

The Denver

OBSERVER

Newsletter of the Denver Astronomical Society
One Mile Nearer the Stars

Image copyright, 2006 Craig Anderson

A Multi-Colored Beauty

The Trifid Nebula, M20 (NGC 6514), in Sagittarius is illuminated by the ionizing radiation of stars within it (red regions) and by reflected starlight (blue regions). It's visible to the naked eye as a faint patch of fuzz under dark skies. Craig Anderson captured this image at Rocky Mountain Star Stare on June 23, 2006 using an AP155 f/7 telescope with an ST-2000XM CCD camera. The image is comprised of 90 minutes of data built up from 10 minute luminance exposures and 5 minute red, green and blue exposures for a total LRGB of 30:30:15:15. Luminance was binned 1x1 and RGB was binned 2x2.

T R A N S I T T I M E

NOVEMBER SKIES

Inside The Observer

President's Corner 2

Schedule of Events 2

Society Directory 2

Promoting the DAS 3

Mercury Transit..... 4-5

EGK Dark Site Update..... 6

DAS Hot Shots 7

Membership Info *back page*

November opens with a transit of Mercury, when the tiny planet crosses the face of the Sun. Transits of Mercury occur only 13 or 14 times a century, and only in May or November. The reason for this is best explained in

Ron Pearson's article on page 4. The next transit will be November 11, 2019. The transit is a special event for the Denver Astronomical Society and the University of Denver's Chamberlin Observatory. The doors to

NOVEMBER PREDOMINANT CELESTIAL OBJECTS

Description	RA	DEC	Description	RA	DEC
M13, globular cluster	16h 41.7m	36° 27'	Perseus double cluster	02h 21.5m	57° 08'
εLyrae, double-double	18h 44.4m	39° 40'	ιCassiopeiae, triple star	02h 29.0m	67° 24'
M57, Ring nebula	18h 53.6m	33° 02'	Pleiades	02h 47.5m	24° 06'
Albireo, double star	19h 30.7m	27° 58'	M42, Orion nebula	05h 35.4m	-5° 22'
M31, Andromeda galaxy	0h 42.7m	41° 16'	M35 cluster	06h 08.9m	24° 21'
M33, Triangulum galaxy	01h 33.9m	30° 39'			

5	Full moon ("Hunter's" moon)
8	Transit of Mercury
12	Last quarter moon
20	New moon
27	First quarter moon

Chamberlin will open on November 8th at 11:30 A.M. for the public.

Saturn will rise around midnight early this month, but by month's end it rises closer to

Continued on page 3

President's Corner

The November General Meeting is dedicated to Show-and-Tell, where you get the chance to show off the new equipment, images, research, or latest contraption built from parts obtained at the auction this past month. The auction was a success, and the proceeds are being placed in the general fund. This gives us the greatest flexibility in using the funds for the members' needs.

The Dark Site now has eight new pads. The south end of the site is dedicated to imaging and research. Work at the site will slow down dramatically through these winter months, giving the Dark Site Committee ample time to plan new work for next season. Their meetings are being moved to Open House Saturday, just prior to the meeting. This will give more people with telescopes an opportunity to contribute to the planning process. Many thanks to all that participated in the work this year.

A contract was awarded for work at Chamberlin this month, and we should start to see some changes soon. Aaron Reid has been refurbishing the cabinet/bookcase in the Director's Office. This area will be-



Wayne Green, president of the Denver Astronomical Society.

come a conference room modeled after Dr. Howe's office. As you all know the current Director maintains his office on the main DU campus.

It is also time to think about the Christmas Potluck. I am leaning toward holding it in town this year, as the weather has been pretty bad the past two times we headed down to the Grange. Perhaps somewhere near the Observatory and those who are interested can head over to Chamberlin for dessert.

I'm challenging each of you to two things: 1) help the DAS develop a class that



DAS Schedule

NOVEMBER

- 3 General Meeting at D.U.'s Olin Hall (Member's "Show-n-Tell" begins at 7:30 P.M.)
- 8 Special Open House for the Transit of Mercury at Chamberlin (Begins at 11:30 A.M.)
- 10 E-Board meeting at Chamberlin Observatory (Begins at 8 P.M.)
- 18-19 EGK Dark Site Weekend
- 23 Thanksgiving Day

DECEMBER

- 2 Open House at Chamberlin Observatory (Begins at 5:00 P.M.)
- 8 E-Board meeting at Chamberlin Observatory (Begins at 8 P.M.)
- 9 DAS Holiday Potluck (Place to be determined)
- 16 Hanukkah Begins
- 16-17 EGK Dark Site Weekend
- 25 Christmas Day
- 30 Open House at Chamberlin Observatory (Begins at 5:00 P.M.)

