



# Desert Sky Observer

Volume 33

Antelope Valley Astronomy Club Newsletter

August 2013

## Up-Coming Events

**August 3:** Annual Picnic and Star Party @ [Brite Lake](#)

**August 9:** Club Meeting\*

**August 23:** A Night To Explore @ [Palmdale Boys and Girls Club](#)

**August 24:** Prime Desert Woodlands Moon Walk @ [Prime Desert Woodlands](#)

\* 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 20<sup>th</sup> 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

Here it is almost August and I haven't been to Pinos yet! I missed our usual long summer weekend of the 6th of July as I was back home for a family reunion. I am planning on enjoying Brite Lake on the 3rd, though. And Frank has ensured that we'll have a nice dark site, too by getting the Tehachapi Cummings County Water District to turn off the lights at

the nearby treatment plant.

Still, nothing like a nice dark Pinos sky. September can be really nice at Pinos so I'll look forward to that. Except now we may be joining the Local Group at Lockwood Valley. Well that would be cool. It's close to Pinos at least... October may be getting a bit chilly but that's my last shot for Pinos – of course we had planned on going to Red Rocks with the China Lake group again so.... No Pinos for 2013?! No problem, Bob Kemp said, "Hey we could go up on an odd last quarter moon or something". Now we're talking! Let's see when's the next last quarter moon? This weekend? Oh! That's a PDW Moonwalk!

So I guess it has to be August 31st. Nothing going on that weekend I see. Five days before the new moon so nice and dark most of the night... I gotta plan my vacations more carefully!

Still, you may have noticed I've mentioned several nice upcoming dark sky star parties. And you never know when you'll have another opportunity so let's get out there this summer under the stars!



## Vice President

### Frank Moore

Once again, on Saturday August 3 beginning at 4:00 PM, the annual Antelope Valley Astronomy Club “Star-B-Que”- Picnic will be held at the Brite Lake Recreational Area near Tehachapi. As we have in the past, we’ll be holding a public “Star Party in the main parking lot, near the picnic Pavilions, from dusk on Saturday August 3 till dawn on Sunday August 4. This is a new moon weekend and the sky should be good and dark for catching those deep sky objects.

Since the club will be having our private picnic, silent auction, and drawings prior to the Star Party, the public is being asked to arrive after 7:30 pm.

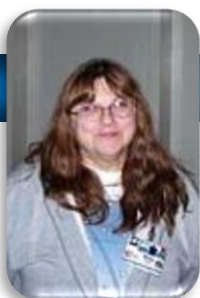
The campground hosts at Brite Lake will be turning off the streetlight in the parking lot and other nearby lights in the park, so the glare does not interfere with viewing through the telescopes and the Tehachapi-Cummings County Water District will be turning off the lights in their nearby facility as they did last year. Weather permitting, we should have dark skies and excellent viewing conditions so be prepared to stay late.

The Public Star Party will be the cover story in the Tehachapi News’ “the Weekender” arts and entertainment publication on July 31 which I hope brings us a good crowd of folks anxious to see some celestial wonders. They may have lots of questions so put your thinking caps on.

Since the main parking lot will be the telescope field, once our picnic is complete we’ll have members who aren’t setting up a telescope to move their cars to the field immediately to the East of the parking lot. The public will be asked to park there as well.

If you haven’t done so already please RSVP to Rose at [mrmorion1@bak.rr.com](mailto:mrmorion1@bak.rr.com), or myself at [mfmoore@bak.rr.com](mailto:mfmoore@bak.rr.com), so we have an accurate count and can buy the proper amount of meat. Directions to the venue have been sent out via a separate email and are also available on the club’s website, <http://www.avastronomyclub.org> or our Facebook page at <https://www.facebook.com/avastronomyclub>.

This should be a nice night, with dark skies, good company, and pleasant temperatures, and I look forward to seeing everyone there.



## Director of Community Development

### Rose Moore

If any of you receive this before August 3rd, I hope you will be attending the AVAC Summer Star-B-Q at Brite Lake in Tehachapi. If anyone still has any questions, or food items they would like to bring, please contact Rose or Frank. Also if you have any items for the raffle or silent auction, please bring them!

