



# Desert Sky Observer

Volume 37

Antelope Valley Astronomy Club Newsletter

March 2017

## Up-Coming Events

March 10: Club Meeting\*

March 11: [Prime Desert Woodland Moon Walk](#)

March 25: [Messier Marathon](#)

\* 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 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

### Frank Moore

“What’s that you say dear? There’s only 28 days this month so I have to write my DSO? Why I never heard of such a thing? Whose idea was it anyhow? OK....OK....I’ll get right on it.”

Well folks, here we go again, another month of “atmospheric river” storms and not much to write about but the weather. Still, I’ll make a go of it.

Other than our meeting at the SAGE Planetarium on Friday February 10, the only event we were able to squeeze in between storms was the monthly Prime Desert Woodland Moonwalk on Saturday February 11. In spite of cold temperatures and partly cloudy skies, we still had 65 members of the public show up to walk the trail with Jeremy Amarant, get a tour of the constellations in the sky, and to see some wonders through our telescopes. Those of us with telescopes included Rod Girard, Ellen Mahler and myself.

In lieu of his big dobsonian reflector, AVAC Treasurer Rod Girard had his new Celestron CPC Deluxe 925HD Schmidt-Cassegrain with EdgeHD optics. After using the incredible SkyAlign system to set it up, he used a Revolution Imager to capture images of the Orion Nebula which he then displayed on a new 7” display he bought to replace the stock display. The imager captured five or six images, which it then stacked automatically, for display on the 7” LCD screen. The result was beautiful, full color, images that refreshed every few seconds. The only drawback was the limited life of the battery he had bought for the display but he’s going to upgrade that for next time.

While Rod and I were still setting up, Ellen Mahler kept the crowd entertained with views of the 61% illuminated waxing gibbous moon, as well as Mars and Venus, on her 6” Orion dob. There’s something to be said for those simple push-to dobs that can be on target while those of us with go-to scopes are still messing with the technology.

As for me, while doing the alignment and sky modeling of our Celestron C-11 on the Losmandy G-11 mount, my fifth alignment star was Betelgeuse and it was so gorgeous that I just left the scope pointed there for the pre-walk public viewing. I bumped up the power and the red supergiant twinkled there in its reddish/orange glory bringing satisfied “Oohs” and “Aaahs” from the public. Of course there were the many requisite jokes about saying Betelgeuse (Beetlejuice) three times in quick succession from the movie.

With the partially cloudy skies blotting out many objects, it was also one of those nights where if you found something that pleased the public, you just left it there as long as it remained in the clear.

The night was damper than I had expected, and while the public was on the walk, the image began to degrade and I realized that my corrector plate was getting covered in dew. Unlike what is common practice for me, I had not brought my dew shield so I had to bust out the infrequently used AstroZap dew heater, which slowly cleared up the optics. I then searched for other objects but by then, high clouds were covering much of the sky and though I could see some objects, only because I knew what to look for, I knew the public would not be able to see they were there. As result, I went to the 61% illuminated moon with a neutral density filter and views were stunning. It was perhaps the best view of the moon I had ever seen through one of our telescopes with super high contrast and detail especially near the terminator. I was already zoomed in, so I was not showing the full disc, and when one little girl asked if I could “make it bigger” I thought she wanted to see the full disc. I asked if that’s what she wanted and she said, “No. Can you make the craters bigger?”. I put in a 20mm Explore Scientific eyepiece, effectively giving us about 150 power, and the views were even more stunning. She could barely be pried away from the eyepiece even when her family said it was time to go. All in all, and though conditions were less than ideal, it turned out to be a very rewarding night of public outreach.

Our next Prime Desert Woodland Moonwalk is scheduled for Saturday March 18, 2017 at 7:30 pm. The PDW Moonwalk for April is Saturday April 1 at 8:00 pm. We’ll have watch out for the practical jokers at that one.