Public nights are held every Tuesday and Thursday evenings beginning at the following times: October 1 - March 31 at 7:00 P.M.
 April 1 - September 30 at 8:30 P.M. at Chamberlin Observatory
 Costs to non-members are: \$3.00 adults, \$2.00 children.
 Please call (303) 871-5172 for reservations.

Society Directory

President:

Wayne Green (303) 530-1023

Email: wgreen@infosavvy.org

Vice President:

Darrell Dodge (303) 932-1309

Email: dmdodge@aol.com

Secretary:

Stuart Hutchins (303) 697-4353

Email: stuart-atm@earthlink.net

Treasurer:

Brad Gilman (720) 488-1028

Email: Brad.Gilman@echostar.com

Executive Board Members

Jack Eastman Bill Ormsby
 Joe Gafford Ron Pearson
 Frank Mancini David Shouldice
 Ron Mickle Dan Wray

Steve Solon, Past President
 President Emeritus, Larry Brooks

Committees

ALCor:

Jerry Sherlin (303) 680-6894

Email: sherlinj@msn.com

EGK Dark Site Chair:

Wayne Kaaz (303) 840-1549

Email: kaazmos@msn.com

IDA Representative:

Dr. Robert Stencel

Public Outreach:

Ron Mickle

Restoration and Maintenance:

Ron Pearson

Finance:

Frank Mancini

Van Nattan Scholarship Fund

P.O. Box 150743

Lakewood, Colorado 80215-0743

Colorado Astronomy Day:

Darrell Dodge

Annual Picnic:

Keith Pool

Newsletter:

Observer editor, Patti Kurtz (720) 217-5707

The Observer is available in color PDF format from the DAS website.

Website:

Darrell Dodge and Patti Kurtz

DAS Information Line:

(303) 871-5172

DAS Correspondence:

Denver Astronomical Society

Chamberlin Observatory C/O Wayne Green

2930 East Warren Avenue

Denver, Colorado 80210

The Executive Board conducts the business of the DAS at 8 P.M. at Chamberlin Observatory. Please see the Schedule of Events for meeting dates. All members are welcome.

the das . org

Promoting the DAS

by Wayne Green

The members of the Denver Astronomical Society bring news and information of amateur astronomy and space science to the public. In the process we get to have some fun, too! I am often asked about courses in amateur astronomy—about which telescope to buy, and other general questions similar to the ones you and I asked when we started into astronomy. I get these questions at our public outreach events, and about all I have been telling people so far is to head to S&S Optika or simply join the club, where we tell them to head to S&S Optika.

In talking with members, I have developed the idea that amateur astronomers come in roughly four flavors. The first is the observer, interested in collecting photons with their eyeballs, making notes, and generally looking at the many and varied splendors of the sky. We are all observers at heart.

The second class of amateur is someone who wants to take pictures of what they see. This is where the game starts to get interesting, as their investment in time, scope, camera and computer starts to weigh heavily on the wallet and chores around the house. The next class of amateur is the instrument maker, more interested in building some device to collect data. The last class is the political astronomer, the people that are more involved with developing and maintaining the framework of amateur astronomy than the photons themselves! (I'm more of a gadget guy myself.)

Someone once asked Dr. Everhart, the third director of Chamberlin, what it took to become an amateur astronomer. He told them to "get a machine shop!" Now, there is a dyed-in-the wool instrument maker if there ever was one. I tell them to join the club and come to Open Houses. This is where we can adopt our newfound friends and bend their ears off

with our opinions of the best telescope for them!

The DAS can do two things to help people achieve becoming an amateur astronomer. We can offer a course about amateur astronomy, and we can write a DAS handbook. This will help people determine their interests and make intelligent buying decisions.

First, the handbook: Many years ago we had a section of our website dedicated to the "D-Files." Very few new articles have been written lately. I know of several that are finished or in the works: one is Bryan Wilburn's Observer article telling how to use the JPL Horizons database to get the position of Pluto together with the SEDs database to print an accurate star field for finding the planet (See the August 2006 *Observer*). That is something that is handy to know! The Public Night teams are experimenting with equipment to acquire accurate times for making observations. The results will be published in an article appearing in the D-Files. There is a lot of interest in imaging using anything from film, ToUCams and security video cameras, to low- and high-end astronomy CCD cameras. Work is starting at Chamberlin with cameras now.

