

OBSERVER

SAILS ALOFT FOR A MILKY WAY VOYAGE!

RHO OPHIUCHI REGION

Several different types of nebulosity are distinct in this image. The yellowish cloud associated with Antares (the brightest star in the image), is IC 4606. Above Antares is IC 4605 which is the blue reflection nebula around 22 Scorpii. To the left of 22 Scorpii is the dark nebula B44. IC 4604 is the blue nebulosity around Rho Ophiuchi, the triple star above that. Below Rho Ophiuchi is the blue nebulosity of IC 4603. Sh 2-9 is the red emission nebula associated with Sigma Scorpii, the blue star near the right edge of the image. Below Sigma Scorpii and to the right of Antares is the globular cluster M4. To the upper right of Antares is the smaller globular cluster NGC 6144. This image is comprised of a four images mosaic. It was shot with a Mamiya lens with HaLRGB filters, binned 1x1 with an SBIG ST-2000XM CCD camera. *Image © Joe Gafford*

Calendar

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15.....	New moon
22.....	First quarter moon
29.....	Full moon

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SEPTEMBER SKIES *by Dennis Cochran*

The Age of Aquarius is upon us. This sprawling constellation reaches out over Capricornus from northeast of its "grin" and manages to cover an impressive chunk of sky. The Water-Bearer (Aquarius) harbors the large globular cluster M2 right on the meridian below its famous sister M15. Bag 'em both! M15 is just up-left from tiny Equuleus, itself just down-left from the easier-to-spot asterism Delphinus the Dolphin. Once you've found M15, M2 is halfway down to Capricornus. Although western Sagittarius has the Saturn Nebula, a planetary that looks like it has a fat ring, it's located just above the middle of the goat's wide grinning "V." The cluster M73 is just down-right from the planetary, the second-brightest in the sky, and next to globular cluster M72, so this area is worth checking out. Meanwhile west of mid-south, Sagittarius continues to dominate the southern evening sky

with all of its well-known nebulae and star clusters above the teapot shape of his bow-and-arrow body that we talked about in "July Skies." That's his arrow pointed west towards Antares, the big red star called the "Heart of the Scorpion."

In the empty space between Sagittarius and Capricornus are two interesting objects near to one another: dwarf galaxy NGC 6822 and a planetary known as the "Little Gem," NGC 6818. They are straight west of the western corner of Capricornus and straight east of the end of that little string of stars that projects northeast from ζ (sigma) Sgr, the uppermost star in the handle of the teapot.

Low to the southern horizon there are several objects squished in the space between Scorpius and Sagittarius. Above and above-left of the "Cat's Eyes" pair of

PRESIDENT'S CORNER

by Ron Pearson

August was another tough summer month for DAS members. Instead of observing the glittering Milky Way, we had unrelenting wild fire haze obscuring the night sky and rainless monsoon clouds making even just one night of observing more rewarding. I got out for the Perseid Meteor shower and saw 15 or so meteors in an hour and half before clouds closed in again. On the August new moon weekend we got a brief respite from the photonic assault coming out of the oil hole drilling near our dark sky site. But, don't celebrate too much, because the assault on our night sky and night vision may resume at any time this fall. According to information posted on the Southwestern Energy and CO. Oil & Gas Conservation Commission websites, despite mediocre returns on their initial tests, they will be extending the depth of the drilling near our site over 4,000 feet horizontally, and intend to drill a second hole "in the area" before the end of the year. As amateurs, professionals and others interested in the science up in our night sky it is ironic that we are so directly confronted and impacted by the effects of two other major issues in science and our society; greenhouse-driven global warming that is contributing to the spread of wild fires and drought while the search for carbon-releasing fossil fuel goes on in earnest, literally in our faces. It certainly proves what we

learned in school; John Donne said, that "No Man is an Island. . ." and ". . . never send to know for whom the bell tolls; It tolls for thee."* These issues also point to an ever-increasing need for science education in schools as our schools get back into session.

