ANTELOPE VALLEY ASTRONOMY CLUB, INC.

Desert Sky Observer

Volume 29 *Antelope Valley Astronomy Club Newsletter* **August 2009**

Up-Coming Events

August 14: Club Meeting*
August 16: Lunar Club meeting @ Pedroza Flats
August 17: Board Meeting @ Don's house
August 22: Club Picnic and Star Party @ Mt. Trotta
August 29: Lunar Club meeting @ Don's house

* 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

Don Bryden

Forty years ago tonight I was eight years old and sitting in our living room in Huntington Beach. Walter Cronkite laughed with relief as Neil Armstrong announced, "Houston, Tranquility Base here, the Eagle has landed."

My dad kept us up to watch the first EVA on the moon. It was only like 7 or 8pm on the West coast, it seemed later. Dad took Polaroids of the TV and they actually came out quite well. Buzz Aldrin described the moon, "Beautiful, beautiful. Magnificent desolation." One of these days we'll return.

If you want to get a nice look at the moon, come join us at Pedroza Flats, August 16th, 3am for another edition of our Lunar Club. If you're more of a late night observer then I hope to see you at the star party at Mt. Trotta after the club picnic! In September we have our Mt. Wilson trip but since it is limited to just 25 members we are planning on having a star party the weekend before as well. Location is TBA and we are considering Mt. Pinos, Red Rock or Devil's Punchbowl. This last weekend was another fantastic night on Mt. Pinos. I think Karole counted something like 22 AVAC members using nearly 30 different scopes!

In the coming months you will be receiving information about proposed amendments to the club's By-laws and ops manual. You also will get information about our club's annual business meeting in October where we will elect a new board for 2010. Please consider nominating someone in the coming months or even tossing your own hat into the ring. You'll be hard pressed to find a better group of people to work with and you'll gain a greater appreciation of your club and your hobby (plus the president brings cookies to the board meetings!)

One of our newest members was working on her Messier list up at Mt. Pinos while her five year old daughter slept next to her in a little chair. As her daughter grows up I believe she'll witness a return to the moon and possibly even missions to Phobos or Mars – I wonder what she'll remember forty years from now.

And that's the way it is. – Walter Cronkite, 1916 – 2009

Don Bryden

Vice President

Rose Moore

Special thanks to Chris Butler for July's meeting presentation 'Under the Southern Stars'!! It was a wonderful presentation and we look forward to having Chris back sometime next year!

For those of us who were fortunate enough to get up to Mt. Pinos the weekend of July 17-19, we had a great time! We counted 23 club members and 16 telescopes out for this weekend! WOW! Great skies, and yes, no cold weather!

Our club picnic is fast approaching, so please contact me or other Board members for any donations for the raffle or silent auction. We still have numerous picnic items not signed up for, so contact one of us if you will be bringing any food items or other items. Several Board members will be calling club members by phone in the next couple of weeks to discuss the club picnic. The picnic will be on Saturday August 22, at 3:00 pm, at Steve Trotta's home. Check the website for directions.

Coming up for our August club meeting will possibly be one of the Planetarium shows with Jeremy. Please check our website for a listing of a definite program. September is Doug Drake's Cosmology talk, October is our business meeting, and November is Jeremy and Matt's presentation on Messier objects. December of course will be no meeting, but we'll be having our Christmas Party!

Speaking of our business meeting, it's not too early to start thinking of who you, as a club member, would like to see in one of our board positions. Please think about who you would like to see help keep our club organized and active in our community!

Rose

Director of Community Development

Karole Barker

The turnout for Prime Desert Woodlands on June 27th was great. We had 157 people show up for the event, in addition to 11 club members. The next two Prime Desert Woodlands will be held on July 25th @ 8:30 p.m. & August 29th @ 8:00 p.m. along with the Lunar Club that night. We still need volunteers to bring out scopes those nights. Please let me know if you can make it.

Mt. Wilson is on Saturday September 19th. We have 25 people going, so the cost will be $36.00 per person. Right now the signup sheet is closed. Funds are due 4 weeks before the event, so for those club members who have signed up, please get your payment in. Please make checks payable to the AVAC and either pay myself or Tom Koonce.

On July 1 was the CAP "Civil Air Patrol" star party on Edwards Air Force Base. This is the second year our club has been invited to do a private star party for the cadets. We had a great turn out with 25 cadets with 7 adults. In addition, we had 7 club members that attended. The kids had a great time.

The Lunar club with Matt Leone will be on August 13, 2009 Sunday morning at 3:00 a.m. at Pedroza Flats.

