



Desert Sky Observer

Volume 31

Antelope Valley Astronomy Club Newsletter

August 2011

Up-Coming Events

August 6: Vasquez Star Party with the Local Group @ [Vasquez Rocks](#)

August 12: Club Meeting*

August 15: Board meeting @ [Don's house](#)

August 20: Prime Desert Woodland Moon Walk @ [Prime Desert Woodlands](#)

August 27: Dark Sky Star Party @ Brite Lake (tentative, check the web calendar for details)

August 30: Astronomy Lecture and Star Party @ [Acton Library](#)

* Monthly meetings are held at the S.A.G.E. Planetarium on the Cactus School campus in Palmdale, the second Friday of each month. The meeting location is at the northeast corner of Avenue R and 20th Street East. Meetings start at 7 p.m. and are open to the public. *Please note that food and drink are not allowed in the planetarium*



President

Don Bryden

The Dog Days are upon us! When I was young and heard that phrase I always pictured a lazy hound like our Bassett lying out in the yard and panting. It made sense when you heard someone say these were the dog days – you felt like lying around like a hound dog too!

The Romans referred to the dog days as dies caniculares and associated the hot weather with the star Sirius. They considered Sirius to be the "Dog Star" because it is the brightest star in the constellation Canis Major.

The Dog Days originally were the days when Sirius rose just before or at the same time as sunrise, which is no longer true, owing to precession of the equinoxes. The Romans sacrificed a dog at the beginning of the Dog Days to appease the rage of Sirius, believing that the star was the cause of the hot, sultry weather. Dog Days were popularly believed to be an evil time "when the seas boiled, wine turned sour, Quinto raged in anger, dogs grew mad, and all creatures became languid, causing to man burning fevers, hysterics, and phrensies"

In Ancient Rome, the Dog Days extended from July 24 through August 24. In many European cultures (German, French, Italian) this period is still said to be the time of the Dog Days. The Old Farmer's Almanac lists the traditional timing of the Dog Days as the 40 days beginning July 3 and ending August 11, coinciding with the ancient rising of the Dog Star, Sirius. These are the days of the year when rainfall is at its lowest levels.

For the ancient Egyptians, Sirius appeared just before the season of the Nile's flooding, so they used the star as a "watchdog" for that event. Since its rising also coincided with a time of extreme heat, the connection with hot, sultry weather was made for all time: "Dog Days bright and clear / indicate a happy year. / But when accompanied by rain, / for better times our hopes are vain."

Dog days or not we are enjoying some great star parties and club events. I would like to thank those who participated in the Repair Day, especially Steve Krell who donated a scope to the club, Pat Jasper who

showed us what a nice, clean well-cared for mirror looks like and Duane Lewis who conversely demonstrated what happens to your mirror when you feed your cats on it! We won't even talk about Jim and Ann's cobweb-filled Newtonian. Suffice it to say, all the spiders and spider eggs were removed (Guys, the scope is called "Cave" because that's the folks who made it – it's not supposed to be a real cave...)

Finally I'd like to say that the Messier Club star party last Friday was a success. We had a good turnout and not a goto scope was to be seen (well except for Jason's but he was there just for the dark skies and cupcakes). Shane probably got through half his Messier list and Karole made a good start on the Globular Club. Guy, Aaron, Bill and Pam all started their star-hopping education and we bagged a few Messier gems in the process (four words, Bill, "Dobsonian with a telrad", Pam – thanks for the cookies!).

I hope to do this once a month on a Friday and either at my house or a nearby location. Don't worry if you can't star hop or aren't interested in the Astronomical League clubs; just come out and enjoy a nice low key star party with your fellow members (though I can't guarantee that there will be cookies and cupcakes each time).



Vice President

Rose Moore

This month we have just 2 public outreach events. The first is our Prime Desert Moon Walk with Jeremy on Saturday, August 20th, starting at 8pm. Please come out with your telescopes or other astro items of interest! Last month we had 23 members turn out, probably our largest group so far!

On Tuesday, August 30th is another Acton Library Astronomy Lecture and Star Party. The lecture starts at 7:30pm, 'Stellar Formations', followed by star gazing, weather permitting. We need some members with their telescopes for the star party!

Our club meeting for August will have a guest speaker, arranged by Jeremy. She is a teacher who has worked on the SOFIA telescope! Further info to follow.