One of the major goals or missions of DAS is outreach to schools and others in the science of astronomy and science in general since astronomy literally encompasses the whole Universe in its sphere of study. We conduct our outreach efforts through both Chamberlin Observatory Public Nights and Open Houses with teams of telescope operators and our school or outside outreach programs through a cadre made up of you, our members, who volunteer ad hoc to requests as we receive them. Both of these programs rely on you, our members, to volunteer and contribute your time and talents. We have recently welcomed several newly certified operators of the historic 20-inch Clark telescope to help out in the dome room, and we welcome those who have stepped up recently to take leadership roles in both Chamberlin and our outside programs. Scott Leach is newly certified operator and will also be our IT support lead. He replaces Chadd Warwick whose job keeps him in out of state. Scott will be leading improvements to our AV computer network in Chamberlin which we use to present talks and images from our telescope camera, as well as provide internet access and the PN reservation system. Amanda Parry has been our outreach coordinator for the past three months and Justin Modra will be taking the lead in one aspect of our outreach education—the area of light pollution education. Perhaps you have seen or read about the excellent documentary film about light pollution called *The City Dark*. With Justin's proposal, the e-board approved the purchase of a full licensed version of the documentary, and Justin will be lining up venues to show the film.

What this society does and accomplishes either at its dark sky site, or in the areas of astronomy outreach at Chamberlin or in school yards, or battling

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DAS SCHEDULE

SEPTEMBER

- 3 Labor Day
- 7 E-Board Meeting at Chamberlin (Begins at 7:30 P.M.)
- 8-16 Okie-Tex Starparty
- 14-16 EGK Dark Sky weekend
- 22 Open House at Chamberlin Observatory (Begins at 7:00 P.M.)
- 26 Yom Kippur
- 28 DAS General Membership meeting at D.U.'s Olin Hall: Speaker: Peg Alig — "Baehr Observatory in Pine, CO." (Begins at 7:30 P.M.)

Public nights are held at Chamberlin Observatory every Tuesday and Thursday evenings beginning at the following times:
 March 13 - April 14 at 8:00 P.M.
 April 15 - August 31 at 8:30 P.M.
 September 1 - September 30 at 8:00 P.M.
 October 1 - March 10 at 7:00 P.M.

Costs to non-members are: \$3.00 adults, \$2.00 children.

Please make reservations via our website (www.denverastro.org) or call (303) 871-5172.

OCTOBER

- 5 E-Board Meeting at Chamberlin (Begins at 7:30 P.M.)
- 12-14 EGK Dark Sky weekend
- 20 Colorado Astronomy Day at DMNS and Chamberlin Observatory (10 A.M. to 4 P.M.) and Open House (Begins at 6:00 P.M.)
- 27 DAS Auction at Chamberlin Observatory (Setup begins at 11:00 A.M., Bidding begins at 1:00 P.M.)
- 31 Hallowe'en

Society Directory

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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

SEPTEMBER SKIES

(CONTINUED FROM PAGE 1)

stars at the end of the scorpion's tail are two well-known star clusters—M6 and M7. On the north-west edge of M7 is NGC 6453, a globular cluster. Just above-left of these famous clusters, right off the end of the teapot's spout are two small globulars—NGC 6522 and NGC 6528. Bag 'em, Dano! Ooching west now to stay out of the steam from the teapot, almost on a line with the end of the spout and M6, but over towards the scorpion is the asymmetrical globular M62. Straight above that a little higher than Antares is another globular, M19, and just left of that (hop over a star) is NGC 6293, a smaller globular. We're not done with these star cities, however: down-left of NGC 6293 is NGC 6316 and below that is NGC 6304. We're being globbed out—aiieeah! We've made a loop, with M62 a ways to the right of NGC 6304. While we're globbing in the vicinity of Antares, just to its west is M4, which everyone knows because of its proximity to Antares. Next we can find M80 on a line up from Antares about 60% of the way to β (beta) Sco (the uppermost of the three head-and-claws stars). We're exploring the nuclear part of our galaxy now, with its seemingly endless details.

