The Denver
OBSERVER
AUGUST 2014

THE CAT'S MEOW (NGC 5334)

From a 2013 press release from Harvard-Smithsonian Center for Astrophysics, "Most skygazers recognize the Orion Nebula . . . is far from the most prolific star-forming region in our galaxy. That distinction may go to one of the more dramatic stellar nurseries like the Cat's Paw Nebula, otherwise known as NGC 6334, which is experiencing a 'baby boom.' NGC 6334 is forming stars at a more rapid pace than Orion—so rapidly that it appears to be undergoing what might be called a burst of star formation," said lead author Sarah Willis of the Harvard-Smithsonian Center for Astrophysics (CfA) and Iowa State University. It might resemble a 'mini-starburst,' similar to a scaled-down version of the spectacular bursts sometimes seen in other galaxies."

Image © Joe Gafford

Calendar

3..... First quarter moon
10..... Full moon (the largest of 2014)
12..... Perseid meteors peak
17..... Last quarter moon
20.....Jupiter 1.2° south of the Beehive
25.....New moon

Inside the *Observer*

AUGUST SKIES

by Dennis Cochran

The south is alive with the sounds of nebulae! **Sagittarius** is front and center, with **Scorpius** to his right and my favorite constellation-shape **Capricorn** to his left. Nebulae bubble up out of the teapot asterism of Sagittarius the Archer like steam from the "Kettle of Creation." This archer is one of those animal-human combos that the Greeks loved to invent: a man-horse. The man part aims the bow, of course, shooting for Scorpius, while the horse part makes, well, celestial road apples—a major source of space debris. Capricorn is a fish-goat, although the constellation looks like a gigantic jester's grin to me. At least the scuttling scorpion is just that. Grasp your planisphere or your telescope firmly as you try to maintain your sanity in all of this confusion!

Just looking at the *Sky & Telescope* magazine chart for August I can see eight Messier numbers around the archer and the nearby tail of the scorpion. **M8, M17** and **M20** are nebulae, known as the Lagoon, Omega and Trifid, respectively. They make the steam of the teapot, as it were. They're in the region of 18h 0m -26° along with the small star cluster M21. Another cluster, M18, is just below M17. Just to the left of the teapot's lid is M22, a globular cluster at 18^h 37^m -26°, while a smaller globular cluster, M28, is just to the right of the teapot's lid at 18^h 28^m -25.5°.

The **Wild Duck Cluster**, M11, is higher up at the top-left of lozenge-shaped **Scutum** at 18^h 50^m -06°. Farther south-southwest is M26, a smaller cluster just east of α (alpha) Scutum at 18^h 44^m -9.9°. Between Scutum and Sagittarius are clusters M23, M24 and M25 arrayed left-to-right around -19 declination at 18^h 55^m, 20^m and 17^h 55^m. A trio of small globulars include

Continued on Page 3

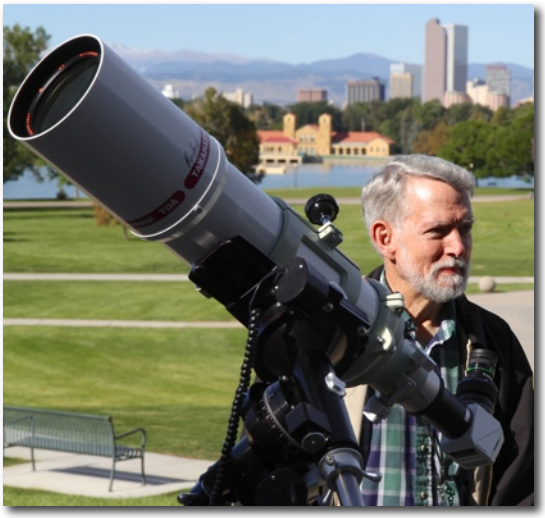
PRESIDENT'S MESSAGE

by Ron Hranac

Arguably the most popular meteor shower of the year is the annual **Perseids,** which is underway as this issue of The Denver *Observer* hits the streets. According to the calendar on the American Meteor Society's website (*http://www.amsmeteors.org/meteor-showers/meteor-shower-calendar/*), the Perseids shower is active from July 13th through August 26th. The shower typically peaks around August 12th or 13th—this year's peak is the night of August 12th/13th.

The Perseids meteor shower, which has been observed for more than 2,000 years, occurs when Earth passes through streams of debris left behind by the shower's parent body, Comet 109P/Swift-Tuttle. The meteoroids that produce the visible meteors are tiny: Dust-sized to perhaps as big as a pea or small piece of gravel. We see meteors created by such small particles because, in the case of the Perseids, they're zipping along at about 60 kilometers per second (130,000 miles per hour). The speedy meteoroids enter Earth's atmosphere and produce meteors that become visible as those meteoroids burn up around 50 to 75 miles above the surface. The Perseids' radiant—the point in the sky from which the meteors appear to originate—is the constellation Perseus. For more on meteor showers in general, see my President's Message in the January 2014 *Observer.*

One of my fondest memories of the Perseids dates back to the 1990s, a few years after my wife and I hosted Japanese exchange students on three occasions during the time that our own kids were in high school. Two of the former exchange students returned for an August visit sometime in the mid- to maybe late-'90s, and while they were here we took them to our mountain property. Their visit coincided with the peak of one of the Perseids showers, so all of us sat out on the deck watching meteors against a backdrop of the dark Rocky Mountain skies. After my wife and I called it a night, the two girls remained outside on the deck for another hour or so ooh-ing and aah-ing at the Perseids. The next morning they said it was like watching fireworks.