I was very disappointed that our planned public outreach, with the display board and solar telescopes, at the LA County Regional Science Olympiad at Antelope Valley College was canceled due to clouds and scattered showers. This is one of my favorite events and it’s the first time we’ve missed it since its origins as Super Science Saturday at Joe Walker Middle School. After the event, AV College Physics Department Head Christos Valiotis emailed me to say, “Put it on your calendar, as this is my official invitation to you for next year.” With any luck, the atmospheric river won’t wipe us out next year.

In like manner, once again our planned Dark Sky Star Party at Judy Fuentes’ house in Antelope Acres had to be canceled due to cloudy skies and showers. We’ll make out there yet.

Remember, one of our biggest events of the year, the Messier Marathon and Dark Sky Star Party, is scheduled for Saturday March 25th. It will be held at the Group Campsite at Saddleback Butte State Park. Some of us will arrive as early as 2:00 pm to setup and we’ll have the site till Sunday morning. We aren’t going to have a formal picnic but we will light off some coals in the BBQ for those who want to cook their own meat and there are tables, under cover, on the site for setting up meals and snacks. We’ll also have coffee and hot cocoa available for the hearty souls observing through the night. Be there...or be a “regular quadrilateral, with four equal sides and four equal 90\* angles.”



**Secretary**  
**Rose Moore**

Well, our trip to SOFIA is over and it was awesome!! I had such a great time! We were treated to a short lecture and power point, and then a tour of SOFIA. Dr. Becklin, one of the pioneers of infrared astronomy, headed our group and was full of information. Most of us were able to sit in the pilot’s seat and have a few pictures taken! We also

toured the facility off the hanger where they house the different science modules that they use, depending on what they are studying. Many of us took pictures, and eventually hope to get all on one disk to show at the SAGE. Special thanks to member Kevin Reilly for helping us out with this event, and showing us around!!

For March we have a couple of events coming up. We have our meeting on Friday, March 10th. Our Prime Desert Moonwalk this month is on Saturday, March 18th, at 7:30pm. Weather permitting! Come on out with your scope, or take the Moonwalk with Jeremy.

On Saturday March 25th, we have our Messier Marathon at Saddleback State Park. We have reserved our usual large camp site. You are welcome to arrive in the early afternoon. Observing will start at dark, weather permitting, dress warm. Bring your telescopes to look for Messier objects, or just to observe. If you don't have a scope, you are welcome to come out to observe through any members scope, we always share!

Also coming up: Prime Desert Moonwalk on April 1st at 7:30pm, and College of the Canyon Star Party on Friday May 5th. We will not be participating in the Poppy Festival.

Upcoming meetings: April we have a speaker pending, arranged by Jeremy and Matt; May meeting will be Dr. Anna Ho from Cal Tech, talking on 'The Invisible Universe'; June meeting Dr. Becklin, from the SOFIA project, topic to be announced.

Remember our annual summer picnic Star-B-Que will be at Brite Lake, Tehachapi, on July 22nd.

## Space Place

### Solar Eclipse Provides Coronal Glimpse

By Marcus Woo

On August 21, 2017, North Americans will enjoy a rare treat: The first total solar eclipse visible from the continent since 1979. The sky will darken and the temperature will drop, in one of the most dramatic cosmic events on Earth. It could be a once-in-a-lifetime show indeed. But it will also be an opportunity to do some science.



*Illustration showing the United States during the total solar eclipse of August 21, 2017, with the umbra (black oval), penumbra (concentric shaded ovals), and path of totality (red) through or very near several major cities. Credit: Goddard Science Visualization Studio, NASA*

Only during an eclipse, when the moon blocks the light from the sun's surface, does the sun's corona fully reveal itself. The corona is the hot and wispy atmosphere of the sun, extending far beyond the solar disk. But it's relatively dim, merely as bright as the full moon at night. The glaring sun, about a million times brighter, renders the corona invisible.

