



Desert Sky Observer

Volume 35

Antelope Valley Astronomy Club Newsletter

August 2015

Up-Coming Events

- August 8: [Prime Desert Moon Walk](#)
- August 14: Club Meeting*
- August 15: Dark Sky Star Party @ [Mt. Pinos](#)
- August 22: [Star Party: Feline Breeding Compound](#)
- August 26: Acton Library Star Party

* Monthly meetings are held at the S.A.G.E. Planetarium 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 Frank Moore

Wowie Zowie !! Was July a busy month or what?

We had our Quarterly Board Meeting at Julianni's on Wednesday July 8. Julianni's is gracious about giving us the big, lonnnnngg, table in their "Mafia Room" for our board meetings where we try to get some business done between bites of yummy pizza, wings, and other delights. If you come out and participate in the governance of the club, there's something yummy in store for you. You ought to try it.

On Friday July 10 we had our monthly club meeting at the SAGE Planetarium where Doug Drake gave a presentation on "The Cosmos". Rose and I apologize to Doug and the membership for having to leave following the business portion of the meeting but Rose's mom and her sisters and their spouses all came to Tehachapi that weekend. One group, having flown in from Philadelphia, was driving to Tehachapi from LAX while we were at the meeting, while the other group, having flown in from Colorado Springs, was driving up from the airport in Bakersfield at the same time.

But...on a great note, Rose's mom and sisters were among the many people who got to gaze at the cosmos through our member's telescopes at the Star Party the following our picnic at Brite Lake on Saturday July 11. The look on Rose's 87 year old mom's face when Don Bryden showed her Saturn through the club's 13" truss dobsonian telescope was priceless. Rose's family went on to also see Venus, Jupiter, and the Ring Nebula before they had to get mom back to our house. It was a special moment for us.

Speaking of the picnic and star party, we had a great turnout with between 45 and 50 members and their guests in attendance. A big "Thank You" to my wife Rose, Deborah and Dennis Eaves, and Judy Fuentes for handling the silent auction and raffle so I could set up telescopes in the parking lot. Thanks also to Darrell Bennett for handling the grilling duties.

Thank you to everyone who showed up and made the picnic such a special event. We had a great turnout from the public from both the Tehachapi and Antelope Valley areas and I know of at least one person who came from Thousand Oaks to see the cosmos through our telescopes and under the dark skies at Brite Lake.

By the way, the Tehachapi Valley Recreation and Parks District donated the use of the facility to us this year and the Tehachapi Cummings County Water District once again turned off the lights at their facility. The Tehachapi News also promoted the event with a great article. The support is really overwhelming.

The support from membership for Lockheed Martin's "A Night to Explore" event, at the Boy's and Girl's Club in Palmdale on Friday July 24, was overwhelming as well. We had over half a dozen telescopes set up outside while Rose, Robert, and Kennedy manned the booth on the inside. I setup the booth, video, and banner in a hurry so I could get outside to setup the club's 60mm Coronado h-alpha telescope for solar viewing. Imagine my surprise when, upon going outside, I found that a Lockheed Martin employee "Evan" (my apologies, I've forgotten his last name) was already sharing views through his 100mm Lunt h-alpha telescope and Stellarvue Raptor with white light filter. It really took the pressure off me and allowed me to take my time setting up the Coronado. For nighttime viewing, we eventually had three SCT's and three dobs setup for public viewing, with apertures from 6" to 16". They were manned by Kevin, Ellen, Jeff, Bill, Jim, Ann, Darrell and myself. The public turnout was great and it seemed like we always had lines at our scopes. A big shout out to BIG hearted Kevin Reilly, who after having packed his 8" Skywatcher in his car, pulled it out and set it up again for a mom and her kids who came by after we all had packed up. He went above and beyond and I could tell those little kids were going to be dreaming of planets and stars that night.

All in all, it was a great month for public outreach and I'M PROUD of the impact our little club had on curious minds, young and old, this month. THANK YOU!!



Vice President Don Bryden

What a picnic! I hope you all made it out for the annual Star-B-Cue last month. Frank and the club gave away a lot of nice goodies at the auction and raffle. Darrell manned the grill and the burgers and dogs were plenty! And thank you to all the people who brought goodies. There were salads and sides and desserts galore!

Afterward, the skies were nice and dark for the star party. Good thing, too, cause the crowds were large. The public turned out in big numbers for a chance to see the heavens through member scopes. Frank and Darrel, Dennis and Bill, Bob and Jim, Me and Robert and Brandon just to name a few had scopes a plenty! Not to mention Matt and his 24" LooneyScope – the views were great!

