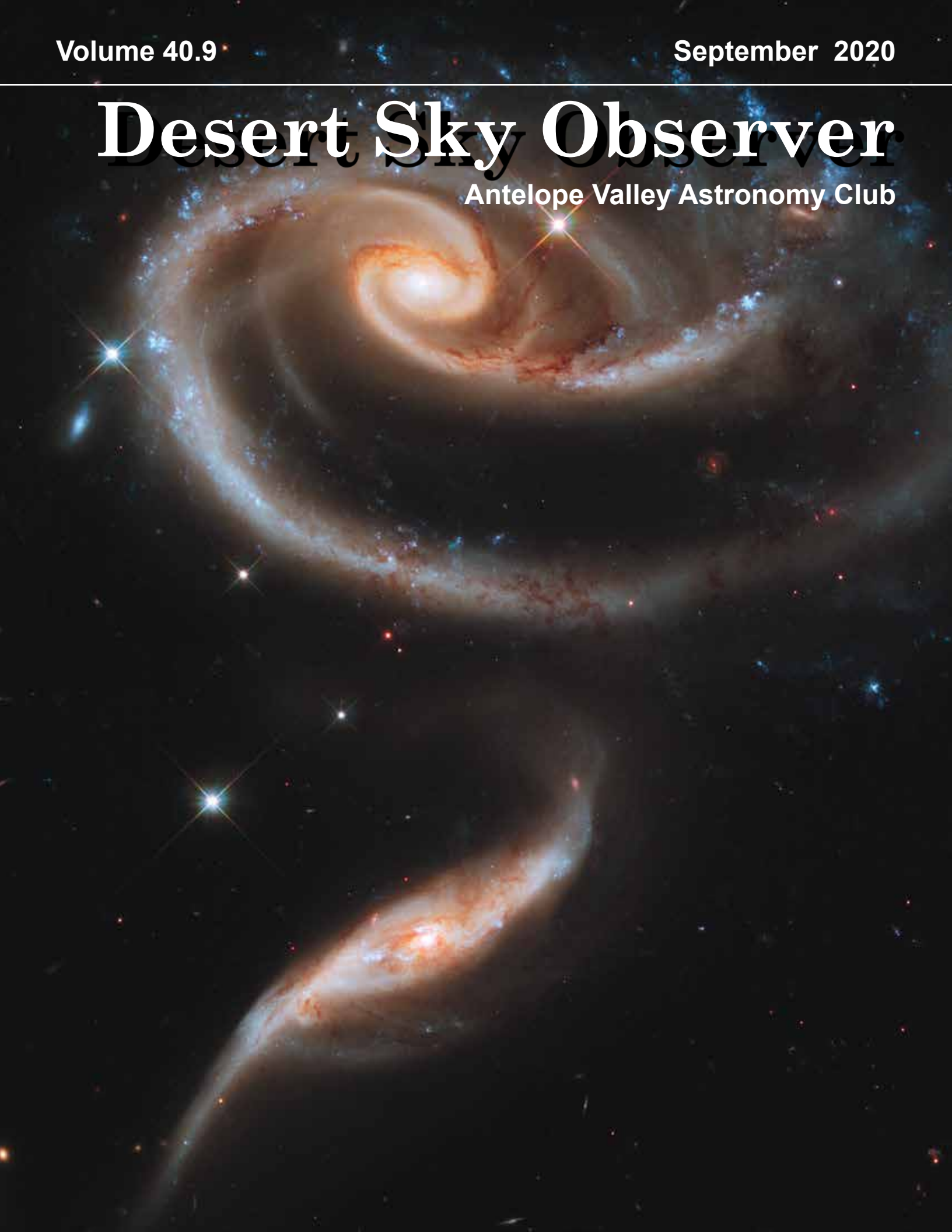


Volume 40.9

September 2020

Desert Sky Observer

Antelope Valley Astronomy Club



Desert Sky Observer

www.avastronomyclub.org

September 2020

Upcoming Events

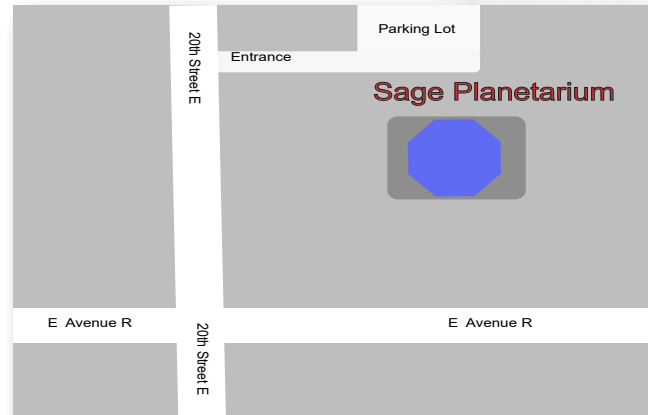
September 11: Club Meeting . . nope
September 12 or 19: DSSP at . . Chuchupate
wait for the email. . .

Any clear night: Personal Star Party

October 9: Business Meeting
October 17: DSSP ...Red Cliffs



AVAC Calendar



Board Members

President: Darrel Bennet (661) 220-0122
president@avastronomyclub.org

Vice-President: Matt Leone (661) 713-1894
vice-president@avastronomyclub.org

Secretary: Rose Moore (661) 972-1953
secretary@avastronomyclub.org

Treasurer: Rod Girard (661) 803-7838
treasurer@avastronomyclub.org

Appointed Positions

Newsletter Editor: Phil Wriedt (661) 917-4874
dso@avastronomyclub.org

Equipment & Library:
John Van Evera 661-754-1819
library@avastronomyclub.org

Club Historian: vacant
history@avastronomyclub.org

Webmaster: Steve Trotta (661) 269-5428
webmaster@avastronomyclub.org

Astronomical League Coordinator:
Frank Moore (661) 972-4775
al@avastronomyclub.org



Monthly Meetings

Monthly meetings are held at the **S.A.G.E. Planetarium** in Palmdale, the second Friday of each month except December. 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.*

Membership

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 ...

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

AVAC

PO Box 8545

Lancaster, CA 93539-8545

Visit the Antelope Valley Astronomy Club website at www.avastronomyclub.org/.



www.avastronomyclub.org

The Antelope Valley Astronomy Club, Inc.