"The beauty of eclipse observations is that they are, at present, the only opportunity where one can observe the corona [in visible light] starting

from the solar surface out to several solar radii," says Shadia Habbal, an astronomer at the University of Hawaii. To study the corona, she's traveled the world having experienced 14 total eclipses (she missed only five due to weather). This summer, she and her team will set up identical imaging systems and spectrometers at five locations along the path of totality, collecting data that's normally impossible to get.

Ground-based coronagraphs, instruments designed to study the corona by blocking the sun, can't view the full extent of the corona. Solar space-based telescopes don't have the spectrographs needed to measure how the temperatures vary throughout the corona. These temperature variations show how the sun's chemical composition is distributed—crucial information for solving one of long-standing mysteries about the corona: how it gets so hot.

While the sun's surface is ~9980 Farenheit (~5800 Kelvin), the corona can reach several millions of degrees Farenheit. Researchers have proposed many explanations involving magneto-acoustic waves and the dissipation of magnetic fields, but none can account for the wide-ranging temperature distribution in the corona, Habbal says.

You too can contribute to science through one of several citizen science projects. For example, you can also help study the corona through the Citizen CATE experiment; help produce a high definition, time-expanded video of the eclipse; use your ham radio to probe how an eclipse affects the propagation of radio waves in the ionosphere; or even observe how wildlife responds to such a unique event.

Otherwise, Habbal still encourages everyone to experience the eclipse. Never look directly at the sun, of course (find more safety guidelines here: <https://eclipse2017.nasa.gov/safety>). But during the approximately 2.5 minutes of totality, you may remove your safety glasses and watch the eclipse directly—only then can you see the glorious corona. So enjoy the show. The next one visible from North America won't be until 2024.

For more information about the upcoming eclipse, please see:

NASA Eclipse citizen science page

<https://eclipse2017.nasa.gov/citizen-science>

NASA Eclipse safety guidelines

<https://eclipse2017.nasa.gov/safety>

Want to teach kids about eclipses? Go to the NASA Space Place and see our article on solar and lunar eclipses! <http://spaceplace.nasa.gov/eclipses/>

## News Headlines

### **NASA Telescope Reveals Largest Batch of Earth-Size, Habitable-Zone Planets Around Single Star**

NASA's Spitzer Space Telescope has revealed the first known system of seven Earth-size planets around a single star. Three of these planets are firmly located in the habitable zone, the area around the parent star where a rocky planet is most likely to have liquid water. The discovery sets a new record for greatest number of habitable-zone planets found around a single star outside our solar system. All of these seven planets could have liquid water – key to life as we know it – under the right atmospheric conditions, but the chances are highest with the three in the habitable zone.

<https://goo.gl/YqKcVM>

### **Martian Winds Carve Mountains, Move Dust, Raise Dust**

On Mars, wind rules. Wind has been shaping the Red Planet's landscapes for billions of years and continues to do so today. Studies using both a NASA orbiter and a rover reveal its effects on scales grand to tiny on the strangely structured landscapes within Gale Crater.

<https://goo.gl/KPEfMI>

### **First Solar Images from NOAA's GOES-16 Satellite**

The first images from the Solar Ultraviolet Imager or SUVI instrument aboard NOAA's GOES-16 satellite have been successful, capturing a large coronal hole on Jan. 29, 2017. The sun's 11-year activity cycle is currently approaching solar minimum, and during this time powerful solar flares become scarce and coronal holes become the primary space weather phenomena – this one in particular initiated aurora throughout the polar regions. Coronal holes are areas where the sun's corona appears darker because the plasma has high-speed streams open to interplanetary space, resulting in a cooler and lower-density area as compared to its surroundings.