DAS President Ron Hranac during Solar Day at the Denver Museum of Nature & Science.
Photo courtesy: Jeff Tropeano

Continued on Page 4

DAS SCHEDULE

AUGUST

2 **Open House at Chamberlin (Starts at 8:30 P.M.)**
8 **DAS General Membership Meeting at Olin Hall (Begins at 7:30 P.M.). Speaker: Mike Roos**
10 **DAS Picnic at Bear Creek Lake Park (See Back Page)**
15 **E-Board Meeting at Chamberlin (Begins at 7:30 P.M.)**
22-24 **EGK Dark Sky weekend**

SEPTEMBER

1 **Labor Day**
5 **DAS General Membership Meeting at Olin Hall (Begins at 7:30 P.M.). Speaker: TBD**
15 **E-Board Meeting at Chamberlin (Begins at 7:30 P.M.)**
20-28 **Okie-Tex Star Party**
26-28 **EGK Dark Sky weekend**
27 **Open House at Chamberlin (Starts at 7:00 P.M.)**

Open House costs: If the skies are clear, $2 per person ($5/family), and $1 per person in the event of inclement weather.
Public nights are held at Chamberlin Observatory every Tuesday and Thursday evenings beginning at the following times:
March 10 - September 30 at 8:30 P.M.
October 1 - March 9 at 7:30 P.M.
Costs to non-members are: $3.00 adults, $2.00 children and students with ID.
Please make reservations via our website (www.denverastro.org) or call (303) 871-5172.

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The Executive Board conducts the business of the DAS at 7:30 p.m. at Chamberlin Observatory. Please see the Schedule of Events for meeting dates. All members are welcome.

www.denverastro.org

AUGUST SKIES

(CONTINUED FROM PAGE 1)

M9 at 17^h 20^m -18°, with NGC 6356 above-left and NGC 6342 below.

Mars is just off the nose of Scorpius, while **Saturn** is on the cross-bar of **Libra's** scale in the west-southwest.

Venus and **Jupiter** are dawn objects. Away from the ecliptic and directly overhead will be bright Vega. Just below it, caught between the two stars at the bottom of **Lyra's** rhombus, is the **Ring Nebula** (M57), arguably the most famous of the planetary nebulae—the smoke-ring of our sky which is the out-puffing of an old star. Down-left of that at 19^h 15^m +30° is the small globular cluster M56. For a good time call—no, take an east-southeasterly glide down to Albireo, the nose of **Cygnus the Swan** or bottom of the Northern Cross, and notice the color contrast in this famous pair. When showing them to the public don't forget to mention that the colors mean different temperatures. Then glide down east-southeast a bit more to find the other well-known planetary nebula M27 (the **Dumbbell Nebula**) at 20^h 0^m +23° in **Vulpecula** the Fox (created by Johannes Hevelius in 1690), that's hard to find. It's between Sagitta the Arrow and Cygnus. Before you get too far away from Lyra, detour up to ϵ (epsilon), a widely-separated double star that's located northeast of the blazing Vega.

The **Perseid meteors**, our greatest and most reliable meteor shower, peaks on the 12th-13th from a radiant northeast of the pointy head of Perseus. The Chinese recorded it in 36 A.D., the Europeans in 811 A.D. It is made up of debris from comet **109P/Swift-Tuttle.** Later in the month, on the 14th, come the **Kappa Cygnids**— they produce few but bright shooting stars because of their low velocity. On September 1 we see the **Aurigids**, which are also few and sometimes bright. At about that time the UFO Convention will be held on Mongo, home of Ming the Merciless. Tickets for that event are hard to get. ★

M13

On June 30m 21014, Jeff imaged the Great Globular Cluster in Hercules from his backyard in Lakewood, CO.
Image © Jeff Tropeano

SAVE THE DATE!

DAS Picnic
August 10 at Bear Creek Lake Park!
See Back Page for Information.

ABOUT THE DAS

Membership in the Denver Astronomical Society is open to anyone wishing to join. The DAS provides trained volunteers who host educational and public outreach events at the **University of Denver's Historic Chamberlin Observatory,** which the DAS helped place on the National Register of Historic Places. First light at Chamberlin in 1894 was a public night of viewing, a tradition the DAS has helped maintain since its founding in 1952.

The DAS is a long-time member in good standing of the **Astronomical League** and the **International Dark Sky Association.** The DAS's mission is to provide its members a forum for increasing and sharing their knowledge of astronomy, to promote astronomical education to the public, and to preserve Historic Chamberlin Observatory and its telescope in cooperation with the University of Denver.

The DAS is 501 (c)(3) tax-exampt corporation and has established three tax-deductible funds: the Van Nattan-Hansen Scholarship Fund, the DAS-General Fund and the Edmund G. Kline Dark Site Fund.