is a §503(c)(3) Non-Profit Corporation.

The AVAC is a Sustaining Member of The Astronomical League and the International Dark-Sky Association

President's Message

By Darrel Bennet

Well hello everyone, I hope you and your families are doing great during this virus shut down. I am still at home waiting to get a call to go back to work.

Last month we had two events scheduled for August; the first was at Mt. Pinos on August 15th, and a lunar star party at Judy's on the 22nd, in Antelope Acres. Both of them were canceled because of the smoke from the fires.

Our next star party will be on September 19th at Chuchupate parking lot. Before the star party we will have an executive board meeting to discuss upcoming club events and talk about the October club board elections. If anyone would like to be on the board next year (especially president) please let one of the board members know. Our October star party will be at Red Cliffs and we will let you know the date.

The board meeting at Chuchupate is open to all club members. So, come out and tell us what you would like the club to do next year and enjoy the night sky.

Until then, keep looking up

On The Cover

This image of a pair of interacting galaxies called Arp 273 was released to celebrate the 21st anniversary of the launch of the NASA/ESA Hubble Space Telescope.

The distorted shape of the larger of the two galaxies shows signs of tidal interactions with the smaller of the two. It is thought that the smaller galaxy has actually passed through the larger one.

Credit:

NASA, ESA and the Hubble Heritage Team (STScI/AURA)

From the Secretary

By Rose Moore

Hope everyone is doing well, and being safe out there.

