the same technique. However, to identify which object is actually the planet, you'll need to take images several days apart and find the "star" that has moved. Following the motion of any planet using a digital camera makes a great long-term project for a budding young astronomer.