CACHE VALLEY ASTRONOMICAL SOCIETY

Cache Valley Clear Skies

The Journal of the Cache Valley Astronomical Society

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Meeting Announcement

Our March meeting will be held on the **fourth Wednesday, March 28, 2018 at 7pm in room 840 of the main BATC campus.** We have room 840 for the rest of this year. Enter on the east side of the building located at 1301 North 600 West.

Our featured speaker this month is club member Garrett Smith. He will be sharing with us a presentation about the king of planets, Jupiter.

Astro-Imaging Special Interest Group

The Astro-Imaging SIG will have a kick-off meeting at the Logan Library in the Temple Fork room at 7pm on March 15th. Please contact Tom at 435-787-6380 if you are interested.

The President's Corner
By Dell Vance, CVAS President

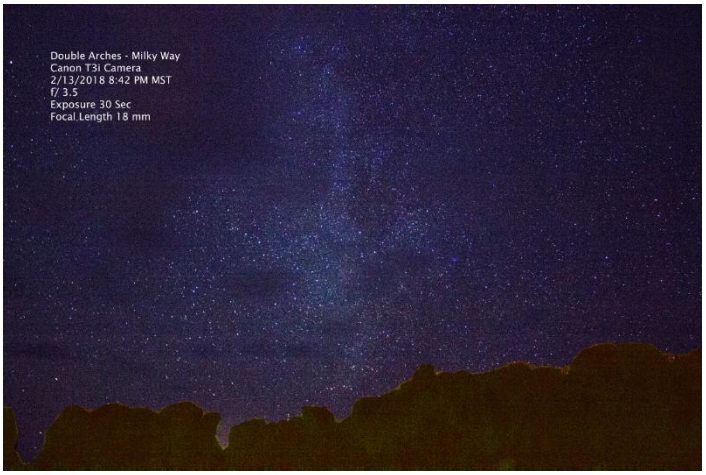
February was a month of extremes. We had warm days and very cold days. Overall it was an interesting month. Tom Westre has encouraged each of us to read some good books on astronomy. He has an extensive library and most of them he is willing let club members borrow.

With that in mind, I was able to travel down to Goblin Valley and Arches National Park during February. I took my binoculars and my camera along, because these areas are known for their dark skies. It was a couple of days before a new moon so the skies should be great. At Arches NP bookshop, I found a book titled "Photography NIGHT SKY" by

Jennifer Wu and James Martin. Just looking through it I picked up a couple of ideas that I could use that night to take photos of the night sky.

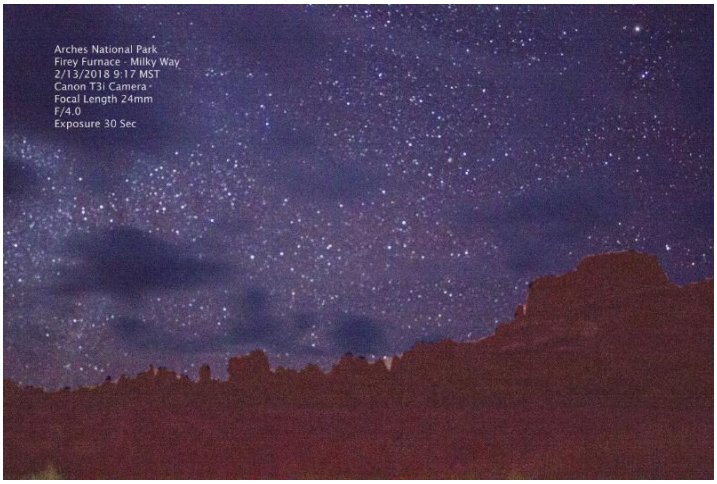
I decided to buy the book and ended up getting several good ideas that helped me get better shots that night.

. It is a good read if you are interested in Night Sky photography (this is not through a telescope). The weather cooperated somewhat. I had about an hour of great skies. This shot at the Double Arches area of the Milky Way Galaxy worked out well.



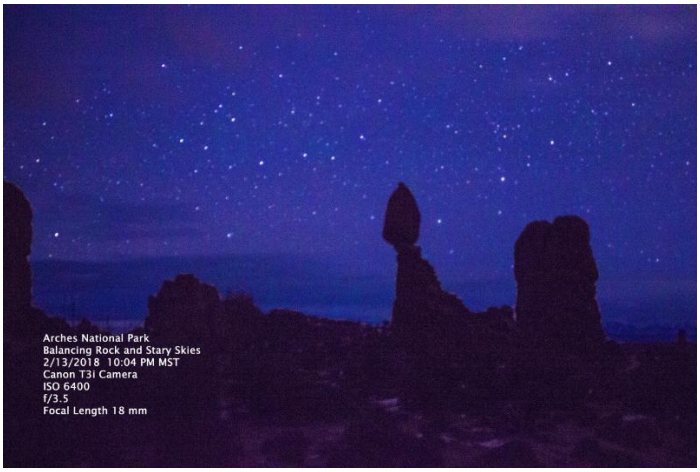
Double Arches - Milky Way - Courtesy Dell Vance

I am still learning to use masks in Photoshop Elements, but it is a good start. Then for the next two hours the clouds started working their way in. My wife and I moved around to different locations to see what we could get. Mostly looking for holes in the clouds over interesting foreground.