Just for the heck of it, let's bag a globular in a far-distant part of the sky. Find Polaris and look south-east for Cepheus the King, father of Andromeda. Between his middle and the right-hand star of the "W" of Cassiopeia his queen, is M52. Oops, M52 is an open cluster, not a globular. Either way it gives us a chance to crane our necks in another direction. One can imagine open clusters condensing out of giant gas clouds in our galaxy's disk, but what about the large, semi-independent globulars? They seem to have an older origin, primeval, mysterious, each one a little galaxy-like unit of its own. This might be tied up with the Big Bang story and the original distribution of Dark Matter. Now, let's observe one more globular: back across the zenith to find Aquila the Eagle and another Summer Triangle star, Altair. (You might remember that Vega, Altair and Deneb at the tail of Cygnus make up the Triangle). The constellation of Aquila is a sort of arrowhead pointing southwest from Altair. Along the vertical west side of the arrowhead is NGC 6749, a small globular in a busy part of the Milky Way.

Closer to home, Saturn is getting mighty low in the evening west. Look at it while you can. On the 28th it's just above Venus, with a crescent moon a

bit to the left. Jupiter rises late—almost midnight, in Taurus—and gets earlier as the month progresses. Mars rises about 2 A.M. The flying saucers will rise, too, and take over the Earth! Nya-ha-ha! Oh, wait: that was a movie, *Revenge of the Disgruntled Flying Saucer People*. It's not easy being a flying saucer person. For one thing not all saucers have bathrooms.

But I digress.

UNDER PRESSURE WITH A SPECTACULAR MILKY WAY IN AFRICA

This image is the first test image of Roger's hand-cranked 1.2-pound barn door mount.

The image is a 30-second exposure with a 24 mm f/1.4 lens at f/2, ISO 1600 with a Canon 1D Mark IV digital camera.

What makes this test interesting is that it was done in some of the darkest skies on Earth: in Tarangire National Park, Tanzania, east Africa. Roger was at a tented camp and made this image with male lions roaring nearby (about 1/2 km away). One shouldn't be out alone, especially with no lights on in such an environment, so he made several 10-second untracked exposures and three 30-second tracked exposures. He dared not trek too far from camp for a better foreground, so the acacia tree branches at the bottom of the frame had to do. With setup and polar alignment, he was out for about 30 minutes.

Later that night, a male lion came less than 100 meters from the tent and made several loud roars.

Image © Roger Clark



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' 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 Cham-

berlin Observatory and its telescope in cooperation with the University of Denver.

The DAS is 501 (c)(3) tax-exempt 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.



DAS JOB JAR

Meet our new *City Dark* volunteer! New member Justin Modra comes to us from Southeastern Wisconsin, where he was active in sidewalk astronomy and astronomy outreach. He's a gem for us to have—and he's interested in taking the documentary *The City Dark*, recently aired on PBS, to several locations around the city. In fact, not only would he be putting together venues and advertising for showings, but your humble board has elected to buy the film outright as opposed to just renting it. This gives Justin the freedom to pick and choose various pieces of content to customize to different audiences, lend it to Amanda for outreach events that get too cloudy for scopes, and even lend it to different area clubs that have a specific need.

As Justin is new in town, he's requesting a small group of helpers to gage the most important places in the city where the film showings are needed, and who to show it to. Darrell's church is the first stop, given the attempt in Littleton to scrap current light pollution ordinances. In addition

to Darrell and Aaron Reid, new member Pam Chadbourne is the go-to person for the Littleton efforts; she has also offered to assist in covering Darrell's needs with the club roster. If you would like to have *The City Dark* shown in your neighborhood, don't hesitate to contact Justin at justin.k.modra@gmail.com or one of your club's officers.