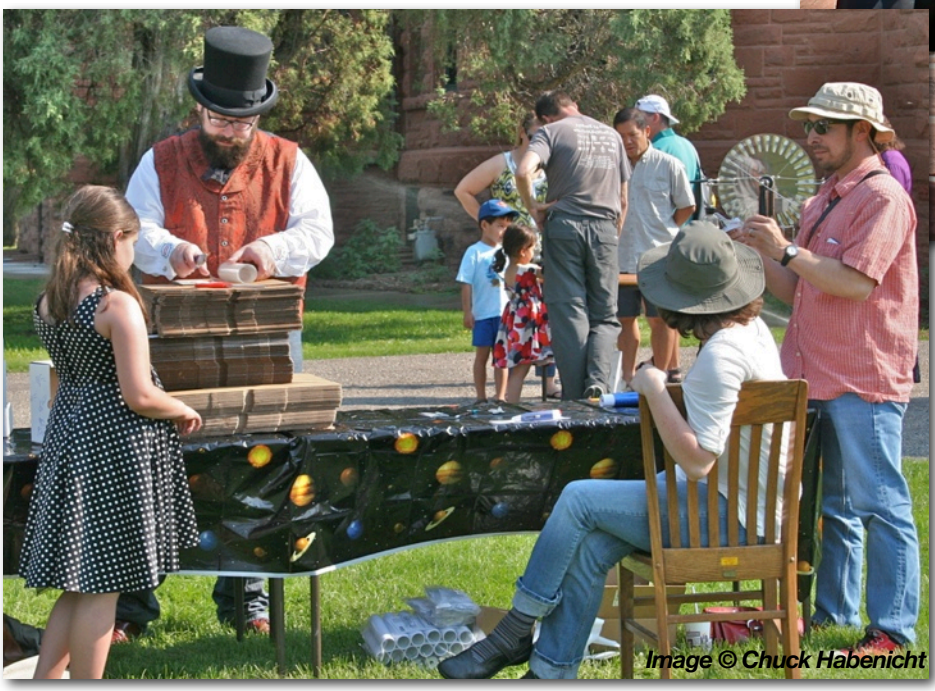
More information about DAS activities and membership benefits is available on the DAS website at *www.denverastro.org.*★

120TH CHAMBERLIN OBSERVATORY ANNIVERSARY CELEBRATION IN PHOTOS

On July 19, the DAS and the University of Denver celebrated the 120th anniversary of Denver's historic Chamberlin Observatory. Thank you, DAS members for photographing the event. Photos clockwise from the top (Page 4): Dr. Bob Stencel is presented a $5,000 DAS donation for the Chamberlin Endowment Fund by President Ron Hranac; Special guests Grace and Sammy Ormsby are greeted by Cathie Havens and Dena McClung; Leon Roybal and Isaac Fluss prepare educational materials for future astrophysicists. Page 5, clockwise from top left: There were many cool science demos and crafts for kids on the south lawn. DAS member Isaac Fluss is in the top hat; visitors in period costumes are photographed with the Clark/Saëgmuller telescope. Shown is the DAS photographer assisted by Jeff Tropeano; solar viewing, science demonstrations and activities are shown on the south lawn; DAS members and their solar telescopes were a great daytime attraction for visitors.

Continued on Page 6

Image © Chuck Habenicht



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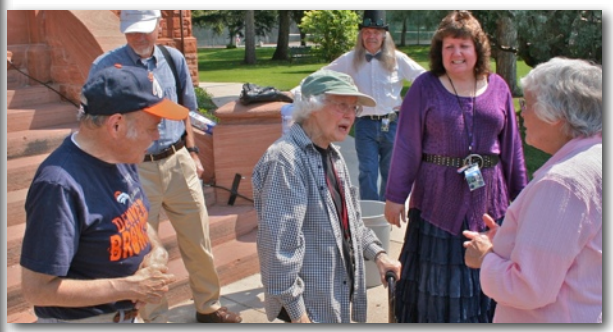


Image © Chuck Habenicht

PRESIDENT'S MESSAGE

(CONTINUED FROM PAGE 2)

Despite a zenithal hourly rate (ZHR) of 100 meteors, the peak of this year's Perseids probably won't produce what anyone might call fireworks. Light from a waning gibbous Moon will wash out all but the brightest meteors. Indeed, the full Moon is on the 10th, just before the shower's peak. But don't let that discourage you. Assuming Mother Nature cooperates with clear skies, you should be able to see a few of the Perseids.

Head for a reasonably dark location away from bright lights—well, as dark as possible considering what will be a Moon that is around 93% full. Sit back on a reclined lawn chair or lie down on a blanket or air mattress, and look up at the night sky in a direction facing away from the Moon. If the weather is a little chilly, bundle up in a sleeping bag. Relax with a cup of hot chocolate or your favorite beverage, and enjoy the show.

Should the sky not cooperate, or the moonlight becomes too frustrating, you can hear the meteor shower using your computer. Go to *http://spaceweatherradio.com/* and listen for meteor "pings." I've done this on more than one occasion when a shower was clouded out or otherwise unwatchable. No matter what happens the night of the 12th/13th, don't forget that you can still see Perseids meteors on dates other than the peak. As mentioned previously, the shower runs from mid-July through late August.