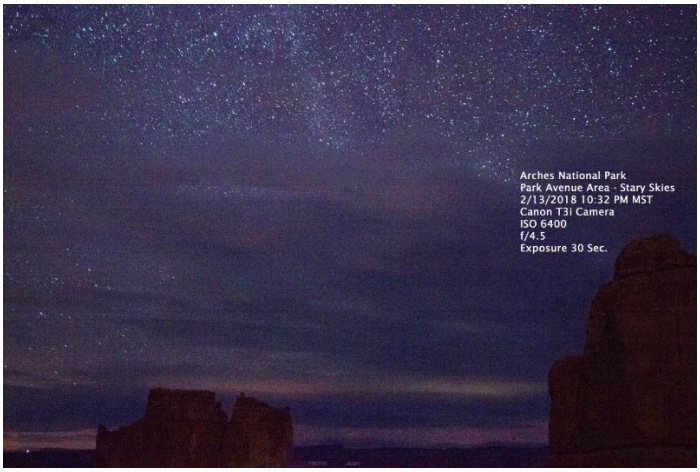
Fiery Furnace - Milky Way - Courtesy Dell Vance

Even the clouds added some interesting shots.



Balancing Rock and Starry Skies - Courtesy Dell Vance

This is last picture that I took that night as the clouds took over. Notice the multitude of stars above the cloud layer.



Park Avenue Area - Starry Skies - Courtesy Dell Vance

The skies there at Arches and most of the National Parks here in Utah are phenomenal. I am even more convinced that I want to travel more to the National Parks on nights around new moons and to continue to practice taking night sky pictures. I guess Tom was right. We can get a lot of ideas reading books about what others are doing.

Our February meeting, on "Mars, Exploring a New Frontier", was very good. Tom Westre was the presenter and did a great job. He was able to boil down 300 hours of research into an hour presentation. It covered what it takes to get to Mars

and what you would find there. It raised a lot of obstacles that must be worked out before any human will be able to set foot on our neighboring planet. Colonizing Mars is even more of a challenge. It was a very thought provoking presentation.

March will be the second month this year with a Blue Moon. There are many other great things to see as well. The March presentation will be about Jupiter and will be presented by Garrett Smith. It is another fascinating planet and should be a very interesting topic.

Keep up the enthusiasm for astronomy. I am convinced that there is no reason to be bored on any clear night. There are so many ways to enjoy our hobby. Be sure to share your experiences with your family and friends. You will be surprised how many people love astronomy; they just don't know it yet.

Thanks again for your support.

Clear skies!

CVAS Loaner Telescope

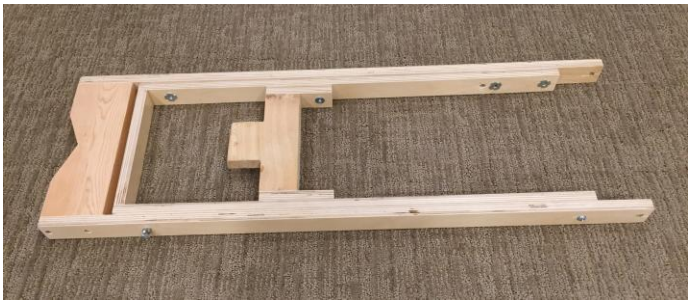
CVAS provides a 10 inch Dobsonian telescope to club members. Contact Garrett Smith to make arrangements to use this telescope. Garrett can be contacted by email at GarrettGillSmith@gmail.com.

Binocular Supports

The club now has available a number of mostly completed binocular supports. These supports are being sold to club members at cost. These supports just need the binocular attachment – which is tailored to the type of binocular being mounted.

Please contact Ned Miller or Dell Vance if you are interested in purchasing a binocular support. The images below show what they look like with binoculars attached as well as an image showing them folded for storage.