Also, an immense thank you to two others, Sarah Borenstein and Bill Smyth, who will be helping us in the dome during Open House nights. What a great group our club is! Scott Leach will be taking our much-needed IT position. Stay tuned for some nifty sidewalk astronomy coming soon to the Southlands mall in Aurora, courtesy of Justin; also the position of posting our events in the *Denver Post's* "Your Hub" feature is still in need of a warm body.

With that, here's our newest bag of goodies that might be fun for members to do:

JOB JAR

Open House Ready-Mount Operator

DAS has a unique mount, owned by the club, that's handy for bringing the eyepiece to those that are wheelchair-bound. It's topped by a 127mm Orion Maksutov-Cassegrain, and the only thing missing for this setup at Open Houses is someone to run it. If you enjoy our OH's and don't need to be with your own scope, would you like to be at the center of the south-lawn circular, asphalt driveway with a glow-in-the-dark handicapped sign (unfortunately, not provided), showing nifty targets to attendees with this setup? Since Chamberlin itself isn't accessible, it'd be beneficial to have some help to accommodate these folks.

New Member Folders

Some time ago, our club used to offer a folder full of information for those new to the club and new to astronomy. Contents included a small planisphere, literature from Astronomy Magazine on how to get started, and handy coupons for S&S Optika. Not everyone who's new to our club is new to our hobby, but those that are may appreciate a folder with info. If you're semi-new yourself and have enjoyed all you've learned so far, you may want to choose handout materials to pass this info along to the next folks to be bitten by the bug.

New Astronomer's Den Mother (or Father)

In addition to having a wheelchair station at Open Houses, it's also nice to have a saved-off space for those who are new to the hobby and want to learn how to use their scopes and find targets. A great many of these folks that have recently joined have been enjoying the Dark Site near Deer Trail, but for those that are still learning constellations, a little bit of city light pollution can actually be beneficial in learning the patterns. Perfect place for laser pointers! This position could use someone who's familiar with most all types of scopes, including Go-To mounts, so as to mentor those who need a little hands-on help.

Calendar Notices Coordinator

We still need someone to submit notices for our monthly Open Houses and events to the *Denver Post's* "Your Hub" feature.

SEPTEMBER SPEAKER: PEG ALIG



Peg's astronomy team hosted three Transit of Venus events—one at Deer Creek Canyon, one at Alderfer/Three Sisters and this photo was taken at Crown Hill Park. It attracted 250 people.

Courtesy Glenn Kubiak, LMNC astronomy team member

Peg Alig is a naturalist and astronomy team lead educator for Lookout Mountain Nature Center (LMNC), part of Jefferson County Open Space. LMNC offers year-round space science programs for all ages. Many programs are conducted at the historic William Baehr Observatory in Pine Grove, CO. Housed in the observatory, is a 1937 6-inch J.W. Fecker refractor in excellent operating condition. Additional stargazing programs are conducted at Hilde-

brand Ranch Park, Alderfer Three Sisters and Crown Hill Park in Wheatridge. Peg also presents astronomy programs for toddlers—topics include the moon, stars & solar system; coordinates bi-annual observatory open house events; quarterly Jr. Astronomer programs for kids ages 6 to 10 and special guest lecture events at LMNC.

Most recently, the LMNC Astronomy team was recruited to lead programs at Bear Creek

Lake Park in Lakewood and on Mt. Evans with cooperation of the U.S. Forest Service. Peg works with a small and extremely dedicated team of volunteers throughout the year. Currently the observatory is only open during scheduled public programs. The most up-to-date program schedule can be found at the LMNC website: http://jeffco.us/openspace/openspace_T56_R135.htm.

