ANTELOPE VALLEY ASTRONOMY CLUB, INC.

Desert Sky Observer

Volume 37 *Antelope Valley Astronomy Club Newsletter* **February 2017**

Up-Coming Events

February 4: Prime Desert Woodland Moon Walk
February 10: Club Meeting*
February 18: AV College Science Olympiad
February 25: Dark Sky 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

Hi folks. How's the weather treating you? Has the respite from the cycle of storms given everyone a chance to dry out?

For Rose and I, up here in Tehachapi, it's been a bit of a wild ride. It seems like we've been beating the snowstorms home, but just barely, since the day before Christmas. On Friday January 20 we left Tehachapi, in driving rain, on our rain to a concert in Downey. The rain stopped about the time that we reached Mojave. On the way home, the rain started again just south of Mojave on Highway 14 and it turned to snow shortly after we entered the pass on Highway 58. CalTrans stayed pretty well on top of it with plows and sand but once we got off the highway local streets were scary and slick with ice. Our old four-wheel-drive Ford Expedition has really been getting a workout this season. We're it not for it; our mobility really would have been limited over the last few weeks.

On Saturday January 7, the date of the last Prime Desert Woodland Moonwalk, we were in full flash flood mode here in Tehachapi. It had been raining all day and by the time I was getting ready to load the telescope into the car, the skies had opened up and we had water a few inches deep flowing across our driveway. I told Rose to send Jeremy a message telling him that we weren't going to be able to make it. The walk went on, only without telescopes, and Jeremy tells us that only six members of the public showed up for the event. Jeremy said they were able to see the moon, Venus, Mars, and ONE star but not at the same time.

We had planned on having our January Dark Sky Star Party at Judy Fuentes' house in Antelope Acres but the unpaved roads in the area were still too muddy and we also felt that the ground in her lot might still be too wet and soft. Of course if temperatures had been like they were here, the ground would have been firm from being frozen. Since it's close to town, but far enough away that skies will be reasonably dark, we'll be trying to have some future events there especially in colder months. Matt Leone also intends to lead us in few lunar observing sessions at Judy's as well. Keep an eye out for announcements since we may try to have the February 25 Dark Sky Star Party there.

Weather permitting, our next public outreach event will be the Prime Desert Woodland Moonwalk on Saturday February 4. Let's hope we get a night of clear skies to pull it off.

When I hadn't yet heard from him concerning the LA County Regional Science Olympiad, I contacted Christos Vaiiotis the Department Chair of the Physics Department at Antelope Valley College. He apologized for not having contacted me sooner and said that they definitely want us and, in fact, that they have us listed on the event maps in our "usual location".

The Science Olympiad is scheduled for Saturday February 18 and we usually begin setting up around 7:30 am and start taking the telescopes and displays down at about 3:00 pm when the students all gather for their awards ceremonies. We'll have our display board and at least a couple of hydrogen-alpha solar telescopes as well as some scopes for use with white light filters or to observe some solar system objects while they're up. The moon will be up till 11:10 am, Saturn till 12:37pm and Venus throughout the entirety of the event. We might be able to share Jupiter with early arrivals but it sets a little after 9:00 am. Mercury will also be up but will probably be too close to the sun for safe viewing. We'll be sending out details, including a map, in a subsequent email. This is a great event, one of my favorites of the year, with plenty of eager, young, science oriented minds.

Mark your calendars. We have the Group Campsite at Saddleback Butte State Park reserved for our Messier Marathon and Dark Sky Star Party on Saturday March 25. Some of us will arrive as early as 2:00 pm to setup and we'll have the site till Sunday morning. We realize it's the same weekend as the LA County Air Show at Fox Field but it was one of two weekends that were optimal for a Messier Marathon and the other, April 1, is the date of a Prime Desert Woodland Moonwalk. We'll send out separate emails with details.

I mentioned this at the meeting, but those of you who are "plane crazy" like me might also be interested in knowing that the Kern County Airshow, at the China Lake Naval Weapons Center in Ridgecrest, is scheduled for the preceding week on Saturday March 18 and Sunday March 19. The Blue Angels will be performing and it will be the first air show at the base in 23 years.

Secretary

Rose Moore

Prior to our PDW event this Saturday on February 4th, we are having a Beginner's Class at the SAGE Planetarium starting at 2pm. Jeremy will be conducting the class covering basic astronomy, star party etiquette, our library, and other topics. This class is needed before members can take out library books and telescopes. You do not have to register for the class, but show up at the SAGE at 2pm.

