



# Desert Sky Observer

**Volume 29**

*Antelope Valley Astronomy Club Newsletter*

**February 2009**

## Up-Coming Events

**February 7:** Moon Walk and Star Party @ [Prime Desert Woodlands](#)

**February 13:** Club Meeting\*

**February 16:** Board Meeting

**February 28:** Star Party @ [Saddle Back Butte](#)

\* 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 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**

### **Don Bryden**

My eight year old daughter, Sophie, loves to hang out with me when I'm looking at the stars. She's not really into astronomy though she can name the bright planets and a few constellations; she just likes to hang out with her daddy.

A few months ago I was hooking up my Feather Touch Digital Focuser. It has a nice hand controller that can be zeroed out to mark the current position. I was focusing on a moderately bright star in preparation for an evening of imaging when Sophie asked to try the focuser hand controller.

I defocused the star and let her try. Soon she said, "There! That's it." And she zeroed out the display. I took a look and smiled when I saw her fuzzy blob. After refocusing I had her take another peek. "Does that look better?" I asked, "No" she said. Hmm, I ran out the focus on the other side and let her retry. After a bit she announced she was done. Same fuzzy star, same position on the display. A few more tries on both sides of focus and she always got back to zero. And, no, she wasn't looking at the display, she was looking at the star!

The Optometrist says she's slightly nearsighted. She could get by without glasses since she can read and see the chalkboard without them. She opted for the "High School Musical" frames.

We are once again Silver "B" level donors to RTMC. We'll have a booth and a lot of members out there Memorial weekend. Also get ready for the Messier Marathon on the 28th of March and the Poppy Festival at the end of April. If you've been by the website lately you've no doubt noticed some changes. There's a new tab for IYA and another for members.

The members' tab is really neat. Just log in with your member number (on your badge) and your last name (case sensitive) and you can update your information. Or go to the events page and see who's coming to the next star party. Sign up, leave comments or just browse the events. Let us know what you think, it's your site and check back often. Soon there will be pages for the Astronomy Dudes and another dedicated to the Youth Exploring Astronomy (YEA) contest.

February's theme for the International Year of Astronomy is the solar system and the object to observe is the moon. So come out to the Prime Desert Woodlands Moonwalk and hear Jeremy speak about the heavens. Or set up your scopes in the parking lot and let someone take a look. If you see Sophie out there, tell her she looks cute in her new glasses!

Clear skies (and warmer nights...),

Don Bryden



## Vice President

### Rose Moore

Our guest speaker for our meeting on February 13th will be Dana Backman. He'll be talking about "Searching For Life In All The Right Places", an astro-biological tour of the solar system. Several emails are out to other speakers for the rest of the year, including Chris Butler, Gary Peterson, and Nagin Cox.

We have the possibility of our own Doug Drake giving us a presentation on Cosmology sometime this year. Also Matt Leone and Jeremy are a possibility for a special Messier presentation in November.

Anyone who would like to make a suggestion for a speaker, or if you might even know someone to recommend, please contact me!

Clear skies!



## Director of Community Development

### Karole Barker

The 1st Prime Desert Woodlands event for 2009 will be on Saturday February 7th at 6:30 p.m., it will be a full moon walk with Jeremy. We still need volunteers to bring out scopes that night. Please let me know if you can make it.

Our club is now confirmed for a 1/2 night at Mt. Wilson on Saturday September 19th. The cost for the night is \$900.00, so if we had exactly 25 people going the cost per person would be \$36.00. If fewer sign up, the cost goes up, but so does your time at the eyepiece. I will keep you posted as the time get closer.

The Poppy Festival is coming up. This year's event is scheduled for April 25-26. I'm working with the City of Lancaster to get our application in for the event.

March 7th is the 1st lunar event of the year, which will be held at the Sage Planetarium. Jeremy is going to do a presentation, and we will be looking through scopes before and after the presentation. Any questions, please contact Matt Leone at 661-948-1521.

March 18th Leona Valley School is having their science fair from 6:00 to 7:00 p.m. We need some volunteers to come out with their scopes and to help judge the entries.

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## Desert Sky Observer

March 28th is our annual Messier Marathon. The tentative spot for the event is the Poppy Reserve. I will have more information before the event. This event is a lot of fun to do, come out and see how many Messier objects you can find in one night.

One of our club big events is RTMC in Big Bear, which is going to be on May 22nd thru May 25th. There are a lot of vendors and great key note speakers every year at this event. It snowed on us last year. We can't wait to go again this year and see what happens.

Clear skies.

## International Year of Astronomy

### Our Solar System

Our Solar System – the Sun and everything in orbit around it – is full of mystery and intrigue. Some planets spin backwards; Mars has polar ice caps that harbor water ice; and blazing volcanoes spew hot magma on Jupiter's moon Io. Thanks to innovative NASA space missions, scientists have been busy making discoveries and finding clues to understanding some of these mysteries.

Early observers and philosophers believed that the Sun and all the other celestial bodies revolved around Earth. Four hundred years ago this year, Galileo Galilei's discoveries using his new telescope supported the concept of a "solar system" in which all the planets, including Earth, revolve around the Sun. When Galileo pointed his telescope at Jupiter, he saw that Jupiter was not a star, but a sphere with orbiting satellites. In the centuries since his revolutionary discoveries, we have come a long way in our understanding of our Solar System.