DAS ADOPT-A-TELESCOPE PROJECT

by Ron Pearson, President DAS

This is a request for proposals. Over the years the DAS has acquired several telescopes or major components like mounts primarily from donations by members, former members or their families. We acquired these scopes or components in hopes they would be used by DAS members or for the use of DAS membership at our Edmund G. Kline Dark Sky Site or other locations. Because we are an official non-profit 501c3 organization we can accept donations like these, but we are also bound by IRS rules in how we might redistribute or re-sell many of these items. In any case, any telescope large or small, needs proper storage but also needs users and those that like to take on projects of the Amateur Telescope Making (ATM) world to make some of these usable, or re-design them for easier usage.

We want the scopes to be used and not put in a dumpster. All offers should be presented and will be considered by the E-board. Priority will be given to proposals to use or complete a scope for DAS use at the dark site or other appropriate place, i.e., a school or another outreach/education non profit where the scope remains DAS property or is transferred to the nonprofit. Second priority should be given to offers to buy from a DAS member with the money going to the scholarship fund. If no one proposes anything, then we'll either sell it at DAS Auction or internet classified website like "Cloudy Nights," and place the funds into the scholarship fund. I am challenging our members to adopt one of these telescope projects for themselves or DAS. Contact me or the E-Board if you want to discuss your ideas for these projects or take up a challenge. Following are a few of these opportunities for DAS members to make something of these telescopes, either for individual use or for use all by all of us:

GTN mount: The first of these projects is a large mount donated to us by the now defunct Global Telescope Network (GTN). It is a large English Single Axis mount that was designed to be run as a remotely-controlled goto mount that would carry two 14-inch Schmidt Cassegrain telescopes. This mount is very large, heavy and has been stored for the past 10 years aside my garage. Originally we hoped it would be located at our dark

sky site perhaps in an observatory building, but was designed and originally used out in the open, so the gear boxes and other components are weatherproofed. The mount could be transferred to someone who will take on the project of erecting it with a telescope at our dark sky site for DAS use or sold to an individual looking to erect it at their location. If no one wants to adopt this project the mount will likely be disassembled for drive gears and other parts and the rest sold for scrap.

17-inch f/4.5 Newtonian Telescope:

This telescope was donated as a very large and heavy Dobsonian that was subsequently disassembled some years ago and had very limited DAS use. It was planned to be rebuilt and used at the dark sky site either rolled out from a storage building, erected as an equatorial folk mount outside or in an observatory. This project was "mothballed" with the donation of the C-14 and building of the Brooks Observatory. Currently it consists of the mirror optics only—the rest of the original scope was disposed of. The mirror was originally made by Jerry Wilkerson. This scope could be taken on as project for the dark site or sold to an individual or at the DAS Auction.

Ohmer 16-inch f/7 Newtonian Telescope and Mirror Grinding Machine:

Fran Ohmer was the one original founding members of DAS and served for several decades as a Public Night Operator of the 20-inch Clark at Chamberlin. Fran was an avid ATM. He ground the full-thickness mirror of a 16-inch f/7 Dobsonian-type telescope using the mirror-grinding machine he also built, which is now stored in the basement of Chamberlin. The mirror was probably made in the late 50s or mid 60s. It



GTN MOUNT

Credit: Patricia Kurtz

appears that the telescope was rebuilt into a Dob-type mount in the 80s. Given its focal length, this is a very large telescope with what are likely great optics and useable as it is. The tube assembly is about nine feet long and consists of an open frame square made from angle aluminum. Fran's daughter is currently storing the telescope in the family garage but will be selling the house this fall. She would like to donate it to the DAS or sell it to someone in DAS who will make good use of it. We have not accepted the donation as of yet because we have no place to store it nor have we found anyone that

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PRESIDENT'S CORNER

light pollution is all up to you. These members have stepped up to take a lead in these missions of the DAS—will you respond when they ask for your help? I think so and hope you will, because, "No man is an Island . . ."—be a part of the Continent of the Sky.

Clear, Dark Skies!—Ron Pearson.