Don't worry if you didn't make it out. We have a lot of great events upcoming. Come out Saturday the 8th to the Prime Desert Woodland Preserve for another great moonwalk. Bring a scope or join Jeremy on the walk – we'll be setting up around 8pm with the walk starting at 8:30.

The following Friday the 14th, come out to the SAGE Planetarium were Jeremy will be speaking about the formation of Earth and Earth-like planets. Join Frank and the club for some nice raffles and then a dome show after the presentation. The following night we'll have a dark sky star party up at Chuchupate.

Finally on Friday the 22nd the club has been invited to host a public star party at the Exotic Feline Breeding Compound in Rosamond (more info to follow).

Hope to see you all out there under the stars!

Director of Community Development

Robert Lynch, Jr.

The past month was loaded with a lot of fun events and outreach. I want to say thanks to all the members that attended the Annual Star-B-Q, who prepared food, and who donated prizes for the raffles and the silent auction. We had a large turnout by the public for the star party afterwards.

I want to also say thanks to all the members who attended the Lockheed Martin annual 'A Night To Explore'. The event was well attended this year. Thanks to Frank, Rose, Kevin, Darrell, Jim, Bill S., Kennedy, Ann, and Evan.

I would also like to mention, at the last club meeting, member Doug Drake did a presentation and dome show on, 'Things You Did Not Know About Astronomy'! Recent pictures of Pluto were presented on the Dome as New Horizons was on its final for the Flyby.

Coming up on Saturday, August 8th at 8:30pm is a Prime Desert Woodlands Moon Walk with Jeremy Amarant. We will need members to bring telescopes and help answer questions that the public may have. Or just come anyway and have fun enjoying the night sky views!

Our club DSSP is on August 15-16 starting 4pm. Weather permitting.

On Saturday, August 22nd at 7:30 - 9:30pm is the Public Star Party at the Feline Breeding Compound in Rosamond. Members will be needed with telescopes. There will be tours of the Compound with Staff for the public. Please come and help for a night of viewing.

The Acton Library event will be held on Wednesday, August 26th at 8:00pm - 10:00pm. We will need members to bring telescopes and answer questions that the public asks! Just come anyway and have fun enjoying the night sky views!

Space Place

On The Brightness Of Venus

By Ethan Siegel

Throughout the past few months, Venus and Jupiter have been consistently the brightest two objects visible in the night sky (besides the moon) appearing in the west shortly after sunset. Jupiter is the largest and most massive planet in the solar system, yet Venus is the planet that comes closest to our world. On June 30th, Venus and Jupiter made their closest approach to one another as seen from Earth—a conjunction—coming within just 0.4° of one another, making this the closest conjunction of these two worlds in over 2,000 years.

And yet throughout all this time, and especially notable near its closest approach, Venus far outshines Jupiter by 2.7 astronomical magnitudes, or a factor of 12 in apparent brightness. You might initially think that Venus's proximity to Earth would explain this, as a cursory check would seem to show. On June 30th Venus was 0.5 astronomical units (AU) away from Earth, while Jupiter was six AU away. This appears to

be exactly the factor of 12 that you need.

Only this doesn't explain things at all! Brightness falls off as the inverse square of the distance, meaning that if all things were equal, Venus ought to seem not 12 but 144 times brighter than Jupiter. There are three factors in play that set things back on the right path: size, albedo, and illumination. Jupiter is 11.6 times the diameter of Venus, meaning that despite the great difference in distance, the two worlds spanned almost exactly the same angular diameter in the sky on the date of the conjunction. Moreover, while Venus is covered in thick, sulfuric acid clouds, Jupiter is a reflective, cloudy world, too. All told, Venus possesses only a somewhat greater visual geometric albedo (or amount of reflected visible light) than Jupiter: 67 percent and 52 percent, respectively. Finally, while Venus and Jupiter both reflect sunlight toward Earth, Jupiter is always in the full (or almost full) phase, while Venus (on June 30th) appeared as a thick crescent.

All told, it's a combination of these four factors—distance, size, albedo, and the phase-determined illuminated area—that determine how bright a planet appears to us, and all four need to be taken into account to explain our observations.

Don't fret if you missed the Venus-Jupiter conjunction; three more big, bright, close ones are coming up later this year in the eastern pre-dawn sky: Mars-Jupiter on October 17, Venus-Jupiter on October 26, and Venus-Mars on November 3.

