

OBSERVER



A KISS FROM THE GODDESS

THE BLACK DROP EFFECT

Dan Wray successfully imaged the black drop during the internal ingress of the transit of Venus on June 5, from his solar setup at Observatory Park. Until the same effect was observed during the transit of Mercury in 1999 and 2003, it was thought that this difficult-to-see phenomenon was a result of the thick atmosphere on Venus. Mercury, however, has no atmosphere so this theory was ruled out. Dan used a Canon 30D camera through a 100mm f/6 scope with a 2X barlow and a Baader white-light solar filter. It is a single frame image with no processing.

Image © Dan Wray

Calendar

- 3..... Full moon
- 10..... Last quarter moon
- 18..... New moon
- 26..... First quarter moon

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JULY SKIES

by Dennis Cochran

We have survived the two back-to-back solar events—the annular solar eclipse on May 20, and the Venus transit on June 5. Our south-looking evenings feature Scorpius and Sagittarius, two shapely constellations that actually look like something. Scorpius represents its namesake arachnid and Sagittarius looks like a teapot. In fact we often just call it that, two syllables instead of five. Above these is the large, vaguely bell-shaped constellation Ophiuchus the Serpent-Bearer. He perhaps is derived from Asclepius, the physician and surgeon that accompanied the Argonauts, and his serpent connection survives today in the snake-twined staff that is the symbol of the medical discipline.

In the middle of the month on Sunday the 15th, Jupiter and Venus will be wandering, as planets do,

through the Hyades. This is the star cluster that makes a “Vee” which represents the head and horns of Taurus the Bull. These will be visible in the morning, unfortunately. A crescent moon will be there as well, which is very nice if you’re a morning person. The moon will be full on the evening of the 3rd and again at the beginning of August, washing out all those nebulae and star clusters that are mixed in the steam rising from the teapot.

This glorious summer panorama includes M8 (the Lagoon Nebula), M16 (a nebulous or cloud-girt star cluster), M17 (the Omega Nebula), M18 (a star cluster), M20 (the Trifid Nebula, so-called because a dark lane trisects the blob of gas), M21 (a star cluster) and M22 (a globular cluster), near the top of the Teapot’s lid. These are nearby other globulars M28 and NGC 6638, as well as star clusters M23, 24 and 25.

Continued on Page 3

PRESIDENT'S CORNER

by Ron Pearson

Fellow members—first, many thanks to all of you who participated in our two big solar events during May and June (the partial annular solar eclipse and the historic transit of Venus). We received many positive comments and appreciations from the public at all of our venues for those of you who shared your telescope views with perfect strangers. After these hugely successful events at which we brought astronomy down to earth for thousands of our fellow citizens of the Denver area, the DAS was brought back down to earth by reports of bright lights ruining the night sky and night vision at our Ed Kline/Brooks Observatory Dark Sky (EGK) site near Deer Trail. The light pollution is being generated by un-

shielded work lights on an oil exploration drill rig about 1.7 miles to the south of our site. Many of you have invested your time, money and sweat into making the EGK a great place from which to observe our universe. Unfortunately, we have been given a rude introduction into one of the most contentious battles and arguments of our current society—that of increased exploration for fossil fuels and the lengths that some will go to find the ever-decreasing supply, along with the role of government regulation to limit the impacts these efforts generate. While there are of course many positive benefits, there are negative impacts which are supposed to be considered and properly mitigated. I think most all of you know all about light pollution and how totally unnecessary it is with well-designed efficient designs. Now, from both the government regulators and private corporate worlds, we are literally confronted



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The oil derrick lights cause loss of dark adaptation, which makes it impossible to observe many deep sky objects.

Image © Darrell Dodge

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DAS SCHEDULE

JULY

- 6 DAS General Membership meeting at D.U.'s Olin Hall: **Speaker: Jack Harvey: "Remote Observing—How to image from here when your telescope is over there."** (Begins at 7:30 P.M.)
- 13 E-Board Meeting at Chamberlin (Begins at 7:30 P.M.)
- 21-22 EGK Dark Sky weekend
- 28 *DAS Picnic (4:00 P.M.) and Open House (8:30 P.M.) at Chamberlin Observatory. See Page 4 *

AUGUST

- 3 DAS General Membership meeting at D.U.'s Olin Hall: **Speaker: Daniel Greenidge on BioBlitz (Begins at 7:30 P.M.)**
- 10 E-Board Meeting at Chamberlin (Begins at 7:30 P.M.)
- 16-18 WUTS, Foxpark, WY. (CANCELLED)
- 17-19 EGK Dark Sky weekend
- 25 Open House at Chamberlin Observatory (Begins at 8:30 P.M.)