For September, we have coming up a Prime Desert Woodlands Moon Walk with Jeremy on Saturday, September 10th, at 7:30pm. We will also be having Dr. David Lynch returning to speak at our club meeting on Sept. 9th at 7:00pm. He will be speaking on 'Color and Light'. A big event for September is PATS (Pacific Astronomy and Telescope Show) in Pasadena. This event is on the weekend of Sept. 17th & 18th. Tickets at a discount are still available! The end of the month is the Acton Library Astronomy Lecture and Star Party with Jeremy. This month the meeting resumes on Wednesday, Sept. 28th at 6:30pm, with the topic of the 'Solar System'.

Coming up in October is our club's annual Business Meeting. Please plan on attending. We need your input! And we need you to come out and vote for your board members for next year! This is important! Maybe you are up to the task? Start thinking of whom you want to be on the AVAC Board for 2012.

Keep looking up!



Secretary

Frank Moore

I know. It's hard to believe isn't it?

We have only two AVAC meetings remaining till the Annual Business Meeting on Friday October 14, 2011.

I want to get a head start, and give everyone plenty of notice so you can nominate your friends, family, associates, and most importantly yourself for a position on the Executive Board.

If you want to lend a hand in steering the Antelope Valley Astronomy Club through the next year and beyond, or know someone you think would be a good club officer and leader, PLEASE submit your nominations to the Executive Board by using the links on the "Contact" page of the website, by dropping us a note, or just by whispering in our ear. We'll hear you, and if they'd be willing to serve, we'll make sure the names of your nominees make it onto the ballot. In coming months, we'll have a receptacle at the meetings and forms you can use to submit your nominations.

If there's something you don't think we've been doing right, would like to see done differently, or we just plain aren't doing, submit your suggestions for proposed changes to the Operations Manual or By-laws as well. Operations Manual changes are approved by a vote of the board only and changes to the Constitution and By-laws are approved by the membership at the annual business meeting.

So remember, submit your nominations, submit your suggestions for changes to the Operations Manual or By-laws, and put it on your calendar now....ATTEND THE AVAC ANNUAL BUSINESS MEETING ON FRIDAY OCTOBER 14. We will be sending you official notifications and more reminders in the coming months.

Now, turn off your outside lights and go look at the stars.

Seeing Is Believing...or Is It? by Paul Derrick

Have you seen this beautiful image? Captioned "Sunset at the North Pole," it's been getting email mileage on the Internet for several years. I saw it again last month when a friend forwarded it to me.

According to the accompanying text, "This is one of the rarest pictures that you will ever see in your life when the moon was closest to the Earth. The date the picture was taken was Thursday, 13th May, 2011. This is the sunset at the North Pole with the moon at its closest point. A scene you will probably never get to see in person, so take a moment and enjoy. And, you also see the sun below the moon, an amazing photo and not one easily duplicated."



The author of the text was purported to be a “lecturer of library and information science” affiliated with two prominent universities. But as pretty as the image is and as authoritative as the source might sound, it is simply another of the countless Internet hoaxes. Remember when Mars was supposed to look as large as a full Moon?

There are so many problems with this North Pole sunset email it's hard to know where to begin debunking it. For starters, May 13, 2011, was a Friday, not Thursday, but that's being picky.

More substantive is the fact that the photo shows the Moon at or very near the new Moon, when the Moon passes between Earth and the Sun. The Moon was new Tuesday, May 3, so maybe the lecturer meant May 3 rather than May 13?

But there's a problem with May 3. If the Moon was “closest to Earth” as claimed, then the photo had to have been taken May 16 when the Moon was at perigee, the point in its monthly elliptical orbit when it swings nearest Earth. And at perigee, the Moon does actually appear larger than average – although only slightly.

There's an even bigger problem with May 16 as the Moon wasn't even visible from the North Pole when it was nearest Earth at perigee. It dipped below the horizon May 12, quite some distance from the Sun, and didn't reappear until May 26, thus no one could have even seen, much photographed, it May 13 or 16 from the North Pole.

And for yet another stake in the heart of this Internet hoax, from the March equinox to September equinox, there is no “sunset at the North Pole.” In this “land of the midnight Sun,” the Sun is constantly in the sky day and night without rising or setting for half a year. In May it hovers some 18 degrees above the horizon as it circles the horizon each day.