<https://goo.gl/c8a8HF>

### **NASA's Juno Mission to Remain in Current Orbit at Jupiter**

NASA's Juno mission to Jupiter, which has been in orbit around the gas giant since July 4, 2016, will remain in its current 53-day orbit for the remainder of the mission. This will allow Juno to accomplish its science goals, while avoiding the risk of a previously-planned engine firing that would have reduced the spacecraft's orbital period to 14 days.

<https://goo.gl/iRTh95>

## March Sky Data

First Qtr Mar 5      Full Mar 12      Last Qtr Mar 20      New Mar 27



**Best time for deep sky observing this month:  
March 17 through March 29**

**Mercury** passes through superior conjunction on March 7th and becomes visible around the 15th in bright twilight just above the western horizon. On the 19th, on its way up, it passes Venus, on its way down, some 9 degrees to its right. Then at magnitude -1.4, its brightness drops to -0.4 by the end of the month. With an angular size increasing to 7.3 arc seconds by month's end, no details would be expected to be seen on its disk.

**Venus** starts the month dominating the western sky shining virtually at its brightest with a magnitude -4.8. It lies due south in mid-afternoon and can even be seen with the unaided eye.

**Mars** is easy to find as March begins lying up and to the left of Venus which is some 13 degrees down to its lower right. As the month progresses, Mars continues to move eastwards while Venus falls back towards the western horizon. Its brightness falls slightly during the month from magnitude +1.3 to +1.5 while its angular diameter falls from 4.6 to 4.1 arc seconds.

**Jupiter** lies in Virgo some 4 degrees above its brightest star, Spica. At the start of February it rises in the east at ~20:45 but by month's end by ~19:34. The size of Jupiter's disk increases slightly from 42 to 44 arc seconds as February progresses with its magnitude increasing very slightly from -2.4 to -2.5.

**Saturn** rises well after midnight and will be highest in the pre-dawn sky. Lying in the western part of Sagittarius, its diameter increases from 16.2 to 17 arc seconds during the month as it shines at magnitude +0.5. It will be high enough in the south-east before dawn to make out the beautiful ring system which, at over 26 degrees to the line of sight, are as open as they ever become.

There are no major **meteor-showers** in March, but we may see a handful of meteors from the Virginid shower, which is usually active during March and April; they appear to radiate outwards from the constellation of Virgo.

## Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
3/1/2017	08:24	21:22	06:20	17:48
3/5/2017	11:22	00:37	06:15	17:51
3/10/2017	16:18	05:00	06:08	17:55
3/15/2017	22:08	08:55	07:01	18:59
3/20/2017	01:39	12:10	06:55	19:03
3/25/2017	05:23	16:49	06:48	19:07
3/31/2017	09:27	23:29	06:39	19:12