We have a Prime Desert Woodland Moon Walk on Saturday, Feb. 4th at 6:30pm. Members needed with telescopes, weather permitting!

On Saturday February 18th, starting at approximately 8:30 am, is the Antelope Valley College Science Olympiad. We will be set up with solar scopes, a table for handouts, and Frank's information board in our usual spot. We will need members to help at this event. Set up time is 7:30am. Our participation in the event is till 1-2pm. Cars will be permitted in to unload, but not after the start of the event. There is usually plenty of parking in the adjacent parking area. We will have maps and further info at the next club meeting, as well as sending out an email a few days before.

I have sent out an email to members regarding participation in the Poppy Festival. I have not had much of a response, but will wait a few more days before we make a decision to do this event. Let me know if you

are interested. The Poppy Festival is Saturday and Sunday April 22nd and 23rd. We need more than a handful of people to do this event. I'll keep members posted as to our status.

I know it's early in the year, but we will have to plan on where our Christmas Party will be for December. Most decent venues are booked up by the spring. If anyone has suggestions as to where we might look into having the party, please email me your suggestions. The Board will keep everyone posted on any decisions as we start looking for a venue.

Space Place

Comet Campaign: Amateurs Wanted

By Marcus Woo

In a cosmic coincidence, three comets will soon be approaching Earth—and astronomers want you to help study them. This global campaign, which will begin at the end of January when the first comet is bright enough, will enlist amateur astronomers to help researchers continuously monitor how the comets change over time and, ultimately, learn what these ancient ice chunks reveal about the origins of the solar system.

Over the last few years, spacecraft like NASA's Deep Impact/EPOXI or ESA's Rosetta (of which NASA played a part) discovered that comets are more dynamic than anyone realized. The missions found that dust and gas burst from a comet's nucleus every few days or weeks—fleeting phenomena that would have gone unnoticed if it weren't for the constant and nearby observations. But space missions are expensive, so for three upcoming cometary visits, researchers are instead recruiting the combined efforts of telescopes from around the world.

"This is a way that we hope can get the same sorts of observations: by harnessing the power of the masses from various amateurs," says Matthew Knight, an astronomer at the University of Maryland.

By observing the gas and dust in the coma (the comet's atmosphere of gas and dust), and tracking outbursts, amateurs will help professional researchers measure the properties of the comet's nucleus, such as its composition, rotation speed, and how well it holds together.

The observations may also help NASA scout out future destinations. The three targets are so-called Jupiter family comets, with relatively short periods just over five years—and orbits that are accessible to spacecraft. "The better understood a comet is," Knight says, "the better NASA can plan for a mission and figure out what the environment is going to be like, and what specifications the spacecraft will need to ensure that it will be successful."

The first comet to arrive is 41P/Tuttle-Giacobini-Kresak, whose prime window runs from the end of January to the end of July. Comet 45P/Honda-Mrkos-Pajdusakova will be most visible between mid-February and mid-March. The third target, comet 46P/Wirtanen won't arrive until 2018.

Still, the opportunity to observe three relatively bright comets within roughly 18 months is rare. "We're talking 20 or more years since we've had anything remotely resembling this," Knight says. "Telescope technology and our knowledge of comets are just totally different now than the last time any of these were good for observing."

For more information about how to participate in the campaign, visit http://www.psi.edu/41P45P46P.

Want to teach kids about the anatomy of a comet? Go to the NASA Space Place and use Comet on a Stick activity! http://spaceplace.nasa.gov/comet-stick/

News Headlines

Two stars will merge in 2022 and explode into red fury
In 2022, there will be a spectacular sky show. Two stars will merge into one, pushing out excess gas into an explosion known as a red nova. At magnitude 2, it will be as bright as Polaris in the sky, and just behind Sirius and Vega in brightness. The collision in the constellation of Cygnus will be visible for up to six months.
http://www.astronomy.com/news/2017/01/2022-red-nova

Close Views Show Saturn's Rings in Unprecedented Detail
Newly released images showcase the incredible closeness with which NASA's Cassini spacecraft, now in its "Ring-Grazing" orbits phase, is observing Saturn's dazzling rings of icy debris.The views are some of the closest-ever images of the outer parts of the main rings, giving scientists an eagerly awaited opportunity to observe features with names like "straw" and "propellers
https://goo.gl/d3i4On

