



Desert Sky Observer

Volume 34

Antelope Valley Astronomy Club Newsletter

February 2014

Up-Coming Events

February 12: Board meeting

February 14: Club Meeting*

February 22: Prime Desert Moon Walk

* 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

Frank Moore

Happy February everyone. I hope everyone is staying warm through our “frigid” temperatures. All kidding aside, and as much as we astronomers appreciate temperate weather, we all need to be hoping and praying for rain and snow to help mitigate California’s dismal water situation.

While we often mention celestial events in these pages, the latest comet, supernova, or discovery in theoretical physics, I have a different kind of star to talk about this month. On January 15, 2014 we lost one of the brightest stars of the astronomical community. Chemist, monk, cosmologist, and perhaps the greatest advocate for public outreach and father of “sidewalk astronomy”, John Dobson, passed away on January 15 at the age of 98.

Many of you will instantly recognize the name and associate it with his simple yet innovative invention, the Dobsonian telescope mount. As we have come to know it, the “Dobsonian telescope” or simply “Dob”, is a Newtonian reflector on a simple alt-azimuth mount. I sometimes describe it to non-astronomers as a Lazy Susan on steroids. While they now come in many shapes and sizes, from both amateur telescope makers and commercial manufacturers, they are all still instantly recognizable as dobsonians. John’s legacy was, of course, that he intended for his designs to be inexpensive and that they would be built from common materials like plywood, cardboard construction tubes, mirrors ground from recycled glass, and common household hardware. Bob Alborzian, one of John’s oldest and dearest friends and member of the Burbank Sidewalk Astronomers, is famous for his telescope, adorned with Rock & Roll flyers and newspaper articles, which swivels smoothly on a bearing made of an old LP record and several strips of Teflon.

John was opinionated and not timid about speaking his mind. He was not impressed with some of the commercial versions of dobsonian telescopes, that had come to be made out of exotic materials and which even have clock drives and Go-to systems, as he felt they had violated his tenet of “affordability”. One year while I was talking to him at the Pacific Astronomy and Telescope Show (PATS) in Pasadena, he motioned to the dobsonian telescopes on display by one of the large manufacturers and openly called them “junk”.

John also had his own theories on cosmology and the origins of the universe, did not believe in the “big bang”, and was a militant environmentalist. Several years ago he was a speaker at RTMC, and while Rose, myself, and Darrell and Nick Bennett waited to get his autograph on one of his books, he proclaimed,

“Anyone who drives a car with an internal combustion engine should be shot.” A voice from with the crowd responded, “How did you get up here John?”, a query which was met by silence.

In a nutshell, John was a character who will be dearly missed. On John Dobson’s official Facebook page, and the page of the Sidewalk Astronomers, many people have inquired about making donations in his honor. They have responded thusly, “What needed to be taken care of has been and we instead ask that if you want to make a donation, find a local astronomy club and assist them with outreach in some way or help a school or library get a scope they can use with the public. That is what JD would want.” They are also soliciting stories, pictures of John, pictures of dobsonian telescopes, and other memorabilia for a documentary book and video they will be compiling about John. Information can be found here:

https://www.facebook.com/Sidewalkastro/posts/10153659182230012?stream_ref=10

The Sidewalk Astronomers has noted on their website, “On March 8th, in honor of John, this year's ISAN (International Sidewalk Astronomy Night) will be dedicated to his memory. Amateur astronomers around the globe can join in and celebrate John's life and continue to carry the torch that he lit back in 1968 when he co-founded the San Francisco Sidewalk Astronomers.”

I would like to participate and we will be looking for suitable venue. In keeping with the theme of “sidewalk astronomy”, I don’t want this to be a remote “dark sky site” but rather someplace where we can expect to have a lot of public traffic. I would welcome your suggestions so send me an email or give me a call if have someplace in mind. Thanks



Vice President
Rose Moore

I'd like to thank Dr. Gary Peterson for giving us a presentation at January's meeting! He came from the San Diego area, so he had quite a drive to get to us! Gary spoke on 'Satellites and the Ring System of Saturn', giving us a different perspective of the Titan and Saturn system and of how they formed. He based his lecture on his years of teaching and understanding geologic formations. A well attended presentation and enjoyed by all!