## Planet Data

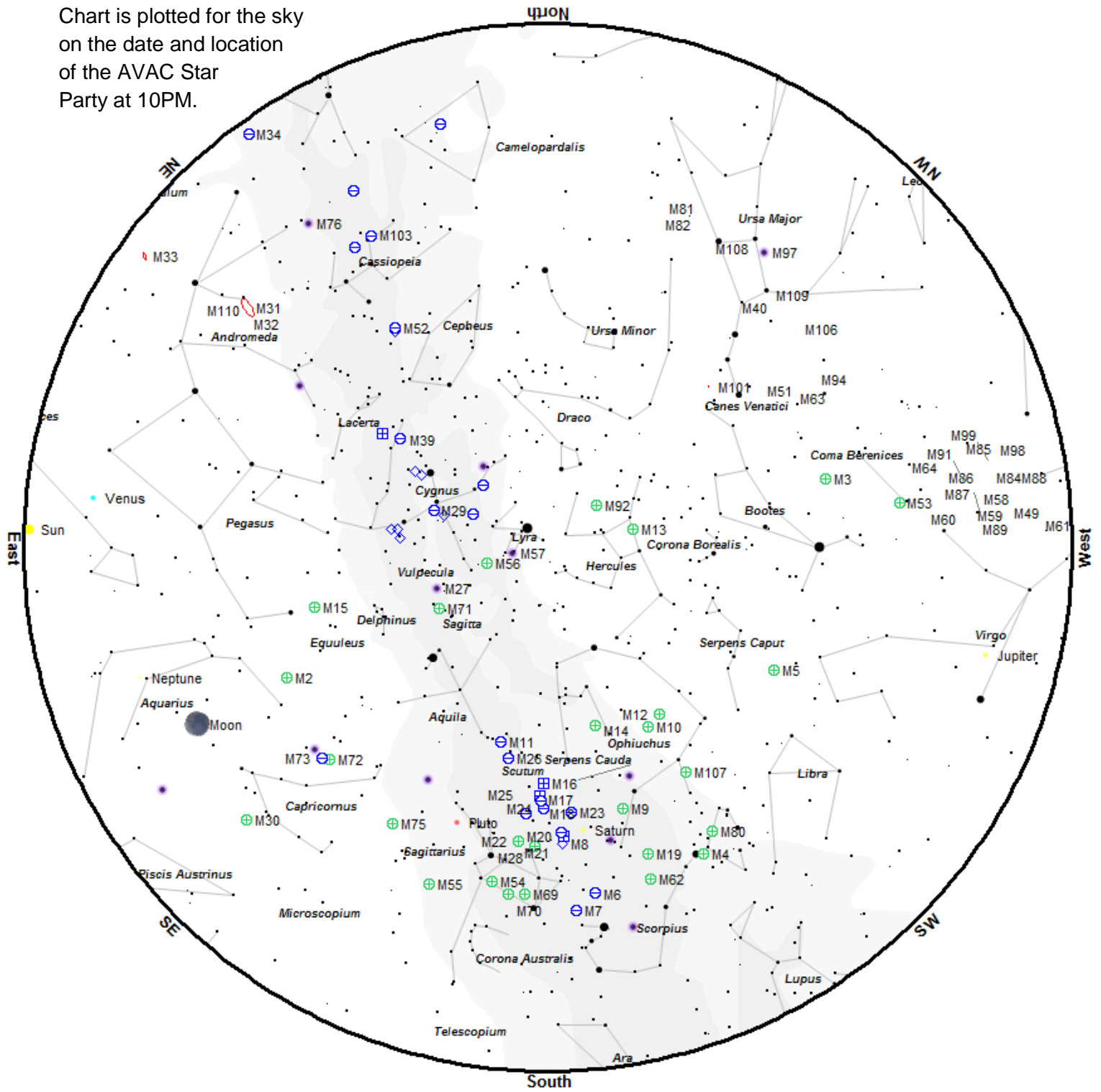
	Mar 1			
	Rise	Transit	Set	Mag
<b>Mercury</b>	06:13	11:53	17:29	-1.3
<b>Venus</b>	07:07	13:49	20:28	-4.6
<b>Mars</b>	08:05	14:41	21:15	1.3
<b>Jupiter</b>	20:47	02:34	08:21	-2.4
<b>Saturn</b>	01:52	06:55	11:58	0.5

	Mar 15			
	Rise	Transit	Set	Mag
<b>Mercury</b>	08:21	14:32	20:44	-1.5
<b>Venus</b>	07:56	14:42	21:21	-4.3
<b>Mars</b>	09:37	16:24	23:10	1.4
<b>Jupiter</b>	21:46	03:34	09:23	-2.4
<b>Saturn</b>	03:00	08:03	13:10	0.5

	Mar 31			
	Rise	Transit	Set	Mag
<b>Mercury</b>	08:13	15:02	21:50	-0.1
<b>Venus</b>	06:34	13:06	19:33	-4.2
<b>Mars</b>	09:07	16:06	23:03	1.5
<b>Jupiter</b>	20:34	02:25	08:15	-2.5
<b>Saturn</b>	01:59	06:01	12:04	0.4

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.