Karole

Extraterrestrial Tidbits by Jeff Riechmann

As I sit here at my computer late into the evening on the 4th of July, it is impossible to get any sleep with all of the bottle rockets that are being deployed, I assume in response to the North Koreans launching of several missiles this week. As I watched a few of these bottle rockets arch skyward, I was reminded of the first astronaut, Wan Hu.

Wan Hu was a stargazer, with the dream of traveling to the stars, who lived during the 16th century. He was a minor Chinese official in the Ming-Dynasty. As the legend goes, Wan Hu supposedly strapped two kites and 47 fire-arrow rockets to a chair. He put on his best clothes and then climbed into the soon-to-be hot seat. At the predetermined signal, forty-seven servants lit the fuses on the rockets and then ran for cover. This was soon followed by a large explosion. When the smoke cleared, Wan Hu and the chair were gone, never to be seen again. Some versions of the legend claim he was burned to death which is quite possible given the propensity for fire-arrows to blow up. Personally, I believe he may actually be Earth's second satellite. (I wonder if he is being tracked by NORAD?) For his exploits, Wan Hoo crater on the Moon is named in his honor.

Space Place - SARSAT to the Rescue

If a plane crashes in the woods and nobody hears it, does it make a sound?

Never mind contemplating this scenario as a philosophical riddle. This can be a real life or death question. And the answer most of the time is that, even if no people are nearby, something is indeed listening high above.

That something is a network of satellites orbiting about 450 miles overhead. The "sound" they hear isn't the crash itself, but a distress signal from a radio beacon carried by many modern ships, aircraft, and even individual people venturing into remote wildernesses.

In the last 25 years, more than 25,000 lives have been saved using the satellite response system called Search and Rescue Satellite-aided Tracking (SARSAT). So what are these life-saving superhero satellites?

Why they are mild-mannered weather satellites.

"These satellites do double duty," says Mickey Fitzmaurice, a National Oceanic and Atmospheric Administration (NOAA) systems engineer for SARSAT. "Their primary purpose is to gather continuous weather data, of course. But while they're up there, they might as well be listening for distress signals too."

In February, NASA launched the newest of these Polar-orbiting Operational Environmental Satellites (or POES) into orbit. This new satellite, called N-Prime at launch and now dubbed NOAA-19, prevents a gap in this satellite network as another, aging NOAA satellite reached the end of its operational life.

"The launch of N-Prime was a big deal for us," Fitzmaurice says. With N-Prime/NOAA-19 in place, there are now six satellites in this network. Amongst them, they pass over every place on Earth, on average, about once an hour.

To pinpoint the location of an injured explorer, a sinking ship, or a downed plane, POES use the same Doppler effect that causes a car horn to sound higher-pitched when the car is moving toward you than it sounds after it passes by.

In a similar way, POES "hear" a higher frequency when they're moving toward the source of the distress signal, and a lower frequency when they've already passed overhead. It takes only three distress-signal bursts — each about 50 seconds apart — to determine the source's location.

Complementing the POES are the Geostationary Operational Environmental Satellites (GOES), which, besides providing weather data, continuously monitor the Western Hemisphere for distress signals. Since their geostationary orbit leaves them motionless with respect to Earth below, there is no Doppler effect to pinpoint location. However, they do provide near instantaneous notification of distress signals.

In the future, the network will be expanded by putting receivers on new Global Positioning System (GPS) satellites, Fitzmaurice says. "We want to be able to locate you after just one burst." With GPS, GOES will also be able to provide the location of the transmitter.

Philosophers beware: SARSAT is making "silent crashes" a thing of the past.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

Moments Remembered by Tom Koonce

June 20, 1994: My Uncle generously decided to pass along his 8 inch Schmidt-Cassegrain telescope to me and make the switch to binoculars that better fit his astronomical observing habits. That gift was what launched me into "serious" amateur astronomy…but that's not why I remember the date so well.

Saturday night, March 23, 1996: My wife and I drove 25 miles north on I-35 out of Fort Worth to a dark, quiet country lane with open fields on either side of us. Surprisingly there were at least a hundred other cars already parked along the sides of the road with people getting ready to do exactly what we were going to do …but that's not why I remember the date so well.

"Rocks and Ice in the Solar System" have made an indelible mark on mankind and probably on each of you too. Our recorded history is full of dramatic references to cometary visitors and falling stars. Many of history's events have been influenced by the superstitious belief that comets were harbingers of great success or of doom. Many of us have read of Augustus Caesar ascending to Emperor of Rome as a comet hung in the sky. It was common for royal births and deaths that occurred during comet apparitions to be recorded as being related directly with the comet. As William Shakespeare said, "When beggars die there are no comets seen; the heavens themselves blaze forth the death of princes."