NASA has sent space probes to explore the eight planets, as well as comets and asteroids. Recent Mars missions have been uncovering secrets of the Martian terrain and soil. The Cassini spacecraft has been sending back breathtaking images of Saturn and its moons. In the realm of icy bodies beyond Neptune and recently reclassified from planet to "dwarf planet/plutoid", Pluto will be visited by the New Horizons spacecraft in 2015. There are many future missions that promise to continually expand our knowledge.

Before humans travel to other planets, we will return to Earth's Moon to explore it anew. The Lunar Reconnaissance Orbiter (LRO) and Lunar CRater Observation and Sending Satellite (LCROSS) missions are scheduled to launch in 2009. LRO will spend a year orbiting and mapping the surface of the moon and characterizing landing sites. LCROSS may soon find out if there is water in the bottom of some lunar craters when it impacts the surface later in the year.

## Space Place

## Severe Space Weather

by Dr. Tony Phillips

Did you know a solar flare can make your toilet stop working?

That's the surprising conclusion of a NASA-funded study by the National Academy of Sciences entitled *Severe Space Weather Events—Understanding Societal and Economic Impacts*. In the 132-page report, experts detailed what might happen to our modern, high-tech society in the event of a “super solar flare” followed by an extreme geomagnetic storm. They found that almost nothing is immune from space weather—not even the water in your bathroom.

The problem begins with the electric power grid. Ground currents induced during an extreme geomagnetic storm can melt the copper windings of huge, multi-ton transformers at the heart of power distribution systems. Because modern power grids are interconnected, a cascade of failures could sweep across the country, rapidly cutting power to tens or even hundreds of millions of people. According to the report, this loss of electricity would have a ripple effect with “water distribution affected within several hours; perishable foods and medications lost in 12-24 hours; loss of heating/air conditioning, sewage disposal, phone service, fuel re-supply and so on.”

“The concept of interdependency,” the report notes, “is evident in the unavailability of water due to long-term outage of electric power—and the inability to restart an electric generator without water on site.”

It takes a very strong geomagnetic storm to cause problems on this scale—the type of storm that comes along only every century or so. A point of reference is the “Carrington Event” of August-September 1859, named after British amateur astronomer Richard Carrington who witnessed the instigating solar flare with his unaided eye while he was projecting an image of the Sun on a white screen. Geomagnetic storms triggered by the flare electrified telegraph lines, shocking technicians and setting their telegraph papers on fire; Northern Lights spread as far south as Cuba and Hawaii; auroras over the Rocky Mountains were so bright, the glow woke campers who began preparing breakfast because they thought it was morning!

“A contemporary repetition of the Carrington Event would cause ... extensive social and economic disruptions,” the report warns. Widespread failures could include telecommunications, GPS navigation, banking and finance, and transportation. The total economic impact in the first year alone could reach \$2 trillion (some 20 times greater than the costs of Hurricane Katrina).

The report concluded with a call for infrastructure designed to better withstand geomagnetic disturbances and improvements in space weather forecasting. Indeed, no one knows when the next super solar storm will erupt. It could be 100 years away or just 100 days. It's something to think about ... the next time you flush.

One of the jobs of the Geostationary Operational Environmental Satellites (GOES) and the Polar-orbiting Operational Environmental Satellites (POES) operated by NOAA is to keep an eye on space weather and provide early warning of solar events that could cause trouble for Earth.

You can keep an eye on space weather yourself at the National Weather Service's Space Weather Prediction Center, [www.swpc.noaa.gov](http://www.swpc.noaa.gov). And for young people, space weather is explained and illustrated simply and clearly at the SciJinks Weather Laboratory, [scijinks.gov/weather/howwhy/spaceweather](http://scijinks.gov/weather/howwhy/spaceweather).

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

## The Moon: Clavius by Tom Koonce

The first object mankind noticed in the night sky was the Moon. Just four hundred years ago, Galileo saw the Moon's true nature; not a 'perfect heavenly sphere' at all, but a world unto itself. The science of Astronomy was born...

*"...I distinguish two parts of it, which I call respectively the brighter and the darker. The brighter seems to surround and pervade the whole hemisphere; but the darker part, like a sort of cloud, discolors the Moon's surface and makes it appear covered with spots. Now these spots, as they are somewhat dark and of considerable size, are plain to everyone and every age has seen them, wherefore I will call them great or ancient spots, to distinguish them from other spots, smaller in size, but so thickly scattered that they sprinkle the whole surface of the Moon, but especially the brighter portion of it. These spots have never been observed by anyone before me; and from my observations of them, often repeated, I have been led to the opinion which I have expressed, namely, that I feel sure that the surface of the Moon is not perfectly smooth, free from inequalities and exactly spherical... but that, on the contrary, it is full of inequalities, uneven, full of hollows and protuberances, just like the surface of the Earth itself, which is varied everywhere by lofty mountains and deep valleys."*

- Galileo Galilei, Describing his pioneering telescope observations of the Moon made from January 1610