Completed Binocular Support (with binos attached) - Courtesy Ned Miller



Binocular support (folded for storage) - Courtesy Ned Miller

Sirius the Pup Challenge

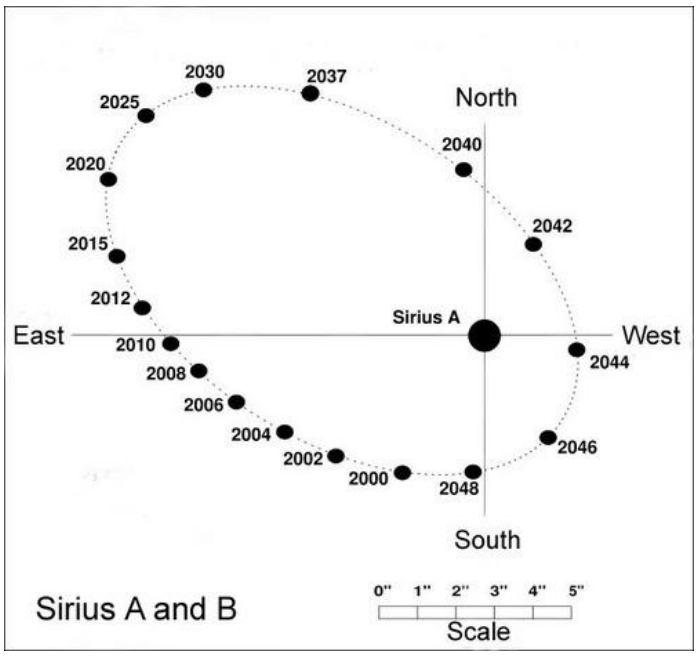
By Tom Westre

The brightest star after the Sun is Sirius the Dog Star in Canis Major, the Great Dog, 8.6 light years away. From Cache Valley, Sirius is a bright white star seen due south every winter in the evening. Sirius is noted for its faint companion, Sirius B, called the Pup. While Sirius is at magnitude -1.46, the Pup is faint and shines at magnitude 8.4, however it can be viewed in a 4 or 6 inch telescope. However it's a challenge due to the brightness of the primary star.

The primary star, Sirius A, is a large white star about as massive as the Sun. Sirius B has evolved over the

past 120 million years. Back then it was a large white star 5 times more massive than the Sun. Over time it passed through the red giant phase. Today Sirius B is a small white dwarf star whose fusion reaction has all but stopped. Although its 25,000 degrees K, it is cooling down. While B is hotter than its larger primary, A, it is much smaller, and is 10,000x fainter than A.

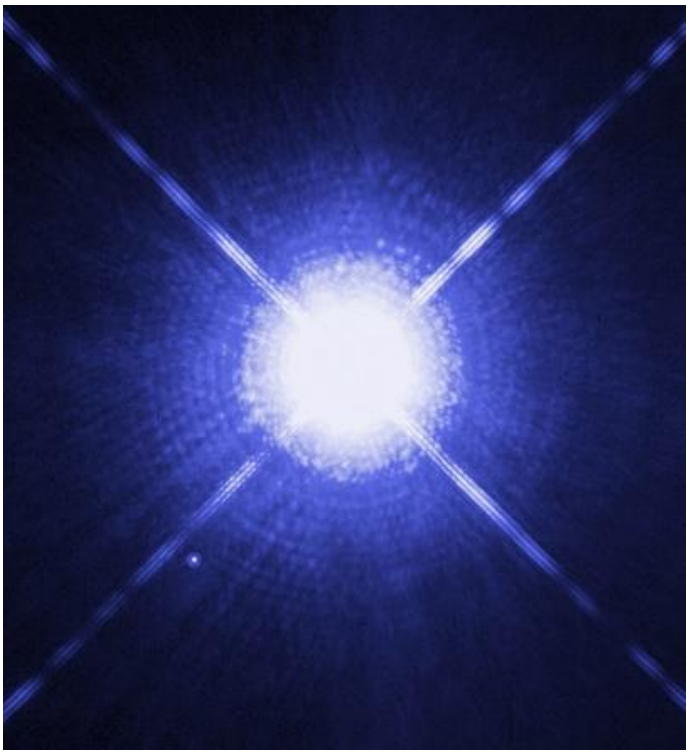
The two stars orbit each other at a distance of 20 AU (like the Sun and Uranus). Sirius B orbits Sirius A in an elliptical orbit that takes 50 years to complete. During this time their separation varies between 3 and 11 arc-seconds. 2018 is a good time to try to observe Sirius B as it's about 10 arc-sec. The separation will continue to widen until the early 2020's.



In theory Sirius B should be easy to split over the next few years even in a 4" telescope. The key is to be patient. You might not see it on the first or second even third try but chances are good you will be able to view the faint companion.
The best time is in January or February when Sirius is highest in the evening sky. March is not out of the question around 8 pm. By April it will be setting in the west.