Comet Hyukatake (Credit: Amador Astronomical Society)

If you've seen a comet and its tail, even if faintly through a telescope, you know how dramatic they appear. The brightest, most easily visible comets are called "Great Comets." These can be seen by the naked eye by multitudes of people across the Earth while the wisps of their icy tails are blown back by the solar wind. As they

stretch across the sky, they are so extraordinary that they are easily remembered for the rest of a person's life. It seems natural that they have figured so prominently throughout history; indeed it would seem more remarkable if they had not!

The Saturday night of March 23, 1996, is fixed firmly in my memory as the night we spent watching Comet Hyukutake stretching gracefully across the northern sky. It was awe inspiring. Even though there were several hundred people on that dark road that night, only hushed voices were heard. We were casually sitting on the hoods of our cars and in lawn chairs, but everyone knew that we were witness to a very special celestial event, and there was a certain reverence to the moment. Later, a police car came around a bend of the road and his headlights shone upon all of the cars and the people looking up at the sky. He came to a sudden stop and the officer just sat in his car for a few minutes looking at us. He must have been quite startled by the scene. I'll never forget what happened next. He got out of his car, looked around slowly at us, started to say something, but stopped… and then he looked up. He just stood there looking for a minute then walked back to his car, turned off the headlights and shut off the car. He came back over without saying a word and watched The Great Comet of 1996 with us for a half hour or so. As I said, there was a certain reverence to the moment.

Our solar system has countless asteroids, and distant rocky Kuiper Belt Objects. Our Earth is struck many times each minute by particles of rice grain-sized rock. 40,000 kg of material falls daily on Earth, most of it in the form of micrometeorites that hit the upper atmosphere, and then fall to Earth. We know that these rocks from space come in many different sizes and some are even left over debris from cometary tails. I have seen great displays of meteoritic activity. Several years ago (November, 2002) a fellow amateur astronomer and I witnessed a stunning (but sadly, too short) five minute burst of Leonid meteors with an equivalent rate of over 700 per hour from a dark sky site. I'm sure we will always remember that portion of the evening and that we were the only two observers left when the meteor shower peak finally came.

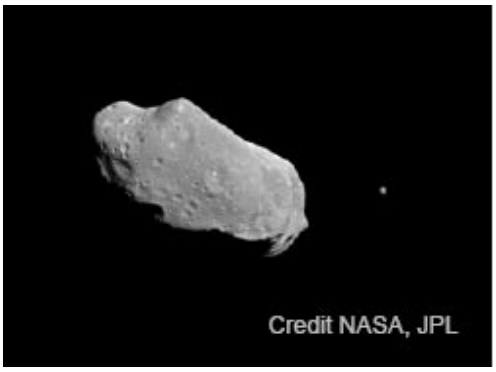
Occasionally the Earth gets hit by rocks and ice that are truly impressive. The Tunguska Event in 1909 was very likely caused by a collision of rock or ice with the Earth. Several mass extinctions of life on the planet have been attributed to collisions at a much larger scale; for instance the demise of the dinosaurs 65 million years ago may have been from an asteroid approximately 4 to 9 miles across. But these events seem to lack the real-world immediacy which resulted from a chain of events that started at Mount Palomar on the night of March 24, 1993. That night, a photograph taken by Carolyn and Eugene Shoemaker and David Levy revealed a comet which now bears their names. It was soon determined that their comet was headed towards Jupiter on a collision course and it was breaking up into a "string of pearls"; a long line of cometary fragments that would hit Jupiter like slow-motion bombardment. If we fast forward fifteen months - I received the C-8 from my Uncle on June 20, and was learning how to use it efficiently. Exactly a month later, on July 20, 1994, I vividly remember looking through the telescope with several other amateurs as we watched the face of Jupiter turn slowly towards us to reveal the scars of massive cometary collisions the size of the entire Earth. There were a few brief cries of astonishment that the impact was so visible followed by stunned silence as we contemplated the energies involved in collisions that could have wiped the Earth clean of life. There was a certain reverence to the moment. Astronomy offers unforgettable moments like those to us.

Photos Courtesy of NASA

We do not remember days; we remember moments. ~Cesare Pavese

International Year of Astronomy

Rocks and Ice in the Solar System



Our Solar System consists of the Sun, planets, and moons, but it also contains a multitude of smaller chunks of rock and ice. These objects were left over from the time when our Sun and Solar System formed.

So where are all of these small neighbors? Millions of rocky chunks called asteroids orbit in a region between the four rocky inner planets and the four outer gas giant planets. The Dawn mission is currently on its way to investigate Ceres and Vesta, two of the largest asteroids. Beyond Neptune, there is another swarm of objects made mostly of ice and dust. This is the disc-shaped region known as the Kuiper Belt, the origin of many comets. Some comets originate even farther out, from a giant shell of objects near the edge of the Solar System known as the Oort cloud.