Regarding their relative sizes, the Moon and Sun always appear virtually the same size – about ½ degree, a space easily covered with the end of a finger held at arm's length. (This derives from the fact that the Sun is 400 times more distant than the Moon and, by coincidence, 400 times larger.) And while the apparent relative sizes of the Sun and Moon do vary, owing to the Earth's elliptical orbit around the Sun and the Moon's elliptical orbit around Earth, the variance is slight and barely noticeable to the casual observer.

All questionable dates and other factors aside, never at any time or season or from any location on Earth does the Moon appear notably larger (or smaller) than the Sun, and certainly not some 40 times larger as this image indicates.

So, maybe seeing isn't always believing after all. Such hoaxes do, however, serve a purpose: they remind of the importance of maintaining a healthy degree of skepticism and keeping our skills of critical inquiry ever at the ready, whether watching TV or reading emails, newspapers, or even this column.

The Web site snopes.com is an excellent source for checking the accuracy of Internet claims. It's usually the first place I turn when anything pushes my skepticism button. According to snopes, this “photograph” is believed to be a digital image entitled “Hideaway” created by Inga Nielsen, a German astrophysics student using Terragen scenery rendering software. There is no indication that Nielsen perpetrated this hoax; more likely, someone else misused the creative artwork.

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Space Place

New GOES-R to Give More Tornado Warning Time

by Dauna Coulter and Dr. Tony Phillips

So far this spring, more than 1,400 tornadoes have struck the U.S. Some of them have cut jaw dropping trails of destruction across the countryside and, tragically, across inhabited communities, too. Hundreds of lives have been lost in the onslaught.

Throughout the season, the National Weather Service has routinely issued tornado alerts. In the case of the Alabama tornadoes of April 27th, forecasters warned of severe weather five full days before the twisters struck. Because they couldn't say precisely where the twisters would strike, however, many of their warnings went unheeded.

"If people get a hurricane warning, they often evacuate the area," notes NOAA's Steve Goodman. "But we react differently to tornado warnings."

Perhaps it's because tornadoes are smaller than hurricanes, and the odds of a direct hit seem so remote. Recent pictures from Tuscaloosa, Alabama, and Joplin, Missouri, however, show the perils of playing those odds. Goodman believes that more precise warnings could save lives.

To fine-tune tornado warnings, NOAA will soon launch the first in a series of next-generation weather satellites – GOES-R (Geostationary Operational Environmental Satellites-R series). The spacecraft is brimming with advanced sensors for measuring key ingredients of severe weather including winds, cloud growth, and lightning.

"GOES-R will be the first geostationary spacecraft to carry a lightning sensor," says Goodman, the GOES-R Program Senior Scientist. "Studies show that sudden changes in the total lightning activity correlate with storm intensity—and with tornadoes."

The lightning mapper will detect and map not only cloud-to-ground lightning, but also bolts within and between clouds. The kind of cloud-to-ground lightning we see from our front yards accounts for only 15-20 percent of total lightning. To get a clear idea of a storm's intensity, meteorologists need to know about all the lightning—a view GOES-R can provide.

All by itself, the lightning mapper will provide 7 minutes more lead time in tornado warnings, according to Goodman. GOES-R's state-of-the-art instruments will also improve long-range forecasts.

"The satellite's Advanced Baseline Imager (ABI), for instance, will provide a much clearer picture of clouds," says NOAA research meteorologist Tim Schmit. Compared to lesser instruments already in orbit, ABI can better detect super-cold "overshooting tops," evidence of enormous energy and upward velocity that correlate with subsequent severe weather.

"Accurate advanced notice of high-risk tornadic conditions can cue officials to close schools and businesses even before tornadoes are actually detected," says Schmit.

Forecasters doubt tornadoes can ever be predicted with 100% accuracy. The twisters are just too capricious. GOES-R, however, is a step in the right direction.

Find out more about GOES-R's unprecedented capabilities at <http://www.goes-r.gov>. Young people can learn more about tornadoes and all kinds of other weather at <http://scijinks.gov>.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

News Headlines

NASA's WISE Finds Earth's First Trojan Asteroid

Astronomers studying observations taken by NASA's Wide-field Infrared Survey Explorer (WISE) mission have discovered the first known "Trojan" asteroid orbiting the sun along with Earth. Trojans are asteroids that share an orbit with a planet near stable points in front of or behind the planet. Because they constantly lead or follow in the same orbit as the planet, they never can collide with it.