There will be no astronomy club meeting on Friday, Sept. 11th, unless something significantly changes. There will be a dark sky star party on a Saturday, either Sept. 12th or Sept. 19th. Further information and email to follow. This will be discussed at a Board meeting we will be having in early September.

We do not have any PDW Moonwalks scheduled due to the restrictions. The trails at PDW are open with new temporary hours, but the interpretive center (building) is closed.

On Aug. 22nd we did have a Lunar Club and star party planned at Judy's home in Antelope Acres, but it was canceled due to the smoke from the Lake Fire. Possibly we'll schedule another one before the end of the year. Stay tuned!

At October's club meeting, we usually renominate previous Board members or elect new officers to the Executive Board. We will probably not be able to hold a meeting at the SAGE Planetarium at that time. When the current Board members meet in early September, we will review what we should do to proceed with an election. Will keep you all posted!

Please check your emails for further club news. Or email one of the Board members if you have any questions. Let's hope for 2021 to be a better year for astronomy!

Rose

Member Scope for Sale

Member Duane Lewis is selling his 9.25 inch Celestron CGEM OTA with the tripod, CGE mount, counterweights, one 1.25" 20mm Plossl eyepiece, a 1.25" diagonal and a 2" diagonal, telrad mount, and a Denkmeir (unknown model) binocular viewer. The OTA was tuned up by member Don Bryden before he moved. It has not been used since. Price is \$1200. Duane is unable to have this set up for viewing because of lack of space. So arrangements will have to be made for viewing the scope and accessories. For more info please contact Duane by email only: gurba1826@gmail.com -- or contact Rose by email: rmorion@bak.rr.com

Summer Triangle Corner: Altair

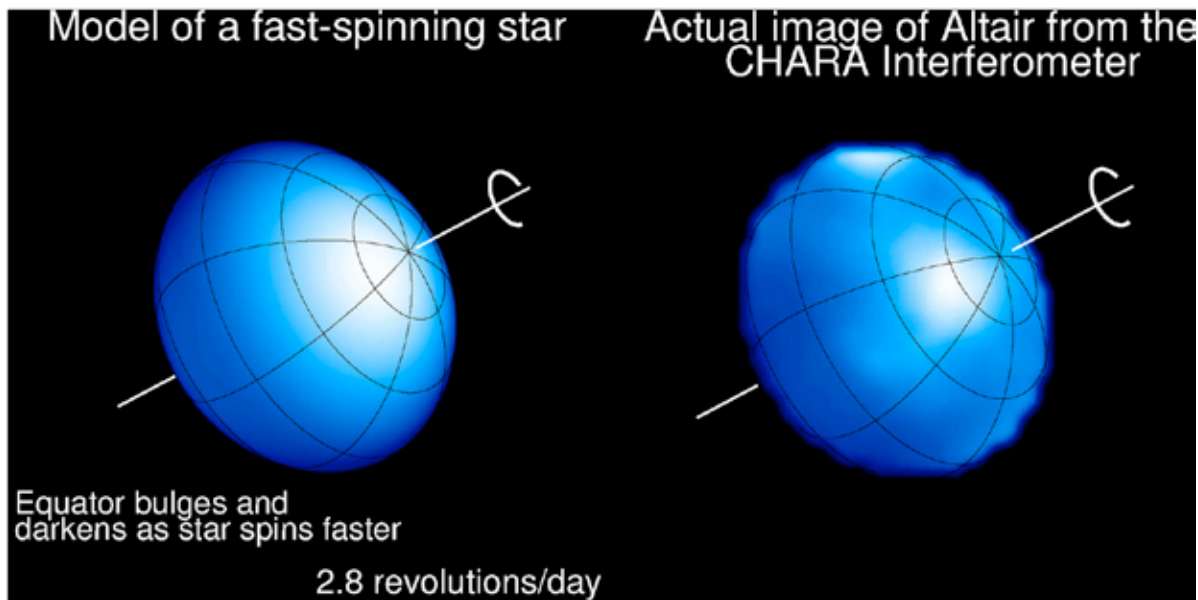
David Prosper, NASA Night Sky Network

Altair is the final stop on our trip around the Summer Triangle! The last star in the asterism to rise for Northern Hemisphere observers before summer begins, brilliant Altair is high overhead at sunset at the end of the season in September. Altair might be the most unusual of the three stars of the Triangle, due to its great speed: this star spins so rapidly that it appears “squished.”