Credit NASA, GSFC

In Galileo's time, comets were the topic of hot debate. It was unclear whether they occurred in Earth's atmosphere (between us and the Moon) or out in the realm of the planets or stars. Today, we understand that icy chunks from the Kuiper Belt occasionally get knocked out of their orbits by passing stars or gravity changes in the Milky Way. When their new trajectories take them near the Sun and they heat up, we see the ice begin to sublimate (turn directly from a solid to a gas) and that gives them their bright head and long tail.

As the ice disappears, some of the rocks and dust trapped in the comet crumble off, leaving a trail of small particles. When the Earth is lucky enough to pass through one of these trails, we get a beautiful meteor shower! What some people call "shooting stars" are actually just pieces of asteroids or comets — most are smaller than golf balls — falling into Earth's atmosphere, burning up and making a bright streak across the sky. Occasionally, meteorites even come to Earth from other planets such as Mars. You don't need a telescope to view meteors; just watching the dark sky is the best way to see them. This month, keep an eye out for the Perseid Meteor shower made by Comet Swift-Tuttle. It will peak early in the morning on August 12th.

Scientists at NASA are studying these small objects throughout our Solar System. NASA's Astromaterials Curation Office houses and analyzes meteorites and samples returned from space missions. In 2005, the spacecraft Deep Impact sent an impactor into the nucleus of comet Tempel 1 and collected data about some of the ejected core material. The Hubble Space Telescope captured some wonderful images of a string of comet pieces hitting Jupiter in 1994. NASA's Stardust mission even collected cometary particles and returned a sample to Earth. NASA studies comets because they may yield important clues about the formation of the Solar System. You can find out what they are made of by cooking up a comet in the attached activity!

Learn more about Rocks and Ice in the Solar System from NASA

News Headlines

Jupiter Apparently Smacked by Rogue Object, New Images Reveal
Jupiter has apparently been smacked again by a rogue object hurtling through space, new images from amateur astronomers and NASA reveal.
http://www.space.com/scienceastronomy/090720-jupiter-new-impact.html

Spitzer Images Out-Of-This-World Galaxy
NASA's Spitzer Space Telescope has imaged a wild creature of the dark - a coiled galaxy with an eye-like object at its center. The galaxy, called NGC 1097, is located 50 million light-years away. It is spiral-shaped like our Milky Way, with long, spindly arms of stars.
http://www.spacedaily.com/reports/Spitzer_Images_Out_Of_This_World_Galaxy_999.html

Thirty Meter Telescope Selects Mauna Kea
After careful evaluation and comparison between two outstanding candidate sites—Mauna Kea in Hawai‘i and Cerro Armazones in Chile—the board of directors of the TMT Observatory Corporation has selected Mauna Kea as the preferred site for the Thirty Meter Telescope. The TMT will be the most capable and advanced telescope ever constructed.
http://www.tmt.org/news/site-selection.htm

A Fireworks Display in the Helix Nebula
The Helix Nebula, NGC 7293, is not only one of the most interesting and beautiful planetary nebulae; it is also one of the closest nebulae to Earth, at a distance of only 710 light years (219 pc) away. A new image, taken with an infrared camera on the Subaru Telescope in Hawaii, shows tens of thousands of previously unseen comet-shaped knots inside the nebula.
http://www.spaceref.com/news/viewpr.html?pid=28638

Largest Ever Survey Of Very Distant Galaxy Clusters Completed
An international team of researchers led by a UC Riverside astronomer has completed the largest ever survey designed to find very distant clusters of galaxies.
http://www.sciencedaily.com/releases/2009/06/090630173817.htm

Giant Soap Bubble In Space
What looks like a giant soap bubble or even perhaps just a water drop on a camera lens is actually a newly discovered planetary nebula. Dave Jurasevich of the Mount Wilson Observatory in California spotted the "Cygnus Bubble" while recording images of the region in July 2008. A few days later, amateur astronomers Mel Helm and Keith Quattrocchi also found it.
http://www.universetoday.com/2009/07/24/giant-soap-bubble-in-space/

Herschel images promise bright future
Herschel has carried out the first test observations with all its instruments, with spectacular results. Galaxies, star-forming regions and dying stars comprised the telescope’s first targets. The instruments provided spectacular data on their first attempt, finding water and carbon and revealing dozens of distant galaxies.
http://www.esa.int/esaCP/SEMAYT6CTWF_index_0.html

Astro Quiz

1. As seen from your current location, when will an upright flagpole cast no shadow because the Sun is directly above the flagpole?
A. Every day at noon.
B. Only on the first day of summer.
C. Only on the first day of winter.
D. On both the first days of spring and fall.
E. Never from your current location.