I have submitted a speaker request form into the Speaker Bureau from the NASA, so we are waiting to hear from them. I'll also be sending some emails out to previous speakers and others to see who we may be able to obtain for our meetings. Also if anyone has any suggestions for speakers, email me. Another item on my agenda is to sort out and find us a place for our Christmas party this year...yes, unfortunately, these restaurants get booked up, usually by spring! If anyone has any suggestions please let me know. Please check our club calendar for upcoming events, and come out to support your fellow members!



Director of Community Development

Don Bryden

This month we have a Prime Desert Moonwalk on Saturday the 22nd at 6:30 pm. Come out and hear Jeremy talk about the Winter sky or bring your scope and share the view with the public. What to look at, you ask? By month's end Orion will be transiting to the south just after sunset. You can follow the Winter circle from Sirius in Canis Major to Procyon in Canis Minor to Castor and Pollux in Gemini. High overhead will be Capella the mother goat in Auriga and on to Aldebaran in Taurus. Finally come full circle to Rigel in Orion. Orion, in fact, anchors the entire loop with the hunter standing straight up, prominently in the south.

This circle of bright stars can guide you to many objects as well. In Canis Major you can find M41, a nice bright open cluster. Although Procyon has no prominent objects, cheat a bit and look to the east to find M44, the Beehive cluster in Cancer. Continuing around to Gemini you can see a nice easy double star in Castor. Castor AB is a long period binary that is easily split in a small to medium scope. At the foot of the twins is M35, a loose open cluster with NGC 2158, a tight, small open cluster just to the lower right.

Moving up to Auriga we continue with more open clusters with M36, M37 & M38. Just below Auriga and above Orion you come to the horns of the bull Taurus. Just next to the lower horn star is M1, the Crab nebula. This is a very diffuse object and can be hard in less than ideal conditions.

We continue our tour clockwise to Aldebaran and a nice open cluster called the Hyades. The Hyades are the five daughters of Atlas and half-sisters to the Pleiades which are just off to the right. Aldebaran is the brightest star in the group but not actually part of the cluster. Finally head back down to the foot of Orion and Rigel. This is another favorite double star of mine with Rigel B being so much smaller than its well-known companion. Most folks will look at Rigel and not notice it's binary companion but if you tell them it has a little twin they notice it right away.

Of course we've been dancing all around the jewel of Winter, Orion and it's molecular cloud complex. From M42 and the Running Man nebula in Orion's sword to M78, the Flame and Horsehead in the belt, the complex wraps all around the middle of the hunter. If your skies are dark then look over in Eridanus, next to Rigel, for the Fox Face and Witch's Head nebulae.

One last treat? Look up at that extremely bright star in Gemini – it's Jupiter! That's quite a lot of goodies for one night so let's get a few scopes out there and share the view.

Space Place

Surprising Young Stars in the Oldest Places in the Universe

By Dr. Ethan Siegel

Littered among the stars in our night sky are the famed deep-sky objects. These range from extended spiral and elliptical galaxies millions or even billions of light years away to the star clusters, nebulae, and stellar remnants strewn throughout our own galaxy. But there's an intermediate class of objects, too: the globular star clusters, self-contained clusters of stars found in spherically-distributed halos around each galaxy.



Globular Cluster NGC 6397. Credit: ESA & Francesco Ferraro (Bologna Astronomical Observatory) / NASA, Hubble Space Telescope, WFPC2.

Back before there were any stars or galaxies in the universe, it was an expanding, cooling sea of matter and radiation containing regions where the matter was slightly more dense in some places than others. While gravity worked to pull more and more matter into these places, the pressure from radiation pushed back, preventing the gravitational collapse of gas clouds below a certain mass. In the young universe, this meant no clouds smaller than around a few hundred thousand times the mass of our Sun could collapse. This coincides with a globular cluster's typical mass, and their stars are some of the oldest in the universe!