We have 2 public outreach events for the month of August. The first will be on Friday, August 23rd, for Lockheed Martin. It's their annual 'A Night To Explore'. This year it will be held again at the Palmdale Boys and Girls Club, from 6pm to 9pm. We will be setting up scopes in the front parking lot, and setting up a booth

inside. We will need members with telescopes, or other astronomy items of interest to show at the inside booth. Please contact me if interested in attending.

The second event for August is on Saturday, August 24th. We have a Prime Desert Moon Walk at PDW starting at 8pm. Bring out your telescope or take the walk through the preserve with Jeremy. Set up time is approximately 1 hour before.

For September we have a PDW Moon Walk on Saturday Sept. 21st at 7pm. Also on Wednesday Sept. 25th we have an Acton Library Lecture Series with Jeremy at the Acton Library. This week's lecture is 'The Big Bang Revisited'! Come on out and enjoy the presentation!

Also coming up at October's Business Meeting will be the election of the AVAC Board for 2014. It's time to start thinking of who you would like to see on next year's Board!

Clear skies and see you there!

## Space Place

### Inventing Astrophotography: Capturing Light Over Time

By Dr. Ethan Siegel

We know that it's a vast Universe out there, with our Milky Way representing just one drop in a cosmic ocean filled with hundreds of billions of galaxies. Yet if you've ever looked through a telescope with your own eyes, unless that telescope was many feet in diameter, you've probably never seen a galaxy's spiral structure for yourself. In fact, the very closest large galaxy to us—Andromeda, M31—wasn't discovered to be a spiral until 1888, despite being clearly visible to the naked eye! This crucial discovery wasn't made at one of the world's great observatories, with a world-class telescope, or even by a professional astronomer; it was made by a humble amateur to whom we all owe a great scientific debt.

Beginning in 1845, with the unveiling of Lord Rosse's 6-foot (1.8 m) aperture telescope, several of the nebulae catalogued by Messier, Herschel and others were discovered to contain an internal spiral structure. The extreme light-gathering power afforded by this new telescope allowed us, for the first time, to see these hitherto undiscovered cosmic constructions. But there was another possible path to such a discovery: rather than collecting vast amounts of light through a giant aperture, you could collect it over time, through the newly developed technology of photography. During the latter half of the 19th Century, the application of photography to astronomy allowed us to better understand the Sun's corona, the spectra of stars, and to discover stellar and nebulous features too faint to be seen with the human eye.

Working initially with a 7-inch refractor that was later upgraded to a 20-inch reflector, amateur astronomer Isaac Roberts pioneered a number of astrophotography techniques in the early 1880s, including "piggybacking," where his camera/lens system was attached to a larger, equatorially-mounted guide scope, allowing for longer exposure times than ever before. By mounting photographic plates directly at the reflector's prime focus, he was able to completely avoid the light-loss inherent with secondary mirrors. His first photographs were displayed in 1886, showing vast extensions to the known reaches of nebulosity in the Pleiades star cluster and the Orion Nebula.



*Great Nebula in Andromeda, the first-ever photograph of another galaxy. Image credit: Isaac Roberts, taken December 29, 1888, published in A Selection of Photographs of Stars, Star-clusters and Nebulae, Volume II, The Universal Press, London, 1899.*

## Desert Sky Observer

But his greatest achievement was this 1888 photograph of the Great Nebula in Andromeda, which we now know to be the first-ever photograph of another galaxy, and the first spiral ever discovered that was oriented closer to edge-on (as opposed to face-on) with respect to us. Over a century later, Andromeda looks practically identical, a testament to the tremendous scales involved when considering galaxies. If you can photograph it, you'll see for yourself! Astrophotography has come a long way, as apparent in the Space Place collection of NASA stars and galaxies posters at

<http://spaceplace.nasa.gov/posters/#stars>.