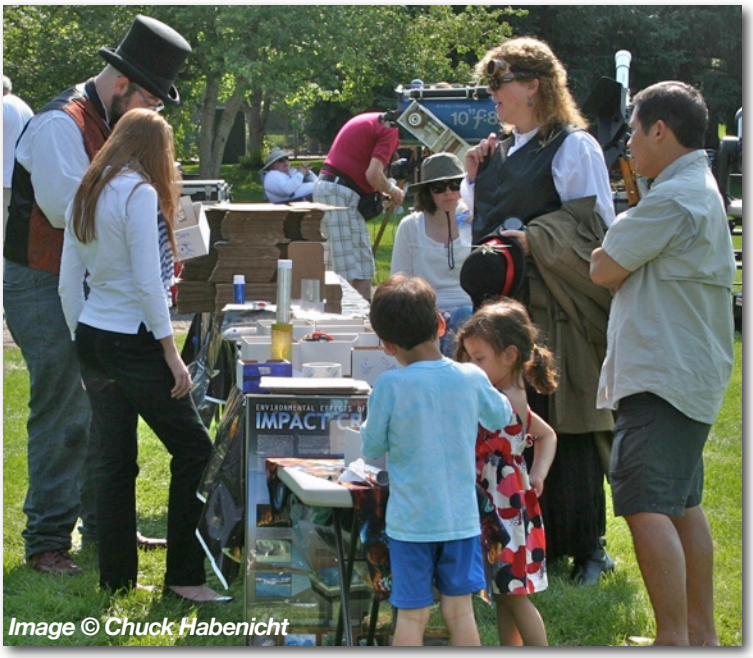
Some other notable showers this year include the following:

Orionids—October 4th through November 14th, peaking on the night of October 21st/22nd. The parent body of the Orionids is Comet 1P/Halley, and the meteoroids are traveling about 67 kilometers per second (41 miles per second). The ZHR is 25, and the radiant is Orion.

Leonids—November 5th through the 30th, peaking the night of November 17th/18th. The parent body of the Leonids is Comet 55P/Tempel-Tuttle, and the meteoroids are traveling about 71 kilometers per second (44 miles per second). The ZHR is 15, and the radiant is Leo.

Geminids—December 4th through the 16th, peaking the night of December 13th/14th. The parent body of the Geminids is asteroid 3200 Phaethon, and the meteoroids are traveling about 35 kilometers per second (22 miles per second). The ZHR is 120, and the radiant is Gemini.