Keep watching the skies, and enjoy the spectacular dance of the planets!



Image credit: E. Siegel, using the free software Stellarium (L); Wikimedia Commons user TimothyBoocock, under a c.c.-share alike 3.0 license (R). The June 30th conjunction (L) saw Venus and Jupiter pass within 0.4° of one another, yet Venus always appears much brighter (R), as it did in this image from an earlier conjunction.

News Headlines

New Horizons Team Finds Haze, Flowing Ice on Pluto

Flowing ice and a surprising extended haze are among the newest discoveries from NASA's New Horizons mission, which reveal distant Pluto to be an icy world of wonders. "We knew that a mission to Pluto would bring some surprises, and now — 10 days after closest approach — we can say that our expectation has been more than surpassed," said John Grunsfeld, NASA's associate administrator for the Science Mission Directorate. "With flowing ices, exotic surface chemistry, mountain ranges, and vast haze, Pluto is showing a diversity of planetary geology that is truly thrilling."

<http://pluto.jhuapl.edu/News-Center/News-Article.php?page=20150724>

Hiding in Plain Sight: Undergraduates Discover the Densest Galaxies Known

Two undergraduates at San José State University have discovered two galaxies that are the densest known. Similar to ordinary globular star clusters but a hundred to a thousand times brighter, the new systems have properties intermediate in size and luminosity between galaxies and star clusters. The first system discovered by the investigators, M59-UCD3, has a width two hundred times smaller than our own Milky Way Galaxy and a stellar density 10,000 times larger than that in the neighborhood of the Sun. For an observer in the core of M59-UCD3, the night sky would be a dazzling display, lit up by a million stars.

<http://buff.ly/1VJggSL>

NASA's Kepler Mission Discovers Bigger, Older Cousin to Earth

NASA's Kepler mission has confirmed the first near-Earth-size planet in the "habitable zone" around a sun-like star. This discovery and the introduction of 11 other new small habitable zone candidate planets mark another milestone in the journey to finding another "Earth." The newly discovered Kepler-452b is the smallest planet to date discovered orbiting in the habitable zone -- the area around a star where liquid water could pool on the surface of an orbiting planet -- of a G2-type star, like our sun. The confirmation of Kepler-452b brings the total number of confirmed planets to 1,030.

<http://www.nasa.gov/press-release/nasa-kepler-mission-discovers-bigger-older-cousin-to-earth>

Pulsar Punches Hole In Stellar Disk

This trio of images contains evidence from NASA's Chandra X-ray Observatory that a clump of stellar material has been jettisoned away from a double star system at incredibly high speeds. This system, known as PSR B1259-63/LS 2883 – or B1259 for short – is comprised of two objects in orbit around one another. The first is a star about 30 times as massive as the Sun that has a disk of material swirling around it. The other is a pulsar, an ultra-dense neutron star left behind when an even more massive star underwent a supernova explosion..

<http://chandra.si.edu/photo/2015/psrb1259/>

Inside the First 100 Days of a Year in Space: Photos

Meet astronaut Scott Kelly. His mission is to spend a year on the International Space Station while some friends, such as Terry Virts, come and go on typical six-month missions. Spending twice as long as the usual astronaut is no easy feat. It'll be hard on Kelly's body and his loved ones. But NASA says Kelly and Mikhail Kornienko's mission will help add information for a trip to Mars someday. Follow along with some of Kelly's first 100 days in pictures taken by the astronaut himself.

<http://oak.ctx.ly/r/3f2j4>

August Sky Data

**Best time for deep sky observing this month:
August 4 through August 21**

This month **Mercury** returns to the twilight sky before sunset increasing in brightness from -1.0 to +0.2 during the month as it rises a little higher in the western sky after sunset.

Venus, rises at sunrise on the 18th of August, but 55 minutes before the Sun a week later and about one hour 30 minutes by month's end. As it does so it brightens from -4.3 to -4.4 and its angular size reduces slightly from 58 to 52 arc seconds and the percentage illuminated area (phase) of the planet increases from 1 to 9%.

As August begins, **Mars**, at magnitude +1.7, rises about 70 minutes before the Sun. This increases to 2 hours by month end with its brightness virtually unchanged at +1.8 magnitudes. On August 8th, it will lie below Castor and Pollux in Gemini around 45 minutes before sunrise. On the 20th and 21st it will lie close the M44, the Beehive Cluster in Cancer.