## Astrophoto of The Month



For comparison to the photo above, this month's Astrophoto is **M31** by Dave Allen. Vixen 90mm Flourite Refractor @ 5.6

## News Headlines

### **NASA Decommissions Its Galaxy Hunter Spacecraft**

NASA has turned off its Galaxy Evolution Explorer (GALEX) after a decade of operations in which the venerable space telescope used its ultraviolet vision to study hundreds of millions of galaxies across 10 billion years of cosmic time. "GALEX is a remarkable accomplishment," said Jeff Hayes, NASA's GALEX program executive in Washington. "This small Explorer mission has mapped and studied galaxies in the ultraviolet, light we cannot see with our own eyes, across most of the sky."

<http://www.galex.caltech.edu/newsroom/glx2013-03r.html>

### **Mystery Signals from Space**

If you've been waiting for mysterious radio signals from space, tune in. An international team of astronomers has detected four powerful bursts that appear to come from billions of light-years away. At that distance, the radio pulses would each have put out in a few thousandths of a second the same amount of energy that the Sun would need 10,000 years to emit.

<http://www.skyandtelescope.com/community/skyblog/newsblog/Mystery-Signals-from-Space-214153371.html>

### **The limits to galactic growth**

Astronomers have long assumed that when a galaxy produces too many stars too quickly, it greatly reduces its capacity for producing stars in the future. Now, a group of astronomers that includes Fabian Walter from the Max Planck Institute for Astronomy were able to obtain the first detailed images of this type of self-limiting galactic behaviour: an outflow of molecular gas, the raw material needed for star formation that is coming from star-forming regions in the Sculptor Galaxy (NGC 253).

[http://www.mpg.de/7476037/galactic-growth-limits?filter\\_order=L&research\\_topic=](http://www.mpg.de/7476037/galactic-growth-limits?filter_order=L&research_topic=)

### **NASA's Wide finds mysterious centaurs may be comets**

The true identity of centaurs, the small celestial bodies orbiting the sun between Jupiter and Neptune, is one of the enduring mysteries of astrophysics. Are they asteroids or comets? A new study of observations from NASA's Wide-field Infrared Survey Explorer (WISE) finds most centaurs are comets. Until now, astronomers were not certain whether centaurs are asteroids flung out from the inner solar system or comets traveling in toward the sun from afar.

<http://phys.org/news/2013-07-nasa-wise-mysterious-centaurs-comets.html>

### **In the Zone: How Scientists Search for Habitable Planets**

There is only one planet we know of, so far, that is drenched with life. That planet is Earth, as you may have guessed, and it has all the right conditions for critters to thrive on its surface. Do other planets beyond our solar system, called exoplanets, also host life forms? Astronomers still don't know the answer, but they search for potentially habitable planets using a handful of criteria. Ideally, they want to find planets just like Earth, since we know without a doubt that life took root here. The hunt is on for planets about the size of Earth that orbit at just the right distance from their star – in a region termed the habitable zone.

[http://www.nasa.gov/mission\\_pages/kepler/news/kepler20130717.html#.UfPLjW3d04k](http://www.nasa.gov/mission_pages/kepler/news/kepler20130717.html#.UfPLjW3d04k)

### **The Weakest Solar Cycle in 100 Years**

The Sun is acting weird. It typically puts on a pageant of magnetic activity every 11 years for aurora watchers and sungazers alike, but this time it overslept. When it finally woke up (a year late), it gave the weakest performance in 100 years.

<http://www.skyandtelescope.com/community/skyblog/newsblog/The-Weakest-Solar-Cycle-in-100-Years-216752671.html>

## August Sky Data

New Aug 6      First Qtr Aug 14      Full Aug 20      Last Qtr Aug 28

**Best time for deep sky observing this month:  
August 1 through August 10**



At the end of July, **Mercury** was at greatest western elongation, so will still be seen in the pre-dawn sky at the start of August. It brightens during the month from -0.5 to -0.8 magnitudes but, at the same time drops back towards the horizon making it harder to spot. It will be lost to view from the middle of the month as it moves towards superior conjunction (on the far side of the Sun) on August 24th.