Did Pluto's Weird Red Spots Result from Crash That Spawned Charon?
Mysterious dark reddish spots along Pluto's equator may be the aftermath of the giant impact that helped form the dwarf planet's largest moon Charon, a new study finds.This finding could also help explain the strangely wide variety of colors seen in distant objects in the solar system's Kuiper belt, researchers say.
https://goo.gl/1O9Nkn

Get Your Iridium Fix Before It's Too Late!
Say it ain't so! The shock and dazzle of Iridium flares will soon be a thing of the past. Here's how to make the most of seeing them before a new generation of spacecraft replaces the Iridium satellites. Sadly, that era will soon draw to a close. On January 14th, SpaceX's Falcon 9 delivered the first 10 of a new generation of Iridium NEXT satellites to low-Earth orbit, starting the process to replace the older units in a maneuver called slot-swapping.
https://goo.gl/cezy19

Astronomers Encourage Cities to Shield Outdoor Lighting
The American Astronomical Society passed a resolution at their annual meeting in Grapevine, Texas this month, "affirming that access to a dark night sky is a universal human right, making quality outdoor lighting a worldwide imperative." The organization also endorsed a set of recommendations for outdoor lighting. In short, "shield the light, dim it, and use redder, warmer colors," said Lori Allen, director of the Kitt Peak National Observatory in Arizona.
https://www.insidescience.org/news/astronomers-encourage-cities-shield-outdoor-lighting

'Earth wind' bathes the Moon with oxygen
A new study from Japanese researchers reveals that for the past 2.4 billion years, the moon has been bathed in a stream of oxygen particles stripped from the Earth's atmosphere. By combining measurements taken with the lunar orbiter Kaguya and studies of lunar rocks, researchers prove that Earth contributes it's own unique whiff of elements to the moon's surface. The findings adds substantial proof to the theory that solar winds can carry particles of terrestrial origins all the way to the lunar surface.
http://www.astronomy.com/news/2017/01/earth-wind-baths-the-moon-in-oxygen

February Sky Data

Best time for deep sky observing this month:
February 15 through February 28

Mercury, lies low in the southeast just before dawn down to the lower left of Saturn. It brightens from -0.2 to -1.2 during the month. It will be best seen around mid-month but no details would be expected to be seen on its disk which spans around 5 arc seconds across.

Venus is dominating the western sky this month shining virtually at its brightest with a magnitude -4.8. On the 4th of February it reaches its highest elevation of 33 degrees at sunset. Its angular size increases from 31 to 46 arc seconds during the month but at the same time the phase reduces from 40% to 18% illuminated.

Mars is easy to find this month lying in Pisces up and to the left of Venus. They are closest on February 1st with a separation of 5.4 degrees. By month's end, as Mars continues to move eastwards and Venus begins to fall back towards the western horizon, their separation increases to just over 12 degrees. Its brightness falls slightly from magnitude +1.1 to +1.3 while its angular diameter falls from 5.1 to 4.6 arc seconds.

Jupiter lies in Virgo some 3 and a half degrees above its brightest star, Spica. It will be due south at an elevation of 34 degrees at ~04:30 at the start and at ~02:30 by the end of February. The size of Jupiter's disk increases slightly from 39 to 42 arc seconds as February progresses with its magnitude increasing very slightly from -2.2 to -2.4.

Saturn is now a morning object, rising in the south-east at ~03:30 as the month begin but by about 02:00 at its end. Its diameter increases from 15.6 to 16.1 arc seconds during the month as it shines at magnitude +0.6. Towards the end of the month 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 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
2/1/2017	09:47	22:25	06:49	17:21
2/5/2017	12:33	01:40	06:46	17:25
2/10/2017	17:31	06:22	06:41	17:30
2/15/2017	22:23	09:25	06:36	17:35
2/20/2017	01:57	12:31	06:31	17:40
2/25/2017	05:50	17:05	06:25	17:44
2/28/2017	07:46	20:16	06:21	17:47

Planet Data

Feb 1

	Rise	Transit	Set	Mag
Mercury	05:36	10:40	15:41	-0.2
Venus	08:41	14:54	21:05	-4.6
Mars	09:03	15:15	21:26	1.1
Jupiter	22:42	04:27	10:13	-2.2
Saturn	03:33	08:36	13:43	0.6