<http://www.jpl.nasa.gov/news/news.cfm?release=2011-230>

Elliptical galaxies much younger than previously thought?

The standard model for elliptical galaxies formation is challenged by a new result uncovered by an international team of astronomers from the Atlas3D collaboration. Team members from CNRS, CEA, CFHT, and the Observatoire de Lyon published in the scientific journal Monthly Notices of the Royal Astronomical Society the first results from their study on two elliptical galaxies exhibiting features characteristic of a fairly recent merging, suggesting they are five times younger than commonly thought.

<http://www.cfht.hawaii.edu/en/news/EllGal/>

NASA's Next Mars Rover to Land at Gale Crater

NASA's next Mars rover will land at the foot of a layered mountain inside the planet's Gale crater. The car-sized Mars Science Laboratory, or Curiosity, is scheduled to launch late this year and land in August 2012. The target crater spans 96 miles (154 kilometers) in diameter and holds a mountain rising higher from the crater floor than Mount Rainier rises above Seattle.

http://www.nasa.gov/mission_pages/msl/news/msl20110722.html

NASA's Hubble Discovers Another Moon Around Pluto

Astronomers using the Hubble Space Telescope discovered a fourth moon orbiting the icy dwarf planet Pluto. The tiny, new satellite -- temporarily designated P4 -- was uncovered in a Hubble survey searching for rings around the dwarf planet.

<http://www.sciencedaily.com/releases/2011/07/110720090505.htm>

The Solar Dynamics Observatory spots extra energy in the Sun's corona

Like giant strands of seaweed some 32,000 miles (51,500 kilometers) high, material shooting up from the Sun sways back and forth with the atmosphere. In the ocean, it's moving water that pulls the seaweed along for a ride; in the Sun's corona, magnetic field ripples called Alfvén waves cause the swaying

<http://www.astronomy.com/News-Observing/News/2011/07/The%20Solar%20Dynamics%20Observatory%20spots%20extra%20energy%20in%20the%20Suns%20corona.aspx>

Caltech-led astronomers discover the largest and most distant reservoir of water yet

Water really is everywhere. Two teams of astronomers, each led by scientists at the California Institute of Technology (Caltech), have discovered the largest and farthest reservoir of water ever detected in the universe. Looking from a distance of 30 billion trillion miles away into a quasar—one of the brightest and most violent objects in the cosmos—the researchers have found a mass of water vapor that's at least 140 trillion times that of all the water in the world's oceans combined, and 100,000 times more massive than the sun.

<http://esciencenews.com/articles/2011/07/22/caltech.led.astronomers.discover.largest.and.most.distant.reservoir.water.yet>

August Sky Data

**Best time for deep sky observing this month:
August 23 through August 31**

Mercury is at inferior conjunction (almost directly in front of the Sun) on August 17th. But by the end of August it will just be emerging into the dawn sky. We will get better views of this elusive little planet next month.

Venus is at superior conjunction (almost directly behind the Sun) on August 16th. We won't be able to see Venus at all this month, and it will be well into the autumn before we start to see the brilliant "Evening Star" again.

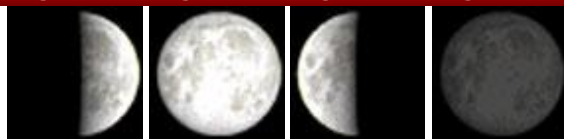
Mars is rising in the north-east shortly after midnight, and it's well up in the east at dawn. Relative to the stars, Mars is moving steadily eastwards, leaving the constellation of Taurus on August 3rd and travelling most of the way across Gemini. It draws gradually closer to the Twin stars, Castor and Pollux.

The giant planet **Jupiter** comes up in the east a couple of hours after sunset, and by dawn it's high in the south-eastern sky. Relative to the stars, Jupiter is moving ever more slowly north-eastwards in Aries, coming to an apparent halt at the end of the month. But Jupiter outshines all the night-time stars, and is easy to recognise.

Saturn is low in the western sky at sunset. At the start of August, it doesn't set until 11 pm, but every night it sets a little earlier; by the end of the month it is disappearing below the horizon a little after 9 pm. Relative to the stars, it is moving slowly south-eastwards in the constellation of Virgo, drawing further away from the star Porrima (gamma Virginis), and heading towards the brightest star in Virgo, Spica.