These compact, spherical collections of stars are all less than 100 light-years in radius, but typically have around 100,000 stars inside them, making them nearly 100 times denser than our neighborhood of the Milky Way! The vast majority of globular clusters have extremely few heavy elements (heavier than helium), as little as 1% of what we find in our Sun. There's a good reason for this: our Sun is only 4.5 billion years old and has seen many generations of stars live-and-die, while globular clusters (and the stars inside of them) are often over 13 billion years old, or more than

90% the age of the universe! When you look inside one of these cosmic collections, you're looking at some of the oldest stellar swarms in the known universe.

Yet when you look at a high-resolution image of these relics from the early universe, you'll find a sprinkling of hot, massive, apparently young blue stars! Is there a stellar fountain of youth inside? Kind of! These massive stellar swarms are so dense -- especially towards the center -- that mergers, mass siphoning and collisions between stars are quite common. When two long-lived, low-mass stars interact in these ways, they produce a hotter, bluer star that will be much shorter lived, known as a blue straggler star. First discovered by Allan Sandage in 1953, these young-looking stars arise thanks to stellar cannibalism. So enjoy the brightest and bluest stars in these globular clusters, found right alongside the oldest known stars in the universe!

Learn about a recent globular cluster discovery here: <http://www.nasa.gov/press/2013/september/hubble-uncovers-largest-known-group-of-star-clusters-clues-to-dark-matter>.

Kids can learn more about how stars work by listening to The Space Place's own Dr. Marc: <http://spaceplace.nasa.gov/podcasts/en/-stars>.

News Headlines

Hubble telescope spies clouds on nearby alien planets

Scientists have found evidence of extraterrestrial clouds blanketing two of the most common types of planets in our Milky Way galaxy, NASA officials say. Two teams of researchers used the Hubble Space Telescope to characterize the atmospheres of the two exoplanets. One of the alien planets is a so-called "super-Earth" larger than the Earth, while the other has been dubbed a "warm Neptune."

<http://www.foxnews.com/science/2014/01/03/hubble-telescope-super-planets-alien-clouds/>

'Sleeping beauty' comet probe awakens from slumber

The European probe Rosetta woke up Monday after a 31-month hibernation in a nearly decade-old quest to explore a comet, the European Space Agency (ESA) announced. "Hello, world!" ESA said on Twitter, mimicking the signal sent back from deep space by the billion-dollar unmanned craft. The agency described Rosetta as a "sleeping beauty" that had emerged from a long sleep.

<http://news.yahoo.com/alarm-call-set-wake-comet-probe-114645648.html>

Cosmic 'web' seen for first time

The hidden tendrils of dark matter that underlie the visible Universe may have been traced out for the first time. Cosmology theory predicts that galaxies are embedded in a cosmic web of "stuff", most of which is dark matter. Astronomers obtained the first direct images of a part of this network, by exploiting the fact that a luminous object called a quasar can act as a natural "cosmic flashlight".

<http://www.bbc.co.uk/news/science-environment-25809967>

Bright Supernova in M82

A surprise supernova has erupted in M82, the famous nearby irregular galaxy in Ursa Major. Observers are reporting it at about magnitude 11.2 as of Saturday, January 25th, with a color on the orange side of white. A spectrum reported by Yi Cao and colleagues (Caltech) suggests that it may still be two weeks away from reaching its peak brightness. Early spectra showed it to be a Type Ia supernova — an exploded white dwarf — with debris expanding at up to 20,000 kilometers per second.

<http://www.skyandtelescope.com/community/skyblog/observingblog/Bright-Supernova-in-M82-241477661.html>

Stephen Hawking shakes up theory (again): Black holes are actually gray

British physicist Stephen Hawking earned worldwide attention for his surprising claims about black holes, and he's doing it again with a new paper claiming that "there are no black holes." Actually, Hawking isn't denying the existence of the massive gravitational singularities that lurk at the center of many galaxies, including our own Milky Way. He's just saying the classical view of a black hole as an eternal trap for everything that's inside, even light, is wrong. In his revised view, black holes are ever so slightly gray, with a chaotic and shifting edge rather than a sharply defined event horizon.