Atmospheric turbulence will be critical to avoid as it blurs the image. Check out the clear sky chart on our web page (cvas-utahskies.org)

Seeing has to be excellent. But even if the sky is not perfect don't give up. There are moments when the air can allow a brief glimpse of Sirius B. Clean optics including your eyepiece will help. Collimation is critical. Be sure the telescope has reached thermal equilibrium with the air temperature.



Hubble Telescope Image of Sirius A and B

A good test star can help you determine your success. Rigel in the constellation Orion is also a double. Rigel A and B have about the same separation and brightness (0.3 and 6.8, at 9.4" separation) which makes the two stars easy to split. If you can't see Rigel B you probably won't see Sirius B.

For Sirius B use high magnification at least 300x to 400 x for even small scopes as well as large scopes. Sirius B is almost due east of Sirius A. Sirius B should be just outside the brightness of Sirius A but will still be weaker that Sirius A. Watch for the winking of the star light. In moments when the sky turbulence settles you might see B.
Take this opportunity to see the Dog star and the Pup this spring.
Clear and Steady Skies!!!!!

Using Rockets to Explore Space

by Alannah Darrington and Bonnie Schenk-Darrington

Rockets are undeniably necessary for modern space travel and astronomy. But few people know how ancient rocket technology really is. The first rockets were probably developed from fireworks in China. Fireworks were first documented in the 7th century ACE. The first rockets were probably invented in the 10th century ACE, but firm documentary evidence for actual rockets doesn't exist until the 13th century ACE. The first use of rockets was for warfare. By the late 1300s, locations as far apart as China, India, Korea, the Middle East, and Europe were using rockets in their military clashes. These rockets were propelled by gunpowder.

Rockets were used in warfare, even in recent times. For example, rockets were used in the Napoleonic wars. If you think about it, you will even remember the line from "The Star-Spangled Banner," written during the War of 1812, which talks of "the rockets' red glare . . . [which] gave proof through the night that our flag was still there." These rockets were highly inaccurate and had a tendency to veer off course. Pioneers like the Polish scientist Josef Bem and British inventors William Hale and Edward Mounier Boxer improved the rocket's shape and launch mechanisms, to help it reach its correct target.

In the early 20th century, a more peaceful use for rockets was posited. Space flight—manned or unmanned—became a real possibility and not just the dream of science fiction writers like Jules Verne and H. G. Wells. Konstantin Tsiolkovsky of Russia suggested that liquid propellants like liquid hydrogen and oxygen might improve rockets and make space exploration possible. Two other key scientists from different countries helped build modern rocket engines: Robert Goddard from the United States, and Hermann Oberth from Germany.