I see the handbook as being an edited collection of articles. All worthy articles will be published in the D-Files section of the DAS website, and we will work to get the best of those published.

As for classes, I would like to develop an outline of the topics that each of you feel is important to those starting in amateur astronomy. One of the biggest questions we hear is ". . . what about these newfangled GOTO telescopes?" Another is, "What can I do to contribute to amateur astronomy?" Members, please think about other questions and

the areas of amateur astronomy you may have had some difficulty with in the past and mail me your ideas for a syllabus for a DAS course about "How to Become an Amateur Astronomer."

Who wants to be the editor of this handbook? Let me know.

Darrell Dodge has prepared a brochure introducing the club. It is available at Chamberlin and at S&S Optika, so you can hand them to people you meet that are interested in joining the ranks of amateur astronomers.

President's Corner

we can offer to newcomers in astronomy and, 2) help write a DAS handbook about being an amateur astronomer that is heavy on the facts and light on the metaphor. See the article on "Promoting DAS" in this issue.—Wayne Green

November Skies

Continued from page 1

10P.M. On November 17, Saturn is at west quadrature; therefore, the ball of Saturn casts its shadow to the side onto the rings.

To get a great view of the planets, stars, and other celestial objects, visit the Denver Astronomical Society's Open House at sunset on Saturday, December 2 at the University of Denver's Historic Chamberlin Observatory. Remember that members of the Denver Astronomical Society have free access to the Clark 20-inch at Chamberlin Observatory during Open House.—Ron Mickle
Astronomical Calendar 2006



updates

An Historic Transit of Mercury at Chamberlin Observatory, University of Denver

by Ron Pearson

Denver Astronomical Society

(All images were downloaded from the Internet and are of the May 7, 2003 Mercury transit.)

On November 8th, given clear daytime skies, many members of the DAS, perhaps numerous members of the public, media, and Dr. Robert Stencel, Observatory Director, will be watching a small, round object move across the face of the sun. The tiny black disk will be the planet Mercury. Some of those observing this astronomical phenomenon will be using the 20-inch Alvan Clark refractor, the six-inch Grubb telescope “finder” or perhaps looking through the five-inch Clark ‘finder’ on the side of the great 20-inch. Others may be out on the south lawn with their personal telescopes viewing the event.

Given that planets move in nearly circular orbits about the sun along the path called the ecliptic or plane of their orbits,

it should be no surprise that occasionally one of the “inferior” planets, Mercury or Venus, passes in front of the sun. And, given that Chamberlin Observatory and its Clark refractor have made 112 orbits of the sun with the Earth since they were constructed, it is not surprising that other transits of Mercury would have been observed with Chamberlin’s 20-inch telescope.

NASA Astronomer Fred Espenak [1] explains the recurrences of transits of Mercury:

“All transits of Mercury fall within several days of 8 May and 10 November. Since Mercury’s orbit is inclined seven degrees to Earth’s, it intersects the ecliptic at two points, or nodes, which cross the Sun each year on those dates. If Mercury passes through inferior conjunction at that time, a transit will occur. During November transits, Mercury is near perihelion and exhibits a disk only 10 arc-seconds in diameter. By comparison, the planet is near aphelion during May transits and appears 12 arc-seconds across. However, the probability of a May transit is smaller by a factor of almost two. Mercury’s slower orbital motion at aphelion makes it less likely to cross the node during the critical period. November transits recur at intervals of 7, 13, or 33 years while May transits recur only over the latter two intervals.”

This year, it is of special note, though, that if we could turn the clock back 112 Earth orbits of the sun, we would see



Image copyright 2003 John Walker

Chamberlin Observatory, the Observatory director, his students, and his wife making timings with the same, but brand new great 20-inch telescope, and the five-inch Clark finder, while others are in the “Student Observatory” adjacent to Chamberlin observing and making timings with the Grubb telescope. Only a few months after first light for the observatory occurred in July, 1894, a transit of Mercury occurred on November 10. These observations and timings would be the first science to be done using Chamberlin’s 20-inch telescope and would be published by the U.S. Naval Observatory.