Feb 15

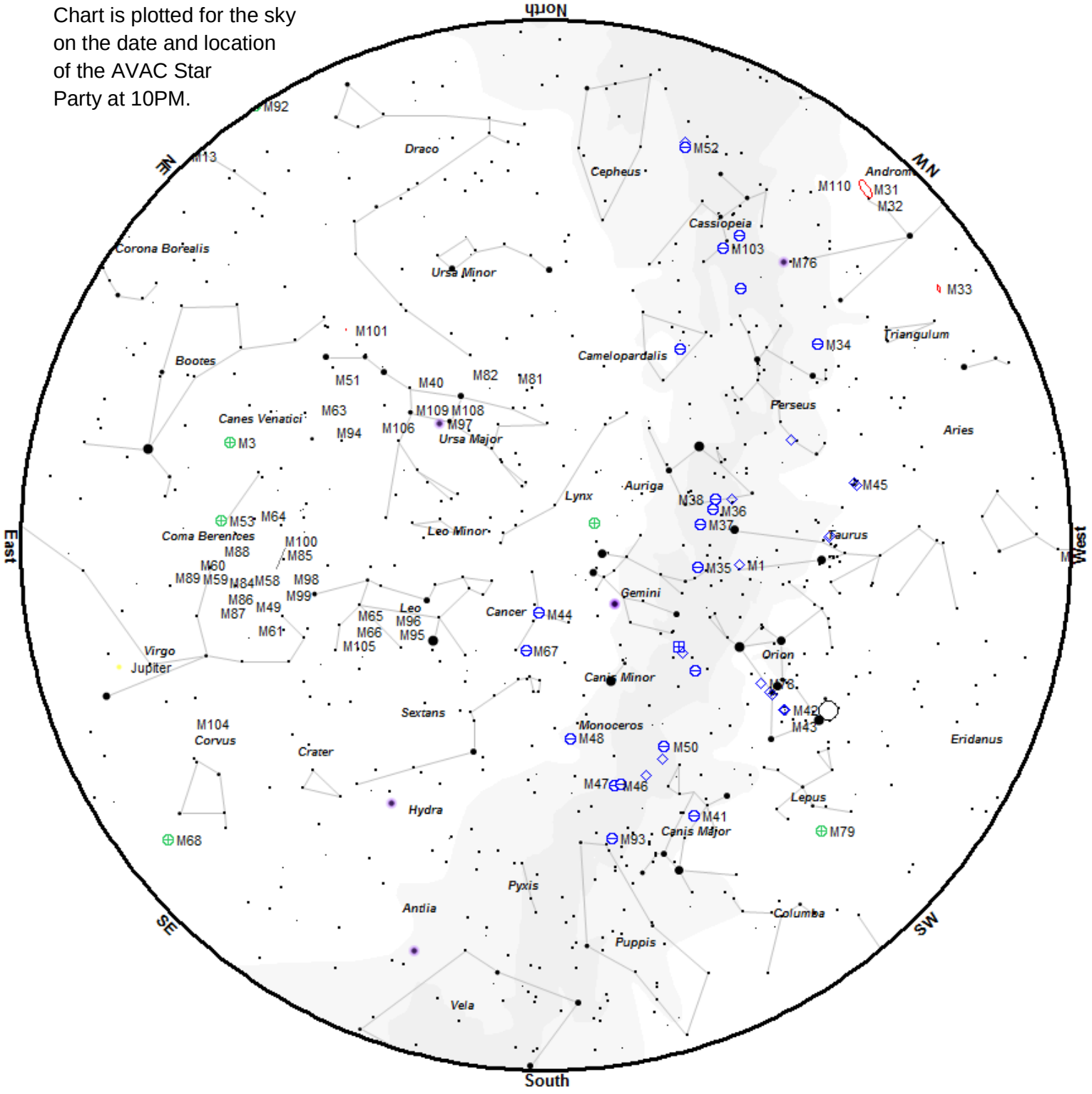
	Rise	Transit	Set	Mag
Mercury	05:58	11:14	16:26	-0.5
Venus	08:01	14:31	20:58	-4.6
Mars	08:34	14:58	21:21	1.2
Jupiter	21:46	03:32	09:18	-2.3
Saturn	02:43	07:46	12:53	0.6

Feb 31

	Rise	Transit	Set	Mag
Mercury	06:12	11:50	17:24	-1.2
Venus	07:11	13:53	20:31	-4.6
Mars	08:07	14:42	21:16	1.3
Jupiter	20:52	02:38	08:25	-2.4
Saturn	01:56	06:59	12:05	0.5

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.