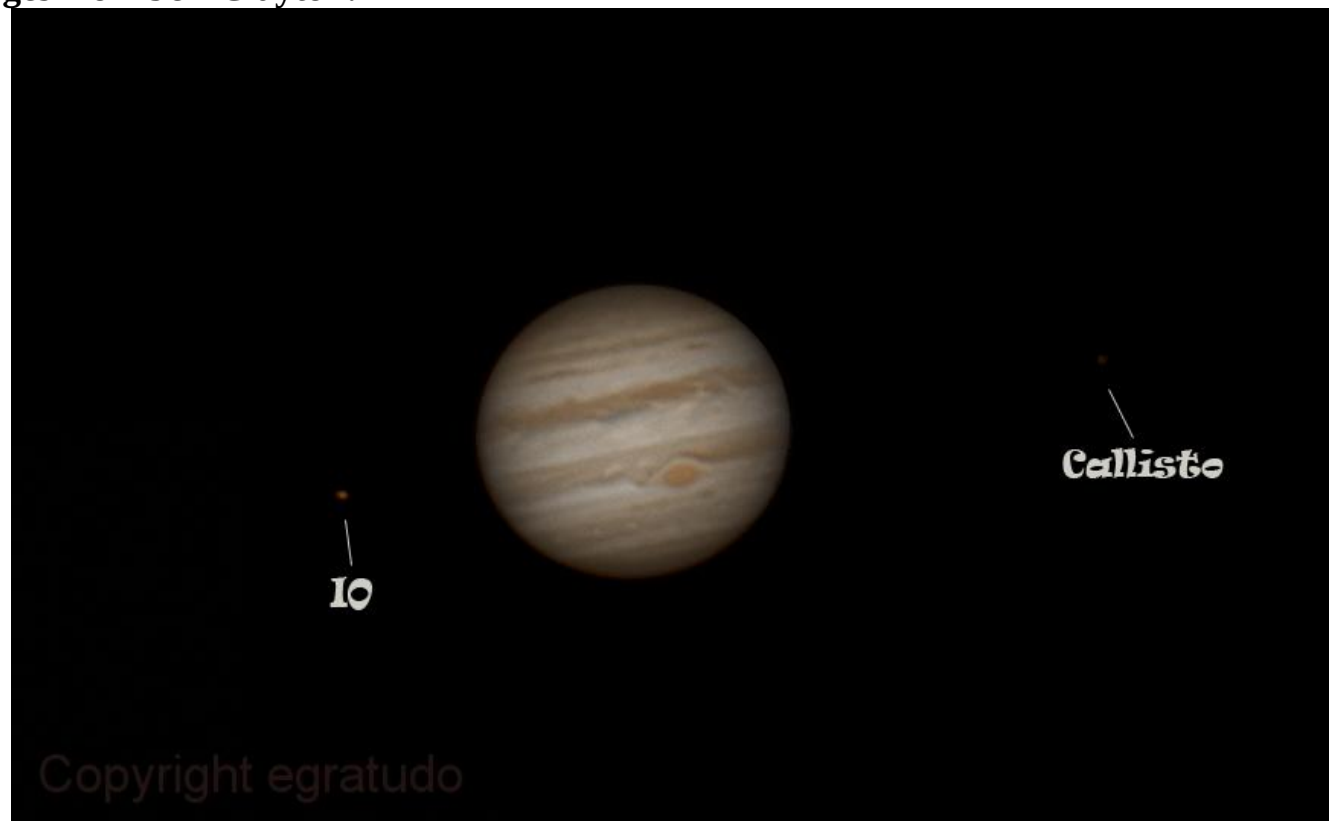
Rockets continued to be improved and used for war in all the 20th century conflicts. But in the 1960s, in part as a result of the Cold War, rockets began to be used for space exploration. The United States and the Soviet Union started to launch rockets into space bearing payloads and passengers of satellites, animals, and eventually people. In the 1960s, unmanned spacecraft—launched by rockets—started to take pictures and probe the moon. The moon landings and Space Shuttle have been propelled into space by rockets. In the early 1970s, orbiting communications and navigational satellites were in everyday use—they could not have been launched without rockets. Even the James Webb Space Telescope will be launched by an Ariane 5 rocket in spring 2019.

Even when rockets have been turned toward peaceful uses, there have been tragedies. The *Challenger* (1986) and *Columbia* (2003) Space Shuttle disasters are an example. Some would claim that we should no longer explore space. It can be very dangerous to go out of Earth's atmosphere and into a world unknown. It takes millions of pounds of fuel to launch a rocket into space. It's expensive and hard on the environment. Human lives can also still be endangered by rockets. In spite of our technology, even when we have learned from our mistakes, the rockets could explode or worse. Also, we are human so we might get a calculation wrong and have the mission fail, or have the satellite or rocket get lost in space and not be able to get it back.

Although we have all these setbacks, space exploration and use of rockets should continue. We rely now on information we have gained from space exploration. Our basic understanding of physics and the universe has been shaped by space travel. We cannot get this knowledge without powerful rockets to send probes into space. And satellites are now used in homeland defense, weather surveillance, communications, navigation, imaging, sensing chemicals, and finding forest fires and other disasters.

So, next time you are looking at the stars, remember the humble rocket, and acknowledge that our lives are so much better because of this ancient technology.

Images from Jeff Clayton:



Jupiter, Io and Callisto - Copyright egratudo

Jupiter, IO, and Callisto.
Taken with a Celestron CPC 9.25 GPS XLT telescope.
Camera was a Celestron Neximage 5.
Software used: Autostakkert!2, Registax 6, Photoshop cs2 best 750 frames out of 3000

