

The Objective View March 2001
Newsletter of the Northern Colorado Astronomical Society

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Meetings first Thursday of each Month

Next Meeting:
March 1 7:30 PM
Telescope Building
Randy Cunningham, Astrosystems

Meeting Directions
Discovery Center Science Museum
703 E Prospect Rd, Fort Collins

In Fort Collins, from the intersection of College Ave and Prospect Rd, head East about 1/2 mile. See the Discovery Center sign to the South, enter the West Wing at its NE corner. From I-25, take Exit 268, West to Lemay Ave, continue West 1/2 mile, see Discovery Center on the left.

Starwatch at at Discovery Center

Scopes are appreciated at monthly evening starwatches. Set up in the South parking lot on the Friday nights near 1st quarter Moon. Contact Dan Laszlo if you can come, 498-9226, djlaszlo@aol.com. Weather cancellations will be posted at 472-3990. Events to come:

March 2	7 PM
March 30	7 PM
April 27	8 PM
May 25	8:30 PM

NCAS Star Party Dates March 16, 17, 23, 24

Cactus Flats site is on undeveloped parcel of prairie about 6 miles west of Briggsdale. Take Colo Highway 14 East from I-25 (Exit 269). From there about 19 miles east to Ault.

Continue 18 miles East of Ault, at County Rd 65 (milepost 170), turn North, go one mile. Site is through the gate on the right (no road), close gate and set up. Beware of the cactus!

Our standard nights are the weekend of the New Moon, sometimes a weekend before and after. If the weather is bad on a Friday night we will try the following night. The site is now offically wheelchair accessible, but there are no facilities so bring essentials. Call Tom Teters, tom@ezlink.com, with

questions about the star party status, site or dates, 482-5702 or 482-0807.

N.C.A.S. Invitaional Star Party- May 17-19, 2001

This will be the First Star Party of the 2001 season to be held in the M.A.R.S. area. It will be held at Virginia Dale, Colorado (Two Chicks Paintball), just South of the Wyoming border on Hwy 287. This is 40 miles north from the 'Y' in N. Ft. Collins, Colorado and approximately 28 miles South of Laramie, Wyoming at an elevation of 7560'. More to come from Tom T.

Rocky Mountain National Park Summer Starwatching

Contact Dan Laszlo if you can volunteer with a scope this summer. Dates are June 15, June 29, July 13, July 27, August 10, August 24.

Other Events

Little Thompson Observatory Star Night, Berthoud 7 p.m.
Heidi Short Stonehenge
March 16 <http://www.starkids.org>

Cheyenne Astronomical Society
<http://users.sisna.com/mcurran>
March 16 7 p.m.

Open House, Chamberlain Observatory, dusk to 10 PM
<http://www.du.edu/~rstencil/Chamberlin/>
March 3 303 871 5172

Longmont Astronomical Society 7PM
<http://laps.fsl.noaa.gov/cgi/las.cgi>
March 15 Longmont Christian School 550 Coffman St

Sterling Star Party, North Sterling Reservoir State Park
April 21-22, see
<http://laps.fsl.noaa.gov/albers/las/sterling.html>

February 1 Meeting: Pluto and Charon, by Ken VanLew

In 1905, Percival Lowell launched the search program which finally culminated in Pluto's discovery. The planets Uranus and Neptune appeared to stray from their predicted courses, and an unknown planet was presumed to be responsible. The successful search for Neptune was born of such an analysis, conducted independently by Leverrier and Adams, and executed by Galle at Berlin on his first night to search. Lowell had national notoriety for his high profile studies of Mars. He had established a private observatory in Flagstaff, Arizona, to pursue the idea that Mars was crisscrossed with canals, constructed by a Martian civilization. The reality of the canals was challenged in Lowell's time, but remained on official US maps of Mars until spacecraft retired them in the 1960's. Lowell Observatory was known for its Mars observations, and the prospect of discovering a planet was irresistible. Lowell and William Pickering conducted 8 searches from 1905 to 1919, and accumulated over 1000 photographic plates. Their tedious search produced no new planet. Lowell was discouraged, and in 1919 died of a stroke. His widow brought a suit to collect from his estate, and legal wrangling drained the family fortune. The observatory managed to install a new 13" refractor camera. Vestro Slipher became the new director, and noticed letters and drawings sent by a Kansas farmboy. Clyde Tombaugh started observing in 1909 when his uncle loaned him a 3 inch telescope. His family moved to Burnett, Kansas in 1922. He enjoyed football, track and field, and studied Latin and Astronomy. He could not afford college, and had not been away from home. Tombaugh was invited to Arizona for the planet search. The camera was not ready when he arrived, so he was assigned more tedious chores as a tour guide and shoveling the abundant snow in Flagstaff. In April 1929 the camera was ready, though Slipher was reluctant to turn Tombaugh loose with it. Their search routine was guided by a realization that their target would be moving quite slowly against the starry background. This would allow them to discard asteroids and comets in their search. At the predicted distance, the object's apparent motion would be dominated by the effect of Earth's orbital motion. The planet would appear to move most rapidly when opposite the Sun, and its direction of motion would be retrograde, from East to West. At best, they estimated the planet would be 1/15 as bright as Neptune. Exposures were over an hour. Each field was photographed a few nights apart. Tombaugh quickly grasped Slipher's technique. A binocular machine was used to view the plates, alternately blinking one or the other, while the observer looked among 50 to 90,000 images on the plate for a dot jumping by a few mm. He churned through the tedious cycle of photographing at night, processing plates, viewing plates, and a little sleep before the next round. The plates revealed 29,000 galaxies, 1800 variable stars, 2 comets. Asteroids were quickly eliminated, as they jumped 10x too much. There were frustrating plate defects. On February 18, 1930, Tombaugh saw a pinprick jump, about 3-4 mm. A third plate was checked and confirmed an object. Tombaugh took 45 minutes to be sure, then found Slipher. "I have