Public nights are held at Chamberlin Observatory every Tuesday and Thursday evenings beginning at the following times:

March 15 - 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.

Society Directory

President:
 Ron Pearson (303) 670-1299
president@denverastro.org
Vice President:
 Lisa Judd (626) 487-8515
vp@denverastro.org
Secretary:
 Dennis Cochran (720) 870-0465
Treasurer:
 Brad Gilman (720) 488-1028

Executive Board Members

Chuck Carlson Ron Hranac
 Jack Eastman Naomi Pequette
 Joe Gafford David Shouldice
 Chuck Habenicht Dan Wray
 President Emeritus, Larry Brooks

Committees

Van Nattan-Hansen Scholarship Fund:
 Tim Pimental (Chair)
 PO Box 100621
 Denver, CO. 80250-0621
EGK Dark Site Committee:
 Darrell Dodge, Interim Chair
 Email: darksite@denverastro.org
IDA Representative:
 Dr. Robert Stencel
 Email: coloida@botmail.com

Volunteers or Appointed Representatives

ALCor:
 Darrell Dodge (303) 932-1309
Newsletter:
 Editor: Patti Kurtz (720) 217-5707
 Email: p_kurtz@comcast.net
 The Observer is available in color PDF format from the DAS website.

Website:
 Darrell Dodge
 Email: webmaster@denverastro.org
 Chad Warwick, IT Specialist
Librarian:
 Phil Klos
 DAS Information Line: (303) 871-5172
DAS Correspondence:
 Denver Astronomical Society
 Chamberlin Observatory c/o Ron Pearson
 2930 East Warren Avenue
 Denver, Colorado 80210

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

JULY SKIES (CONTINUED FROM PAGE 1)

There may be some other sights I have forgotten. These are part of the furniture of the galaxy, as it were, gathered near its center in Sagittarius. Slightly farther afield are some other M-objects and many NGC (New General Catalogue) targets; look at your sky atlas and roam this region at will, gazing at its wonders like the first person to see Yosemite Valley.

On the north side of the ecliptic, which is the equator-like skyline followed by the sun and moon, is Ophiuchus, his large open middle bisected by the line of globular clusters M10, 12 and 14. Another globular cluster, M9, sits by itself far to the west of M23-25 below the lower-left corner of the bell.

Saturn rules in the early-evening southern sky. He was looking good at our last Open House on May 26. We had plenty of scopes and could have used more gawkers, but that night's count was low, perhaps because it was the Memorial Day weekend. Mars had his place in the southwest and was almost impossibly red. These guys will still be there this month, shifted a bit farther west and getting closer together. I've heard that Ming the Merciless (an apology to Chinese peo-

Visitors watch a projection of the transit at Chamberlin Observatory.