August brings the well-known Perseid **meteor-shower**. The radiant point is in the constellation of Perseus, which is well up in the north-east during the evening, and high in the east by dawn. Perseid meteors may be seen any time from late July to late August, but the peak this year is expected in the early hours of Saturday August 13th. Unfortunately, the light of the Full Moon will drown out all but the brightest meteors on the night of the 12th-13th.

First Qtr Aug 6 Full Aug 13 Last Qtr Aug 21 New Aug 28



Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
8/1/2011	08:13	21:01	06:01	19:54
8/5/2011	12:48	23:30	06:04	19:50
8/10/2011	17:42	03:04	06:08	19:45
8/15/2011	20:28	08:02	06:12	19:40
8/20/2011	23:05	12:39	06:15	19:34
8/25/2011	02:31	16:59	06:19	19:27
8/31/2011	09:24	20:46	06:23	19:19

Planet Data

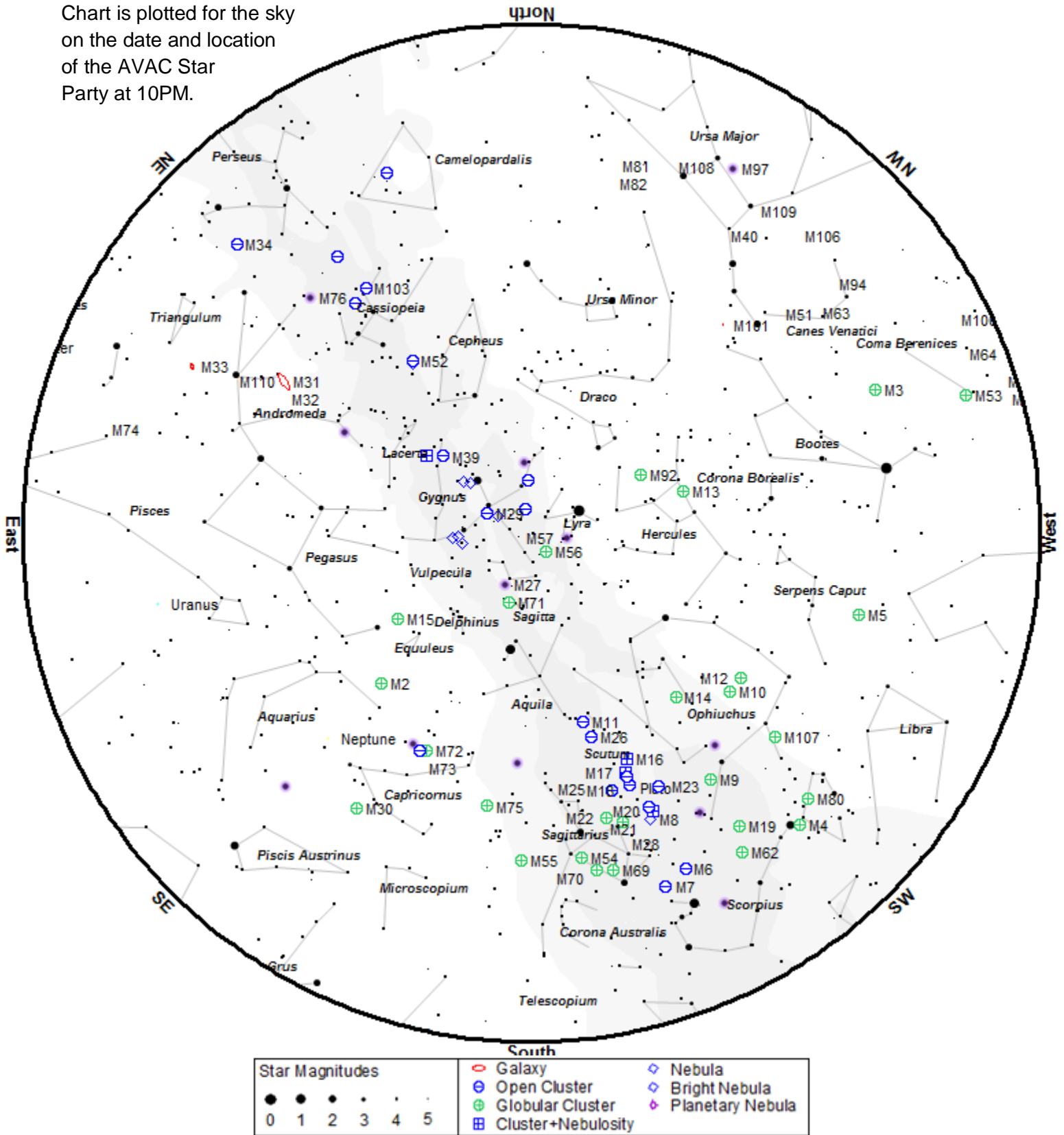
	Aug 1			
	Rise	Transit	Set	Mag
Mercury	07:48	14:24	20:56	1.4
Venus	05:38	12:47	19:59	-3.9
Mars	02:46	10:11	17:36	1.4
Jupiter	23:53	06:42	13:35	-2.5
Saturn	10:58	17:05	23:08	0.9