Jupiter passes behind the Sun on August 26th so can only be observed during twilight at the very beginning of the month low in the west after sunset.

Saturn is the only bright planet visible outside twilight this month. One hour after sunset it will lie ~20 degrees above the horizon so the atmosphere will limit the view of its 17 arc second disk but the ring system, now 24 degrees open, should still show nicely along with Titan, its largest satellite. Saturn is 90 degrees east of the sun (eastern quadrature) on August 21st so the globe's shadow on the rings is at its maximum extent giving a three-dimensional feel to our view of this, most beautiful, planet.

The Perseid **meteor shower** will reach its peak on August 13. Some "shooting stars" associated with the shower are expected to be visible each night from Jul 23 to Aug 20. The maximum rate of meteors expected to be visible from a dark location is around 80 per hour. The Moon will be 28 days old at the time of peak activity, and so will present minimal interference.

Last Qtr Aug 6 New Aug 14 First Qtr Aug 22 Full Aug 29



Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
8/1/2015	21:55	08:33	07:06	20:59
8/5/2015	00:38	13:03	07:09	20:56
8/10/2015	03:44	17:59	07:13	20:51
8/15/2015	08:18	21:19	07:17	20:45
8/20/2015	12:45	00:01	07:20	20:39
8/25/2015	17:19	03:01	07:24	20:33
8/31/2015	21:52	09:39	07:29	20:25

Planet Data

	Aug 1			
	Rise	Transit	Set	Mag
Mercury	06:51	13:44	20:41	-1.0
Venus	07:43	14:15	20:42	-4.3
Mars	04:53	12:06	19:19	1.7
Jupiter	07:30	14:18	21:02	-1.7
Saturn	14:38	20:01	01:24	0.4

	Aug 15			
	Rise	Transit	Set	Mag
Mercury	07:54	14:20	20:50	-0.2
Venus	06:18	12:51	19:17	-3.9
Mars	04:41	11:48	18:56	1.7
Jupiter	06:49	13:34	20:16	-1.7
Saturn	13:44	19:06	00:29	0.5

	Aug 31			
	Rise	Transit	Set	Mag
Mercury	08:32	14:33	20:34	0.2
Venus	04:40	11:14	17:52	-4.4
Mars	04:28	11:26	18:26	1.8
Jupiter	06:03	12:44	19:23	-1.7
Saturn	12:43	18:06	23:28	0.6