(CONTINUED FROM PAGE 2)

*The entire quote from John Donne's: *Devotions upon Emergent Occasions*, 1624:

"No man is an Island, intire of it selfe; every man is a peece of the Continent, a part of the maine; if a Clod bee washed away by the Sea, Europe is the lesse, as well as if a Promontorie were, as well as if a Mannor of thy friends or of thine owne were; any mans death diminishes me, because I am involved in Mankinde; And therefore never send to know for whom the bell tolls; It tolls for thee."

DAS MEMBERS PARTICIPATE IN BIOBLITZ LIGHT POLLUTION PROJECT

By Darrell Dodge

Three DAS members were team leaders for the National Park Service/ National Geographic BioBlitz sky brightness measurement project, which occurred on Sunday, August 12th, on the first—and the only—clear night during the August 12-17 project period. The entire measurement transect reached from about nine miles north of Wellington, Colorado to the south end of Chatfield Reservoir—about 100 miles as the crow flies. Karen Tobo led the Boulder transect, Greg Wimpey the north Denver transect, and I led the south Denver transect. We signed up at the August 3rd DAS general meeting, after hearing Daniel Greenidge's very professional presentation on the project. Each of us received two loaner Sky Quality Meters (SQM): the original model that samples 80 degrees of sky and the new "L" model that samples 20 degrees to arrive at a quantitative sky quality measurement. One project objective was to collect data that could be used to compare the performance of the two different SQMs at similar sites.

The number provided by an SQM reading is the sky brightness if the light of a star of that magnitude was spread across a square arc-second of sky. A reading of 22 is said to be the "darkest possible" reading, which would be light that comes only from natural sources—the Milky Way, the zodiacal light, and airglow. The darkest SQM reading along the Boulder to Chatfield BioBlitz transects on August 12th was 19.88 south of Chatfield Reservoir, which would be considered moderately light-polluted. (By comparison, the best recent DAS dark site reading was about 21.60.)

The sites for the BioBlitz SQM project were selected to provide continuous lines (or transects) of sky brightness measurements along the Front Range and up two canyons leading into Rocky Mountain National Park. The immediate goals for the project were "to measure night sky brightness across a broad spectrum of lighting conditions, demonstrate how anthropogenic (human-generated) light sources influence the Rocky Mountain National Park, and present the findings at a Bioblitz festival to facilitate a discussion of the importance of star-filled skies in our communities." The long term objective is the designation of Rocky Mountain National Park as a "Dark Sky Preserve."

Karen Tobo of Lafayette teamed up with BASS members Stan Jarrett and Dave Bender to tackle the open spaces of Louisville and Boulder. The darkest skies for this team were found at the Boulder Reservoir, where clear skies estimated at Bortle Class 6 measured 19.84 with the SQM-L. Cloud coverage of about 40% affected measurements at Louisville's Warembourg Open Space, which measured just 18.10. Readings at this site were interrupted by a bellowing

local youngster with an impressive flashlight, and the group vowed to keep their voices down at the remaining sites that adjoined residential areas. Later at North Boulder Park, the team narrowly missed stepping on some meteor viewers in the dark. They were pleased to see a few folks out looking up!

Stan and Dave accommodated Karen's request to add Lafayette's "The Great Bark Dog Park" to the inventory, with the team arriving just after midnight. Local haze seemed to be a factor, as this site was farthest from Boulder but measured 19.33. Fond farewells were exchanged, and the group parted company at 12:30 A.M.

The North Denver Team, comprised of Greg Wimpey, Ivan Geisler, and Neal Pearson, collected 5 data points, starting in Broomfield north of 120th Avenue at Emerald Elementary School at 10:38 P.M. and continuing south to Berkeley Lake in Denver shortly after midnight. The readings on their SQM-L meter ranged from 18.53 magnitudes per sq-arc second in the suburban skies of Broomfield to 18.20 in urban Denver. They had about 25% cloud cover at the first location, but by the time they arrived at their second station, the clouds had almost completely cleared.