2. When the Moon appears to completely cover the Sun (an eclipse), the Moon must be at which phase?
A. Full
B. New
C. First quarter
D. Last quarter
E. At no particular phase

3. Imagine that you are building a scale model of the Earth and the Moon. You are going to use a 12-inch basketball to represent the Earth and a 3-inch tennis ball to represent the Moon. To maintain the proper distance scale, about how far from the surface of the basketball should the tennis ball be placed?
A. 4 inches (1/3 foot)
B. 6 inches (1/2 foot)
C. 36 inches (3 feet)
D. 30 feet
E. 300 feet

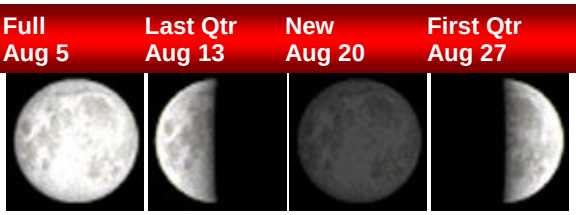
Astrophoto of the Month

M13 by Don Bryden

M13 (star chart) was discovered by Edmond Halley in 1714 and has an apparent magnitude of 5.8. Composed of several hundred thousand stars, its diameter is about 145 light-years, and is 25,100 light-years away from Earth

SBIG ST2000XCM
Stellarvue SV-105
Maui Coffee Co. "Kona Blend"
45 15" exposures
May 29th to 30th 2008
Two Goats Observatory

August Sky Data



Best time for deep sky observing this month:
August 15 through August 24

Mercury is at its greatest elongation east of the Sun on August 24th, so in theory it should be visible in the west after sunset. But in practise it sets only minutes after the Sun. We're unlikely to see this elusive little planet this month.

Venus is rising about three hours before the Sun, and by dawn it shines a hand's-breadth above the eastern horizon. Although it is low in the twilight sky, the "Morning Star" is so bright that it can be picked up easily, in clear conditions. Relative to the stars, Venus is moving rapidly eastwards, crossing right through the constellation of Gemini and into Cancer; but Venus is much brighter than any of the stars.

Mars is rising in the north-east around midnight BST, and by dawn it's high in the east – well to the upper right of Venus, but much less bright. This month it is moving eastwards out of Taurus and into Gemini; if you can locate Aldebaran, the brightest star in Taurus, you will find Mars lower down and further left, and getting further away from Aldebaran every day.

Jupiter is at opposition (to the Sun) on August 14th. So it is rising as the Sun sets, and setting at sunrise; it's due south in the middle of the night. Relative to the stars, the giant planet is moving very slowly south-westwards in Capricornus; it never gets more than about 20 degrees above the horizon. But, although it's so low down, the giant planet still outshines any of the stars.

At the start of August, it may be possible to glimpse **Saturn** very low in the western sky, immediately after at sunset; but it sets earlier every night, and by the end of the month we will have lost sight of the Ringed Planet. It passes behind the Sun in the middle of September.

Perseid **meteors** may be seen any time from late July to late August, but the peak this year is expected in the afternoon of Wednesday August 12th. However, there should be good numbers of meteors on the night of the 11th, increasing in theory to one Perseid every two or three minutes towards dawn on the 12th.

Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
8/1/2009	17:12	01:58	06:02	19:53
8/5/2009	19:43	05:43	06:05	19:50
8/10/2009	21:56	10:31	06:08	19:45
8/15/2009	00:38	15:55	06:12	19:39
8/20/2009	06:34	19:42	06:16	19:33
8/25/2009	12:11	22:25	06:19	19:27
8/31/2009	17:13	02:36	06:24	19:19

Planet Data

Aug 1

	Rise	Transit	Set	Mag
Mercury	07:31	14:17	21:07	-0.4
Venus	03:01	10:19	17:36	-4.0
Mars	01:46	09:06	16:26	1.1
Jupiter	20:28	01:58	07:27	-2.8
Saturn	09:07	15:38	22:06	1.1