It was Edmond Halley that realized that if accurate enough timings could be made of the transits of Mercury or Venus, a distance scale of the solar system could be derived. Timing these transits then became an extremely important goal for early astronomers. By 1894 the scale of the solar system was pretty well determined from earlier transits, although more accurate measurements were needed to refine the numbers. Perhaps this was a ‘learning opportunity’ for DU students to learn how to make observations and reduce them mathematically. It was also an opportunity to make possibly important discoveries about the nature of the planet Mercury it-

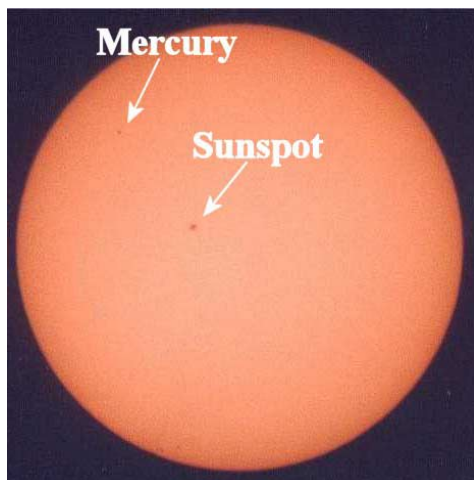


Image copyright 2003 D. McCracken



self. The physical nature of Mercury was largely unknown at the time due to its small size and close position to the sun. As Chamberlin's first director, Dr. Herbert Howe noted in his book, "A Study of the Sky" [2]:

"Of Mercury little is known, for it is coy and keeps close to the sun . . . It is very difficult to make out any markings on Mercury's disk . . . There is great uncertainty about the presence of air or water; certain spectroscopic observations indicate that there may be a thin atmosphere, in which water vapor is present."

The observations reported to the U.S. Naval Observatory read as an observing log of the event, clearly describing all details of how the timings were made, who made them—giving credit to his students and the problems and poor seeing conditions encountered. Tables of reduced timings are reported for three groups of observers. A brief summary of the first descriptions reads:

"I. The instrument used was a 20-inch equatorial refractor, aperture reduced to 12 inches; polarizing eyepiece with a power of 220 diameters. The timepiece was a sidereal chronometer, Frodsham No. 2593. . .

Mr. Eugene M. Antram counted loudly the seconds indicated by the chronometer face, and I noted according to his counting. I looked for the planet before first contact, but did not see it until the notch was quite large. . . A ring of light was looked for around the invisible part of the planet's disk, between first and second contacts, but none was seen. The planet was seen through light clouds and definition was poor...I waited patiently in the hope that the seeing might improve...Finally, at a critical moment geometrical contact seemed to be well seen and time was noted accordingly. I made a hand signal with my hand to two students, Mr. Ralph Brann and Miss Nan McFarland, when I was sure that the second contact had not yet come . . ."

"During the transit the planet was looked for occasionally to detect evidences of atmosphere, or possible satellites, or shadings on



Image copyright 2003 John Walker

the disk. The definition varied from very bad to fair. "

"II. Herbert E. Russell, associate professor of mathematics in the University of Denver, made the following observations with the equatorial of the Students' Observatory: ... The instrument used was a 6-inch Grubb equatorial, eyepiece Herschelien, with a power of 99 diameters. The timepiece was a Fauth mean time clock with the chronograph.

"III. Mrs. Herbert A. Howe used the five-inch finder of the 20-inch equatorial, equipped with a Herschelien eyepiece magnifying 120 diameters. Her timepiece was the Fauth sidereal clock of the observatory, connected with a chronograph. In the morning, the chronograph pen worked badly and there was no indubitable record of her observations."

The observatory was the fulfillment of the dream of Dr. Howe, Chamberlin's first director, and of Humphrey Chamberlin, who wanted to bring the joy of astronomy and a great telescope to the "wilds" of Denver, Colorado during the close of the frontier west. For Dr. Howe, this was the be-

ginning of 32 years of contributions to astronomy and teaching students how to observe and measure the objects in the sky. On Earth 112 years have passed, 464 Mercury years and their great refractor continues to observe the sky and provide students perhaps their first opportunities for learning astronomy with all its joys and frustrations.

References:

1. <http://sunearth.gsfc.nasa.gov/eclipse/OH/transit03.html>.
2. *A Study of the Sky*, Herbert A. Howe, 1896; The Chatauqua-Century Press.
3. "Observations Made At the Chamberlin Observatory of the University of Denver," Report of Prof. Herbert A. Howe; *Publications of the U.S. Naval Observatory* 9, page 682.