A very bright star, Altair has its own notable place in the mythologies of cultures around the world. As discussed in our previous edition, Altair represents the cowherd Niulang in the ancient Chinese tale of the “Cowherd and the Weaver Girl.” Altair is the brightest star in the constellation of Aquila the Eagle; while described as part of an eagle by ancient peoples around the Mediterranean, it was also seen as part of an eagle by the Koori people in Australia! They saw the star itself as representing a wedge-tailed eagle, and two nearby stars as his wives, a pair of black swans. More recently one of the first home computers was named after the star: the Altair 8800.

Altair’s rapid spinning was first detected in the 1960s. The close observations that followed tested the limits of technology available to astronomers, eventually resulting in direct images of the star’s shape and surface by using a technique called *interferometry*, which combines the light from two or more instruments to produce a single image. Predictions about how the surface of a rapidly spinning massive star would appear held true to the observations; models predicted a squashed, almost “pumpkin-like” shape instead of a round sphere, along with a dimming effect along the widened equator, and the observations confirmed this! This equatorial dimming is due to a phenomenon called *gravity darkening*. Altair is wider at the equator than it is at the poles due to centrifugal force, resulting in the star’s mass bulging outwards at the equator. This results in the denser poles of the star being hotter and brighter, and the less dense equator being cooler and therefore dimmer. This doesn’t mean that the equator of Altair or other rapidly spinning stars are actually dark, but rather that the equator is dark in comparison to the poles; this is similar in a sense to sunspots. If you were to observe a sunspot on its own, it would appear blindingly bright, but it is cooler than the surrounding plasma in the Sun and so appears dark in contrast.

As summer winds down, you can still take a Trip Around the Summer Triangle with this activity from the Night Sky Network. Mark some of the sights in and around the Summer Triangle at: bit.ly/TriangleTrip. You can discover more about NASA’s observations of Altair and other fast and furious stars at nasa.gov.



The image on the above was created using optical interferometry: the light from four telescopes was combined to produce this image of Altair's surface. Image credit: Ming Zhao. More info: bit.ly/altairvsmodel



Altair is up high in the early evening in September. Note Altair's two bright "companions" on either side of the star. Can you imagine them as a formation of an eagle and two swans, like the Koori?

This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach.

Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Astronomy Picture Of The Day

<https://apod.nasa.gov/apod/ap200826.html>



Cygnus Skyscape

Image Credit & Copyright: Alistair Symon

Image used with permission

Explanation: In brush strokes of interstellar dust and glowing hydrogen gas, this beautiful skyscape is painted across the plane of our [Milky Way Galaxy](#) near the northern end of the [Great Rift](#) and the constellation [Cygnus the Swan](#). Composed using 22 different images and over 180 hours of image data, the widefield mosaic spans an impressive 24 degrees across the sky. Alpha star of Cygnus, bright, hot, supergiant [Deneb](#) lies near top center. Crowded with stars and luminous gas clouds Cygnus is also home to the dark, obscuring [Northern Coal Sack Nebula](#), extending from Deneb toward the center of the view. The reddish glow of star forming regions NGC 7000 and IC 5070, the [North America Nebula and Pelican Nebulas](#), are just left of Deneb. The [Veil Nebula](#) is a standout below and left of center. A [supernova remnant](#), the Veil is some 1,400 light years away, but many other nebulae and star clusters are identifiable throughout the cosmic scene. Of course, Deneb itself is also known to northern hemisphere skygazers for its place in two asterisms -- marking the top of the [Northern Cross](#) and a vertex of the [Summer Triangle](#).