Aug 15

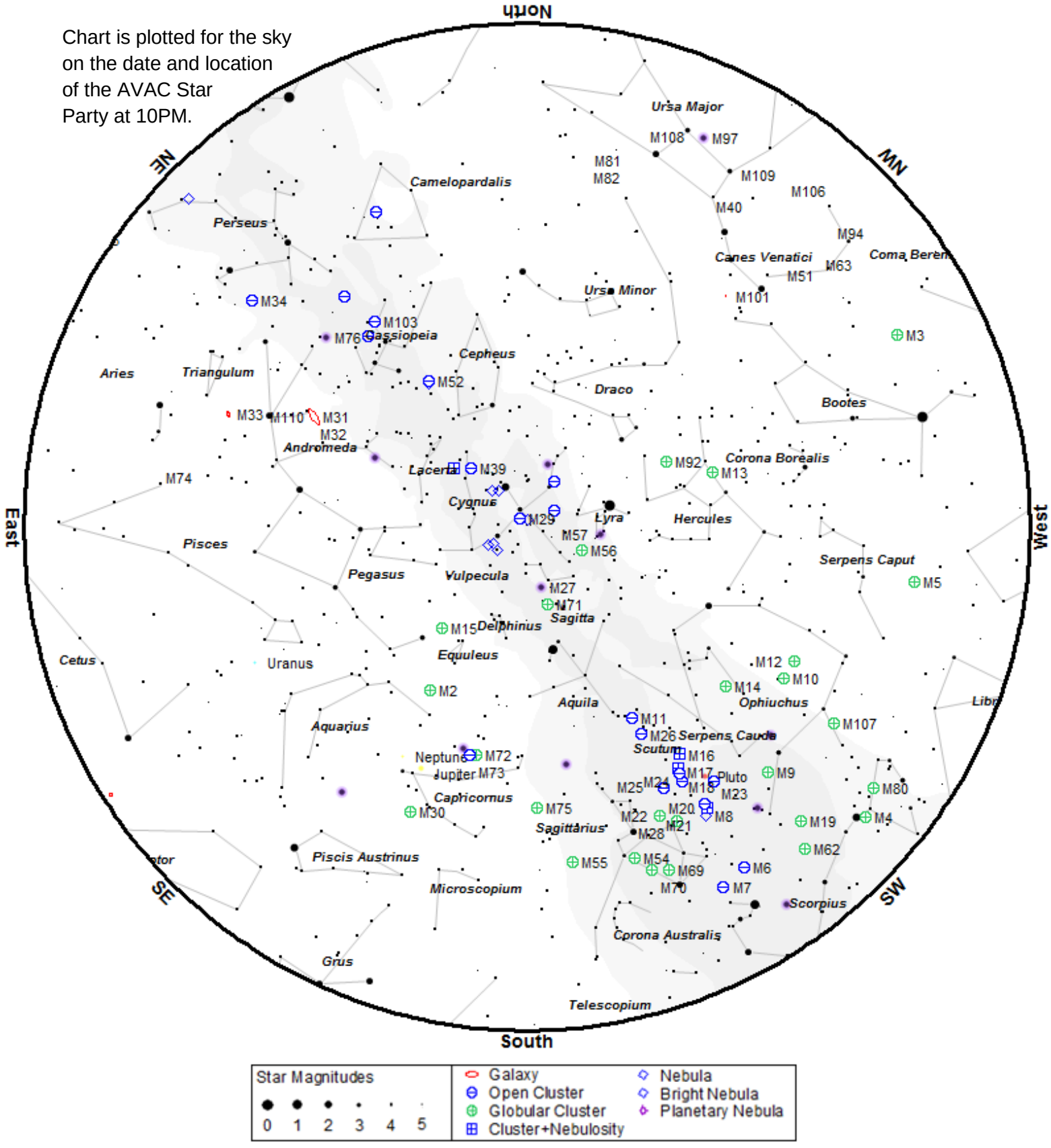
	Rise	Transit	Set	Mag
Mercury	08:17	14:37	20:59	0.1
Venus	03:17	10:34	17:50	-4.0
Mars	01:28	08:51	16:14	1.0
Jupiter	19:28	00:56	06:23	-2.9
Saturn	08:20	14:49	21:15	1.1

Aug 31

	Rise	Transit	Set	Mag
Mercury	08:28	14:27	20:24	0.6
Venus	03:44	10:51	17:58	-4.0
Mars	01:08	08:32	15:57	1.0
Jupiter	18:19	23:45	05:10	-2.8
Saturn	07:26	13:53	20:17	1.1