*Drawings of the Moon by Galileo*

Galileo Galilei (1564-1642) was an Italian physicist, artist and astronomer who made fundamental contributions to science. He believed that careful observations could reveal the universe's hidden truths, even when the observations came into conflict with long-established dogma. Today, he's recognized as the father of modern Astronomy. Can you imagine what it must have felt like for him to realize that he was the first person - ever - to gaze upon the true nature of the surface of the Moon? Galileo must have been awestruck. I think that each of us, even four hundred years later, feels a bit of that awe on a clear evening as we point our comparatively colossal telescopes at our Moon. He gazed through optics that suffered horrendously from optical aberration, dim views and magnified just 7X to 14X. These were the 'state of the art' at that time. Today, a common pair of 10X50 binoculars provides a far superior view to Galileo's, yet he discovered the existence of craters and valleys on the Moon, the rings of Saturn and the Moons and their orbital motions around Jupiter.

This month, we're going to explore a magnificent Lunar crater that was not only studied carefully by early astronomers, but was the scene of the fictional discovery of a giant black monolith in Stanley Kubrick's science fiction movie classic 2001: A Space Odyssey.

The crater Clavius spans 140 miles across and is the third largest crater on the side of the Moon which faces the Earth. Scientists estimate that the crater is one of the most ancient on the Moon at approximately 4 billion years old. It lies in the Moon's spectacular southern highlands and is best seen a couple of days past the Moon's first quarter phase when it will be seen as a notch in the terminator separating day and night. Clavius is a distinct crater, despite it being so old. What makes this one of my favorite lunar object to observe is series of craters which decrease in size in an arc.

You can find Clavius to the South of Tycho and its prominent rays. Its lunar coordinates are 58.4° S, 14.4° W. It is named after the German mathematician and astronomer Christopher Klau (1538-1612), whose Latinized name was Christop Clavius.



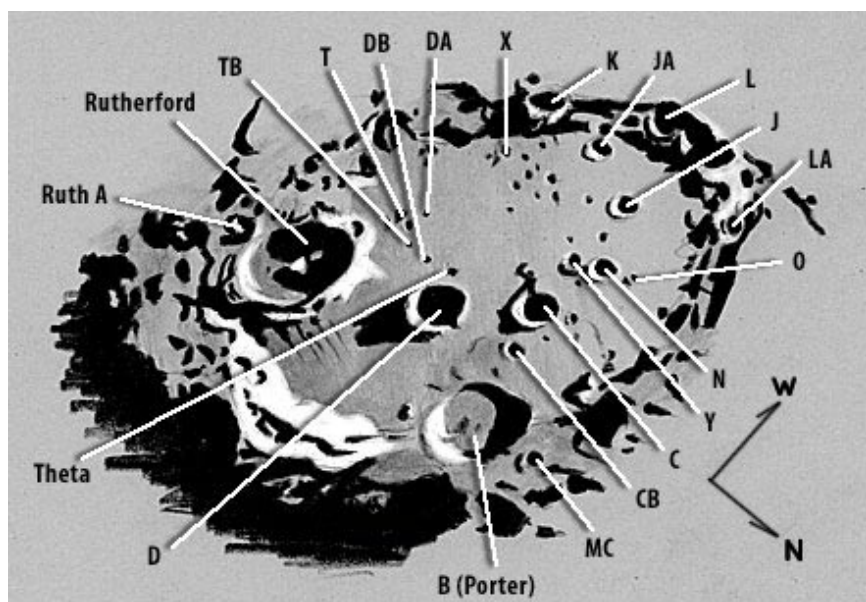
**Clavius crater**

Image: Chabot Space & Science Center, 20" refracting telescope

The floor of the crater forms a convex plain that is marked by some interesting crater impacts. The most notable of these is a curving chain of craters that begin with Rutherford in the south, then arc across the floor in a counterclockwise direction forming a sequence of ever diminishing diameters. From largest to smallest, these craters are designated Clavius D, C, N, J, and JA. This sequence of diminishing craters has proved a useful tool for amateur astronomers that want to test the resolution of their small telescopes. The outline of another crater similar in size to Rutherford (Clavius D) is Porter crater, located on the northwestern edge of Clavius. Porter crater is less distinct than Rutherford, but still has a distinct central peak.

Look carefully slightly south of Clavius N. The diminutive remains of a central peak may still be seen. The relative smoothness of the floor and the low size of the central peaks may indicate that the crater surface was formed some time after the original impact. Imagine lava filling this crater until only the very top of the massive central peak remained above.

<b>Sources:</b>	<i>The New Guide to the Moon</i> By Patrick Moore <a href="http://en.wikipedia.org/wiki/Clavius_(crater)">http://en.wikipedia.org/wiki/Clavius_(crater)</a> <a href="http://www.perezmedia.net/beltofvenus/archives/000464.html">http://www.perezmedia.net/beltofvenus/archives/000464.html</a>
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Try making a careful pencil and paper sketch of Clavius like the one here. A number of ravines run north from Rutherford crater. Crater Clavius CB sits astride what appears to be a smooth mound or dome. Besides Rutherford and Porter Craters, you may be able to observe around 32 craters on the floor of Clavius. The smallest seen with average amateur telescopes on a night of steady seeing is just east of Clavius N and is about 2 miles in diameter. Lava flows and subtle shading differences as the Moon phases progress has made the crater Clavius interesting to observe for the last four hundred years!