	Aug 15			
	Rise	Transit	Set	Mag
Mercury	06:21	13:03	19:38	4.6
Venus	06:08	13:02	19:58	-3.9
Mars	02:32	09:56	17:21	1.4
Jupiter	23:01	05:51	12:44	-2.6
Saturn	10:09	16:14	22:16	0.9

	Aug 31			
	Rise	Transit	Set	Mag
Mercury	04:55	11:47	18:40	0.1
Venus	06:41	13:15	19:50	-3.9
Mars	02:17	09:38	17:00	1.4
Jupiter	21:59	04:49	11:39	-2.7
Saturn	09:14	15:17	21:17	0.9

Planet, Sun, and Moon data calculated for local time at Lancaster, CA

Chart is plotted for the sky on the date and location of the AVAC Star Party at 10PM.



To use the chart, go outside within an hour or so of the time listed and hold it up to the sky. Turn the chart so the direction you are looking is at the bottom of the chart. If you are looking to the south then have 'South horizon' at the lower edge.

Suggested Observing List

The list below contains objects that will be visible on the night of the AVAC Star Party. The list is sorted by the best time to observe the object. The difficulty column describes how difficult it is to observe the object from the current location on a perfect night in a 6 inch Newtonian telescope.

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
NGC 6322	Open	6.5	Sco	17h18m25.0s	-42°56'00"	19:27	19:41	20:14	easy
M 80	Glob	7.3	Sco	16h17m02.0s	-22°58'30"	19:36	19:48	20:16	detectable
M 62	Glob	6.4	Oph	17h01m13.0s	-30°06'48"	19:35	19:49	20:22	detectable
M 3	Glob	6.3	CVn	13h42m11.0s	+28°22'42"	19:39	19:51	20:02	detectable
M 19	Glob	6.8	Oph	17h02m38.0s	-26°16'06"	19:39	19:51	20:18	difficult
M 5	Glob	5.7	Ser	15h18m34.0s	+02°05'00"	19:36	19:52	20:26	detectable
NGC 6383	Open	5.4	Sco	17h34m48.0s	-32°34'00"	19:32	19:52	20:53	detectable
M 6	Open	4.6	Sco	17h40m20.0s	-32°15'12"	19:31	19:52	21:12	easy
NGC 5195	Gal	10.5	CVn	13h29m59.6s	+47°15'58"	19:43	19:53	20:17	difficult
M 51	Gal	8.7	CVn	13h29m52.3s	+47°11'40"	19:37	19:53	20:32	detectable
M 7	Open	3.3	Sco	17h53m51.0s	-34°47'36"	19:34	19:54	20:53	detectable