<http://www.nbcnews.com/science/stephen-hawking-shakes-theory-again-black-holes-are-actually-gray-2D12001605>

Water Detected on Dwarf Planet Ceres

Scientists using the Herschel space observatory have made the first definitive detection of water vapor on the largest and roundest object in the asteroid belt, dwarf planet Ceres. "This is the first time water vapor has been unequivocally detected on Ceres or any other object in the asteroid belt and provides proof that Ceres has an icy surface and an atmosphere," said Michael Küppers of ESA in Spain, lead author of a paper in the journal Nature.

http://science.nasa.gov/science-news/science-at-nasa/2014/22jan_ceres/

Astrophoto of The Month



M82 with Supernova SN 2014J in the lower right. By Don Bryden. About four hours of LRGB and Ha

Students at the University College London, Mill Hill Observatory, discovered the Type 1a supernova on the 21st of January. M82 lies 12 million light years away in the constellation Ursa Major. Though it will be fading during February it should still be visible in a small telescope. A Type 1a supernova results when a white dwarf star accretes matter from a companion star. When the mass of the white dwarf exceeds the Chandrasekhar Limit (about 1.44 solar masses) the star can no longer be supported by electron degeneracy pressure, it explodes. The peak brightness of a Type 1a supernova is believed to be constant and so these can be used as "standard candles" to determine the distances of remote galaxies. This has shown that the Universe is expanding at an increasing rate and is evidence for dark energy.

February Sky Data

First Qtr Feb 6 Full Feb 14 Last Qtr Feb 22 New Mar 1



**Best time for deep sky observing this month:
February 17 through 28**

Venus passed between the Earth and the Sun on the 11th of January so, in February, will be seen low above the eastern horizon before dawn. By mid February, the planet, shining at magnitude -4.6, will be visible 17 degrees above the south-eastern horizon at sunrise.

On February 1st, **Mercury** will lie about 8 degrees below a slightly fuller crescent Moon and will be visible for ~2 hours after sunset. Moving back towards the Sun in angle it will still remain visible for around an hour and a half after sunset by February 7th but by then its brightness will have dropped to magnitude +1. Mercury will pass in front of the Sun (inferior conjunction) on the 15th February but then reappear in the pre dawn sky by month's end.

Mars, lying in Virgo, rises around 10:30 the start of the month and about one hour earlier at month's end. Its magnitude increases from +0.2 to -0.5 during the month with its angular size increasing from 9 to 11 arc seconds. So, given good seeing, it is possible to see markings on its surface such as the polar caps and Syrtis Major. The north polar region is tilted towards us by ~19 degrees so North Polar Cap should be particularly prominent.

This month **Jupiter** is visible for much of the night and dominates the southern sky in the evening. It was at opposition on the 5th January so at the start of the month is high in the sky during the evening. By month's end Jupiter will be due south at ~8:30 pm. Jupiter is in the constellation Gemini moving westwards in retrograde motion towards the star Mebsuta - Epsilon Geminorum.

Saturn is now visible in the pre-dawn sky, rising at about 1 am at the start of February and at about 11:30 pm at its end. Lying in Libra, it is shining with a magnitude of +0.4 and its disk has a diameter of ~17 arc seconds. The rings have now opened to around 23 degrees from the line of sight so presenting a magnificent view.

There are no significant **meteor-showers** in February, and it is generally a quiet time for sporadic meteors too.

Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
2/1/2014	07:52	19:55	06:55	17:20
2/5/2014	10:22	-----	06:51	17:24
2/10/2014	14:05	03:40	06:46	17:29
2/15/2014	18:36	06:45	06:41	17:34
2/20/2014	23:28	09:31	06:35	17:39
2/25/2014	03:23	13:59	06:29	17:44
2/28/2014	05:43	17:29	06:25	17:47

Planet Data

	Feb 1			
	Rise	Transit	Set	Mag
Mercury	07:34	13:15	18:54	-0.3
Venus	04:34	09:56	15:22	-4.6
Mars	22:43	04:32	10:20	0.2
Jupiter	14:38	21:55	05:11	-2.6
Saturn	01:03	06:24	11:45	0.5