### Lunar Craters

By convention these features are identified on lunar maps by placing the letter on the side of the crater midpoint that is closest to Clavius.

Clavius	Latitude	Longitude	Diameter
C	57.7° S	14.2° W	21 km
D	58.8° S	12.4° W	28 km
E	51.5° S	12.6° W	16 km
F	55.4° S	21.9° W	7 km
G	52.0° S	13.9° W	17 km
H	51.9° S	15.8° W	34 km
J	58.1° S	18.1° W	12 km
K	60.4° S	19.8° W	20 km
L	58.7° S	21.2° W	24 km
M	54.8° S	11.9° W	44 km
N	57.5° S	16.5° W	13 km
O	56.8° S	16.4° W	4 km
P	57.0° S	7.7° W	10 km
R	53.1° S	15.4° W	7 km
T	60.4° S	14.9° W	9 km
W	55.8° S	16.0° W	6 km
X	60.0° S	17.6° W	7 km
Y	57.8° S	16.0° W	7 km

*Reference: 9 day old Moon*



Have you joined the AVAC and Matt Leone Lunar Observing Group yet? There is so much to see on the Moon that it will keep you occupied for years of bright, moonlit nights. Get involved with the International Year of Astronomy activities and February's focus is on ... the Moon!!!

## The History of Roswell by Jeff Riechmann

It seems like whenever a discussion starts about Roswell, it isn't long before someone wants to know about Roswell. Perhaps the time is upon us to finally receive a little history behind our little friend from the planet Belluckleonia, or as we pronounce it, Belt Buckle!

In 2004, I had been reassigned by my fire department, to their training office. This was the direct result of my hearing loss and I had been told that I was finished working in the fire stations. During this assignment, I was tasked by the Chief to train my fellow firefighters in aircraft rescue fire fighting. This was a good thing as I was already recognized by the California State Fire Marshal's office to teach this class and it went right along with the training I had received from the US Air Force.

One evening during this time, I was sitting at home, watching the History channel. They were showing a documentary on unidentified flying objects (UFO), which had caught my attention...for whatever reason! During their discussion, they mentioned that there had been a UFO crash in Roswell, New Mexico and there were claims made about other crashes around the world. Sounded sort of like what I was teaching to the fire department!

Soon, they were discussing the book *Fire Officer's Guide to Disaster Control*, specifically chapter 13. Now they really had my interest! They discussed in this book the subject of UFOs and how to respond to UFO crashes. This was a joke, right?

The next day at the training office, I checked to see if the book was included in our library. It was not. I asked the librarian about it, she had never heard of it. I soon found a catalog that detailed a variety of books available for fire fighters. *Fire Officer's Guide to Disaster Control* was listed!

I bought it!

Once the book arrived, everyone in the office read the chapter on responding to UFO crashes. It soon became quite the joke around the office. Suggestions were made that questions on the subject should be included in the next promotional exam for Captains! I even had a Chief approach me and volunteer to be on the oral interview board and thought that the prospective Captains should be asked questions on the subject of UFO crashes. He then tried to convince me that he was an alien! (I believed him and so would you if you knew him!)

It wasn't long until the suggestion was made to include the subject in the aircraft fire fighter training that I was conducting, which it soon was. The intent was not to really teach anything about responding to UFO crashes as much as I had hoped to just lighten the class up a little bit. It worked! (Everyone kept suggesting that I speak to the fire fighter who had actually purchased alien abduction insurance!) In fact, there are many in the fire department who to this day, do not know if I was being serious or was just joking!

This wasn't the end. It wasn't long before the fire department's audio visual section, with the assistance of my fellow training officers and myself, were soon secretly in production filming a training video on how to deal with UFO crashes. Word leaked about the project and it was halted. What footage was put together was hilarious! I sincerely hope that someday it is finished.

It wasn't long after this all started that I soon found a garden statue of an alien (Roswell) standing next to a crashed UFO. This was too good to be true! I had to have it! It was perfect! Unfortunately, this was about the time that I retired from the fire department so Roswell never had the opportunity to meet my fellow fire fighters.

Even after my retirement, the office staff in the training office and I continue to exchange UFO stuff to this day. In fact, they have a scrapbook of alien stuff that we have collected over the years. This is really beginning to go way too far!

So one day, I decided to join the Antelope Valley Astronomy Club. The club would set up displays at schools and other places. I soon started to collect meteorites and began displaying them at club activities. I would tell the kids that meteorites were rocks that fell from the sky. It wasn't long before I started to ask if they knew what else fell out of the sky. The answer was UFOs!

To help educate the kids, I made a handout sheet explaining what meteorites and comets and so on were. On the bottom of the sheet, I had a picture of Roswell, the garden statue. Soon the kids were asking who Roswell was and I told them that he was my son! Of course, that meant I was an alien! Believe it or not, this actually lead to some interesting discussions with women in regards to the possibility of their husbands being aliens! Some would laugh and say that they thought he could be. One or two even scurried away with a scared look on their face! The husbands usually didn't say anything, but did have a "cat that swallowed the canary" smile on their face!