<p>Star Magnitudes</p> <p>● ● ● ● ● ●</p> <p>0 1 2 3 4 5</p>	<p>Galaxy</p> <p>Open Cluster</p> <p>Globular Cluster</p> <p>Cluster+Nebulosity</p>	<p>Nebula</p> <p>Bright Nebula</p> <p>Planetary Nebula</p>
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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 AVAC Star Party. Since this month is our Messier Marathon the list is the observing order for the night. You can download the order in Excel format at [http://www.avastronomyclub.org/docs/marathon\\_order.xls](http://www.avastronomyclub.org/docs/marathon_order.xls) or Adobe PDF at [http://www.avastronomyclub.org/docs/marathon\\_order.pdf](http://www.avastronomyclub.org/docs/marathon_order.pdf)

Order	Time	M #	NGC	Con	R.A.	Dec	Mag	Type	Comments
1		M 77	1068	CET	2h 43m	0° 1'	8.8	SG	
2		M 74	628	PSC	1h 37m	15° 47'	9.2	S	
3		M 33	598	TRI	1h 34m	30° 39'	5.7	SG	Pinwheel galaxy
4		M 31	224	AND	0h 43m	41° 16'	3.4	SG	Andromeda galaxy
5		M 32	221	AND	0h 43m	40° 52'	8.2	EG	
6		M 110	205	AND	0h 40m	41° 41'	8.0	EG	
7		M 52	7654	CAS	23h 24m	61° 35'	6.9	OC	
8		M 103	581	CAS	1h 33m	60° 42'	7.4	OC	
9		M 76	650	PER	1h 42m	51° 34'	11.5	PN	The Little Dumbell
11		M 34	1039	PER	2h 42m	42° 47'	5.2	OC	
11		M 45		TAU	3h 47m	24° 7'	1.2	OC	Pleiades
12		M 79	1904	LEP	5h 24m	-24° 33'	8.0	GC	
13		M 42	1976	ORI	5h 35m	-5° 27'	4.0	DN	Great Orion nebula
14		M 43	1982	ORI	5h 35m	-5° 16'	9.0	DN	
15		M 78	2068	ORI	5h 47m	0° 3'	8.0	DN	
16		M 1	1952	TAU	5h 34m	22° 1'	8.4	PN	Crab nebula
17		M 35	2168	GEM	6h 09m	24° 20'	5.1	OC	
18		M 37	2099	AUR	5h 52m	32° 33'	5.6	OC	
19		M 36	1960	AUR	5h 36m	34° 8'	6.0	OC	
20		M 38	1912	AUR	5h 29m	35° 50'	6.4	OC	
21		M 41	2287	CMA	6h 47m	-20° 44'	4.5	OC	
22		M 93	2447	PUP	7h 45m	-23° 52'	6.2	OC	
23		M 47	2422	PUP	7h 37m	-14° 30'	4.4	OC	
24		M 46	2437	PUP	7h 42m	-14° 49'	6.1	OC	
25		M 50	2323	MON	7h 03m	-8° 20'	5.9	OC	
26		M 48	2548	HYA	8h 14m	-5° 48'	5.8	OC	
27		M 44	2632	CNC	8h 40m	19° 59'	3.1	OC	Beehive Cluster
28		M 67	2682	CNC	8h 50m	11° 49'	6.9	OC	
29		M 95	3351	LEO	10h 44m	11° 42'	9.7	SG	
30		M 96	3368	LEO	10h 47m	11° 49'	9.2	SG	
31		M 105	3379	LEO	10h 48m	12° 35'	9.3	EG	
32		M 65	3623	LEO	11h 19m	13° 5'	9.3	SG	Leo's triplet
33		M 66	3627	LEO	11h 20m	12° 59'	9.0	SG	Leo's triplet
34		M 81	3031	UMA	9h 56m	69° 4'	6.8	SG	Bodes Galaxy
35		M 82	3034	UMA	9h 56m	69° 41'	8.4	IG	Cigar Galaxy
36		M 97	3587	UMA	11h 15m	55° 1'	11.2	PN	Owl Nebula
37		M 108	3556	UMA	11h 12m	55° 40'	10.0	SG	