At each of their data collection sites, they estimated the sky quality class to be 9 on the Bortle scale. This is the most light-polluted class. Greg notes that they made these estimates based on the visible stars and it seemed there was some haze in the sky that night. If so, that might have obscured some stars and biased the sky quality estimates towards more light pollution.

They had no problems during their portion of the transect (other than noticing some very poor lighting installations).

The south Denver team met at Chamberlin Observatory, which had been added to the transect at the last minute. Skies were cloudy, but expected to clear later, so Ron Hranac, Jennifer Kobilan and I decided to head off in my minivan about 9:35 P.M. and make the Chamberlin measurements when we returned later. Using Ron's somewhat out of date GPS unit and a route I developed a few days before, we arrived at the first transect point—the Paco Sanchez Park near Federal and 12th—at 9:50 P.M., only to find three east-west lenticular wave clouds filling the sky like huge hotdog buns. Our first measurement, made at 10:35 P.M. just as the clouds had cleared, turned out to be the worst of the night, at 17.70 with a Bortle Class estimate of 9. We then worked our way down toward Chatfield reservoir for the next two hours, constantly frustrating the "recalculating!" GPS unit, encountering: 1) a lovely little pocket park at Huston Lake, 2) a spooky-dark urban forest on the south side of Bear Creek Park, across from Ft. Logan Cemetery, 3) two kind but stern law enforcement officers who warned us that we were breaking county park regulations at the Wynetka Ponds in Littleton, and 4) the darkest measurements of the night south of Chatfield Lake, despite the nearby entrance of Lockheed-Martin (cut-off lights work!), at 19.88 and Bortle Class 5. We stopped off to measure a slightly brighter site along Wadsworth Boulevard before heading back to Chamberlin, where it was still unfortunately too cloudy. We headed home at 1:35 A.M.

One can only conclude from the measurements we made that (with only a few exceptions) the night skies along the transect are horribly light-polluted, even though there were promising indications, such as the full cutoff street lights that municipalities had installed in some of the parks. Maybe the BioBlitz project will help publicize the fact that there is something called "light pollution." A more critical challenge will be to convince enough people that it's important.

The Paco Sanchez Park near 12th and Federal in west Denver was the northern-most (and most light polluted) measurement point in the South Denver transect, with an SQM reading of 17.70. Note the skyglow and the Denver skyline through the trees.

Credit: Darrell Dodge



BEGINNERS BITS— GREEK LETTERS AND OTHER DESIGNATIONS FOR STARS

by Lisa Judd

There's a thing that sometimes sounds intimidating to the casual astronomer, used most often in the academic realm but not too difficult to get used to if you know what it means. While learning constellations, it's good to learn the names of all the brighter stars—but be aware that they also have designations that involve a Greek letter and the possessive form of the constellation. So, α (alpha) Aurigae is another name for Capella, β (beta) Orionis is Rigel, γ (gamma) Virginis, and α (alpha) Ursae Minoris is the north star. Conversely, there are many medium-bright stars that also have names, but are more popularly referred to by the Greek letter and constellation possessive. After all, who could learn all those names if we included the medium-bright ones as well as the bright ones?

The general rule is that you pick a particular constellation, using its spatial boundaries rather than the stick figures, then assign the designation Alpha to its brightest member, Beta to the second brightest, Gamma to the third, and so on. But, that general rule has a lot of leeway, mainly due to variables but also when a constellation has many bright stars whose differences in brightness is dif-

ficult to tell apart (think the Big Dipper). I'm not sure why, but the strangest one is Nunki in the handle of the teapot, which somehow got all the way to Sigma despite being the brightest star in Sagittarius. If you don't know the order or symbols of the Greek alphabet, most star maps have it.