	Feb 15			
	Rise	Transit	Set	Mag
Mercury	06:12	11:52	17:41	4.5
Venus	03:59	09:20	14:42	-4.6
Mars	22:02	03:48	09:34	-0.1
Jupiter	13:38	20:55	04:12	-2.6
Saturn	00:10	05:31	10:52	0.5

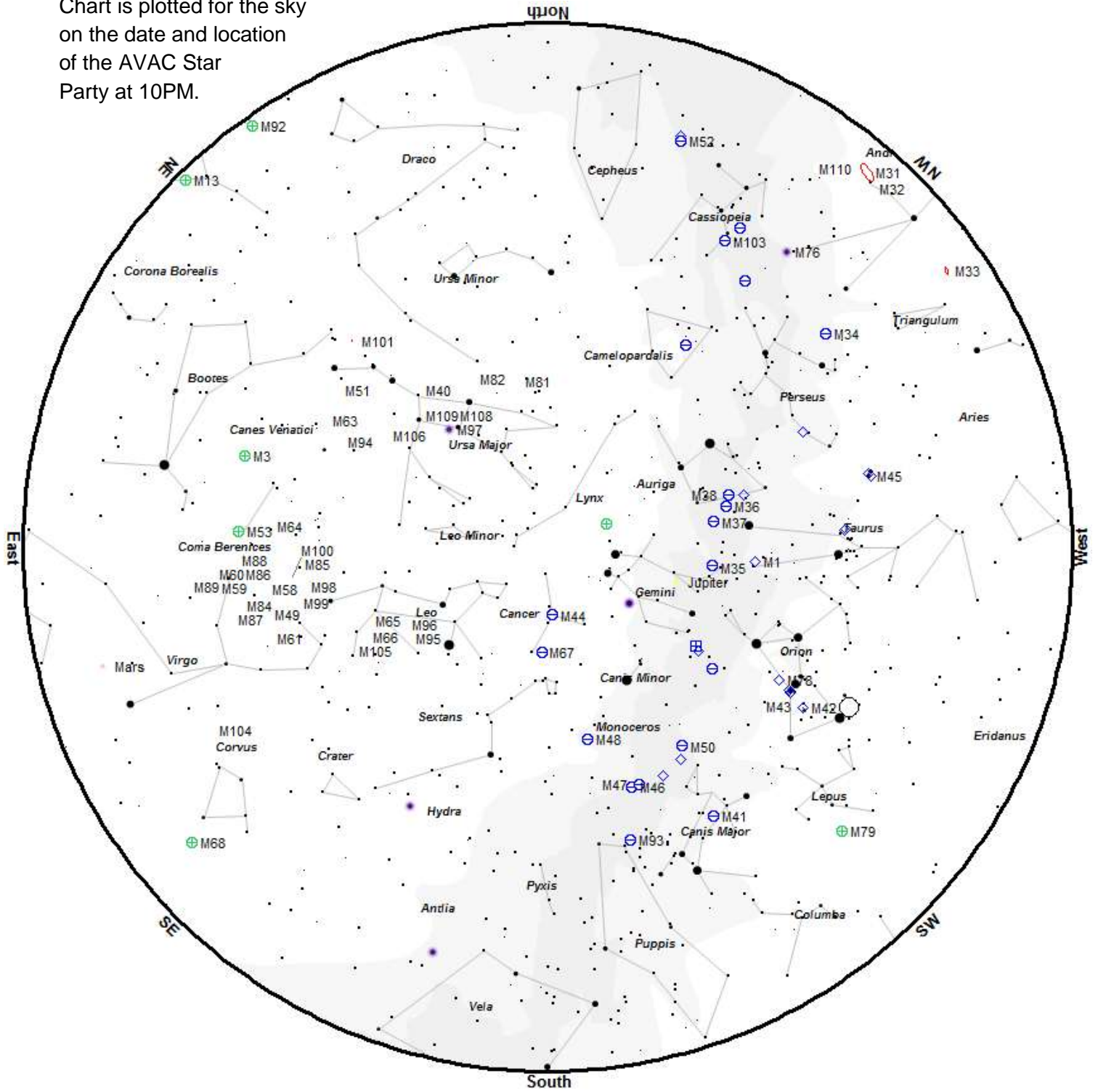
	Feb 28			
	Rise	Transit	Set	Mag
Mercury	05:05	10:34	16:06	0.9
Venus	03:44	09:05	14:26	-4.6
Mars	21:16	03:01	08:46	-0.5
Jupiter	12:44	20:01	03:19	-2.5
Saturn	23:20	04:40	10:01	0.4