As August begins, **Venus** is 32 degrees east of the Sun at Sunset, but it will only be 11 degrees above the horizon when observed in the pre-dawn sky. Venus brightens slightly to magnitude -4 from -3.9 during the month. Venus is moving rapidly across the sky from Leo into Virgo and ends August just 5 degrees from Spica, Alpha Virginis.

**Mars** starts August in Gemini but, moving quickly across the sky, moves into Cancer on August 25th. It will lie about 15 degrees above the north-eastern horizon 45 minutes before sunrise as August begins and should be visible in binoculars in the pre-dawn. Its magnitude of +1.6 remains constant during the month.

**Jupiter** rises about 03:30 at the beginning of August so is visible in the pre-dawn sky shining at magnitude -2. By month's end Jupiter rises some three to four hours before the Sun and will be far easier to spot.

**Saturn** is now several months past opposition so will be seen in the south west after sunset. It lies 11 degrees to the left of Spica and will appear slightly brighter with a yellowish hue. Saturn's magnitude remains at +0.7 during the month. Saturn, having ended its retrograde motion across the sky, is now moving eastwards between the stars Spica and Alpha Librae. The rings have now opened out to ~17 degrees from the line of sight and we are now observing the planet's southern

August brings the well-known Perseid **meteor-shower**. The peak this year is expected in the late morning of Monday August 12th, so the best time to observe will be in the early hours of that morning. There will be little to no interference from the waxing crescent moon.

## Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
8/1/2013	01:43	16:04	06:02	19:53
8/5/2013	05:04	18:55	06:05	19:50
8/10/2013	09:47	21:42	06:08	19:45
8/15/2013	14:56	00:28	06:12	19:39
8/20/2013	19:10	05:51	06:16	19:33
8/25/2013	22:16	11:12	06:19	19:27
8/31/2013	02:04	16:14	06:24	19:19

## Planet Data

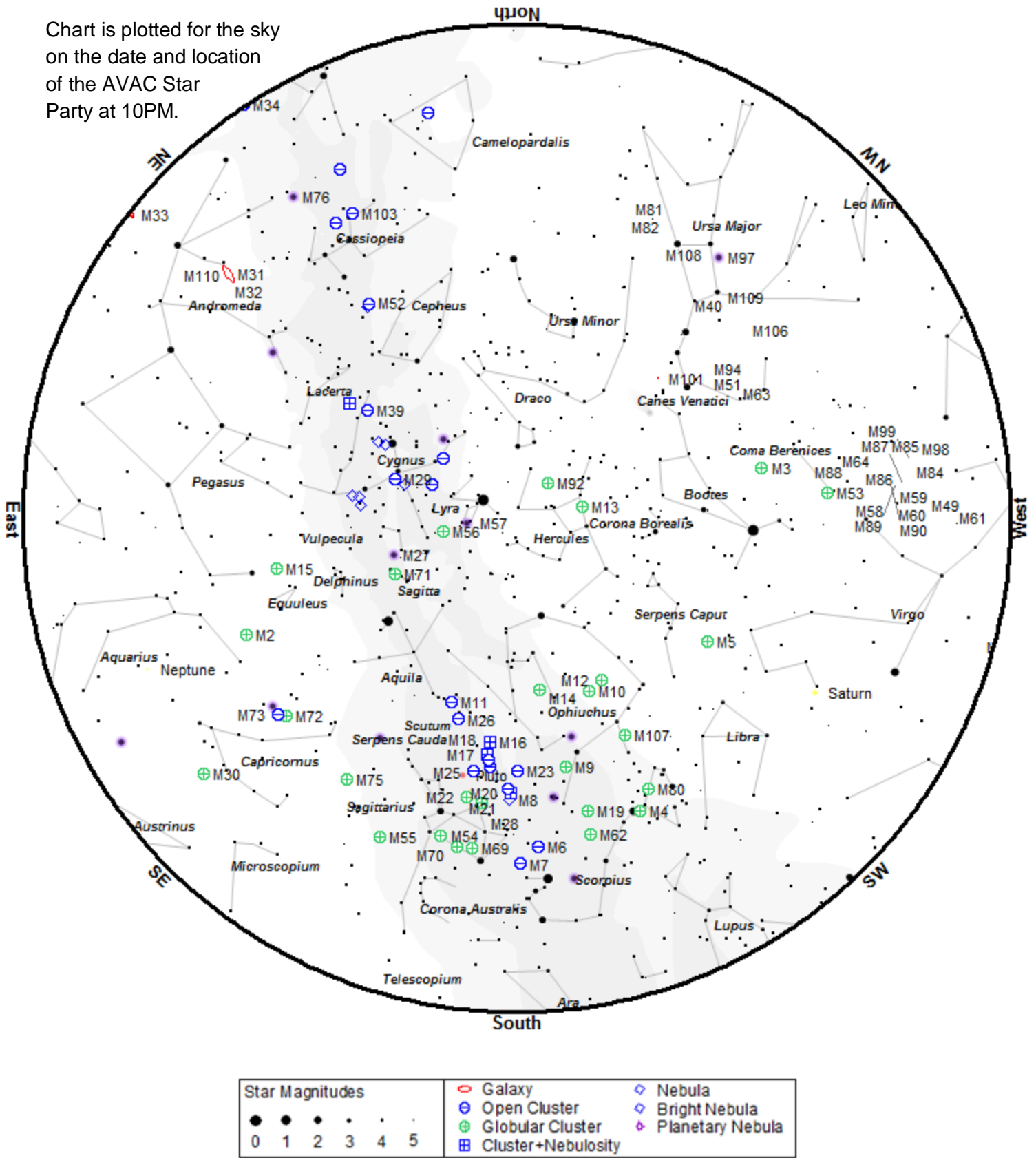
	Aug 1			
	Rise	Transit	Set	Mag
<b>Mercury</b>	04:28	11:38	18:45	-0.2
<b>Venus</b>	08:37	15:06	21:36	-3.9
<b>Mars</b>	03:46	11:04	18:24	1.6
<b>Jupiter</b>	03:26	10:42	18:01	-2.0
<b>Saturn</b>	12:48	18:23	23:59	0.7