Order	Time	M #	NGC	Con	R.A.	Dec	Mag	Type	Comments
38		M 109	3992	UMA	11h 58m	53° 23'	9.8	SG	
39		M 40		UMA	12h 22m	58° 5'	8.0	dbl	
40		M 106	4258	CVN	12h 19m	47° 18'	8.3	SG	
41		M 94	4736	CVN	12h 51m	41° 7'	8.1	SG	
42		M 63	5055	CVN	13h 16m	42° 2'	8.6	SG	Sunflower galaxy
43		M 51	5194	CVN	13h 30m	47° 12'	8.1	SG	Whirlpool galaxy
44		M 101	5457	UMA	14h 03m	54° 21'	7.7	SG	
45		M 102	5457	UMA	14h 03m	54° 21'	7.7	SG	Duplicate of M101
46		M 53	5024	COM	13h 13m	18° 10'	7.7	GC	
47		M 64	4826	COM	12h 57m	21° 41'	8.5	SG	Black eye galaxy
48		M 3	5272	CVN	13h 42m	28° 23'	6.4	GC	
49		M 98	4192	COM	12h 14m	14° 54'	10.1	SG	
50		M 85	4382	COM	12h 25m	18° 11'	9.2	EG	
51		M 99	4254	COM	12h 19m	14° 25'	9.8	SG	Pin Wheel nebula
52		M 100	4321	COM	12h 23m	15° 49'	9.4	SG	
53		M 84	4374	VIR	12h 25m	12° 53'	9.3	EG	
54		M 86	4406	VIR	12h 26m	12° 57'	9.2	EG	
55		M 87	4486	VIR	12h 31m	12° 24'	8.6	EG	
56		M 89	4552	VIR	12h 36m	12° 33'	9.8	EG	
57		M 90	4569	VIR	12h 37m	13° 10'	9.5	SG	
58		M 88	4501	COM	12h 32m	14° 25'	9.5	SG	
59		M 91	4548	COM	12h 35m	14° 30'	10.2	SG	
60		M 58	4579	VIR	12h 38m	11° 49'	9.8	SG	
61		M 59	4621	VIR	12h 42m	11° 39'	9.8	EG	
62		M 60	4649	VIR	12h 44m	11° 33'	8.8	EG	
63		M 49	4472	VIR	12h 30m	8° 0'	8.4	EG	
64		M 61	4303	VIR	12h 22m	4° 28'	9.7	SG	
65		M 104	4594	VIR	12h 40m	-11° 37'	8.3	SG	Sombrero galaxy
66		M 68	4590	HYA	12h 40m	-26° 45'	8.2	GC	
67		M 83	5236	HYA	13h 38m	-29° 52'	7.6	SG	Southern Pinwheel
68		M 5	5904	SER	15h 18m	2° 5'	5.8	GC	
69		M 13	6205	HER	16h 42m	36° 28'	5.9	GC	Hercules Cluster
70		M 92	6341	HER	17h 17m	43° 8'	6.5	GC	
71		M 57	6720	LYR	18h 54m	33° 2'	9.0	PN	Ring nebula
72		M 56	6779	LYR	19h 17m	30° 11'	8.2	GC	
73		M 29	6913	CYG	20h 23m	38° 32'	6.6	OC	
74		M 39	7092	CYG	21h 32m	48° 26'	4.6	OC	
75		M 27	6853	VUL	20h 00m	22° 43'	8.1	PN	Dumbbell nebula
76		M 71	6838	SGE	19h 54m	18° 47'	8.3	GC	
77		M 107	6171	OPH	16h 33m	-13° 3'	8.1	GC	
78		M 10	6254	OPH	16h 57m	-4° 6'	6.6	GC	
79		M 12	6218	OPH	16h 47m	-1° 57'	6.6	GC	
80		M 14	6402	OPH	17h 38m	-3° 15'	7.6	GC	
81		M 9	6333	OPH	17h 19m	-18° 31'	7.9	GC	
82		M 4	6121	SCO	16h 23m	-26° 32'	5.9	GC	