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

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Desert Sky Observer

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



Star Magnitudes 	Galaxy Open Cluster Globular Cluster Cluster+Nebulosity	Nebula Bright Nebula Planetary Nebula
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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 February 28. 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 1851	Glob	Col	05h14m06.0s	-40°02'48"	7.1	18:56	19:11	19:52	difficult
M 52	Open	Cas	23h24m48.0s	+61°35'36"	8.2	19:00	19:12	19:47	detectable
NGC 7789	Open	Cas	23h57m24.0s	+56°42'30"	7.5	19:00	19:12	19:45	detectable
M 31	Gal	And	00h42m44.3s	+41°16'07"	4.3	18:56	19:12	19:13	easy
M 32	Gal	And	00h42m41.8s	+40°51'58"	8.9	18:56	19:12	19:13	easy
M 77	Gal	Cet	02h42m40.8s	-00°00'48"	9.7	18:56	19:12	19:30	detectable
NGC 7790	Open	Cas	23h58m24.0s	+61°12'30"	7.2	18:52	19:13	19:16	easy
M 33	Gal	Tri	01h33m50.9s	+30°39'36"	6.4	18:57	19:13	19:42	detectable
NGC 752	Open	And	01h57m41.0s	+37°47'06"	6.6	18:53	19:15	20:21	challenging
NGC 559	Open	Cas	01h29m31.0s	+63°18'24"	7.4	18:52	19:16	20:52	easy
M 103	Open	Cas	01h33m23.0s	+60°39'00"	6.9	18:50	19:16	20:48	obvious
NGC 457	Open	Cas	01h19m35.0s	+58°17'12"	5.1	18:52	19:16	20:30	obvious
M 76	PNe	Per	01h42m19.9s	+51°34'31"	10.1	18:58	19:16	20:31	detectable
NGC 637	Open	Cas	01h43m04.0s	+64°02'24"	7.3	18:49	19:17	21:08	obvious
NGC 663	Open	Cas	01h46m09.0s	+61°14'06"	6.4	18:53	19:17	21:03	easy
NGC 884	Open	Per	02h22m18.0s	+57°08'12"	4.4	18:49	19:17	21:29	obvious
NGC 869	Open	Per	02h19m00.0s	+57°07'42"	4.3	18:49	19:17	21:25	obvious
M 34	Open	Per	02h42m05.0s	+42°45'42"	5.8	18:55	19:17	21:08	easy
NGC 957	Open	Per	02h33m21.0s	+57°33'36"	7.2	18:54	19:17	21:41	easy
NGC 1027	Open	Cas	02h42m40.0s	+61°35'42"	7.4	18:58	19:18	21:26	detectable
NGC 1342	Open	Per	03h31m38.0s	+37°22'36"	7.2	18:56	19:18	21:30	detectable
M 45	Open	Tau	03h47m00.0s	+24°07'00"	1.5	18:50	19:18	21:41	obvious
Heart Neb	Neb	Cas	02h33m52.0s	+61°26'50"	6.5	19:04	19:18	20:10	challenging
NGC 1245	Open	Per	03h14m42.0s	+47°14'12"	7.7	18:53	19:18	21:58	challenging
NGC 1444	Open	Per	03h49m25.0s	+52°39'30"	6.4	18:48	19:19	22:44	obvious
Hyades	Open	Tau	04h26m54.0s	+15°52'00"	0.8	18:52	19:19	22:01	obvious
NGC 1502	Open	Cam	04h07m50.0s	+62°19'54"	4.1	18:47	19:20	23:28	obvious
NGC 1528	Open	Per	04h15m23.0s	+51°12'54"	6.4	18:53	19:20	22:57	easy
NGC 1647	Open	Tau	04h45m55.0s	+19°06'54"	6.2	18:57	19:20	21:32	detectable
NGC 1664	Open	Aur	04h51m06.0s	+43°40'30"	7.2	18:52	19:21	23:14	easy
NGC 1746	Open	Tau	05h03m50.0s	+23°46'12"	6.1	18:56	19:21	21:54	detectable
M 43	Neb	Ori	05h35m30.0s	-05°16'00"	9.0	19:00	19:22	21:02	difficult
M 42	Neb	Ori	05h35m18.0s	-05°23'00"	4.0	18:53	19:22	22:02	easy
M 38	Open	Aur	05h28m40.0s	+35°50'54"	6.8	18:54	19:23	23:04	detectable
M 1	Neb	Tau	05h34m30.0s	+22°01'00"	8.4	19:00	19:23	21:36	difficult
M 36	Open	Aur	05h36m18.0s	+34°08'24"	6.5	18:50	19:25	23:50	easy
M 78	Neb	Ori	05h46m48.0s	+00°05'00"	8.0	19:01	19:25	21:14	difficult
M 37	Open	Aur	05h52m18.0s	+32°33'12"	6.2	18:51	19:27	23:55	easy
NGC 2129	Open	Gem	06h01m07.0s	+23°19'20"	7.0	18:49	19:29	23:53	obvious
NGC 2169	Open	Ori	06h08m24.0s	+13°57'54"	7.0	18:49	19:32	23:36	obvious
M 35	Open	Gem	06h09m00.0s	+24°21'00"	5.6	18:52	19:32	23:48	easy
NGC 2175	Open	Ori	06h09m39.0s	+20°29'12"	6.8	18:54	19:32	23:11	detectable