Space News

News from around the Net

Hubble Helps Uncover the Mystery of the Dimming of Betelgeuse

New observations by the NASA/ESA Hubble Space Telescope suggest that the unexpected dimming of the supergiant star Betelgeuse was most likely caused by an immense amount of hot material ejected into space, forming a dust cloud that blocked starlight coming from Betelgeuse's surface. . . (continued at <https://www.spacetelescope.org/news/heic2014/?lang>)



NASA Researchers Track Slowly Splitting 'Dent' in Earth's Magnetic Field

A small but evolving dent in Earth's magnetic field can cause big headaches for satellites. Earth's magnetic field acts like a protective shield around the planet, repelling and trapping charged particles from the Sun. But over South America and the southern Atlantic Ocean, an unusually weak spot in the field – called the South Atlantic Anomaly, . . . (continued at <https://www.nasa.gov/feature/nasa-researchers-track-slowly-splitting-dent-in-earth-s-magnetic-field>)



Unveiling Rogue Planets With NASA's Roman Space Telescope

New simulations show that NASA's Nancy Grace Roman Space Telescope will be able to reveal myriad rogue planets – freely floating bodies that drift through our galaxy untethered to a star. Studying these island worlds will help us understand more about how planetary systems form, evolve, and break apart. (continued at <https://www.nasa.gov/feature/goddard/2020/unveiling-rogue-planets-with-nasas-roman-space-telescope>)



NASA's Planet Hunter Completes Its Primary Mission

On July 4, NASA's Transiting Exoplanet Survey Satellite (TESS) finished its primary mission, imaging about 75% of the starry sky as part of a two-year-long survey. In capturing this giant mosaic, TESS has found 66 new exoplanets, or worlds beyond our solar system, as well as nearly 2,100 candidates astronomers are working to confirm. . . . (continued at <https://www.nasa.gov/feature/goddard2020/nasa-s-planet-hunter-completes-its-primary-mission>)



Arecibo Down, But Not Necessarily Out, Following Cable Failure

The Arecibo Observatory just can't catch a break. Early Monday morning, a 3-inch thick cable that supports a platform high above the radio telescope failed, striking and damaging the dome that houses its receiver and tearing a 100-foot (30.5 meter) gash in the observatory's main dish. No one was injured in the incident, observatory officials say, which occurred at 2:35 A.M. local time while the telescope was tracking, . . . (continued at <https://astronomy.com/news/2020/08/arecibo-down-but-not-necessarily-out-following-cable-failure>)



The Origin Of Earth's Water

We may finally have found the missing source of most of Earth's water in a rare class of meteorites called enstatite chondrites. These are remnants of the part of the protoplanetary disk from which the terrestrial planets formed. Their composition resembles Earth's, but they had been thought too dry to supply water. . . . (continued at <https://skyandtelescope.org/astronomy-news/the-origin-of-earths-water/>)



Space News

News from around the Net. . .continued

Space station crew spend extra night in Russian segment as air leak investigation continues

But there's nothing to worry about, NASA officials stressed. Update, Aug. 25, 9:45 a.m.: The trio of astronauts currently living and working on the International Space Station reopened the hatch between the Russian and American sides of the station this morning, according to NASA spokesperson Dan Huot. . . . (continued at <https://www.space.com/space-station-leak-investigation-continues.html>)



“Dead Ringer” For The Milky Way Found In Early Universe

A cosmic magnifying glass has revealed a Milky Way-like galaxy in the early universe that doesn't conform to cosmologists' expectations. When astronomers look into the distant universe, the galaxies they have the best chance of seeing must be exceedingly bright to be seen from so far away. But cosmic magnifying glasses known as gravitational lenses make even ordinary galaxies visible from billions of light-years away. (continued at <https://skyandtelescope.org/astronomy-news/dead-ringer-milky-way-found-early-universe/>)