Mark your calendar for each of these, and enjoy yet another spectacle of the night sky that makes amateur astronomy so much fun. ★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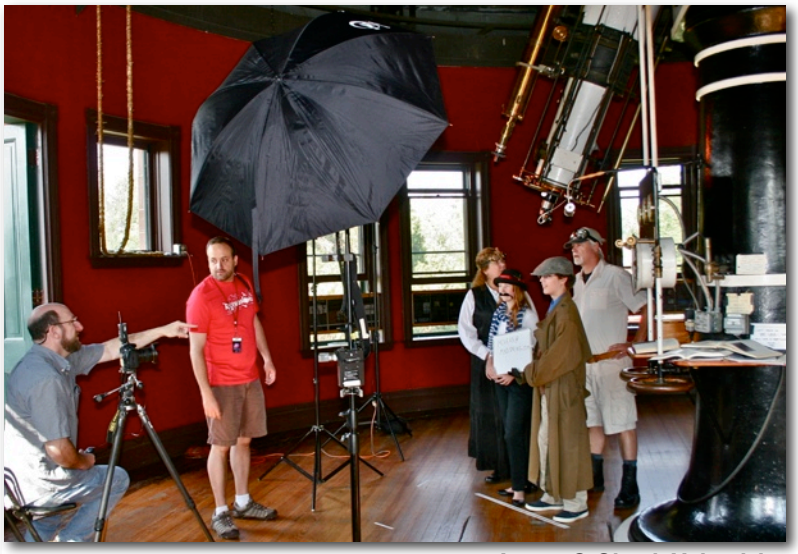
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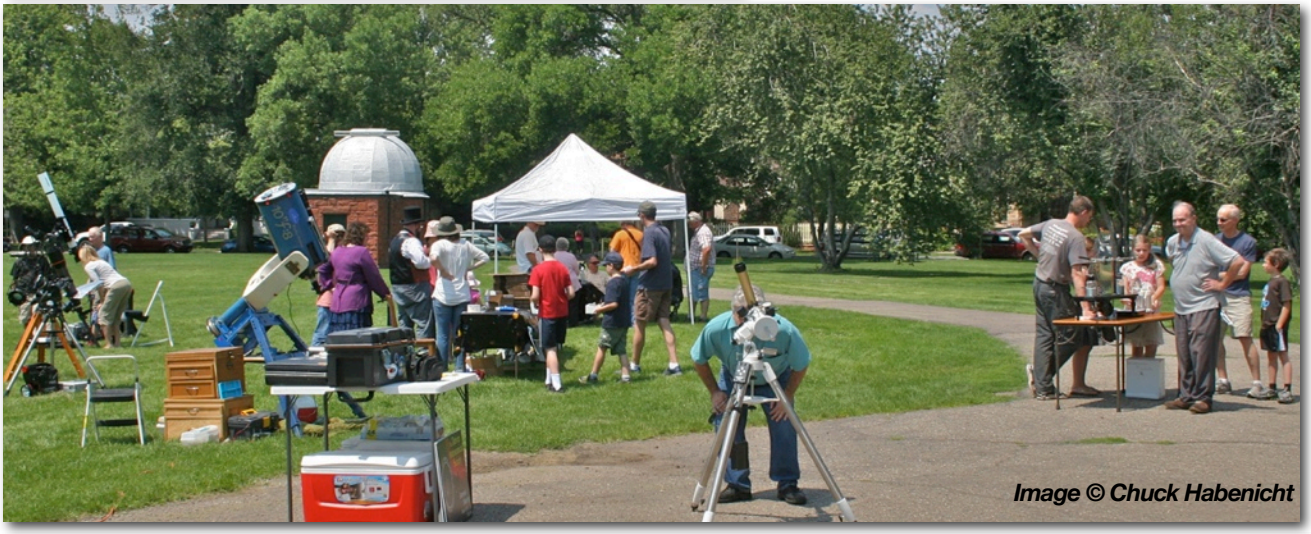
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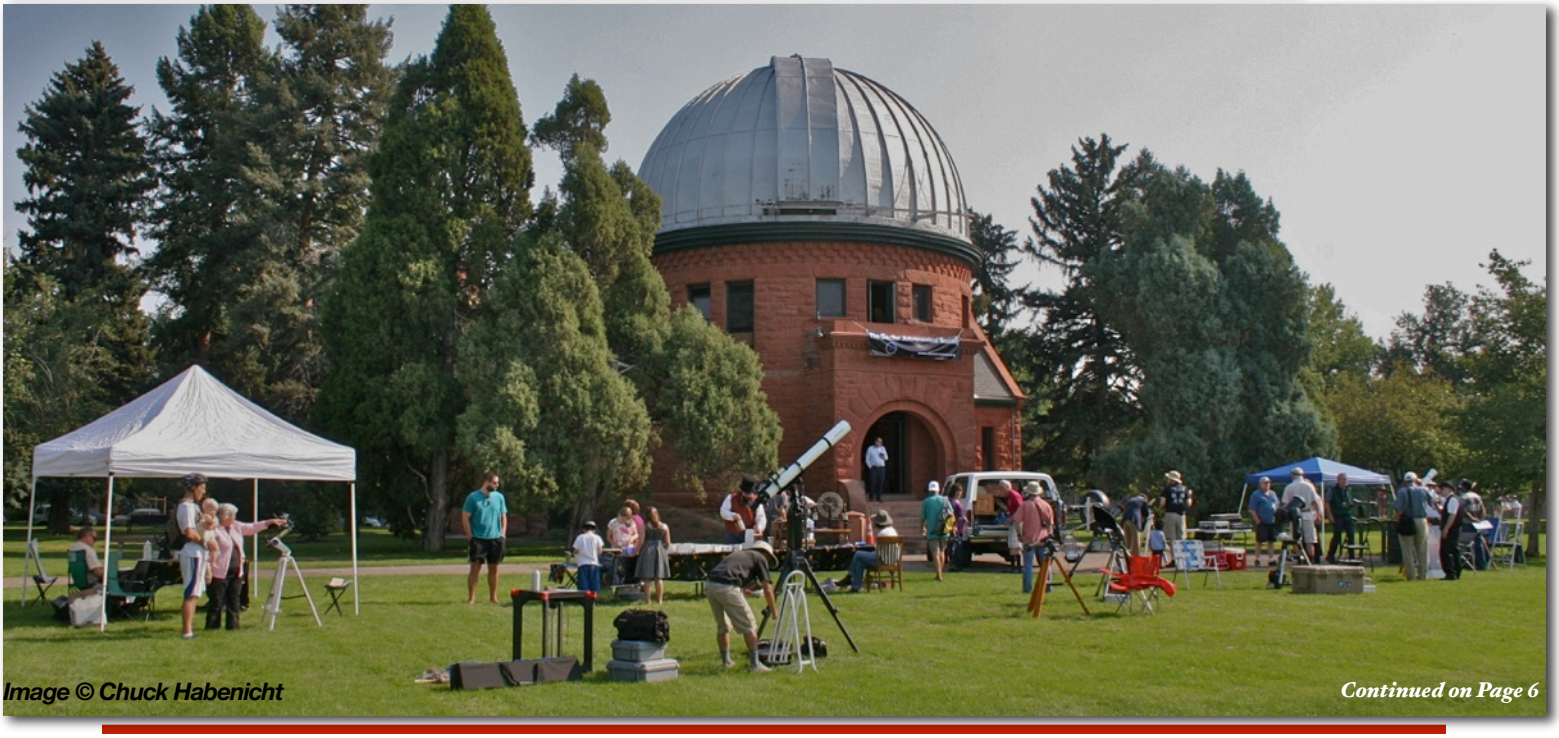
Image © Chuck Habenicht

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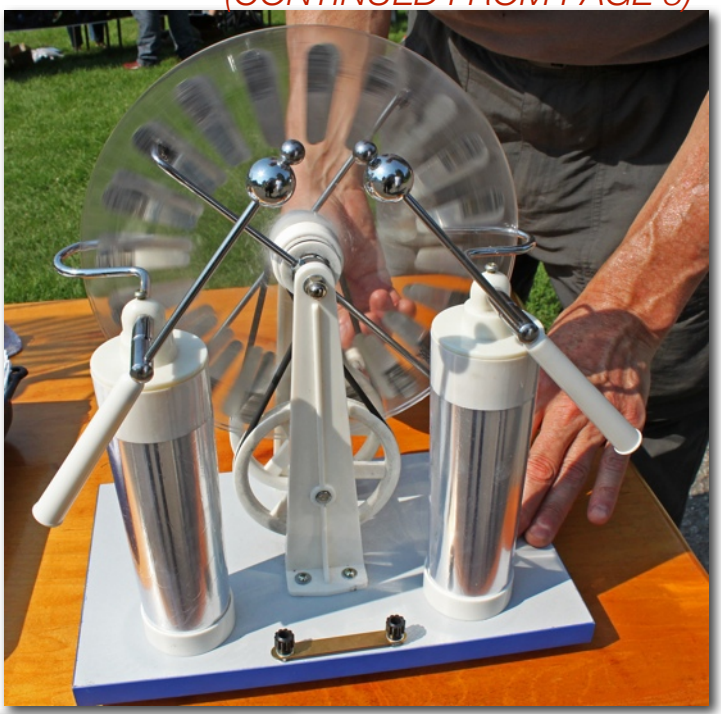
120TH ANNIVERSARY