	Aug 15			
	Rise	Transit	Set	Mag
<b>Mercury</b>	05:24	12:20	19:21	-1.5
<b>Venus</b>	09:02	15:11	21:22	-4.0
<b>Mars</b>	03:34	10:49	18:05	1.6
<b>Jupiter</b>	02:43	09:59	17:17	-2.0
<b>Saturn</b>	11:52	17:31	23:06	0.7

	Aug 31			
	Rise	Transit	Set	Mag
<b>Mercury</b>	06:54	13:18	19:46	-1.2
<b>Venus</b>	09:30	15:16	21:04	-4.0
<b>Mars</b>	03:21	10:29	17:39	1.6
<b>Jupiter</b>	01:54	09:09	16:26	-2.1
<b>Saturn</b>	10:55	16:32	22:06	0.7

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 6167	Open	6.6	Nor	16h34m34.0s	-49°46'18"	21:00	21:13	21:34	challenging
NGC 6193	Open	5.4	Ara	16h41m20.0s	-48°45'48"	21:00	21:14	21:41	difficult
NGC 6178	Open	7.2	Sco	16h35m47.0s	-45°38'36"	21:00	21:18	22:00	detectable
NGC 5986	Glob	7.6	Lup	15h46m03.0s	-37°47'12"	21:06	21:18	21:42	difficult
NGC 6124	Open	6.3	Sco	16h25m20.0s	-40°39'12"	20:58	21:21	22:28	challenging
NGC 5897	Glob	8.4	Lib	15h17m24.0s	-21°00'36"	21:11	21:24	21:51	challenging
NGC 4565	Gal	10.1	Com	12h36m20.8s	+25°59'15"	21:13	21:26	21:45	difficult
M 64	Gal	9.3	Com	12h56m43.8s	+21°41'00"	21:10	21:26	21:30	detectable
M 80	Glob	7.3	Sco	16h17m02.0s	-22°58'30"	21:05	21:28	22:52	detectable
M 106	Gal	9.1	CVn	12h18m57.6s	+47°18'13"	21:11	21:29	21:50	detectable
M 94	Gal	8.7	CVn	12h50m53.1s	+41°07'12"	21:09	21:29	22:07	detectable
M 3	Glob	6.3	CVn	13h42m11.0s	+28°22'42"	21:07	21:29	22:32	easy
M 5	Glob	5.7	Ser	15h18m34.0s	+02°05'00"	21:06	21:29	22:58	easy
NGC 6322	Open	6.5	Sco	17h18m25.0s	-42°56'00"	20:59	21:30	23:01	easy
NGC 5195	Gal	10.5	CVn	13h29m59.6s	+47°15'58"	21:11	21:31	22:45	detectable
M 51	Gal	8.7	CVn	13h29m52.3s	+47°11'40"	21:08	21:31	23:00	easy
M 62	Glob	6.4	Oph	17h01m13.0s	-30°06'48"	21:05	21:32	23:10	detectable
M 101	Gal	8.4	UMa	14h03m12.4s	+54°20'53"	21:12	21:33	23:06	detectable
M 19	Glob	6.8	Oph	17h02m38.0s	-26°16'06"	21:08	21:33	23:08	detectable
M 12	Glob	6.1	Oph	16h47m14.0s	-01°56'48"	21:04	21:35	00:11	easy
M 10	Glob	6.6	Oph	16h57m09.0s	-04°06'00"	21:07	21:36	23:56	detectable
M 13	Glob	5.8	Her	16h41m41.0s	+36°27'36"	21:03	21:38	01:20	easy
M 9	Glob	7.8	Oph	17h19m12.0s	-18°31'00"	21:08	21:39	23:15	difficult
NGC 6388	Glob	6.8	Sco	17h36m17.0s	-44°44'06"	21:08	21:41	22:37	challenging
NGC 6383	Open	5.4	Sco	17h34m48.0s	-32°34'00"	21:02	21:43	23:51	easy
M 92	Glob	6.5	Her	17h17m07.0s	+43°08'12"	21:04	21:44	02:02	easy
M 6	Open	4.6	Sco	17h40m20.0s	-32°15'12"	21:01	21:46	00:10	easy
M 14	Glob	7.6	Oph	17h37m36.0s	-03°14'48"	21:07	21:47	00:35	detectable
IC 4665	Open	5.3	Oph	17h46m18.0s	+05°43'00"	21:09	21:53	00:46	detectable
M 7	Open	3.3	Sco	17h53m51.0s	-34°47'36"	21:05	21:58	23:57	detectable
M 23	Open	5.9	Sgr	17h57m04.0s	-18°59'06"	21:05	22:01	23:50	detectable
NGC 6543	PNe	8.3	Dra	17h58m33.4s	+66°37'59"	20:55	22:03	04:19	obvious
M 20	Open	5.2	Sgr	18h02m42.0s	-22°58'18"	21:03	22:06	23:09	easy
M 8	Neb	5.0	Sgr	18h04m02.0s	-24°23'14"	21:35	22:08	22:40	easy
M 21	Open	7.2	Sgr	18h04m13.0s	-22°29'24"	21:07	22:08	23:18	detectable
NGC 6541	Glob	6.3	CrA	18h08m02.0s	-43°42'54"	21:18	22:11	23:10	difficult
NGC 6572	PNe	8.0	Oph	18h12m06.4s	+06°51'12"	20:50	22:15	02:07	obvious
M 16	Open	6.5	Ser	18h18m48.0s	-13°48'24"	21:01	22:22	00:47	obvious



ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
M 18	Open	7.5	Sgr	18h19m58.0s	-17°06'06"	21:02	22:23	00:28	easy
M 17	Open	7.3	Sgr	18h20m47.0s	-16°10'18"	21:12	22:25	00:27	difficult
M 28	Glob	6.9	Sgr	18h24m33.0s	-24°52'12"	22:19	22:27	22:38	detectable
NGC 6633	Open	5.6	Oph	18h27m15.0s	+06°30'30"	21:03	22:30	02:20	easy
M 25	Open	6.2	Sgr	18h31m47.0s	-19°07'00"	21:07	22:35	00:22	detectable
M 22	Glob	5.2	Sgr	18h36m24.0s	-23°54'12"	21:53	22:39	23:25	detectable
IC 4756	Open	5.4	Ser	18h39m00.0s	+05°27'00"	21:07	22:42	02:05	easy
M 70	Glob	7.8	Sgr	18h43m13.0s	-32°17'30"	21:15	22:46	00:32	detectable
M 11	Open	6.1	Sct	18h51m05.0s	-06°16'12"	21:08	22:54	01:49	detectable
M 57	PNe	9.4	Lyr	18h53m35.1s	+33°01'45"	21:01	22:57	03:44	easy
NGC 6716	Open	7.5	Sgr	18h54m34.0s	-19°54'06"	21:17	22:58	00:38	detectable
M 54	Glob	7.7	Sgr	18h55m03.0s	-30°28'42"	21:28	22:59	00:31	difficult
NGC 6723	Glob	6.8	Sgr	18h59m33.0s	-36°37'54"	21:32	23:03	00:34	detectable
M 56	Glob	8.4	Lyr	19h16m36.0s	+30°11'06"	21:11	23:19	02:50	detectable
M 55	Glob	6.3	Sgr	19h40m00.0s	-30°57'42"	21:51	23:43	01:35	detectable
NGC 6818	PNe	10.0	Sgr	19h43m57.8s	-14°09'12"	21:23	23:47	02:12	easy
M 71	Glob	8.4	Sge	19h53m46.0s	+18°46'42"	21:07	23:56	03:59	easy
M 27	PNe	7.3	Vul	19h59m36.3s	+22°43'16"	21:07	00:02	04:11	easy
NGC 6871	Open	5.8	Cyg	20h05m59.0s	+35°46'36"	21:07	00:08	04:32	easy
NGC 6910	Open	7.3	Cyg	20h23m12.0s	+40°46'42"	21:08	00:26	04:45	easy
M 29	Open	7.5	Cyg	20h23m57.0s	+38°30'30"	21:08	00:26	04:42	easy
NGC 7009	PNe	8.3	Aqr	21h04m10.9s	-11°21'48"	22:26	01:06	03:47	obvious
M 15	Glob	6.3	Peg	21h29m58.0s	+12°10'00"	21:54	01:33	04:47	detectable
M 39	Open	5.3	Cyg	21h31m48.0s	+48°26'00"	21:11	01:35	04:54	easy
M 2	Glob	6.6	Aqr	21h33m27.0s	-00°49'24"	22:25	01:36	04:40	detectable
IC 1396	Neb		Cep	21h39m06.0s	+57°30'00"	21:10	01:41	04:54	challenging
M 30	Glob	6.9	Cap	21h40m22.0s	-23°10'42"	00:42	01:43	02:44	detectable
NGC 7160	Open	6.4	Cep	21h53m40.0s	+62°36'12"	21:04	01:56	05:00	obvious
Cocoon	Neb	10.0	Cyg	21h53m24.0s	+47°16'00"	21:15	01:56	04:55	challenging
NGC 7243	Open	6.7	Lac	22h15m08.0s	+49°53'54"	22:05	02:17	04:50	detectable
NGC 7293	PNe	6.3	Aqr	22h29m38.5s	-20°50'14"	00:59	02:32	04:05	detectable
M 52	Open	8.2	Cas	23h24m48.0s	+61°35'36"	23:18	03:27	04:50	detectable
NGC 7789	Open	7.5	Cas	23h57m24.0s	+56°42'30"	00:10	03:58	04:49	difficult
NGC 7790	Open	7.2	Cas	23h58m24.0s	+61°12'30"	21:59	03:58	04:59	easy
M 32	Gal	8.9	And	00h42m41.8s	+40°51'58"	00:06	04:13	04:57	easy
NGC 637	Open	7.3	Cas	01h43m04.0s	+64°02'24"	23:35	04:13	04:59	obvious
NGC 559	Open	7.4	Cas	01h29m31.0s	+63°18'24"	23:24	04:13	04:57	easy
NGC 663	Open	6.4	Cas	01h46m09.0s	+61°14'06"	23:46	04:13	04:56	easy
M 103	Open	6.9	Cas	01h33m23.0s	+60°39'00"	23:35	04:13	04:59	obvious
NGC 457	Open	5.1	Cas	01h19m35.0s	+58°17'12"	23:27	04:13	04:57	easy
M 110	Gal	8.9	And	00h40m22.3s	+41°41'09"	00:52	04:13	04:54	detectable
M 31	Gal	4.3	And	00h42m44.3s	+41°16'07"	00:03	04:13	04:57	easy
NGC 55	Gal	8.5	Scl	00h15m08.4s	-39°13'13"	03:16	04:14	04:48	challenging
M 76	PNe	10.1	Per	01h42m19.9s	+51°34'31"	01:21	04:23	04:52	detectable
Heart Nebula	Neb	6.5	Cas	02h33m52.0s	+61°26'50"	00:35	04:24	04:55	challenging