Image © Ron Pearson



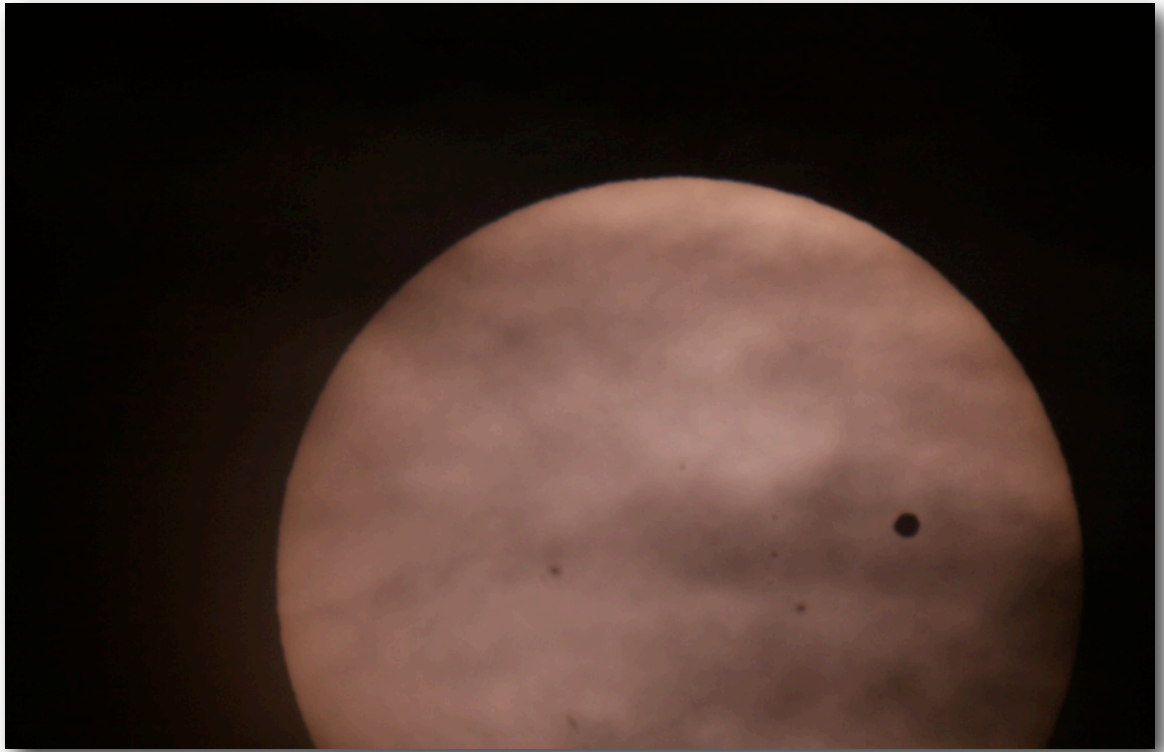
ABOUT THE DAS

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-



THROUGH THE CLOUDS

As Venus progressed across the face of the sun, Dan shot this image through the clouds from his spot on the lawn outside Chamberlin Observatory.

Image © Dan Wray

ple everywhere for that name, but that's the way it was in the 1930s) has perfected a ray that will cause Mars to *cr-r-r-r*ash into Mongo! No—rather into Earth, because Ming lives on Mongo in the Flash Gordon movie serials. I'm still waiting for astronomers to discover Mongo.

New Bad Thing That Can Happen to Observers: death by Miller Moth! Okay, not exactly death but more like they fly around and bump into you. Actually they won't bother astronomers because we don't stand under lights. Astronomers have been known to shoot lights out, however, but only astronomers gone bad, like, you know, Pdgr Xzpybfc. Oh—and beware the bats! We had them at the Open House, where several people were bitten and transformed into vampires. I hate it when that happens. Most of

the bats had their mouths full of bugs, however. I call them the Bug Patrol, one of Mankind's best friends in the mammal kingdom. Come out to the next star party and cheer on the Bug Patrol. Maybe you can capture one crossing your telescope or binocular's field of view as they pursue their nocturnal prey.

EDITOR'S NOTE:

Thank you, Luis Uribe, for producing the May and June *Observers* for me. You did a *fantastic* job and created a fabulous newsletter. Thank you, thank you!

—Patti Kurtz

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.

DARK SKIES TAKE A HIT AT THE EGK DARK SITE

by Darrell Dodge

A new feature appeared southeast of the DAS EGK Dark Site this May. Excavation machines were carving a square pad in the prairie grassland just above Muddy Creek, the slough that flows east of the property the DAS has leased from Henry Weisensee for 15 years. With all the similar activities along the Front Range lately, there was only one thing it could be.

A call to Mr. Weisensee verified the fact. Although the exploratory oil well near the dark site wasn't on his land, he had another well on his property (10 miles from our lease) that had been drilling for three months. On June 2nd, Ted Cox and I noted that the placard at the entrance of the site said that the Encana exploration well would "Spud" after May 15th. Sure enough, on Friday, June 8th, DAS members Justin Modra and Juan Velasquez reported that an oil derrick had sprung up on the excavation site (seemingly as quickly as a tripod in "The War of the Worlds.") And that it was beaming harsh rays of blue-white light that were deadly to an astronomer's dark adaptation in the direction of our beloved dark site and Brooks Observatory. Justin's cinema verite photo told the story: things were not going to be the same at the dark site this summer.