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		
0 1 2 3 4 5	Galaxy	Nebula
	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	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
NGC 6178	Open	7.2	Sco	16h35m47.0s	-45°38'36"	20:25	20:37	21:01	detectable
NGC 6322	Open	6.5	Sco	17h18m25.0s	-42°56'00"	20:22	20:44	21:45	easy
M 80	Glob	7.3	Sco	16h17m02.0s	-22°58'30"	20:33	20:47	21:22	difficult
M 3	Glob	6.3	CVn	13h42m11.0s	+28°22'42"	20:38	20:50	21:15	detectable
M 5	Glob	5.7	Ser	15h18m34.0s	+02°05'00"	20:34	20:50	21:34	detectable
M 62	Glob	6.4	Oph	17h01m13.0s	-30°06'48"	20:33	20:49	21:33	difficult
M 51	Gal	8.7	CVn	13h29m52.3s	+47°11'40"	20:35	20:51	21:41	detectable
NGC 6383	Open	5.4	Sco	17h34m48.0s	-32°34'00"	20:29	20:52	22:14	detectable
M 12	Glob	6.1	Oph	16h47m14.0s	-01°56'48"	20:32	20:54	22:30	detectable
M 10	Glob	6.6	Oph	16h57m09.0s	-04°06'00"	20:36	20:54	22:01	difficult
M 6	Open	4.6	Sco	17h40m20.0s	-32°15'12"	20:26	20:53	22:36	easy
M 7	Open	3.3	Sco	17h53m51.0s	-34°47'36"	20:32	20:56	22:13	detectable
M 13	Glob	5.8	Her	16h41m41.0s	+36°27'36"	20:33	20:57	23:16	detectable
M 14	Glob	7.6	Oph	17h37m36.0s	-03°14'48"	20:35	20:59	22:33	difficult
M 92	Glob	6.5	Her	17h17m07.0s	+43°08'12"	20:33	21:00	23:50	detectable
IC 4665	Open	5.3	Oph	17h46m18.0s	+05°43'00"	20:37	21:00	22:39	difficult
M 23	Open	5.9	Sgr	17h57m04.0s	-18°59'06"	20:35	21:00	22:35	detectable
M 21	Open	7.2	Sgr	18h04m13.0s	-22°29'24"	20:34	21:02	22:10	difficult
M 20	Open	5.2	Sgr	18h02m42.0s	-22°58'18"	20:33	21:02	22:03	detectable
M 8	Neb	5.0	Sgr	18h04m02.0s	-24°23'14"	20:30	21:01	21:41	detectable
NGC 6572	PNe	8.0	Oph	18h12m06.4s	+06°51'12"	20:20	21:06	00:50	obvious
M 16	Open	6.5	Ser	18h18m48.0s	-13°48'24"	20:27	21:09	23:37	easy
M 18	Open	7.5	Sgr	18h19m58.0s	-17°06'06"	20:28	21:10	23:15	easy
M 28	Glob	6.9	Sgr	18h24m33.0s	-24°52'12"	20:37	21:13	21:50	difficult
NGC 6543	PNe	8.3	Dra	17h58m33.4s	+66°37'59"	20:24	21:16	02:58	obvious
NGC 6633	Open	5.6	Oph	18h27m15.0s	+06°30'30"	20:30	21:16	00:30	easy
M 25	Open	6.2	Sgr	18h31m47.0s	-19°07'00"	20:37	21:19	22:56	difficult
M 22	Glob	5.2	Sgr	18h36m24.0s	-23°54'12"	20:36	21:24	22:23	difficult
IC 4756	Open	5.4	Ser	18h39m00.0s	+05°27'00"	20:34	21:26	00:06	detectable
M 70	Glob	7.8	Sgr	18h43m13.0s	-32°17'30"	20:41	21:31	22:37	challenging
M 11	Open	6.1	Sct	18h51m05.0s	-06°16'12"	20:37	21:38	23:45	difficult
NGC 6716	Open	7.5	Sgr	18h54m34.0s	-19°54'06"	20:35	21:41	23:29	detectable
M 57	PNe	9.4	Lyr	18h53m35.1s	+33°01'45"	20:30	21:41	01:40	detectable
M 56	Glob	8.4	Lyr	19h16m36.0s	+30°11'06"	20:40	22:03	00:25	challenging
M 55	Glob	6.3	Sgr	19h40m00.0s	-30°57'42"	21:20	22:27	23:34	challenging
NGC 6818	PNe	10.0	Sgr	19h43m57.8s	-14°09'12"	20:28	22:31	00:58	easy
M 71	Glob	8.4	Sge	19h53m46.0s	+18°46'42"	20:34	22:40	01:58	detectable
M 27	PNe	7.3	Vul	19h59m36.3s	+22°43'16"	20:34	22:46	02:06	detectable