M 9	Glob	7.8	Oph	17h19m12.0s	-18°31'00"	19:40	19:54	20:31	difficult
M 101	Gal	8.4	UMa	14h03m12.4s	+54°20'53"	19:43	19:56	20:26	difficult
M 12	Glob	6.1	Oph	16h47m14.0s	-01°56'48"	19:34	19:56	21:21	detectable
M 10	Glob	6.6	Oph	16h57m09.0s	-04°06'00"	19:38	19:56	21:01	detectable
M 13	Glob	5.8	Her	16h41m41.0s	+36°27'36"	19:35	19:59	22:13	detectable
M 21	Open	7.2	Sgr	18h04m13.0s	-22°29'24"	19:36	19:59	20:43	detectable
M 8	Neb	5.0	Sgr	18h04m02.0s	-24°23'14"	19:32	19:59	20:00	easy
M 14	Glob	7.6	Oph	17h37m36.0s	-03°14'48"	19:38	19:59	21:28	detectable
M 23	Open	5.9	Sgr	17h57m04.0s	-18°59'06"	19:36	19:59	21:17	detectable
M 20	Open	5.2	Sgr	18h02m42.0s	-22°58'18"	19:34	19:59	20:34	detectable
M 92	Glob	6.5	Her	17h17m07.0s	+43°08'12"	19:35	20:02	22:46	detectable
NGC 6572	PNe	8.0	Oph	18h12m06.4s	+06°51'12"	19:22	20:04	23:35	obvious
M 16	Open	6.5	Ser	18h18m48.0s	-13°48'24"	19:30	20:05	22:17	easy
M 18	Open	7.5	Sgr	18h19m58.0s	-17°06'06"	19:32	20:05	21:55	easy
M 28	Glob	6.9	Sgr	18h24m33.0s	-24°52'12"	19:38	20:05	21:27	detectable
NGC 6543	PNe	8.3	Dra	17h58m33.4s	+66°37'59"	19:25	20:08	01:52	obvious
M 25	Open	6.2	Sgr	18h31m47.0s	-19°07'00"	19:37	20:10	21:50	detectable
NGC 6633	Open	5.6	Oph	18h27m15.0s	+06°30'30"	19:34	20:10	23:15	easy
M 22	Glob	5.2	Sgr	18h36m24.0s	-23°54'12"	19:37	20:12	20:48	detectable
M 70	Glob	7.8	Sgr	18h43m13.0s	-32°17'30"	19:42	20:16	21:19	difficult
M 11	Open	6.1	Sct	18h51m05.0s	-06°16'12"	19:38	20:24	22:38	detectable
M 57	PNe	9.4	Lyr	18h53m35.1s	+33°01'45"	19:31	20:27	00:28	easy
NGC 6716	Open	7.5	Sgr	18h54m34.0s	-19°54'06"	19:36	20:27	22:06	detectable
M 56	Glob	8.4	Lyr	19h16m36.0s	+30°11'06"	19:41	20:49	23:26	difficult
M 55	Glob	6.3	Sgr	19h40m00.0s	-30°57'42"	20:02	21:13	22:21	difficult
NGC 6818	PNe	10.0	Sgr	19h43m57.8s	-14°09'12"	19:30	21:16	23:40	easy
M 71	Glob	8.4	Sge	19h53m46.0s	+18°46'42"	19:36	21:25	00:45	detectable
M 27	PNe	7.3	Vul	19h59m36.3s	+22°43'16"	19:36	21:32	00:55	detectable