I visited the dark site several times in mid June to verify the subjective impact of the light pollution problem and obtain some Sky Quality Meter

(SQM) data. I also took some photographs and videos, tried to determine the impact on observing with the Brooks Observatory. I also discovered that the prototype windscreen cast a shadow and would help to block some of the light from the oil derrick.

During the day, the situation doesn't look too bad. But the oil derrick lights (which seem to remain on all day) are already glimmering and flaring before dusk and it's easy to see that some of them are very bright. There are at least 15 large blue-white yard lights virtually aimed at the dark site. After dark, their light is so intense that it's difficult to look directly at them, indicating a clear threat to dark adaptation. The metal-halide bulbs intended to provide yard lighting 1.75 miles away actually make shadows on our pads and turn the south wall of the observatory into a shadow puppet screen. Close up images with a DSLR and the C14 in the observatory indicate that the lights are about 10-inches in diameter (some with reflectors) and that a farm with six lights is aimed in the general direction of an out-building between the lights and our site. Fluorescent lights on the trusses of the derrick were less bright, but would still be a problem.

SQM measurements were somewhat less affected than dark adaptation. These were made on a clear hazeless night (June 10th) and a clear night with significant smoke haze (June 17th).

June 10th: While measurements immediately above the derrick were a very low 19.90, (about the reading in my light-polluted Littleton backyard) measurements at 40 degrees recovered to 21.26; the same as the "Denver nebula" quadrant. At the Zenith and in the northeast, SQMs of 21.51 and 21.56 were measured.

For comparison, David Delassus provided a 21.68 as his best ever at the dark site. He normally measures SQMs of 21.9 at WUTS and 21.8 at RMSS. From the Brooks Observatory, views of nebulae in the SE are severely affected. The Swan Nebula (M17) was faint and pondless,

and the nebula in M16 was not visible at all with the large 14-inch SCT. (Of course, it was not possible to test the effect on galaxies in the SE right now).

On June 17th, SQM measurements were degraded an average of 0.30 by smoke from the High Park fire, which was brought in by upper-level winds from the north. Nonetheless, at 2 A.M., I was able to observe nebulosity in M16 (then near the Meridian) with a C11.

Observing is possible from the observatory in other areas of the sky. Observing and imaging is also still possible behind the windscreen because the porous fabric is still dense enough to cut the glare significantly. However, people observing behind a windscreen will have to shield their eyes and avoid looking directly at the oil derrick lights when they leave its protection. Once lost, it takes 20-30 minutes to regain dark adaptation.

Five windscreens (which could serve 10 observers) are on order and we hope to be ready to block light and wind with them for the dark sky weekends in July and August. However, if the well is not successful, the oil derrick might be removed by that time.

DARK SKIES BUSTER

At night, the impact of the 140-foot oil derrick and its 15 metal-halide lights is greater than a quarter moon.

Image © Darrell Dodge



PICNIC TIME!!



It's almost time for our summertime picnic! On July 28th at 4:00 P.M., we'll get together at Chamberlain for food and fun, followed by our usual July Open House night. It's free, and no reservations are required. Everyone is encouraged to bring a salad or dessert, and DAS will supply the drinks and a tasty barbecue.

PRESIDENT'S CORNER

(CONTINUED FROM PAGE 2)

will continue to gather data, and in the short term there is not a lot we can do. We wait for the results of the drilling to determine if further development or drilling will be occurring in our area of Arapahoe County, and hope that they have a dry hole. Darrell and I will endeavor to keep you informed of the situation through our Yahoo group and DAS meetings:

DAS members: as you're likely aware from previous posts, an oil exploration well is being drilled near our Ed Kline Dark Sky Site in Arapahoe County. As their work goes on 24 hrs/day the rig is heavily lighted at night for the workers and this has created a significant negative light pollution impact on the night sky at our site. After learning about this development this past weekend, some of us on the E-board and the Dark Site committee spent most of last Sunday pulling together what information we could find regarding the drilling activity and what we might expect about future oil drilling or resource development in the Deer Trail area. While most of us may be "just amateur astronomers," one of the great things about DAS is the diversity of professional expertise among our members; from lawyers, professionals in the energy industry, govt. regulators, retired geologists like myself, and newly graduated students with ed' in GIS computer data bases we can draw on. On Tues. I wrote a letter/email to Arapahoe County with cc to Southwest Energy asking for information and informing them of the severe impacts their light pollution has on our site and I received their reply this morning. To date, we have learned the following:

The drilling is being conducted by the Southwestern Energy Corporation. It is an exploration hole designed to determine the presence of oil in several different geologic formations. It is not intended to produce oil or gas after completion—unless they discover significant product. The drilling is expected to last 35 to 40 days—we presume from start of drilling last week. Arapahoe County has lighting regulations which would severely limit or restrict the amount of light directed off site, but the county's lighting regulations are superseded by requirements of the State of CO Oil and Gas Commission which oversees and regulates all oil and gas development in the state. Those regulations only apply to an area within 700 ft. of the drill site. Hearings were held and permit approvals given for this drilling by the Oil and Gas Commission. DAS was not informed of the permit applications or provided any information from the Commission or Arapahoe County.

We have used the CO Oil and Gas Commission's GIS on-line data base to assess whether there are any other drill sites planned or permitted in the area around Deer Trail and put this data into a KML Google Earth file which is more user-friendly for our capability. I will post this file which I will set up in our group files section for this issue. It is apparent that this drilling operation is not exploring for oil in the same formations as many other wells currently in the front range plains and is 'all by itself' wildcat well east of the Niobrara formation drilling that you hear much about in the news with regard to hydro-fracking and other issues. From the state's data base, it appears there are no other exploration holes planned in our area. HOWEVER, any further drilling or development will depend heavily on the results from this drilling near our site. We therefore will have to "wait and see" what the results are. We can hope they have a dry hole—which is more common than not in drilling for oil.

For now, Darrell Dodge our Dark Site Manager and I plan to meet with our land-owner at the earliest possible time to discuss the situation and also his thoughts for our future at the site. We had planned this meeting anyway well before this drilling began. As I said in my letter to the county, this new development will weigh heavily in our decisions about the future of our dark sky site. As you're aware, from my previous columns in the Observer, we have been anticipating the end of our lease and deliberating what our options are for the past two years since we met with our land owner.

For the short term, Darrell has been working on a wind screen design for use at the site and has tested this as a potential 'photon barrier' also with pretty good results. While this light pollution has ruined our best skies during the warm summer months at "Ed's Place," the barriers will help

block the glare and overall sky quality is still good. We will continue to collect data, develop information re the possibility of future drilling in the area and stay vigilant to provide input about further drilling with Arapahoe County and State of CO. O&G Commission.

FYI. I am copying the letter below that I received this morning from Arapahoe County representative.

Clear, Dark Skies and Dry Holes!—Ron Pearson, President, DAS

Ron,

Thank you for your email letter of June 12, 2012. While I can appreciate your frustration with the lights from a nearby oil and gas well, current regulatory jurisdiction for oil and gas wells is primarily with the State of Colorado Oil and Gas Conservation Commission (COGCC), including lighting regulations for oil and gas rigs. COGCC lighting regulation, Rule 803, indicates to the extent practicable, site lighting shall be directed downward and internally so as to avoid glare on public roads and building units within 700 feet. The County's lighting regulations are superseded by the State's regulations. The applicant, Southwestern Energy, submitted an application for a permit to drill on March 7, 2012 and was approved by the COGCC on April 11, 2012. Part of the COGCC's permitting process requires the applicant to notify property owners within 500 feet of the proposed drilling permit. Notification of all pending drilling permits in Colorado is given on the COGCC's web site. If you have any more questions of COGCC, please call them at (303) 894-2100.

I forwarded your letter to Southwestern Energy and they responded with the attached letter.

If you have any other questions or would like to discuss this matter further, please contact me via email or phone at 720-874-6665.