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
NGC 6871	Open	5.8	Cyg	20h05m59.0s	+35°46'36"	20:35	22:53	02:22	detectable
NGC 6910	Open	7.3	Cyg	20h23m12.0s	+40°46'42"	20:33	23:10	03:01	detectable
M 29	Open	7.5	Cyg	20h23m57.0s	+38°30'30"	20:36	23:11	02:49	detectable
NGC 7009	PNe	8.3	Aqr	21h04m10.9s	-11°21'48"	21:08	23:50	02:34	obvious
M 15	Glob	6.3	Peg	21h29m58.0s	+12°10'00"	21:29	00:16	03:04	detectable
M 39	Open	5.3	Cyg	21h31m48.0s	+48°26'00"	20:40	00:18	04:28	detectable
M 2	Glob	6.6	Aqr	21h33m27.0s	-00°49'24"	21:55	00:20	02:44	detectable
M 30	Glob	6.9	Cap	21h40m22.0s	-23°10'42"	23:17	00:27	01:37	difficult
NGC 7160	Open	6.4	Cep	21h53m40.0s	+62°36'12"	20:29	00:36	05:20	easy
NGC 7243	Open	6.7	Lac	22h15m08.0s	+49°53'54"	22:06	01:01	03:56	difficult
NGC 7293	PNe	6.3	Aqr	22h29m38.5s	-20°50'14"	23:38	01:16	02:55	detectable
NGC 7790	Open	7.2	Cas	23h58m24.0s	+61°12'30"	21:09	02:40	05:22	easy
M 110	Gal	8.9	And	00h40m22.3s	+41°41'09"	00:50	03:26	05:10	challenging
M 32	Gal	8.9	And	00h42m41.8s	+40°51'58"	23:46	03:28	05:18	detectable
M 31	Gal	4.3	And	00h42m44.3s	+41°16'07"	23:54	03:29	05:17	detectable
NGC 253	Gal	7.9	Scl	00h47m33.1s	-25°17'20"	03:08	03:33	04:00	difficult
NGC 457	Open	5.1	Cas	01h19m35.0s	+58°17'12"	22:59	04:01	05:21	easy
NGC 559	Open	7.4	Cas	01h29m31.0s	+63°18'24"	22:54	04:11	05:22	easy
M 103	Open	6.9	Cas	01h33m23.0s	+60°39'00"	22:33	04:16	05:24	easy
M 33	Gal	6.4	Tri	01h33m50.9s	+30°39'36"	01:30	04:19	05:17	difficult
NGC 637	Open	7.3	Cas	01h43m04.0s	+64°02'24"	22:25	04:24	05:23	easy
NGC 663	Open	6.4	Cas	01h46m09.0s	+61°14'06"	23:44	04:27	05:20	detectable
M 76	PNe	10.1	Per	01h42m19.9s	+51°34'31"	01:36	04:27	05:15	difficult
NGC 884	Open	4.4	Per	02h22m18.0s	+57°08'12"	23:31	04:45	05:23	easy
NGC 869	Open	4.3	Per	02h19m00.0s	+57°07'42"	23:24	04:44	05:24	obvious
NGC 957	Open	7.2	Per	02h33m21.0s	+57°33'36"	00:51	04:47	05:19	detectable
NGC 1027	Open	7.4	Cas	02h42m40.0s	+61°35'42"	02:26	04:48	05:13	challenging
M 34	Open	5.8	Per	02h42m05.0s	+42°45'42"	02:01	04:49	05:18	detectable
NGC 1502	Open	4.1	Cam	04h07m50.0s	+62°19'54"	00:53	04:54	05:27	obvious
NGC 1444	Open	6.4	Per	03h49m25.0s	+52°39'30"	00:58	04:54	05:25	obvious
M 77	Gal	9.7	Cet	02h42m40.8s	-00°00'48"	03:02	04:53	05:17	difficult
NGC 1528	Open	6.4	Per	04h15m23.0s	+51°12'54"	02:27	04:54	05:20	detectable
NGC 1342	Open	7.2	Per	03h31m38.0s	+37°22'36"	02:46	04:55	05:18	detectable
M 45	Open	1.5	Tau	03h47m00.0s	+24°07'00"	02:13	04:56	05:23	easy
NGC 1664	Open	7.2	Aur	04h51m06.0s	+43°40'30"	02:54	04:57	05:19	detectable
M 38	Open	6.8	Aur	05h28m40.0s	+35°50'54"	03:59	04:58	05:16	detectable
M 36	Open	6.5	Aur	05h36m18.0s	+34°08'24"	03:24	04:59	05:21	easy
NGC 1746	Open	6.1	Tau	05h03m50.0s	+23°46'12"	04:19	04:59	05:13	difficult
NGC 1647	Open	6.2	Tau	04h45m55.0s	+19°06'54"	04:16	04:59	05:13	difficult
M 37	Open	6.2	Aur	05h52m18.0s	+32°33'12"	03:44	05:00	05:20	easy
M 35	Open	5.6	Gem	06h09m00.0s	+24°21'00"	04:19	05:01	05:17	detectable
NGC 2129	Open	7.0	Gem	06h01m07.0s	+23°19'20"	04:12	05:01	05:23	easy
NGC 2175	Open	6.8	Ori	06h09m39.0s	+20°29'12"	04:35	05:02	05:14	difficult
NGC 2169	Open	7.0	Ori	06h08m24.0s	+13°57'54"	04:42	05:04	05:23	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.
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Answers to Astro Quiz: 1: D, 2: B, 3: D

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