found your Planet X." There were immediate concerns. No planetary disk was visible. The object was 1/250 fainter than Neptune, over tenfold dimmer than predicted. Additional confirmation images were sought, based on predictions from plates taken on January 21-29. On February 18, clouds prevented imaging. On February 19, plates were shot, and processed on the 20th, confirming motion as predicted. Lowell astronomers held their news until March 13, 1930, the 75th anniversary of Percival Lowell's birth. The planet was dubbed Pluto for the god of the Underworld. The orbit is unusual, with 25% eccentricity and rather high inclination. Pluto is carried inside Neptune's orbit between 1979-99, but they never approach each other due to a 2:3 orbital resonance. Pluto remained mysterious for years, but the ceiling on its mass shrank as it was observed. The ominous trend was humorously projected to total disappearance at a future date. Photometry revealed a 6.39 day periodicity in brightness variations. The magnitude was too much for surface markings. Precise repetition implied little or no atmosphere. The answer came in 1978, when Jim Christie was given 18 Pluto photographs to measure. It was casually mentioned that some plates appeared defective, with Pluto out-of-round. He realized that Pluto was the only asymmetrical object on the plate, and that the asymmetry occurred periodically. Review of plates in 1970 confirmed the evidence that Pluto had a companion, to be dubbed Charon, which was about half its size. Leif Andersson, a Ph.D. candidate at the University of Indiana, determined that Charon was about to begin a series of eclipses with Pluto, an opportunity which only comes twice in Pluto's 248 year solar orbit. Timing of photometry during the eclipses allowed much more precise determination of the pair's characteristics. Charon is estimated to be about 1/10 Pluto's mass, by far the largest proportionally in the Solar System. The barycenter of the pair lies between Pluto and Charon. Their rotation is tidally locked, so an observer on Pluto would always see the same face of Charon. Prospects for a spacecraft to Pluto recently brightened, when NASA recently solicited new proposals. Pluto is believed to develop an atmosphere temporarily when nearest the Sun, and the chance to study it will wane if more than a few years elapse before launch. Lessons of the Pluto saga are: Persistence pays off. Technique is important. Adequate support for science is critical. Unexpected results are a chance for discovery. See Alan Stern's 1998 book, Pluto and Charon, for more details.

NCAS Business for February 1

President Jan Kok called the meeting to order. Items for purchase with club funds were discussed. A laser collimator was secured by Doug Moench. Dave Chamness had about a dozen members at his home for some mildly breezy winter sky viewing on January 20.

Software For Sale SkyMap Pro version 4. \$25

By Chris Marriot of the UK. Includes printed manual. Current version is Seven which goes for \$95 these days. Randy Moench, 7348 Poudre Canyon Hwy, Bellvue CO 970-491-8429

4.5 inch mirror blanks, S&T Magazines available.

The blanks are approximately 4.5 inches in diameter and 1/2 inch thick. I have approximately a dozen of them, and various grinding powders. These blanks would be great for kids since the glass is relatively soft and grinds fast. Sky and Telescope with some issues from the 60's. I'm just trying to find a useful home for this stuff. It's free for the taking. I live west of Boulder and I'm looking for someone close by or is willing to pay UPS shipping.