It soon became obvious that Roswell needed to make an appearance! And as they say, the rest is history!

So there you have it, the brief history of Roswell and how I became an "expert" in UFO crash rescue!

## Astrophoto of The Month



This month's photo is by Shane Barker. Conjunction of Jupiter, Venus, and the Moon, Sat 29 Nov 2008.  
Canon EOS DIGITAL REBEL 30mm f/5.6 1.6 sec ISO 400

## News Headlines

### **Rock Reveals Moon Had Liquid Metal Core**

One of the most enduring mysteries stemming from the Apollo moon missions is why rocks brought back to Earth for analysis are magnetized.

<http://dsc.discovery.com/news/2009/01/28/moon-magnetism.html>

### **China Building Huge 500-Meter Radio Telescope**

Official ground-breaking ceremonies took place for a gigantic new 500 meter diameter radio telescope in China which will allow astronomers to detect galaxies and pulsars at unprecedented distances.

<http://www.universetoday.com/2009/01/31/china-building-huge-500-meter-radio-telescope/>

### **Black Hole Outflows From Centaurus A**

Astronomers have a new insight into the active galaxy Centaurus A (NGC 5128), as the jets and lobes emanating from the central black hole have been imaged at submillimetre wavelengths for the first time.

<http://www.sciencedaily.com/releases/2009/01/090128074617.htm>

### **Astronomers To Gaze Back In Time And Map History Of Universe**

UK astronomers are set to expand our knowledge of the history of our Universe with a new project to map the inception and formation of galaxies.

<http://www.sciencedaily.com/releases/2009/01/090105091528.htm>

### **Discovery of Methane Reveals Mars Is Not A Dead Planet**

A team of NASA and university scientists has achieved the first definitive detection of methane in the atmosphere of Mars. This discovery indicates the planet is either biologically or geologically active.

<http://www.spaceref.com/news/viewpr.html?pid=27373>

### **Mars Spirit Rover behaving oddly**

The team operating NASA's Mars Exploration Rover Spirit plans diagnostic tests this week after Spirit did not report some of its weekend activities, including a request to determine its orientation after an incomplete drive.

<http://www.astronomy.com/asy/default.aspx?c=a&id=7876>

### **Scientists Not So Sure 'Doomsday Machine' Won't Destroy World**

Three physicists have reexamined the math surrounding the creation of microscopic black holes in the Switzerland-based LHC, the world's largest particle collider, and determined that they won't simply evaporate in a millisecond as had previously been predicted.

<http://www.foxnews.com/story/0,2933,483477,00.html>

### **Team maps Milky Way, confirms existence of four spiral arms**

A research team has developed the first complete map of the Milky Way galaxy's spiral arms. The map shows the inner part of the Milky Way has two prominent, symmetric spiral arms that extend into the outer galaxy where they branch into four spiral arms.

<http://www.astronomy.com/asy/default.aspx?c=a&id=7793>

## February Sky Data

**Best time for deep sky observing this month:**  
**February 14 through February 26**

**Mercury** is at its greatest separation west from the Sun on February 13th. But it rises only just over an hour before sunrise; it will be hard to see this elusive little planet this month.

**Venus** is still a brilliant “Evening Star” in the southwestern sky at dusk. Throughout February, Venus isn’t setting until about 9:30 pm. Relative to the stars, it’s moving rapidly north-eastwards, in Pisces; but Venus is far brighter than any of the stars.

On the evening of Friday February 27th, the narrow crescent Moon will appear directly below Venus; the two objects will be about 4 degrees apart, and should fit nicely into the same field of view in a pair of binoculars.

This month, **Mars** is rising only a few minutes before sunrise, so we won’t be able to see the “Red Planet”. In fact we won’t be getting good views of it again until after the summer.

**Jupiter**, like Mars, rises less than an hour before the Sun this month. This giant planet, too, won’t be easily observable until after the summer.

**Saturn** is rising in the middle of the evening, and it’s well up in the southern sky by dawn. It’s moving very slowly north-westwards at the southern end of Leo. It lies to the lower left of the star Regulus in Leo; Saturn is just a little brighter than Regulus, and shines with a steadier light.

On the evening of Wednesday 11th, the gibbous Moon will appear directly below Saturn, about 8 degrees away (a little more than the field of view in a typical pair of binoculars).

There are no significant **meteor showers** in February, and it is generally a quiet time for sporadic (non-shower) meteors, as well.