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

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	Con	RA 2000	Dec 2000	Mag	Begin	Best	End	Difficulty
NGC 6193	Open	Ara	16h41m20.0s	-48°45'48"	5.4	20:51	21:05	21:36	detectable
NGC 6178	Open	Sco	16h35m47.0s	-45°38'36"	7.2	20:52	21:08	21:50	easy
NGC 5986	Glob	Lup	15h46m03.0s	-37°47'12"	7.6	20:56	21:09	21:34	detectable
NGC 6397	Glob	Ara	17h40m42.0s	-53°40'24"	5.3	20:48	21:10	21:56	not visible
NGC 6124	Open	Sco	16h25m20.0s	-40°39'12"	6.3	20:59	21:11	21:34	challenging
NGC 5897	Glob	Lib	15h17m24.0s	-21°00'36"	8.4	21:01	21:13	21:39	difficult
NGC 6322	Open	Sco	17h18m25.0s	-42°56'00"	6.5	20:50	21:16	22:46	easy
M 80	Glob	Sco	16h17m02.0s	-22°58'30"	7.3	20:55	21:16	22:36	detectable
NGC 6388	Glob	Sco	17h36m17.0s	-44°44'06"	6.8	20:55	21:17	22:23	detectable
M 94	Gal	CVn	12h50m53.1s	+41°07'12"	8.7	21:00	21:17	21:20	easy
M 5	Glob	Ser	15h18m34.0s	+02°05'00"	5.7	20:56	21:17	22:20	easy
NGC 6302	PNe	Sco	17h13m44.2s	-37°06'16"	12.8	20:50	21:17	23:01	not visible
M 3	Glob	CVn	13h42m11.0s	+28°22'42"	6.3	20:58	21:18	21:47	easy
M 82	Gal	UMa	09h55m52.4s	+69°40'47"	9.0	20:59	21:19	23:03	detectable
NGC 5195	Gal	CVn	13h29m59.6s	+47°15'58"	10.5	21:01	21:19	22:09	detectable
M 51	Gal	CVn	13h29m52.3s	+47°11'40"	8.7	20:57	21:19	22:09	easy
M 62	Glob	Oph	17h01m13.0s	-30°06'48"	6.4	20:55	21:19	22:51	detectable
M 19	Glob	Oph	17h02m38.0s	-26°16'06"	6.8	20:58	21:20	22:53	detectable
M 101	Gal	UMa	14h03m12.4s	+54°20'53"	8.4	21:01	21:21	22:50	detectable
M 12	Glob	Oph	16h47m14.0s	-01°56'48"	6.1	20:54	21:22	23:36	easy
M 10	Glob	Oph	16h57m09.0s	-04°06'00"	6.6	20:57	21:22	23:35	detectable
M 9	Glob	Oph	17h19m12.0s	-18°31'00"	7.8	20:57	21:23	22:50	detectable
NGC 6383	Open	Sco	17h34m48.0s	-32°34'00"	5.4	20:53	21:22	23:31	easy
M 6	Open	Sco	17h40m20.0s	-32°15'12"	4.6	20:53	21:24	23:49	easy
M 13	Glob	Her	16h41m41.0s	+36°27'36"	5.8	20:53	21:24	00:55	easy
M 14	Glob	Oph	17h37m36.0s	-03°14'48"	7.6	20:56	21:27	00:09	detectable
M 7	Open	Sco	17h53m51.0s	-34°47'36"	3.3	20:54	21:27	23:41	easy
M 92	Glob	Her	17h17m07.0s	+43°08'12"	6.5	20:53	21:28	01:36	easy
M 23	Open	Sgr	17h57m04.0s	-18°59'06"	5.9	20:55	21:30	23:25	detectable
M 21	Open	Sgr	18h04m13.0s	-22°29'24"	7.2	20:55	21:32	23:03	detectable
M 20	Open	Sgr	18h02m42.0s	-22°58'18"	5.2	20:53	21:32	22:57	easy
NGC 6541	Glob	CrA	18h08m02.0s	-43°42'54"	6.3	20:59	21:31	22:53	detectable
M 8	Neb	Sgr	18h04m02.0s	-24°23'14"	5.0	20:54	21:32	22:42	easy
NGC 6543	PNe	Dra	17h58m33.4s	+66°37'59"	8.3	20:47	21:37	03:17	obvious
NGC 6572	PNe	Oph	18h12m06.4s	+06°51'12"	8.0	20:42	21:38	01:27	obvious
M 24	Open	Sgr	18h18m26.0s	-18°24'24"	11.1	20:53	21:41	23:51	not visible
M 16	Open	Ser	18h18m48.0s	-13°48'24"	6.5	20:50	21:42	00:18	obvious
M 18	Open	Sgr	18h19m58.0s	-17°06'06"	7.5	20:52	21:42	00:00	easy