Chet Kieffer ckieffer@indra.com

Best Looks

Moon	By Saturn & Jupiter 3/ 1,2,28,29 by Mars 3/ 15,16
Mercury	In SE, eves, 1st 2 weeks
Venus	Visible in dawn and dusk sky for a few days starting 3/ 25
Mars	Drawing away from Antares, am
Jupiter & Saturn	High in W at dusk

SLIVER CRESCENT VENUS IN DAYLIGHT

Venus swings about 8 degrees North of the Sun at Inferior Conjunction. For a week before and after March 28, it can be safely found around Noon with binoculars, IF you stand in the shadow of a rooftop. DO NOT SWEEP RANDOMLY, NEVER RISK ACCIDENTALLY VIEWING THE UNFILTERED SUN! See the attached chart and know your binocular field.

SPRING SKY WATCHING

Ken VanLew will be teaching a CSU Continuing Ed class on Spring Skies beginning Thursday, Mar 22. Topics will be identification, location, & mythology of circumpolar, Spring, and zodiacal constellations. Lots of viewing opportunities will be provided including a planned 2 hour dark sky session. The course will meet 6 Thursdays from Mar 22-Apr 26. Anyone interested can call 491-5288 to enroll. Ken would appreciate your passing the information on to beginning stargazers.

From:
Dan Laszlo
2001 S Shields St Building H
Fort Collins CO 80525

TO:

International Space Station Passes.

When the Space Shuttle arrives at the Station, new predictions will likely be necessary.

Date	Mag	Starts		Max. Altitude		Ends		
		Time	Alt. Az.	Time	Alt. Az.		Time	Alt. Az.
11 Mar	1.0	05:34:58	10 SSW	05:37:49	33 SE	05:40:40	10 ENE	
12 Mar	2.2	04:35:40	10 SSE	04:37:25	14 SE	04:39:10	10 E	
13 Mar	-0.2	05:10:04	16 SW	05:12:22	58 SE	05:15:27	10 ENE	
14 Mar	1.5	04:12:09	23 ESE	04:12:09	23 ESE	04:14:22	10 E	
14 Mar	0.2	05:44:39	10 W	05:47:35	36 NNW	05:50:32	10 NE	
15 Mar	-0.8	04:46:12	55 WSW	04:46:46	81 NW	04:49:55	10 NE	
16 Mar	2.2	03:47:58	18 ENE	03:47:58	18 ENE	03:49:01	10 ENE	
16 Mar	0.8	05:20:05	15 WNW	05:22:02	26 NNW	05:24:44	10 NE	
17 Mar	0.4	04:21:43	40 N	04:21:43	40 N	04:24:07	10 NE	
18 Mar	1.3	04:55:21	17 NW	04:56:20	20 NNW	04:58:44	10 NNE	
19 Mar	1.8	03:56:48	20 NNE	03:56:48	20 NNE	03:58:05	10 NE	
19 Mar	2.0	05:30:24	10 NW	05:31:49	12 N	05:33:15	10 NNE	
20 Mar	1.6	04:30:14	16 NNW	04:30:30	16 NNW	04:32:33	10 NNE	

Mir Complex. Expect these times to be significantly in error, as Mir approaches decay. Check www.heavens-above.com website for updates.

Date	Mag	Starts		Max. Altitude		Ends		
		Time	Alt. Az.	Time	Alt. Az.		Time	Alt. Az.
07 Mar	2.0	19:50:46	10 NW	19:51:09	13 NW	19:51:09	13 NW	
08 Mar	1.4	19:44:32	10 NW	19:45:28	21 NW	19:45:28	21 NW	
09 Mar	0.6	19:38:00	10 WNW	19:39:30	31 W	19:39:30	31 W	
10 Mar	0.5	19:31:09	10 WNW	19:33:13	27 SW	19:33:14	27 SW	
11 Mar	1.4	19:24:06	10 W	19:25:43	17 SW	19:26:44	13 SSW	
12 Mar	2.2	19:17:21	10 WSW	19:17:47	10 SW	19:18:13	10 SW	

A Few Iridium Flares. Computed for the intersection of Lemay and Trilby in Fort Collins.

Date	Local Time	Intensity(Mag)	Alt.	Azimuth	Distance to flare center	Intensity (Mag.) at flare center	Satellite
26 Feb	18:22:34	-4	49	179	9.3 km (W)	-8	Iridium 31
02 Mar	19:43:24	-4	44	131	13.8 km (E)	-8	Iridium 6
03 Mar	06:17:43	-5	55	11	6.3 km (W)	-8	Iridium 28
04 Mar	06:11:41	-8	53	11	0.4 km (E)	-8	Iridium 31
05 Mar	06:05:43	-4	51	12	9.1 km (E)	-8	Iridium 57
06 Mar	05:59:43	-3	49	12	15.3 km (E)	-8	Iridium 60
07 Mar	05:53:48	-2	48	12	18.5 km (E)	-8	Iridium 29
07 Mar	19:22:11	-5	50	140	9.7 km (E)	-8	Iridium 61