First Qtr Feb 2      Full Feb 9      Last Qtr Feb 16      New Feb 24



## Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
2/1/2009	09:54	23:58	06:49	17:21
2/5/2009	13:06	03:25	06:46	17:25
2/10/2009	19:08	07:14	06:41	17:30
2/15/2009	-----	09:45	06:36	17:35
2/20/2009	03:56	13:43	06:31	17:40
2/25/2009	06:34	18:41	06:25	17:44
2/28/2009	07:58	21:51	06:21	17:47

## Planet Data

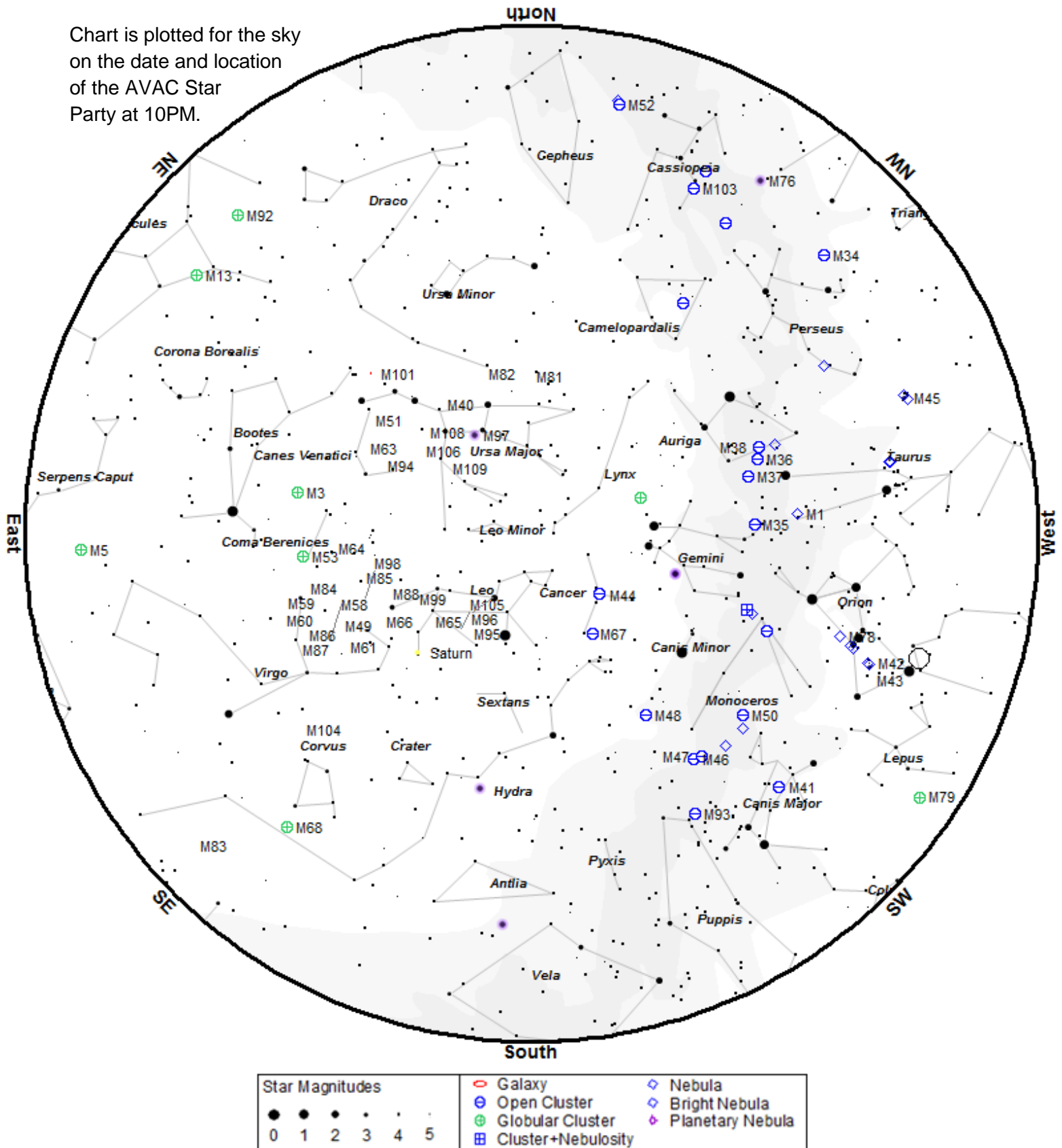
	Feb 1			
	Rise	Transit	Set	Mag
<b>Mercury</b>	05:22	10:34	15:49	0.5
<b>Venus</b>	08:45	14:58	21:08	-4.6
<b>Mars</b>	05:59	11:04	16:10	1.3
<b>Jupiter</b>	06:25	11:37	16:52	-1.9
<b>Saturn</b>	20:10	02:32	08:54	0.7

	Feb 15			
	Rise	Transit	Set	Mag
<b>Mercury</b>	05:13	10:24	15:34	0.0
<b>Venus</b>	08:07	14:37	21:04	-4.6
<b>Mars</b>	05:41	10:54	16:07	1.3
<b>Jupiter</b>	05:41	10:55	16:13	-2.0
<b>Saturn</b>	19:10	01:34	07:57	0.6

	Feb 28			
	Rise	Transit	Set	Mag
<b>Mercury</b>	05:23	10:43	16:01	-0.1
<b>Venus</b>	07:20	14:03	20:42	-4.6
<b>Mars</b>	05:22	10:44	16:06	1.2
<b>Jupiter</b>	04:59	10:16	15:36	-2.0
<b>Saturn</b>	18:15	00:39	07:03	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.