Space Debris Observed For The First Time During The Day

On the afternoon of February 10, 2009, the operational communications satellite Iridium 33 collided with the obsolete Cosmos 2251 communications satellite over Siberia at an altitude of roughly 800 kilometers. The collision was at a speed of 11.7 kilometers a second and produced a cloud of more than 2,000 pieces of debris larger than ten centimeters. . . . (continued at <https://phys.org/news/2020-08-space-debris-day.html>)



Nasa's Webb Solar Array Reconnects To The Telescope

One kilowatt is about what it takes to heat up some leftovers in a microwave—or to power the largest and most technically advanced telescope ever built. Thanks to its solar array, NASA's James Webb Space Telescope will stay energy-efficient more than 1 million miles (1.5 million kilometers) from Earth. . . .(continued at <https://phys.org/news/2020-08-nasa-webb-solar-array-reconnects.html>)



Hubble Maps Giant Halo Around Andromeda Galaxy

In a landmark study, scientists using NASA's Hubble Space Telescope have mapped the immense envelope of gas, called a halo, surrounding the Andromeda galaxy, our nearest large galactic neighbor. Scientists were surprised to find that this tenuous, nearly invisible halo of diffuse plasma extends 1.3 million light-years from the galaxy—about halfway to our Milky Way . . (cont'd at <https://phys.org/news/2020-08-hubble-giant-halo-andromeda-galaxy.html>)



New Observations Of Black Hole Devouring A Star Reveal Rapid Disk Formation

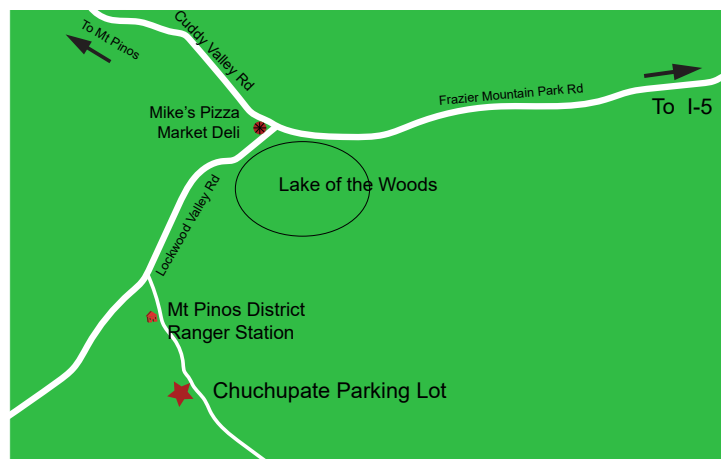
When a star passes too close to a supermassive black hole, tidal forces tear it apart, producing a bright flare of radiation as material from the star falls into the black hole. Astronomers study the light from these “tidal disruption events” (TDEs) for clues to the feeding behavior of the supermassive black holes lurking at the centers of galaxies. . . .(continued at <https://www.sciencedaily.com/releases/2020/08/200826152727.htm>)



Dark Sky Observing Sites

The Chuchupate parking lot is a half a mile beyond the Mt Pinos ranger station (on some maps The Chuchupate Ranger Sta., the parking lot is also called Frazier Mountain trailhead).

To get there, take the Frazier Mountain Park RD east about 7 miles from I-5, to Lake Of The Woods, Turn left on Lockwood Valley Rd. (If you see Mike's Pizza on your left you missed the turn) In less than a mile there is a road to the left, go past the ranger station, the parking lot is on the right. The Club gathers in the upper end of the lot. The Elevation is 5430 feet. There is a vault toilet.



The Red Cliffs Natural Area is part of **Red Rock Canyon State Park** is a day use area and is not for use by the public after dark. The Club gets a special permit for a star party and pays a fee.