(CONTINUED FROM PAGE 5)

Photos clockwise from the top: the high voltage generator is demonstrated; Naomi Pequette and friend dressed up in period attire; Dr. Jennifer Hoffman in period costume at the Clark/Saëgmuller telescope; a child cranks a display at the DMNS display table; Ron Hranac's meteorite display; and "Women in Astronomy Space Trivia Game." Thank you, everyone who contributed photos of this grand event! ★



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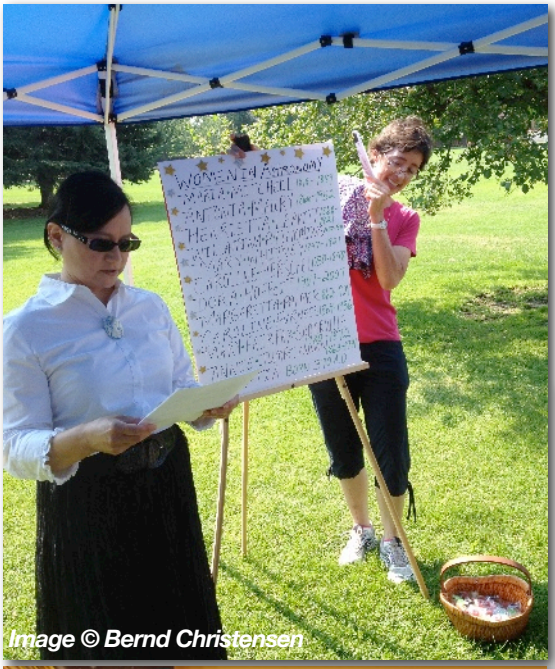
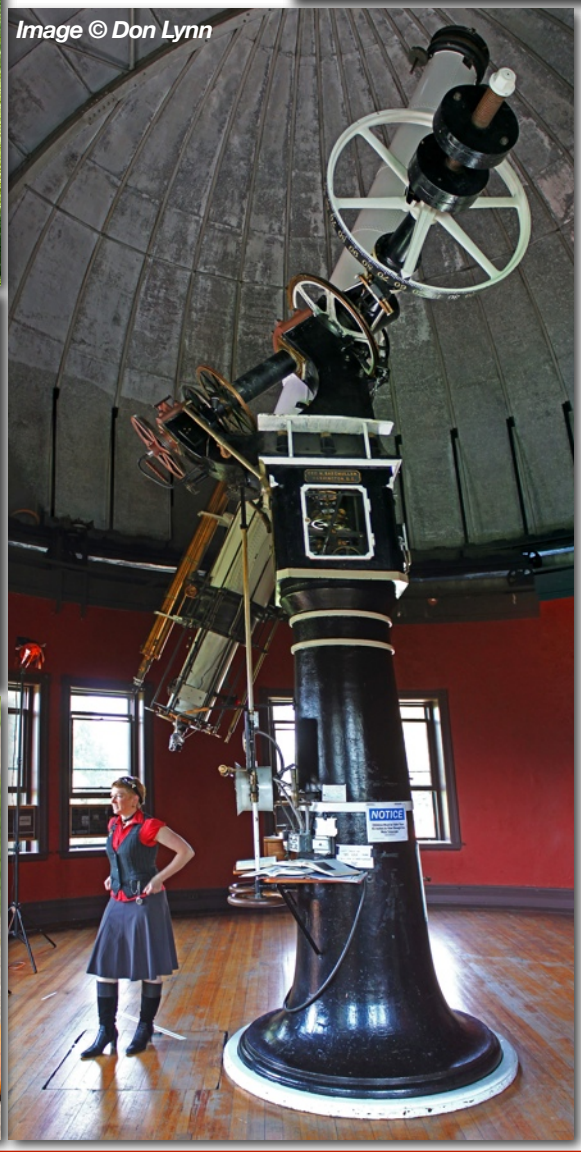


Image © Bernd Christensen



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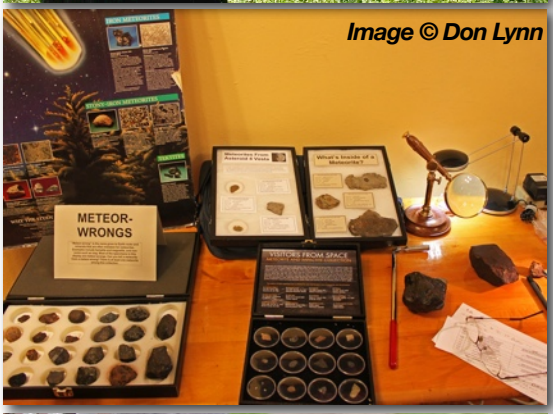