Order	Time	M #	NGC	Con	R.A.	Dec	Mag	Type	Comments
83		M 80	6093	SCO	16h 17m	-22° 59'	7.2	GC	
84		M 19	6273	OPH	17h 03m	-26° 16'	7.2	GC	
85		M 62	6266	OPH	17h 01m	-30° 7'	6.6	GC	
86		M 6	6405	SCO	17h 40m	-32° 13'	4.2	OC	Butterfly cluster
87		M 7	6475	SCO	17h 54m	-34° 49'	3.3	OC	Ptolemy's Cluster
88		M 11	6705	SCT	18h 51m	-6° 16'	5.8	OC	Wild Duck cluster
89		M 26	6694	SGR	18h 45m	-9° 24'	8.0	OC	
90		M 16	6611	SER	18h 19m	-13° 47'	6.0	DN	Eagle nebula
91		M 17	6618	SGR	18h 21m	-16° 11'	7.0	DN	Swan nebula
92		M 18	6613	SGR	18h 20m	-17° 8'	6.9	OC	
93		M 24	6603	SGR	18h 16m	-18° 29'	4.5	OC	
94		M 25		SGR	18h 32m	-19° 15'	4.6	OC	
95		M 23	6494	SGR	17h 57m	-19° 1'	5.5	OC	
96		M 21	6531	SGR	18h 05m	-22° 30'	5.9	OC	
97		M 20	6514	SGR	18h 02m	-23° 2'	8.5	DN	Trifid nebula
98		M 8	6523	SGR	18h 03m	-24° 23'	5.8	DN	Lagoon nebula
99		M 28	6626	SGR	18h 25m	-24° 52'	6.9	GC	
100		M 22	6656	SGR	18h 36m	-23° 54'	5.1	GC	
101		M 69	6637	SGR	18h 31m	-32° 21'	7.7	GC	
102		M 70	6681	SGR	18h 43m	-32° 18'	8.1	GC	
103		M 54	6715	SGR	18h 55m	-30° 29'	7.7	GC	
104		M 55	6809	SGR	19h 40m	-30° 58'	7.0	GC	
105		M 75	6864	SGR	20h 06m	-21° 55'	8.6	GC	
106		M 15	7078	PEG	21h 30m	12° 10'	6.4	GC	
107		M 2	7089	AQR	21h 33m	0° -49'	6.5	GC	
108		M 72	6981	AQR	20h 54m	-12° 32'	9.4	GC	
109		M 73	6994	AQR	20h 58m	-12° 38'		ast	
110		M 30	7099	CAP	21h 40m	-23° 11'	7.5	GC	

## 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**  
**P.O. BOX 8545,**  
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Visit the Antelope Valley Astronomy Club website at [www.avastronomyclub.org/](http://www.avastronomyclub.org/)

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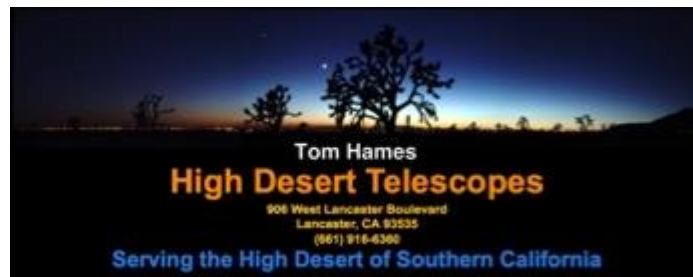


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