Star Magnitudes						Galaxy	Nebula
0	1	2	3	4	5	Open Cluster	Bright Nebula
						Globular Cluster	Planetary Nebula
						Cluster+Nebulosity	

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	Con	RA 2000	Dec 2000	Mag	Begin	Best	End	Difficulty
M 52	Open	Cas	23h24m48.0s	+61°35'36"	8.2	18:58	19:11	19:49	detectable
M 110	Gal	And	00h40m22.3s	+41°41'09"	8.9	18:57	19:11	19:23	detectable
M 32	Gal	And	00h42m41.8s	+40°51'58"	8.9	18:55	19:11	19:25	easy
NGC 7789	Open	Cas	23h57m24.0s	+56°42'30"	7.5	18:59	19:11	19:14	detectable
M 31	Gal	And	00h42m44.3s	+41°16'07"	4.3	18:53	19:11	19:25	easy
M 77	Gal	Cet	02h42m40.8s	-00°00'48"	9.7	18:55	19:11	19:40	detectable
NGC 7790	Open	Cas	23h58m24.0s	+61°12'30"	7.2	18:50	19:12	19:26	easy
NGC 1851	Glob	Col	05h14m06.0s	-40°02'48"	7.1	18:54	19:12	19:59	difficult
M 33	Gal	Tri	01h33m50.9s	+30°39'36"	6.4	18:56	19:12	19:53	detectable
NGC 457	Open	Cas	01h19m35.0s	+58°17'12"	5.1	18:52	19:13	20:41	obvious
M 76	PNe	Per	01h42m19.9s	+51°34'31"	10.1	18:56	19:13	20:37	detectable
NGC 752	Open	And	01h57m41.0s	+37°47'06"	6.6	18:52	19:13	20:33	challenging
M 103	Open	Cas	01h33m23.0s	+60°39'00"	6.9	18:49	19:14	21:00	obvious
NGC 559	Open	Cas	01h29m31.0s	+63°18'24"	7.4	18:51	19:14	21:04	easy
NGC 637	Open	Cas	01h43m04.0s	+64°02'24"	7.3	18:48	19:15	21:19	obvious
NGC 663	Open	Cas	01h46m09.0s	+61°14'06"	6.4	18:51	19:15	21:14	easy
NGC 957	Open	Per	02h33m21.0s	+57°33'36"	7.2	18:52	19:16	21:52	easy
NGC 884	Open	Per	02h22m18.0s	+57°08'12"	4.4	18:48	19:16	21:39	obvious
NGC 869	Open	Per	02h19m00.0s	+57°07'42"	4.3	18:48	19:16	21:37	obvious
M 34	Open	Per	02h42m05.0s	+42°45'42"	5.8	18:54	19:16	21:11	easy
NGC 1342	Open	Per	03h31m38.0s	+37°22'36"	7.2	18:54	19:16	21:35	detectable
NGC 1027	Open	Cas	02h42m40.0s	+61°35'42"	7.4	18:55	19:17	21:31	detectable
Heart Neb	Neb	Cas	02h33m52.0s	+61°26'50"	6.5	19:01	19:17	20:16	challenging
NGC 1245	Open	Per	03h14m42.0s	+47°14'12"	7.7	19:03	19:17	20:04	challenging
M 45	Open	Tau	03h47m00.0s	+24°07'00"	1.5	18:49	19:17	21:51	obvious
NGC 1444	Open	Per	03h49m25.0s	+52°39'30"	6.4	18:46	19:17	22:56	obvious
Hyades	Open	Tau	04h26m54.0s	+15°52'00"	0.8	18:50	19:18	22:09	obvious
NGC 1502	Open	Cam	04h07m50.0s	+62°19'54"	4.1	18:44	19:19	23:39	obvious
NGC 1528	Open	Per	04h15m23.0s	+51°12'54"	6.4	18:52	19:19	23:01	easy
NGC 1647	Open	Tau	04h45m55.0s	+19°06'54"	6.2	18:55	19:19	21:40	detectable
NGC 1664	Open	Aur	04h51m06.0s	+43°40'30"	7.2	18:51	19:20	23:21	easy
NGC 1746	Open	Tau	05h03m50.0s	+23°46'12"	6.1	18:55	19:20	22:04	detectable
M 43	Neb	Ori	05h35m30.0s	-05°16'00"	9.0	18:58	19:23	21:14	difficult
M 42	Neb	Ori	05h35m18.0s	-05°23'00"	4.0	18:52	19:23	22:13	easy
M 38	Open	Aur	05h28m40.0s	+35°50'54"	6.8	18:51	19:23	23:13	detectable
M 1	Neb	Tau	05h34m30.0s	+22°01'00"	8.4	18:58	19:23	21:47	difficult
M 36	Open	Aur	05h36m18.0s	+34°08'24"	6.5	18:49	19:25	23:58	easy
M 78	Neb	Ori	05h46m48.0s	+00°05'00"	8.0	18:59	19:26	21:27	difficult