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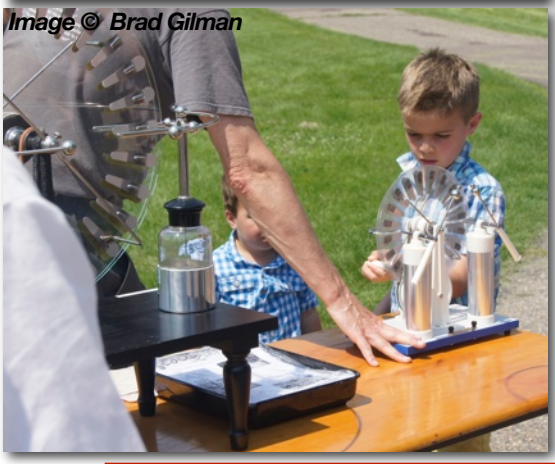

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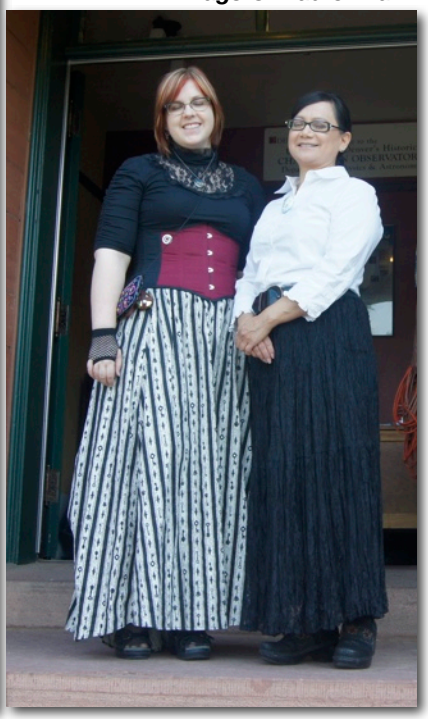


Image © Brad Gilman

NASA'S Space Place

THE INVISIBLE SHIELD OF OUR SUN

by Dr. Ethan Siegel
A Space Place Partners' article

Whether you look at the planets within our solar system, the stars within our galaxy or the galaxies spread throughout the universe, it's striking how empty outer space truly is. Even though the largest concentrations of mass are separated by huge distances, interstellar space isn't empty: it's filled with dilute amounts of gas, dust, radiation and ionized plasma. Although we've long been able to detect these components remotely, it's only since 2012 that a manmade spacecraft—Voyager 1—successfully entered and gave our first direct measurements of the interstellar medium (ISM).

What we found was an amazing confirmation of the idea that our Sun creates a humongous "shield" around our solar system, the heliosphere, where the outward flux of the solar wind crashes against the ISM. Over 100 AU in radius, the heliosphere prevents the ionized plasma from the ISM from nearing the planets, asteroids and Kuiper belt objects contained within it. How? In addition to various wavelengths of light, the Sun is also a tremendous source of fast-moving, charged particles (mostly protons) that move between 300 and 800 km/s, or nearly 0.3% the speed of light. To achieve these speeds, these particles originate from the Sun's superheated corona, with temperatures in excess of 1,000,000 Kelvin!

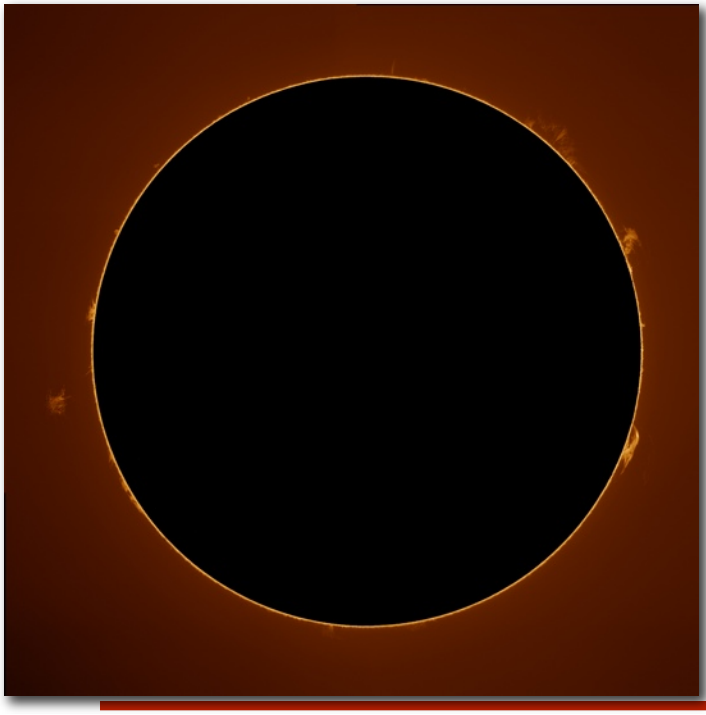
When Voyager 1 finally left the heliosphere, it found a 40-fold increase in the density of ionized plasma particles. In addition, traveling beyond the heliopause showed a tremendous rise in the flux of intermediate-to-high energy cosmic ray protons, proving that our Sun shields our solar system quite effectively. Finally, it showed that the outer edges of the heliosheath consist of two zones, where the solar wind slows and then stagnates, and disappears altogether when you pass beyond the heliopause.