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
NGC 6871	Open	5.8	Cyg	20h05m59.0s	+35°46'36"	19:36	21:39	01:19	detectable
NGC 6910	Open	7.3	Cyg	20h23m12.0s	+40°46'42"	19:36	21:55	01:51	easy
M 29	Open	7.5	Cyg	20h23m57.0s	+38°30'30"	19:36	21:56	01:40	detectable
NGC 7009	PNe	8.3	Aqr	21h04m10.9s	-11°21'48"	19:56	22:37	01:15	obvious
M 15	Glob	6.3	Peg	21h29m58.0s	+12°10'00"	20:09	23:02	01:56	detectable
M 39	Open	5.3	Cyg	21h31m48.0s	+48°26'00"	19:38	23:04	03:22	easy
M 2	Glob	6.6	Aqr	21h33m27.0s	-00°49'24"	20:37	23:06	01:35	detectable
M 30	Glob	6.9	Cap	21h40m22.0s	-23°10'42"	22:15	23:13	00:08	detectable
NGC 7160	Open	6.4	Cep	21h53m40.0s	+62°36'12"	19:32	23:26	04:19	obvious
NGC 7293	PNe	6.3	Aqr	22h29m38.5s	-20°50'14"	22:32	00:01	01:30	detectable
M 52	Open	8.2	Cas	23h24m48.0s	+61°35'36"	22:03	00:57	03:48	difficult
NGC 7789	Open	7.5	Cas	23h57m24.0s	+56°42'30"	22:52	01:29	04:00	difficult
NGC 7790	Open	7.2	Cas	23h58m24.0s	+61°12'30"	20:01	01:30	04:22	easy
M 110	Gal	8.9	And	00h40m22.3s	+41°41'09"	23:19	02:12	04:13	difficult
M 31	Gal	4.3	And	00h42m44.3s	+41°16'07"	22:30	02:14	04:19	detectable
M 32	Gal	8.9	And	00h42m41.8s	+40°51'58"	22:27	02:15	04:19	detectable
NGC 253	Gal	7.9	Scl	00h47m33.1s	-25°17'20"	00:46	02:19	03:51	detectable
NGC 457	Open	5.1	Cas	01h19m35.0s	+58°17'12"	21:43	02:51	04:22	easy
NGC 559	Open	7.4	Cas	01h29m31.0s	+63°18'24"	21:43	03:01	04:23	easy
M 103	Open	6.9	Cas	01h33m23.0s	+60°39'00"	21:27	03:05	04:25	easy
M 33	Gal	6.4	Tri	01h33m50.9s	+30°39'36"	00:05	03:06	04:18	detectable
M 76	PNe	10.1	Per	01h42m19.9s	+51°34'31"	00:05	03:14	04:16	difficult
NGC 637	Open	7.3	Cas	01h43m04.0s	+64°02'24"	21:06	03:14	04:25	obvious
NGC 663	Open	6.4	Cas	01h46m09.0s	+61°14'06"	22:28	03:17	04:20	easy
NGC 869	Open	4.3	Per	02h19m00.0s	+57°07'42"	22:13	03:40	04:24	obvious
NGC 884	Open	4.4	Per	02h22m18.0s	+57°08'12"	22:20	03:41	04:25	obvious
NGC 957	Open	7.2	Per	02h33m21.0s	+57°33'36"	23:33	03:45	04:21	easy
NGC 1027	Open	7.4	Cas	02h42m40.0s	+61°35'42"	00:52	03:46	04:15	difficult
M 34	Open	5.8	Per	02h42m05.0s	+42°45'42"	00:34	03:48	04:19	detectable
M 77	Gal	9.7	Cet	02h42m40.8s	-00°00'48"	01:47	03:52	04:19	detectable
NGC 1444	Open	6.4	Per	03h49m25.0s	+52°39'30"	23:41	03:53	04:26	obvious
NGC 1502	Open	4.1	Cam	04h07m50.0s	+62°19'54"	23:32	03:53	04:28	obvious
NGC 1528	Open	6.4	Per	04h15m23.0s	+51°12'54"	01:13	03:55	04:20	easy
M 45	Open	1.5	Tau	03h47m00.0s	+24°07'00"	00:58	03:56	04:25	obvious
NGC 1664	Open	7.2	Aur	04h51m06.0s	+43°40'30"	01:45	03:57	04:21	easy
M 38	Open	6.8	Aur	05h28m40.0s	+35°50'54"	02:48	03:59	04:17	detectable
NGC 1647	Open	6.2	Tau	04h45m55.0s	+19°06'54"	03:01	03:59	04:16	detectable
M 36	Open	6.5	Aur	05h36m18.0s	+34°08'24"	02:19	03:59	04:21	easy
NGC 1746	Open	6.1	Tau	05h03m50.0s	+23°46'12"	03:06	03:59	04:15	detectable
M 37	Open	6.2	Aur	05h52m18.0s	+32°33'12"	02:37	04:00	04:20	easy
M 35	Open	5.6	Gem	06h09m00.0s	+24°21'00"	03:03	04:02	04:20	easy
NGC 2129	Open	7.0	Gem	06h01m07.0s	+23°19'20"	02:58	04:02	04:24	easy
NGC 2175	Open	6.8	Ori	06h09m39.0s	+20°29'12"	03:28	04:02	04:16	detectable
NGC 2169	Open	7.0	Ori	06h08m24.0s	+13°57'54"	03:29	04:03	04:23	easy
M 42	Neb	4.0	Ori	05h35m18.0s	-05°23'00"	03:59	04:06	04:23	easy

A.V.A.C. Information

Membership in the Antelope Valley Astronomy Club is open to any individual or family.

The Club has three categories of membership.

- Family membership at \$30.00 per year.
- Individual membership at \$25.00 per year.
- Junior membership at \$15.00 per year.

Membership entitles you to...

- Desert Sky Observer—monthly newsletter.
- The Reflector – the publication of the Astronomical League.
- The A.V.A.C. Membership Manual.
- To borrow club equipment, books, videos and other items.

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