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 1851	Glob	7.1	Col	05h14m06.0s	-40°02'48"	18:54	19:09	19:51	detectable
NGC 7790	Open	7.2	Cas	23h58m24.0s	+61°12'30"	18:49	19:11	19:15	obvious
M 110	Gal	8.9	And	00h40m22.3s	+41°41'09"	18:56	19:10	19:13	detectable
M 31	Gal	4.3	And	00h42m44.3s	+41°16'07"	18:54	19:10	19:14	easy
M 32	Gal	8.9	And	00h42m41.8s	+40°51'58"	18:54	19:09	19:12	easy
M 77	Gal	9.7	Cet	02h42m40.8s	-00°00'48"	18:54	19:10	19:30	detectable
M 33	Gal	6.4	Tri	01h33m50.9s	+30°39'36"	18:57	19:11	19:42	detectable
NGC 457	Open	5.1	Cas	01h19m35.0s	+58°17'12"	18:51	19:12	20:30	obvious
M 76	PNe	10.1	Per	01h42m19.9s	+51°34'31"	18:54	19:12	20:30	detectable
NGC 637	Open	7.3	Cas	01h43m04.0s	+64°02'24"	18:48	19:13	21:09	obvious
NGC 559	Open	7.4	Cas	01h29m31.0s	+63°18'24"	18:50	19:13	20:54	easy
NGC 663	Open	6.4	Cas	01h46m09.0s	+61°14'06"	18:52	19:13	21:03	easy
M 103	Open	6.9	Cas	01h33m23.0s	+60°39'00"	18:48	19:13	20:50	obvious
M 34	Open	5.8	Per	02h42m05.0s	+42°45'42"	18:54	19:13	21:07	easy
NGC 957	Open	7.2	Per	02h33m21.0s	+57°33'36"	18:51	19:14	21:42	easy
NGC 884	Open	4.4	Per	02h22m18.0s	+57°08'12"	18:49	19:14	21:28	obvious
NGC 869	Open	4.3	Per	02h19m00.0s	+57°07'42"	18:49	19:14	21:26	obvious
NGC 1027	Open	7.4	Cas	02h42m40.0s	+61°35'42"	18:54	19:16	21:22	detectable
NGC 1342	Open	7.2	Per	03h31m38.0s	+37°22'36"	18:53	19:15	21:31	easy
M 45	Open	1.5	Tau	03h47m00.0s	+24°07'00"	18:49	19:15	21:40	obvious
NGC 1444	Open	6.4	Per	03h49m25.0s	+52°39'30"	18:46	19:17	22:46	obvious
NGC 1502	Open	4.1	Cam	04h07m50.0s	+62°19'54"	18:45	19:18	23:28	obvious
NGC 1528	Open	6.4	Per	04h15m23.0s	+51°12'54"	18:50	19:17	23:03	easy
NGC 1647	Open	6.2	Tau	04h45m55.0s	+19°06'54"	18:53	19:17	21:36	detectable
NGC 1664	Open	7.2	Aur	04h51m06.0s	+43°40'30"	18:50	19:19	23:18	easy
NGC 1746	Open	6.1	Tau	05h03m50.0s	+23°46'12"	18:53	19:18	22:11	detectable
M 42	Neb	4.0	Ori	05h35m18.0s	-05°23'00"	18:49	19:20	22:02	easy
M 38	Open	6.8	Aur	05h28m40.0s	+35°50'54"	18:52	19:21	23:09	easy
M 36	Open	6.5	Aur	05h36m18.0s	+34°08'24"	18:48	19:22	23:51	obvious
M 37	Open	6.2	Aur	05h52m18.0s	+32°33'12"	18:48	19:24	23:59	easy
M 1	Neb	8.4	Tau	05h34m30.0s	+22°01'00"	18:50	19:25	22:07	difficult
NGC 2129	Open	7.0	Gem	06h01m07.0s	+23°19'20"	18:48	19:26	23:53	obvious
M 35	Open	5.6	Gem	06h09m00.0s	+24°21'00"	18:51	19:29	23:51	easy
NGC 2169	Open	7.0	Ori	06h08m24.0s	+13°57'54"	18:48	19:28	23:37	obvious
NGC 2175	Open	6.8	Ori	06h09m39.0s	+20°29'12"	18:51	19:30	23:16	detectable
NGC 2264	Open	4.1	Mon	06h40m58.0s	+09°53'42"	18:49	19:54	23:59	obvious
M 41	Open	5.0	CMa	06h46m01.0s	-20°45'24"	18:54	20:00	21:39	easy
NGC 2301	Open	6.3	Mon	06h51m45.0s	+00°27'36"	18:51	20:05	23:39	easy