ID	Cls	Con	RA 2000	Dec 2000	Mag	Begin	Best	End	Difficulty
M 37	Open	Aur	05h52m18.0s	+32°33'12"	6.2	18:50	19:30	00:03	easy
NGC 2129	Open	Gem	06h01m07.0s	+23°19'20"	7.0	18:46	19:32	00:03	obvious
NGC 2169	Open	Ori	06h08m24.0s	+13°57'54"	7.0	18:47	19:37	23:47	obvious
M 35	Open	Gem	06h09m00.0s	+24°21'00"	5.6	18:50	19:38	23:58	easy
NGC 2175	Open	Ori	06h09m39.0s	+20°29'12"	6.8	18:53	19:39	23:21	detectable
NGC 2237	Neb	Mon	06h32m02.0s	+04°59'10"	5.5	19:02	19:59	22:00	challenging
NGC 2264	Open	Mon	06h40m58.0s	+09°53'42"	4.1	18:49	20:08	00:09	easy
M 41	Open	CMa	06h46m01.0s	-20°45'24"	5.0	18:53	20:13	21:51	easy
NGC 2301	Open	Mon	06h51m45.0s	+00°27'36"	6.3	18:50	20:19	23:52	easy
M 50	Open	Mon	07h02m42.0s	-08°23'00"	7.2	18:53	20:30	23:27	detectable
NGC 2353	Open	Mon	07h14m30.0s	-10°16'00"	5.2	18:50	20:42	23:30	easy
NGC 2355	Open	Gem	07h16m59.0s	+13°45'00"	9.7	18:58	20:44	23:30	difficult
NGC 2360	Open	CMa	07h17m43.0s	-15°38'30"	9.1	19:17	20:44	22:13	challenging
NGC 2392	PNe	Gem	07h29m10.8s	+20°54'42"	8.6	18:46	20:57	01:26	obvious
NGC 2423	Open	Pup	07h37m06.0s	-13°52'18"	7.0	18:54	21:04	23:33	easy
M 47	Open	Pup	07h36m35.0s	-14°29'00"	4.3	18:50	21:04	23:30	obvious
NGC 2439	Open	Pup	07h40m45.0s	-31°41'36"	7.1	19:03	21:08	23:18	detectable
M 46	Open	Pup	07h41m46.0s	-14°48'36"	6.6	18:57	21:09	23:33	detectable
NGC 2440	PNe	Pup	07h41m55.4s	-18°12'31"	11.5	19:10	21:09	23:08	detectable
M 93	Open	Pup	07h44m30.0s	-23°51'24"	6.5	20:14	21:11	22:09	easy
NGC 2451	Open	Pup	07h45m23.0s	-37°57'21"	3.7	19:17	21:12	23:07	easy
NGC 2477	Open	Pup	07h52m10.0s	-38°31'48"	5.7	19:29	21:19	23:09	easy
NGC 2506	Open	Mon	08h00m01.0s	-10°46'12"	8.9	19:30	21:27	23:26	difficult
NGC 2547	Open	Vel	08h10m09.0s	-49°12'54"	5.0	21:06	21:37	22:08	challenging
NGC 2546	Open	Pup	08h12m15.0s	-37°35'42"	5.2	20:27	21:39	22:52	difficult
NGC 2571	Open	Pup	08h18m56.0s	-29°45'00"	7.4	19:30	21:46	00:02	detectable
M 44	Open	Cnc	08h40m24.0s	+19°40'00"	3.9	18:55	22:08	02:10	easy
IC 2395	Open	Vel	08h42m30.0s	-48°06'48"	4.6	21:16	22:09	23:03	detectable
M 67	Open	Cnc	08h51m18.0s	+11°48'00"	7.4	19:21	22:18	01:17	detectable
M 82	Gal	UMa	09h55m52.4s	+69°40'47"	9.0	18:56	23:23	05:06	detectable
M 81	Gal	UMa	09h55m33.1s	+69°03'56"	7.8	18:56	23:23	05:00	detectable
NGC 3132	PNe	Vel	10h07m01.8s	-40°26'11"	8.2	21:45	23:33	01:21	easy
NGC 3132	PNe	Vel	10h07m01.8s	-40°26'11"	8.2	21:45	23:33	01:21	easy
NGC 3228	Open	Vel	10h21m22.0s	-51°43'42"	6.4	23:26	23:48	00:09	challenging
NGC 3227	Gal	Leo	10h23m30.6s	+19°51'54"	11.5	20:42	23:51	02:59	difficult
NGC 3242	PNe	Hya	10h24m46.1s	-18°38'32"	8.6	21:56	23:51	01:47	obvious
M 97	PNe	UMa	11h14m47.7s	+55°01'09"	9.7	20:14	00:41	05:01	detectable
M 65	Gal	Leo	11h18m55.7s	+13°05'32"	10.1	21:18	00:46	04:13	detectable
M 66	Gal	Leo	11h20m14.9s	+12°59'30"	9.7	21:19	00:47	04:14	detectable
M 106	Gal	CVn	12h18m57.6s	+47°18'13"	9.1	21:40	01:45	05:08	detectable
Col 256	Open	Com	12h25m06.0s	+26°06'00"	2.9	21:37	01:51	05:13	easy
M 84	Gal	Vir	12h25m03.9s	+12°53'12"	10.1	22:34	01:52	05:02	detectable
M 86	Gal	Vir	12h26m12.2s	+12°56'44"	9.8	22:50	01:52	04:53	detectable
3C 273.0	QSO	Vir	12h29m06.7s	+02°03'08"	12.8	22:26	01:55	05:11	difficult
3C 273.0	QSO	Vir	12h29m06.7s	+02°03'08"	12.8	22:26	01:55	05:11	difficult