Dark Sky Site Update

by Joe Gafford
All photos
by Ken Takahashi



All, the concrete pouring is done for the season for the north end of the dark sky site. There are now eight additional powered single pads to go with the three doubles already there. Don't use the four pads on the downhill side until we remove the forms and dress the soil around them. There is yellow tape around the four pads.

There are two foot pad clusters on the south end for those who want to do some serious CCD work and research work. These pad areas have block pads only to cover the footprint of the telescope mount to isolate the tripod and square telescope mount feet from footstep vibrations.

One of the pads is a 40-inch square for the square (JMI NGT-18) and small tripod feet, the other plus one more to be done soon are three blocks set 120 degrees apart to accommodate tripods with foot distance from 31-inch to 60-inch apart— good enough for the largest Losmandy mount. I measured the one at Kathie's (42-inch) for reference.

The area around these pads have been leveled and will have lava rock on landscape fabric around them to keep the dust down.

The south end (the CCD and Research Section) is being developed for those who want to do the serious CCD and astrometric work. There is no AC power at this end yet! BYOBattery!

All, please come into the site from the *south* (through Deer Trail) and leave the same way. We find that the headlights are less intrusive from that direction. There is also less dirt road!

THANK YOU to all who came in and did the work this season from the EGK DSS committee and the E-board!—*Joe Gafford.*



DAS Hot Shots

From the Editor:

Thank you, Wayne Green, for taking over last month's newsletter—you're truly appreciated. As always, my thanks to all the great contributors of this issue including Steve Solon for his help with copy editing. If you find editing mistakes, remember, they're probably mine. Additionally, photographers—you guys are totally rockin'! Keep it up!

I have a request to those contributing articles: feel free to submit text as Word or straight text documents. If you have accompanying images, please submit them separately as jpegs or tif files. Thanks so much! — *Patti Kurtz*



Image copyright 2006 Joe Gafford

Image copyright 2006 Philip Good



Hard work behind the camera lens . . .

Top image: IC1613, an irregular galaxy in Cetus. The image was shot on September 19, 2006 at the Okie-Tex star party with an 18-inch f/4.5 NGT-18 telescope and an SBIG ST-2000XM CCD camera: 10-, 10-, 7- and 10-minute exposures of LRGB respectively were made.

Bottom left image: The Draco Triplet of galaxies NGC 5985, 5982 and 5981 from left to right in the constellation Draco. These galaxies have magnitudes of 11.9, 12.0 and 13.9 respectively.



About the Denver Astronomical Society

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 participates in **NASA's Project Astro** program.

The DAS' credo 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 a 501(c)(3) tax-exempt corporation and has established three tax-deductible funds: the Van Nattan-Hansen Scholarship Fund, the Public Outreach Fund, and the Edmund G. Kline Dark Site Fund. To contribute, please see the bottom of the membership form for details.

More information about the DAS, its activities, and the special tax-deductible funds is available on the DAS web site at www.thedas.org.



**APPLICATION FOR MEMBERSHIP TO THE
DENVER ASTRONOMICAL SOCIETY**

New Renewal

Name: _____
 Address: _____
 City, State, Zip: _____
 Phone numbers: Home () Work ()
 E-mail Address: _____
 Occupation: _____
 Other Interests: _____
 (Students Only) School: _____ Grade: _____

Do you want to download the newsletter in PDF format from our website instead of by postal mail?
 Yes No

Do you want the above information excluded from the yearly roster?
 Yes No

Please Circle All That Apply:

Regular Membership: \$35 Students: \$12 (*Students under age 23*)
 \$ _____

Astronomy Magazine/\$34
 Sky & Telescope Magazine/\$32.95
 \$ _____

Van Nattan Scholarship Fund \$ _____

Public Outreach Fund \$ _____

Total Amount Paid \$ _____

Please make donations to the Dark Sky Site Fund payable to the DAS EGKDS Fund and mail to Steve Solon, 9774 W. Elmhurst Place, Littleton, CO 80128-5199. Please make other amounts payable to the Denver Astronomical Society and mail along with this completed form to Brad Gilman, DAS Treasurer, 7003 S. Cherry St., Centennial, CO 80122-1179.



Denver Astronomical Society

c/o Chamberlin Observatory
 2930 East Warren Avenue
 Denver, Colorado 80210

S & S OPTIKA
Your Extended-Vision Specialists
 Colorado's Premier Astronomical
 Supply Store
(303) 789-1089
www.sandsoptika.com