Since there are only 23 Greek letters, and most constellations have more stars than that, a new system takes over when you get past the bright ones—namely English alphabet letters and Arabic numerals. There's some overlap, and when you get past basic constellation-learning and into the telescopic targets, you'll notice. Besides starhopping, there are a great deal of doubles, variables and deep-red carbon stars that go by more than one designation. For example, δ Trianguli is the same as ι (iota) Trianguli, so don't make the mistake of logging them twice. For those with letters, there's also a difference between capital and lowercase.

Sometimes deep-sky objects that have never been named are designated by whatever star is closest, and the same goes for some that have been named. Although it's difficult to see from here because of the southerly declination, the Omega Centauri cluster is often just called "Omega Centauri" since it's much more interesting than the

star. One thing that can't be seen from here is the Jewel Box, which is also known as the Kappa Crucis cluster. Others include the Gamma Cassiopeiae nebula, the Omicron Velorum cluster, the Eta Carinae nebula, and one of my favorites—the Tau Canis Majoris cluster, which surrounds its namesake star. The Omega Nebula is another name for the Swan, but doesn't lie next to a star; it just looks like a capital Omega in photographs.

One of the weirdest nebulae is the FU Orionis nebula, which of course surrounds FU Orionis. The convention for naming variable stars is with capital letters, starting with A, B, C etc. but quickly coming to AA, AB, AC etc. Somewhere along the line the letters were doubled before differing, so your star map may plot UUs or YYs. With the sheer number of stars in Orion, it's unsurprising we'd get all the way to FU, but don't neglect W Orionis. Many doubles are also variables, and many variables are also carbon stars, so organizing them into designation schemes introduces more error the deeper you go.

As with anything I contribute, addenda, questions, comments and corrections are welcome. My email address is lm_judd@hotmail.com.

DAS ADOPT-A-TELESCOPE PROJECT

(CONTINUED FROM PAGE 5)

wants to take it on for use at our dark site. This scope could be rebuilt again into a more modern and lighter weight Dobsonian or other design. The DAS could acquire the telescope and dismantle it to sell the optics if no home is found for it. Arrangements might be made to buy the telescope directly from the family. Fran's mirror grinding machine is also in need of a new home and restoration. It currently sits in the basement of Chamberlin rusting slowly into the concrete.

The DAS also has some smaller telescopes which "technically" are in our Scope Loan Program, but have not seen any use. These will likely be sold at the DAS Auction or other internet sites if no use is made of them:

C-5 SCT on CG-5 Mount: This is a 5-inch Celestron Schmidt Cass telescope on Celestron CG-5 mount. It may be sold at the DAS Auction or internet site this Oct.

Meade 127mm APO refractor on LXD 75 goto Mount: This donation is a high quality refractor that was mounted for about two years at Craig Betzina's Strasburg dark site in an observatory for DAS member use. Unfortunately, it saw no use by DAS members. The mount requires some work to make it function. It will be eligible for sale (by IRS rules) next year. If it gets no use it will likely be sold at the DAS Auction or internet.

C-8 SCT Telescope: "Orange Pumpkin" 8-inch $f/10$ SCT in the Scope Loan Program. It has seen no use and will likely be up for sale in the DAS Auction next year.



DAVID SHOULDICE WITH FRAN OHMER'S 16-INCH F/7 TELESCOPE.

Credit: Ron Pearson



WELCOME NEW DAS MEMBERS!

- Sarah Borenstein
- Joseph Gabriele
- Kevin Goates
- Ben Griffiths
- Christopher Hamilton
- Brendan Loy
- Donald Lynn
- Baranthwaj Murali
- Tim Robinson
- Keith Stevenson

In long-exposure photographs, the “Dumbbell Nebula” (M27), looks more like an exploding celestial balloon. The subexposures for this image of the planetary nebula were obtained at the DAS EGK Dark Site during June and July, when nearby oil derrick lights were partially blocked by a wind screen. The central blue/white dwarf star that illuminates the nebulosity is easily seen. Modified Canon 450D with an Astronomik CLS broadband clip-in filter, through a Celestron 11-inch SCT.

Image © Darrell Dodge



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