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
NGC 884	Open	4.4	Per	02h22m18.0s	+57°08'12"	00:35	04:24	04:59	obvious
NGC 869	Open	4.3	Per	02h19m00.0s	+57°07'42"	00:31	04:24	04:59	obvious
NGC 1027	Open	7.4	Cas	02h42m40.0s	+61°35'42"	01:43	04:25	04:50	detectable
NGC 957	Open	7.2	Per	02h33m21.0s	+57°33'36"	00:47	04:25	04:56	easy
NGC 752	Open	6.6	And	01h57m41.0s	+37°47'06"	03:15	04:25	04:45	challenging
M 33	Gal	6.4	Tri	01h33m50.9s	+30°39'36"	01:38	04:26	04:55	detectable
NGC 253	Gal	7.9	Scl	00h47m33.1s	-25°17'20"	02:34	04:26	04:55	detectable
NGC 1502	Open	4.1	Cam	04h07m50.0s	+62°19'54"	02:06	04:27	05:02	obvious
M 34	Open	5.8	Per	02h42m05.0s	+42°45'42"	01:54	04:27	04:54	detectable
NGC 288	Glob	8.1	Scl	00h52m45.0s	-26°35'00"	03:23	04:28	04:49	challenging
NGC 1444	Open	6.4	Per	03h49m25.0s	+52°39'30"	02:12	04:28	04:59	obvious
NGC 1245	Open	7.7	Per	03h14m42.0s	+47°14'12"	01:50	04:28	04:55	challenging
NGC 1528	Open	6.4	Per	04h15m23.0s	+51°12'54"	02:41	04:29	04:54	easy
NGC 1342	Open	7.2	Per	03h31m38.0s	+37°22'36"	02:38	04:30	04:53	detectable
NGC 1664	Open	7.2	Aur	04h51m06.0s	+43°40'30"	03:34	04:31	04:55	easy
M 45	Open	1.5	Tau	03h47m00.0s	+24°07'00"	03:12	04:32	04:57	obvious
M 77	Gal	9.7	Cet	02h42m40.8s	-00°00'48"	03:16	04:32	04:54	detectable
M 38	Open	6.8	Aur	05h28m40.0s	+35°50'54"	04:29	04:33	04:51	detectable
NGC 1746	Open	6.1	Tau	05h03m50.0s	+23°46'12"	04:30	04:34	04:48	detectable
Hyades	Open	0.8	Tau	04h26m54.0s	+15°52'00"	04:13	04:34	04:56	easy
M 36	Open	6.5	Aur	05h36m18.0s	+34°08'24"	03:32	04:35	04:54	easy
NGC 1647	Open	6.2	Tau	04h45m55.0s	+19°06'54"	04:23	04:35	04:49	detectable

## 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.
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- Desert Sky Observer—monthly newsletter.
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- The A.V.A.C. Membership Manual.
- To borrow club equipment, books, videos and other items.

### AVAC

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