ID	Cls	Con	RA 2000	Dec 2000	Mag	Begin	Best	End	Difficulty
NGC 2237	Neb	Mon	06h32m02.0s	+04°59'10"	5.5	19:03	19:49	21:44	challenging
NGC 2264	Open	Mon	06h40m58.0s	+09°53'42"	4.1	18:51	19:57	23:58	easy
M 41	Open	CMa	06h46m01.0s	-20°45'24"	5.0	18:54	20:02	21:40	easy
NGC 2301	Open	Mon	06h51m45.0s	+00°27'36"	6.3	18:52	20:08	23:41	easy
M 50	Open	Mon	07h02m42.0s	-08°23'00"	7.2	18:55	20:19	23:16	detectable
NGC 2353	Open	Mon	07h14m30.0s	-10°16'00"	5.2	18:51	20:31	23:19	easy
NGC 2360	Open	CMa	07h17m43.0s	-15°38'30"	9.1	19:14	20:34	22:01	challenging
NGC 2355	Open	Gem	07h16m59.0s	+13°45'00"	9.7	18:59	20:34	23:16	difficult
NGC 2392	PNe	Gem	07h29m10.8s	+20°54'42"	8.6	18:48	20:46	01:15	obvious
NGC 2423	Open	Pup	07h37m06.0s	-13°52'18"	7.0	18:54	20:54	23:23	easy
M 47	Open	Pup	07h36m35.0s	-14°29'00"	4.3	18:52	20:53	23:19	obvious
NGC 2439	Open	Pup	07h40m45.0s	-31°41'36"	7.1	19:00	20:57	23:07	detectable
M 46	Open	Pup	07h41m46.0s	-14°48'36"	6.6	18:57	20:58	23:22	detectable
NGC 2440	PNe	Pup	07h41m55.4s	-18°12'31"	11.5	19:03	20:58	22:57	detectable
M 93	Open	Pup	07h44m30.0s	-23°51'24"	6.5	20:03	21:01	21:58	easy
NGC 2451	Open	Pup	07h45m23.0s	-37°57'21"	3.7	19:08	21:01	22:58	easy
NGC 2477	Open	Pup	07h52m10.0s	-38°31'48"	5.7	19:19	21:08	22:58	easy
NGC 2506	Open	Mon	08h00m01.0s	-10°46'12"	8.9	19:21	21:16	23:13	difficult
NGC 2547	Open	Vel	08h10m09.0s	-49°12'54"	5.0	20:56	21:27	21:57	challenging
NGC 2546	Open	Pup	08h12m15.0s	-37°35'42"	5.2	20:16	21:29	22:41	difficult
NGC 2571	Open	Pup	08h18m56.0s	-29°45'00"	7.4	19:19	21:35	23:51	detectable
M 44	Open	Cnc	08h40m24.0s	+19°40'00"	3.9	18:56	21:57	02:05	easy
M 67	Open	Cnc	08h51m18.0s	+11°48'00"	7.4	19:14	22:07	01:04	detectable
M 82	Gal	UMa	09h55m52.4s	+69°40'47"	9.0	18:56	23:12	05:02	detectable
M 81	Gal	UMa	09h55m33.1s	+69°03'56"	7.8	18:58	23:12	04:56	detectable