Orion Nebula! - Copyright egratudo

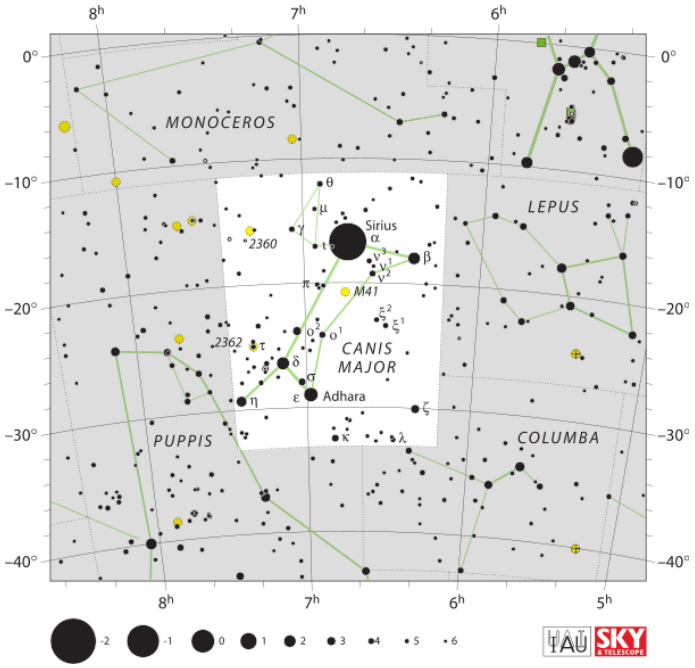
Imaging Telescope: Orion ED80T CF Refractor
Imaging Camera: QHY8L OSC
Mount: Orion Atlas EQ-G
Guiding Camera: Orion Starshoot Auto-Guider monochrome CCD
Focal Reducer: Orion Field Flattener for small refractors
Software: EZCap, Photoshop CS2, ProDigital Astronomy Tools, FITS LIBERATOR, Nebulosity 3.1
Accessories: Orion Mini 50mm Guide Scope with Helical focuser
Image is a composite of 10 frames @ 20 second for the core, 10 frames @ 90 seconds for the transitional from core to nebula, and 2 frames & 600 second for the nebula

Spotlight on Canis Major, the Big Dog

By Dale Hooper

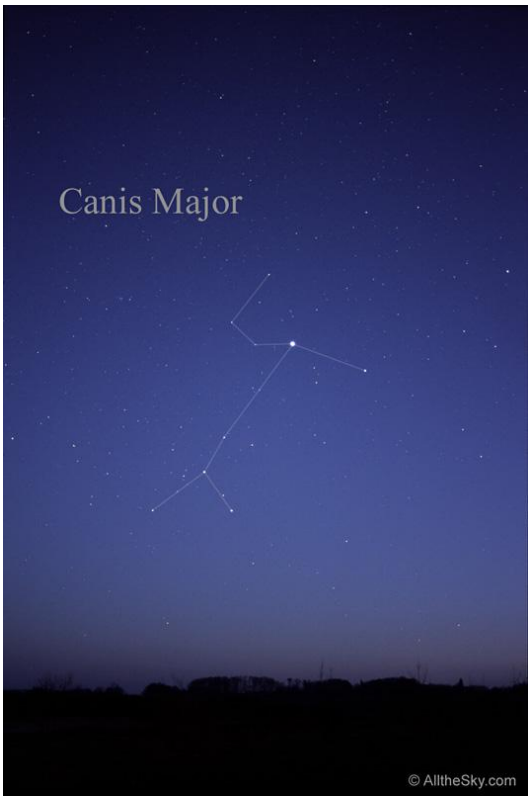
Canis Major is one of the constellations which actually does provide a reasonable "stick figure" of what it is supposed to represent. It is fairly easy to picture "man's best friend" with a jeweled collar following after Orion. This is an especially good time to highlight this constellation because of Tom's excellent article about "the Pup" (Sirius B). Canis Major contains a number of reasonable double stars and some excellent open clusters – including Messier 41 and NGC 2362. It also contains several decent galaxies.

Objects which rank at least three stars in *The Night Sky Observer's Guide* (Canis Major is in Volume 1) have been included. As usual, the table is organized according to increasing Right Ascension values.



IAU and Sky& Tel - Roger Sinnott & Rick Fienberg

Object	R.A.	Dec.
NGC 2207 (Galaxy mag 10.8)	06h16.4m	-21°22'
NGC 2217 (Galaxy mag 10.2)	06h21.7m	-27°14'
6 Canis Majoris (Double star)	06h36.4m	-18°40'
NGC 2280 (Galaxy mag 10.5)	06h44.8m	-27°38'
Sirius (Double star)	06h45.1m	-16°43'
Messier 41 (Open Cluster)	06h47.0m	-20°44'
NGC 2292, 2293 (Interacting galaxies mag 10.8, 10.7)	06h49.7m	-26°45'
β324 (Multiple star)	06h49.7m	-24°05'
Collinder 121 (Open cluster)	06h54.2m	-24°38'
17 Canis Majoris (Multiple star)	06h55.0m	-20°24'
19 Canis Majoris (Dbl star)	06h55.6m	-20°08'
μ (Double star)	06h56.1m	-14°03'
Minkowski 3-1 (Pl Neb)	07h02.8m	-32°35'
NGC 2327 (Emis & Ref Neb)	07h04.3m	-11°18'
NGC 2345 (Open cluster)	07h08.3m	-13°10'
Sharpless 2-301 (Emis Neb)	07h09.8m	-18°29'
NGC 2354 (Open cluster)	07h14.3m	-25°44'
Collinder 132 (Open cluster)	07h14.4m	-31°10'
h3945 (Double star)	07h16.6m	-23°19'
NGC 2360 (Open cluster)	07h17.8m	-15°37'
τ (Multiple star)	07h18.7m	-24°57'
NGC 2362 (Open cluster)	07h18.8m	-24°57'
Collinder 140 (Open cluster)	07h23.9m	-32°12'
NGC 2374 (Open cluster)	07h24.0m	-13°16'
NGC 2383 (Open cluster)	07h24.8m	-20°56'
Ruprecht 18 (Open cluster)	07h24.8m	-26°13'
NGC 2384 (Open cluster)	07h25.1m	-21°02'
Trumpler 6 (Open cluster)	07h26.1m	-24°18'