ID	Cls	Con	RA 2000	Dec 2000	Mag	Begin	Best	End	Difficulty
M 49	Gal	Vir	12h29m46.8s	+08°00'01"	9.3	22:40	01:56	05:04	detectable
M 87	Gal	Vir	12h30m49.2s	+12°23'29"	9.6	22:38	01:58	05:04	detectable
NGC 4565	Gal	Com	12h36m20.8s	+25°59'15"	10.1	22:45	02:03	05:05	difficult
M 104	Gal	Vir	12h39m59.3s	-11°37'22"	9.1	23:26	02:06	04:47	detectable
M 94	Gal	CVn	12h50m53.1s	+41°07'12"	8.7	21:50	02:17	05:14	detectable
M 64	Gal	Com	12h56m43.8s	+21°41'00"	9.3	22:37	02:23	05:13	detectable
M 51	Gal	CVn	13h29m52.3s	+47°11'40"	8.7	22:12	02:56	05:15	easy
NGC 5195	Gal	CVn	13h29m59.6s	+47°15'58"	10.5	22:51	02:56	05:12	detectable
M 3	Glob	CVn	13h42m11.0s	+28°22'42"	6.3	22:59	03:08	05:16	easy
M 101	Gal	UMa	14h03m12.4s	+54°20'53"	8.4	23:20	03:29	05:13	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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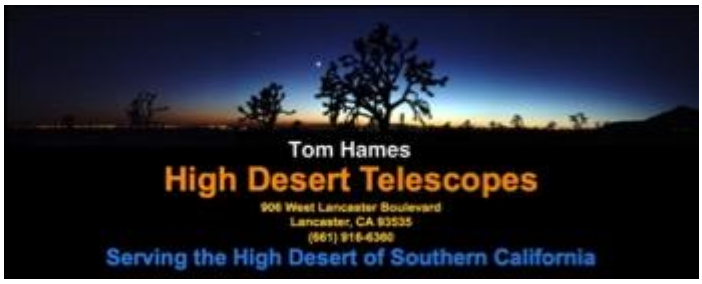

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