Sherman Feher

From: Ron Pearson [mailto:ursamajor_1@mac.com]

Sent: Tuesday, June 12, 2012 10:06 AM

To: Sherman Feher

Subject: Arapahoe County—Oil Exploration Drill Lighting—Severe Impacts

Sherman Feher

ARAPAHOE COUNTY

Public Works & Development

6924 South Lima Street

Centennial, CO 80112

Mr. Feher,

I am President of the Denver Astronomical Society Inc. We are a 501c3 non-profit organization with over 350 members in the Denver area for over 60 years. We lease approximately 6 acres of land in Arapahoe County near Deer Trail for the purpose of providing our members and visitors a place where they can observe the unpolluted night sky with their telescopes, educate and do outreach science education and conduct research projects in Astronomy. Our astronomy outreach and science education activities reach over 5000 people each year. We have leased this property for the past 15 years in Arapahoe County because of very good night sky conditions which is a valued resource of limited light polluted conditions relatively close to the Denver area. The DAS is an all volunteer non-profit and we have invested considerable time and money into developing this site for the objectives stated above. Last year we completed building and dedicated an astronomical observatory, our Brooks Observatory, with a telescope donated by a major corporation and local donors.

It was with real regret that this past weekend, one of our members found the site to be severely impacted by light pollution from a nearby oil exploration drilling operation, 1.72 miles from our site. We have since learned this

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THE TRANSIT OF VENUS

From the University of Denver's Historic Chamberlin Observatory, June 5, 2012



THE SUN AND VENUS COME DOWN TO EARTH

Clockwise from upper left: Chamberlin Observatory's 20-inch Clark-Saegmuller and 6-inch Grubb refractors were outfitted with solar filters for the transit (Photo by Ron Pearson); Venus's 2nd Contact on the Sun as seen on the dome room LCD monitor from the imaging camera (on the 6-inch Grubb refractor) (Photo by Ron Pearson); Venus approaching 2nd contact through a C-5 with Thousand Oaks solar filter (Image © Brad Gilman); Jack Eastman (left) and Dr. Bob Stencel "go Hollywood" for the transit at Observatory Park (Photo by Ron Pearson); and Brenda Wray (right) sharing the transit through 11x80 binoculars (Photo by Ron Pearson).



PRESIDENT'S CORNER

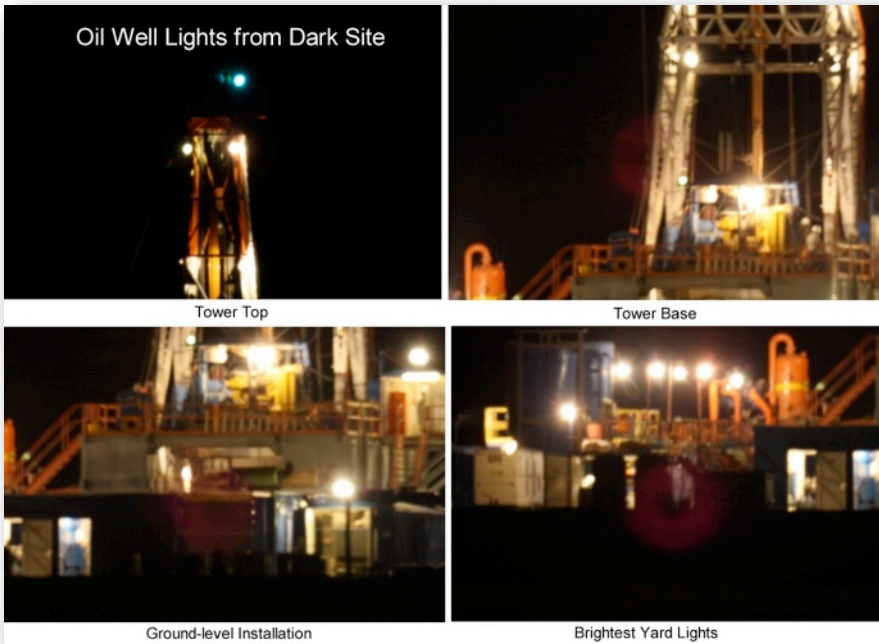
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operation is owned by Southwestern Energy Production corporation which is the Staner 5-58 #1-8 well. As you can imagine, the glare from the unshielded bright lights on this rig severely limit and impede our ability to use our site for astronomy. Despite being a land lessee in Arapahoe County for

the past 15 years we received no notices about plans for this drilling operation or hearings where we could comment or provide input to approvals or waivers of Arapahoe County lighting regulations in "Part 1 of Zoning Regulations Section 1-4700 Lighting Standards" or to the Colorado Oil and Gas Conservation Commission.