The constellation Canis Major as it can be seen with the unaided eye. © T. Credner & S. Kohle, AlltheSky.com - used with permission

CVAS Minutes – February 2018

The February CVAS meeting was held on February 28th at BATC. There were approximately twenty-five people in attendance. Tom Westre announced that he wanted to get with those interested in the Astrophoto SIG to work out a date to meet in March. Dell announced that Jupiter would be the topic of our March meeting and that Garrett Smith would be the featured speaker. Dale mentioned that this is now a good time to observe Jupiter and soon Mars and galaxy season will be upon us soon.

Dell mentioned that dues are now $10 through the remainder of the club's fiscal year. He also mentioned that we are heading toward purchasing two Orion Starblast 4.5 inch dobs for our library program.

Dell introduced our featured speaker Tom Westre. Tom is a retired educator who does a lot in the club and heads up the Summer Citizens astronomy course. The remainder of the time was turned over to Tom for his presentation about Mars: A New Era of Exploration.

Tom spoke of the influence the Robert Zubrin book, **A Case for Mars** had on him. Tom spoke about the similarities and differences between Mars and Earth. He then detailed the various unmanned missions that have been sent to Mars. He also spoke about its composition and geology.

The remainder of his talk concerned future colonization including challenges, why go to other worlds, why Mars and resources. There was a lot of great information to ponder and Tom's remarks were well received.

Upcoming Star Parties

There are currently no CVAS star parties planned for March 2018.

March Planet Bonanza

by Tom Westre

March is a great month to view all five bright planets, Mercury, Venus, Mars, Jupiter and Saturn. The inferior planets which orbit inside Earth's orbit Mercury and Venus can be seen in the western sky after sunset. The Superior planets orbit outside Earth's orbit, Mars, Jupiter and Saturn are best viewed between midnight and sunrise.

Venus is 12 times brighter than Mercury so will guide you to Mercury. Both planets are close to each other. During the first three weeks of March both planets are near each other in binoculars, about 5 degrees. Venus shines at mag -3.9 with an angular size of 10.3 arc seconds. During the month it has two conjunctions with Mercury.

Mercury reaches its peak in the west on March 15 at greatest elongation, 18 degrees east of the Sun. But its magnitude will drop from -1.3 at the start of the month to -0.4. By March 20th its magnitude is +0.9 and will be difficult to see.

Look east to locate the Superior planets as they rise in the sky. You will see Jupiter first, followed by Mars then Saturn. Jupiter's disk begins the month at 39 arc seconds and magnitude -2.4. However since it is in Libra its elevation is low in the sky.

Saturn rises about 3 am and is 16.3 arc seconds and becomes easier to spot as the month progresses. Saturn brightens from +0.6 to +0.5 during the month. Saturn is in Sagittarius and like Jupiter is low in the sky.

Mars begins March in Ophiuchus and by March 12 it enters Sagittarius. Mars Rises about 2 am at magnitude +0.8 to +0.3. Its angular diameter of 7 increases to 8.5 arc seconds making it a challenge to see surface detail.

Lunar and Planetary Highlights for March 2018

by Tom Westre

Mar 2 -- Full Moon. This is the Full Crow Moon, Full Crust Moon, Full Sap Moon and the Lenten Moon.

Mar 7 -- Moon Jupiter conjunction. 20 day old Moon passes 4 degrees north of Jupiter called an appulse. Moon is magnitude -12 while

Jupiter is magnitude -2.2 in Libra. Both share the right ascension called a conjunction.

Mar 9 – Moon at Last Quarter, rises about midnight

Mar 9 -- Jupiter reverses direction after midnight in Libra. It stops its eastward motion and begins retrograde loop that lasts until mid July because Earth on a faster orbit passes Jupiter on the "inside track."

Mar 9 – Friday morning the asteroid Vesta is 4.5 degrees to the left of the Moon and 6.5 degrees above Mars.