NGC 3132	PNe	Vel	10h07m01.8s	-40°26'11"	8.2	21:35	23:22	01:12	easy
NGC 3132	PNe	Vel	10h07m01.8s	-40°26'11"	8.2	21:35	23:22	01:12	easy
NGC 3228	Open	Vel	10h21m22.0s	-51°43'42"	6.4	23:16	23:37	23:59	challenging
NGC 3227	Gal	Leo	10h23m30.6s	+19°51'54"	11.5	20:31	23:40	02:46	difficult
NGC 3242	PNe	Hya	10h24m46.1s	-18°38'32"	8.6	21:45	23:40	01:38	obvious
M 97	PNe	UMa	11h14m47.7s	+55°01'09"	9.7	20:07	00:31	04:52	detectable
M 65	Gal	Leo	11h18m55.7s	+13°05'32"	10.1	21:09	00:35	04:00	detectable
M 66	Gal	Leo	11h20m14.9s	+12°59'30"	9.7	21:12	00:36	04:01	detectable
M 106	Gal	CVn	12h18m57.6s	+47°18'13"	9.1	21:33	01:34	05:05	detectable
Col 256	Open	Com	12h25m06.0s	+26°06'00"	2.9	21:22	01:40	05:09	easy
M 84	Gal	Vir	12h25m03.9s	+12°53'12"	10.1	22:25	01:41	04:53	detectable
M 86	Gal	Vir	12h26m12.2s	+12°56'44"	9.8	22:42	01:42	04:41	detectable
M 49	Gal	Vir	12h29m46.8s	+08°00'01"	9.3	22:31	01:45	04:55	detectable
M 87	Gal	Vir	12h30m49.2s	+12°23'29"	9.6	22:29	01:47	04:59	detectable
NGC 4565	Gal	Com	12h36m20.8s	+25°59'15"	10.1	22:38	01:52	04:58	difficult
M 68	Glob	Hya	12h39m28.0s	-26°44'36"	7.3	23:52	01:55	03:58	detectable
M 104	Gal	Vir	12h39m59.3s	-11°37'22"	9.1	23:15	01:56	04:36	detectable
M 94	Gal	CVn	12h50m53.1s	+41°07'12"	8.7	21:41	02:06	05:11	detectable
M 64	Gal	Com	12h56m43.8s	+21°41'00"	9.3	22:28	02:12	05:09	detectable
M 51	Gal	CVn	13h29m52.3s	+47°11'40"	8.7	22:02	02:45	05:12	easy
NGC 5195	Gal	CVn	13h29m59.6s	+47°15'58"	10.5	22:44	02:45	05:09	detectable
M 3	Glob	CVn	13h42m11.0s	+28°22'42"	6.3	22:50	02:57	05:13	easy
M 101	Gal	UMa	14h03m12.4s	+54°20'53"	8.4	23:14	03:18	05:08	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.
- 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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