Unprotected passage through interstellar space would be life-threatening, as young stars, nebulae, and other intense energy sources pass perilously close to our solar system on ten-to-hundred-million-year timescales. Yet those objects pose no major danger to terrestrial life, as our Sun's invisible shield protects us from all but the rarer, highest energy cosmic particles. Even if we pass through a region like the Orion Nebula, our heliosphere keeps the vast majority of those dangerous ionized particles from impacting us, shielding even the solar system's outer worlds quite effectively. NASA spacecraft like the Voyagers, IBEX and SOHO continue to teach us more about our great cosmic shield and the ISM's irregularities. We're not helpless as we hurtle through it; the heliosphere gives us all the protection we need!

Image credit: Hubble Heritage Team (AURA / STScI), C. R. O'Dell (Vanderbilt), and NASA, of the star LL Orionis and its heliosphere interacting with interstellar gas and plasma near the edge of the Orion Nebula (M42). Unlike our star, LL Orionis displays a bow shock, something our Sun will regain when the ISM next collides with us at a sufficiently large relative velocity.

Want to learn more about Voyager 1's trip into interstellar space? Check this out: *http://www.jpl.nasa.gov/news/news.php?release=2013-278.*

Kids can test their knowledge about the Sun at NASA's Space place: *http://spaceplace.nasa.gov/ solar-tricktionary/.* ★



On July 19, 2014, Brian captured this hanging prominence on the Sun.
Image © Brian Kimball

WELCOME NEW DAS MEMBERS!

- ★ Curtis Altstadt
- ★ Azadeh Bolhari
- ★ Charles Copeland
- ★ Susan Gibson
- ★ Ed Ladner
- ★ Stephan Lambert
- ★ Paul Mankowski
- ★ Matthew Orrin
- ★ Trent Paradis
- ★ Tracy Rackauskus
- ★ Christopher Sheffer
- ★ Clark Stewart
- ★ Patrick Wilson

AUGUST SPEAKER: MIKE ROOS

Mike is from Fort Collins Colorado, where he works in the medical imaging industry.

Mike's interest in astronomy began as a child, where he vaguely remembers Apollo 13 and nothing at all about Mercury or Gemini. As a child, he expected that we would have landed a man on Mars by now. His first telescope was one of those 60mm refractors with the inexpensive eyepieces and shaky mount. Later he got one of the orange tube C8's, which he still owns.

His interest in photography started in high school with a fully manual SLR handed down from his grandfather. At some time during the 1980's astronomy met photography, and he did some piggyback shots with the camera on the C8 and some lunar, solar and planetary photography. The results were mediocre. He didn't attempt any more astrophotography for the next 20 years.

Mike's interest in the Messier Marathon started in the late 1990's. On his first attempt he observed 60 of the first 65 objects with the C8 and then got clouded out. His best visual result is 108 of 110 objects.

In 2010, he bought a DSLR and got back into short exposure astrophotography. In March 2013, he decided to attempt a Messier Marathon by photographing the objects instead of looking at them in the telescope. The results were encouraging and led to a Messier Plus Marathon as an observing program and photography contest for the 2013 Okie-Tex. A Messier Plus Marathon is designed for the fall and has NGC objects to replace Messiers not visible then. ★

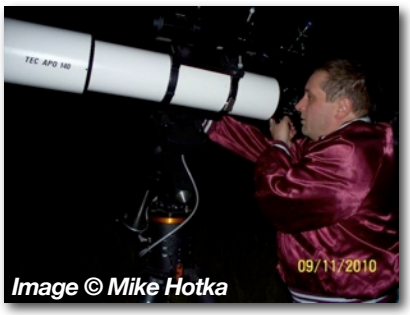


Image © Mike Hotka

DAS PICNIC—AUGUST 10TH AT BEAR CREEK LAKE PARK, MORRISON, CO

Come join us for the club picnic August 10th at Bear Creek Lake Park. *http://www.lakewood.org/bclp/*:

- Meet at the Pelican Point shelter which is reserved all day, 6:00 A.M. to 10:00 P.M.
- Come in the morning and enjoy the park for the day. Set up your Solar telescope.
- Official picnic at 1 p.m. Bring your own food and drink. Alcohol permitted up to 6%.
- You might want to bring food for a second meal and spend the whole day. The club will furnish charcoal for the grills.
- DAS has reserved a large covered shelter (76' X 34') that accommodates 300 people, located on the west side of the park near Bear Creek Reservoir. 24 tables and 3 grills, running water (no electric), three port-a-lets on site and access to ample parking
- Activities: sand volleyball court and horseshoe pits. camping, swimming at Soda Lake, fishing, hiking, bike riding, horseback riding, boating and archery.
- Cost: Gate fees are $7 per car, $5 senior.
- Bring: food and drink, solar telescope, swim suit, fishing pole, volley ball, horse shoes, bicycle, and. . . boat!

Directions: Entrance,15600 W. Morrison Rd, Morrison, CO.

- If you are traveling west on Morrison Rd. the entrance is just east of C-470.
- If you are traveling on C-470, exit at Morrison and go east on Morrison Rd.
- Once in the park take the first right and go past the visitor center and swim beach.

The Denver Astronomical Society
c/o Chamberlin Observatory
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Denver, Colorado 80210