Mar 10 – Moon and Mars conjunction. 23 day old Moon passes 3 degrees north of Mars. Moon will magnitude -11.2 while Mars is at 0.7 in Ophiuchus. Visible in binoculars.

Mar 11 -- Comet 74P/Smirnova-Chernyka is brightest at magnitude 12.4. in Leo.

Mar 11 – 24 day old moon and Saturn in conjunction in Sagittarius low in eastern sky before sunrise.

Mar 14 – Mercury at dichotomy. Mercury is well placed in the evening sky at magnitude -0.4. It can be seen only a few day near greatest separation from the Sun (greatest elongation). It lies 18 degrees east of the Sun.

Mar 17 – New Moon. Best time to view galaxies and star cluster.

Mar 18 -- Venus Mercury conjunction. Venus passes about 4 degrees south of Mercury. Venus is at magnitude -3.9 while Mercury is a magnitude 0.1 in Pisces. Look for a very young crescent Moon. A great photo opportunity.

Mar 18 -- Moon and Mercury conjunction. The 1 day old Moon passes about 7 degrees south of Venus . The Moon at magnitude -8.4 in Cetus while Mercury at magnitude 0.3 is in Pisces.

Mar 20 -- March Equinox -- 10:15 am Utah time. First day of spring. 12 hours of day and night.

Mar 20 -- The dwarf planet (formerly asteroid) Ceres stop retrograde motion westward and resumes eastward motion. At magnitude 7.8 Ceres is on "inside track" and can be seen in binoculars near the northern boundary of Cancer, 13 degrees to the lower left of the bright star Pollux in Gemini.

Mar 22 -- Moon near Aldebaran in the southwestern sky, the waxing crescent moon passes to upper left of Aldebaran, the brightest star in Taurus in early evening.

Mar 28 – Full Moon meet Regulus in the western pre-dawn sky. The waxing gibbous moon meets Regulus in Leo.

Mar 28 – **CVAS Monthly Meeting, 7pm BATC room 840**

Mar 29 – Venus and Uranus conjunction. Venus passes 0.04' south of Uranus. Venus at magnitude -3.9 and Uranus at magnitude 5.9 in Pisces.

Mar 31 – Comet C/2015 01 (Panstarrs) at its brightest near magnitude 12.9 in Bootes (RA5h 37m / DEC 51 deg 54')

Mar 31 – Full Moon, Blue Moon. In 2018 there are two blue moon (two full moons in the same month, February and March)

Apr 2 --Mars and Saturn will share the same right ascension, with Mars passing 1°16' to the south of Saturn. The pair will be visible in the dawn sky, rising at 02:41 (MST) – 4 hours and 27 minutes before the Sun – and reach an altitude of 25° above the southern horizon before fading from view as dawn breaks at around 06:36. Mars will be at mag 0.3, and Saturn at mag 0.3, both in the constellation Sagittarius.

Apr 7 --- Moon and Saturn Conjunction. The 21 day old moon passes 2 degrees north of Saturn in the early dawn sky about 4 hours before the Sun rises. The Moon will be at magnitude -11 and Saturn at magnitude 0.2 in Sagittarius.

Apr 7 --- Moon and Mars conjunction. The 21 day old moon will pass 3 degrees north of Mars 4 hours and 23 minutes before Sunrise in Sagittarius.

Apr 8-- The Moon is at Last Quarter

Apr 12 -- Virginid Meteor Shower Peaks. The shower will be visible from April 7 to April 18. The Moon will be 26 days old at the time of peak activity, presenting minimal interference.

CACHE VALLEY ASTRONOMICAL SOCIETY
MEMBERSHIP APPLICATION FORM

Member # _____

NAME:_____ _____ _____
First Middle Initial Last

Address:_____ _____ _____ _____
Street City State Zip Code

Home Phone: _____ **Cell Phone:**_____

Work Phone : _____ **Occupation** :_____

Email Address: _____

How did you learn about CVAS?

_____Website ____Star Party ____CVAS Member ____Other _____

Membership: $20 a year

Tell us about yourself: Do you have a special interest in astronomy? Do you have special skills? Are you willing to volunteer on CVAS projects or attend public outreach star parties? Astro equipment owned.

_____

_____

By signing this application, I acknowledge I have access to the CVAS website, cvas-utahskies.org , and the CVAS Constitution. I agree to abide by the constitution.

Signature: _____ Date:_____

Bring this form to the meeting or Mail Application to:

Brad Kropp, CVAS Treasurer
1573 E 1425 N
Logan, UT 84341

For any questions contact our Treasurer at brad.kropp@usu.edu or our Secretary Dale Hooper at dchooper5@gmail.com