ID	Cls	Con	RA 2000	Dec 2000	Mag	Begin	Best	End	Difficulty
M 17	Open	Sgr	18h20m47.0s	-16°10'18"	7.3	21:00	21:42	00:06	detectable
M 28	Glob	Sgr	18h24m33.0s	-24°52'12"	6.9	20:56	21:46	22:56	detectable
NGC 6633	Open	Oph	18h27m15.0s	+06°30'30"	5.6	20:51	21:48	01:40	easy
M 25	Open	Sgr	18h31m47.0s	-19°07'00"	6.2	20:57	21:53	23:59	detectable
M 22	Glob	Sgr	18h36m24.0s	-23°54'12"	5.2	20:56	21:57	23:20	detectable
IC 4756	Open	Ser	18h39m00.0s	+05°27'00"	5.4	20:55	21:59	01:41	easy
M 70	Glob	Sgr	18h43m13.0s	-32°17'30"	7.8	20:57	22:04	00:12	detectable
M 11	Open	Sct	18h51m05.0s	-06°16'12"	6.1	20:55	22:11	01:23	detectable
NGC 6716	Open	Sgr	18h54m34.0s	-19°54'06"	7.5	20:55	22:15	00:16	detectable
M 54	Glob	Sgr	18h55m03.0s	-30°28'42"	7.7	21:01	22:15	00:13	difficult
NGC 6723	Glob	Sgr	18h59m33.0s	-36°37'54"	6.8	20:58	22:20	00:17	detectable
M 57	PNe	Lyr	18h53m35.1s	+33°01'45"	9.4	20:51	22:20	03:06	easy
M 56	Glob	Lyr	19h16m36.0s	+30°11'06"	8.4	20:58	22:36	02:19	detectable
M 55	Glob	Sgr	19h40m00.0s	-30°57'42"	6.3	21:03	23:00	01:14	detectable
NGC 6818	PNe	Sgr	19h43m57.8s	-14°09'12"	10.0	20:50	23:04	01:41	easy
M 71	Glob	Sge	19h53m46.0s	+18°46'42"	8.4	20:54	23:14	03:30	easy
M 27	PNe	Vul	19h59m36.3s	+22°43'16"	7.3	20:54	23:20	03:39	easy
NGC 6871	Open	Cyg	20h05m59.0s	+35°46'36"	5.8	20:55	23:26	04:06	easy
NGC 6910	Open	Cyg	20h23m12.0s	+40°46'42"	7.3	20:55	23:43	04:38	easy
M 29	Open	Cyg	20h23m57.0s	+38°30'30"	7.5	20:55	23:43	04:29	easy
NGC 7009	PNe	Aqr	21h04m10.9s	-11°21'48"	8.3	21:33	00:24	03:16	obvious
M 15	Glob	Peg	21h29m58.0s	+12°10'00"	6.3	21:07	00:49	04:43	easy
M 39	Open	Cyg	21h31m48.0s	+48°26'00"	5.3	20:58	00:52	05:04	easy
M 2	Glob	Aqr	21h33m27.0s	-00°49'24"	6.6	21:26	00:53	04:22	detectable
M 30	Glob	Cap	21h40m22.0s	-23°10'42"	6.9	23:27	01:00	02:33	detectable
NGC 7160	Open	Cep	21h53m40.0s	+62°36'12"	6.4	20:54	01:13	05:11	obvious
NGC 7243	Open	Lac	22h15m08.0s	+49°53'54"	6.7	21:14	01:35	05:00	detectable
NGC 7293	PNe	Aqr	22h29m38.5s	-20°50'14"	6.3	23:56	01:49	03:43	detectable
M 52	Open	Cas	23h24m48.0s	+61°35'36"	8.2	22:25	02:44	05:00	detectable
NGC 7789	Open	Cas	23h57m24.0s	+56°42'30"	7.5	23:08	03:17	05:01	detectable
NGC 7790	Open	Cas	23h58m24.0s	+61°12'30"	7.2	21:32	03:18	05:09	obvious
M 110	Gal	And	00h40m22.3s	+41°41'09"	8.9	23:59	04:00	05:04	detectable
M 32	Gal	And	00h42m41.8s	+40°51'58"	8.9	23:12	04:01	05:08	easy
M 31	Gal	And	00h42m44.3s	+41°16'07"	4.3	23:14	04:02	05:09	easy
NGC 457	Open	Cas	01h19m35.0s	+58°17'12"	5.1	22:59	04:25	05:09	obvious
NGC 559	Open	Cas	01h29m31.0s	+63°18'24"	7.4	22:58	04:27	05:09	easy
M 103	Open	Cas	01h33m23.0s	+60°39'00"	6.9	23:08	04:28	05:10	obvious
NGC 637	Open	Cas	01h43m04.0s	+64°02'24"	7.3	23:09	04:29	05:11	obvious
NGC 663	Open	Cas	01h46m09.0s	+61°14'06"	6.4	23:20	04:30	05:08	easy
M 76	PNe	Per	01h42m19.9s	+51°34'31"	10.1	00:30	04:31	05:05	detectable
NGC 869	Open	Per	02h19m00.0s	+57°07'42"	4.3	00:01	04:33	05:12	obvious
Heart Neb	Neb	Cas	02h33m52.0s	+61°26'50"	6.5	02:33	04:34	04:57	challenging
NGC 884	Open	Per	02h22m18.0s	+57°08'12"	4.4	00:03	04:34	05:12	obvious
NGC 1027	Open	Cas	02h42m40.0s	+61°35'42"	7.4	01:02	04:35	05:04	detectable
NGC 957	Open	Per	02h33m21.0s	+57°33'36"	7.2	00:13	04:35	05:08	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.

AVAC

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Visit the Antelope Valley Astronomy Club website at www.avastronomyclub.org/

The Antelope Valley Astronomy Club, Inc. is a 501(c)(3) Non-Profit Corporation.

The A.V.A.C. is a Sustaining Member of The Astronomical League and the International Dark-Sky Association.

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