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
M 50	Open	7.2	Mon	07h02m42.0s	-08°23'00"	18:52	20:16	23:17	easy
NGC 2237	Neb	5.5	Mon	06h32m02.0s	+04°59'10"	18:53	20:16	22:40	difficult
NGC 2353	Open	5.2	Mon	07h14m30.0s	-10°16'00"	18:50	20:26	23:20	obvious
NGC 2355	Open	9.7	Gem	07h16m59.0s	+13°45'00"	18:56	20:27	23:36	detectable
NGC 2439	Open	7.1	Pup	07h40m45.0s	-31°41'36"	18:59	20:54	23:12	easy
NGC 2451	Open	3.7	Pup	07h45m23.0s	-37°57'21"	19:12	21:00	22:57	easy
NGC 2360	Open	9.1	CMa	07h17m43.0s	-15°38'30"	19:13	21:02	22:52	difficult
NGC 2477	Open	5.7	Pup	07h52m10.0s	-38°31'48"	19:21	21:07	23:00	easy
NGC 2547	Open	5.0	Vel	08h10m09.0s	-49°12'54"	20:38	21:26	22:21	detectable
NGC 2392	PNe	8.6	Gem	07h29m10.8s	+20°54'42"	18:45	21:52	01:15	obvious
NGC 2506	Open	8.9	Mon	08h00m01.0s	-10°46'12"	19:20	21:53	23:26	difficult
NGC 2423	Open	7.0	Pup	07h37m06.0s	-13°52'18"	18:53	21:52	23:21	easy
M 47	Open	4.3	Pup	07h36m35.0s	-14°29'00"	18:49	21:52	23:17	obvious
M 46	Open	6.6	Pup	07h41m46.0s	-14°48'36"	18:55	21:52	23:21	detectable
NGC 2440	PNe	11.5	Pup	07h41m55.4s	-18°12'31"	19:00	21:52	22:57	detectable
M 93	Open	6.5	Pup	07h44m30.0s	-23°51'24"	20:08	21:52	21:55	easy
NGC 2571	Open	7.4	Pup	08h18m56.0s	-29°45'00"	19:25	21:52	23:51	easy
M 44	Open	3.9	Cnc	08h40m24.0s	+19°40'00"	18:54	21:57	02:04	easy
IC 2395	Open	4.6	Vel	08h42m30.0s	-48°06'48"	20:51	21:59	23:12	easy
M 67	Open	7.4	Cnc	08h51m18.0s	+11°48'00"	19:21	22:08	01:06	detectable
M 82	Gal	9.0	UMa	09h55m52.4s	+69°40'47"	18:55	23:09	05:06	easy
M 81	Gal	7.8	UMa	09h55m33.1s	+69°03'56"	18:57	23:09	05:00	easy
NGC 3132	PNe	8.2	Vel	10h07m01.8s	-40°26'11"	21:39	23:23	01:11	easy
NGC 3132	PNe	8.2	Vel	10h07m01.8s	-40°26'11"	21:39	23:23	01:11	easy
NGC 2546	Open	5.2	Pup	08h12m15.0s	-37°35'42"	22:13	23:23	00:34	difficult
NGC 3228	Open	6.4	Vel	10h21m22.0s	-51°43'42"	22:57	23:38	00:18	easy
NGC 3227	Gal	11.5	Leo	10h23m30.6s	+19°51'54"	20:45	23:41	02:47	detectable
NGC 3242	PNe	8.6	Hya	10h24m46.1s	-18°38'32"	21:47	23:42	01:35	obvious
M 65	Gal	10.1	Leo	11h18m55.7s	+13°05'32"	21:25	00:35	03:57	detectable
M 66	Gal	9.7	Leo	11h20m14.9s	+12°59'30"	21:24	00:37	04:02	detectable
M 97	PNe	11.0	UMa	11h14m47.7s	+55°01'09"	21:37	00:55	04:20	difficult
M 106	Gal	9.1	CVn	12h18m57.6s	+47°18'13"	21:47	01:35	05:10	detectable
M 86	Gal	9.8	Vir	12h26m12.2s	+12°56'44"	22:40	01:43	04:45	detectable
M 84	Gal	10.1	Vir	12h25m03.9s	+12°53'12"	22:24	01:42	04:58	detectable
M 49	Gal	9.3	Vir	12h29m46.8s	+08°00'01"	22:30	01:46	05:00	detectable
M 87	Gal	9.6	Vir	12h30m49.2s	+12°23'29"	22:28	01:47	05:03	detectable
NGC 4565	Gal	10.1	Com	12h36m20.8s	+25°59'15"	22:39	01:53	05:01	detectable
M 104	Gal	9.1	Vir	12h39m59.3s	-11°37'22"	23:15	01:56	04:36	detectable
M 68	Glob	7.3	Hya	12h39m28.0s	-26°44'36"	23:53	01:55	03:58	detectable
M 94	Gal	8.7	CVn	12h50m53.1s	+41°07'12"	21:51	02:07	05:15	easy
M 64	Gal	9.3	Com	12h56m43.8s	+21°41'00"	22:31	02:13	05:14	detectable
NGC 5195	Gal	10.5	CVn	13h29m59.6s	+47°15'58"	22:45	02:46	05:15	detectable
M 51	Gal	8.7	CVn	13h29m52.3s	+47°11'40"	22:04	02:46	05:17	easy
M 3	Glob	6.3	CVn	13h42m11.0s	+28°22'42"	22:55	02:58	05:18	easy
M 101	Gal	8.4	UMa	14h03m12.4s	+54°20'53"	23:15	03:16	05:15	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.

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- Desert Sky Observer—monthly newsletter.
- The Reflector – the publication of the Astronomical League.
- The A.V.A.C. Membership Manual.
- To borrow club equipment, books, videos and other items.

### AVAC

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