We would like to know how long this operation will last, and whether there are any plans that the county will enforce its existing lighting regulations so that the drilling operation lights are shielded in accordance with existing county regulations. We would also like to receive notices and information of further plans for drilling or development operations in the Deer Trail area by Southwestern Energy or any other applicant for drilling or development purposes. The lease for our site will expire in a few years and we have been considering whether to purchase land in Arapahoe County or consider alternative locations and options for the future of our site for astronomy. It is obvious this type of development will weigh heavily in our decisions.

We would be glad to meet with you or discuss these impacts with you at any time in hopes to ameliorate or limit the impacts on this important resource of Arapahoe County. I am attaching a google earth KML file which shows the location of the Staner well in relation to our site, designated EGKDSS, for Edmund G. Kline Dark Sky Site. Clicking the location of the Staner well will bring up the information from the CO Oil and Gas Commission GIS data base regarding the operation. We look forward to hearing from you in the near future.



OIL RIG BY THE DARK SITE

This photo montage (which is in the DAS Yahoo Group Photos section) is a close-up image of the lights. It was taken with a DSLR through the 14-inch Celestron SCT in the Brooks Observatory. It shows how big the lights are and that they are pointed almost directly at the dark site.

Sincerely,
 Ronald M. Pearson
 President, Denver Astronomical Society Inc.
www.denverastro.org

Image © Darrell Dodge



A STELLAR TURN-OUT

From upper left: First contact! (Image © Brad Gilman); Aaron Reid guides a budding astronomer in the use of the 20-inch Clark (Photo by Ron Pearson); At times, the line stretched all the way across Observatory Park (Photo by Ron Pearson).



JULY SPEAKER: JACK HARVEY

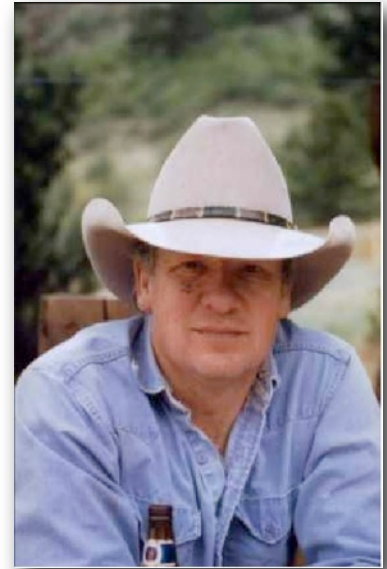


ON FIRE

At “Land's End Observatory,” a nature observatory on Grand Mesa overlooking Grand Junction, Joe imaged the transit as it set behind the hills. He used his 10-inch f/4.5 Newtonian telescope. He needed no filter at sundown due to the smoke from wildfires to the south.

Image © Joe Gafford

Jack Harvey is a retired sports medicine physician who operates an observatory on Coyote Rim Ranch in Colorado containing a 14.5-inch RCOS Ritchey-Chretien telescope with ion milled optics. He joined three other astronomers to form Star Shadows Remote Observatory (SSRO) at New Mexico Skies, used remotely via the internet to do astrophotography and some science. He then collaborated with professional astronomers at UNC-Chapel Hill to set up a group of RCOS Ritchey-Chretien telescopes at Cerro Tololo Inter-American Observatory (CTIO) in Chile, led by Dr. Daniel Reichart, to do GRB research and develop educational outreach for colleges and high schools using the telescopes. Jack formed an astrophotography section of PROMPT at CTIO, which took shape to produce a world class observatory for astrophotography of the southern skies. The SSRO/PROMPT Imaging Team was formed with Rick Gilbert, Daniel Verschatse and Steve Mazin, who were appointed Visiting Scholars of the Department of Physics and Astronomy of UNC-CH. This ongoing work continues to improve the facilities at SSRO/PROMPT and has been published on the web, in books and publications such as *National Geographic*.



The Denver Astronomical Society
 c/o Chamberlin Observatory
 2930 E. Warren Ave.
 Denver, Colorado 80210