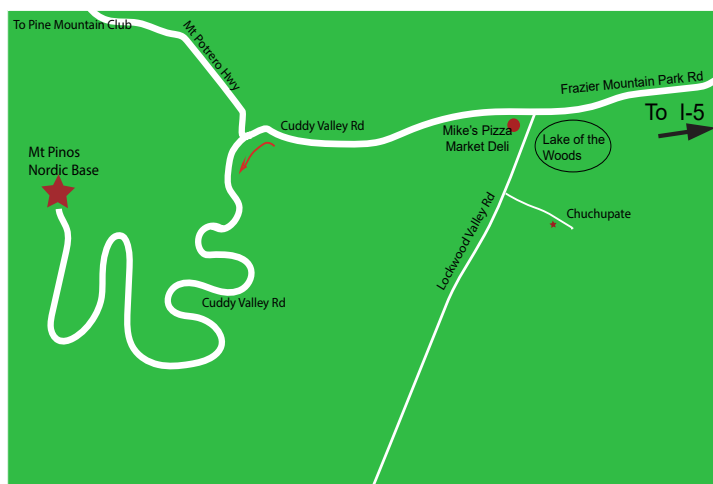
To get there: Take the CA-14 north 25 miles past Mojave. You will see giant red cliffs on the right side and a small sign that says "Red Cliffs Natural Area" and a dirt road. (If you see the large sign for the Ricardo campground, you drove a mile too far). Follow the road to the large parking lot (that hasn't been graded in a long time). Elevation is 2410 feet. There is a vault toilet.



Mt Pinos is a parking lot at 8350 feet for the "Mt Pinos Nordic Base." There is a vault toilet 300 yds to the east in the Chula Vista campground.

To get there: From I-5, get off at Frazier Mountain Park Rd and drive west about 7 miles to Mike's Pizza/Market Deli at Lockwood Valley Rd. Keep on the main roadway (don't turn left to go to Chuchupate). Continue past Mike's Pizza on Cuddy Valley Rd (the road's new name) about 5 miles. Continue straight (do not turn right on to Mil Potrero Hwy) for another 8 1/2 miles to the parking area.

Note: The entire drive is uphill



Planet Summary

The **Sun** starts September in Leo and crosses into Virgo on the 17th of the month.

Mercury spends the entire month slowly separating from the Sun towards its greatest eastern elongation (GEE) on October 1. It will be difficult to see with the ecliptic so far south this time of the year.

Venus remains in the morning twilight, towering high above the Sun along the steepest portion of the ecliptic. The waning crescent Moon passes 4° north on the morning of the 14th. By the end of the month it nears Regulus with which it will have a close pass in early October.

Mars rises soon after sunset and is prominent in Pisces throughout the night. Mars reaches its first stationary point on the 9th and begins its retrograde motion. The waning gibbous Moon will make an extremely close pass on the evening of the 5th.

Jupiter reaches its second stationary point on the 13th thereafter returning to prograde motion. The waxing gibbous Moon passes 2° to the south on the 25th. Jupiter and Saturn continue to move closer until December 21 when they are less than 7' apart.

Saturn continues its retrograde motion in eastern Sagittarius until the 29th when it reaches its second stationary point, after which it resumes its prograde motion. The waxing gibbous Moon passes 2° to its south on the 25th.

Uranus will spend 2020 in southern Aries at magnitude 5+. The 77% waning Moon will pass 3° south on the early evening of the 7th.

Neptune will spend the month stationary in northeast Aquarius at mag 7.8. On the 11th reaches opposition 4 light-hours (28.9 au) from earth. The Moon will pass 4° south on the morning of the 30th.

Pluto spends the month in Sagittarius at mag 14 between Jupiter and Saturn.

Sun and Moon Rise and Set



First Qtr
Sept 23

Full
Sept 1

Third Qtr
Sept 10

New
Sept 17

Sun and Moon Rise and Set*

Date	Moonrise	Moonset	Sunrise	Sunset
9/1/2020	18:58	04:46	06:26	19:20
9/5/2020	20:55	08:36	06:28	19:14
9/10/2020	23:32	13:17	06:32	19:07
9/15/2020	03:14	17:41	06:35	19:00
9/20/2020	09:09	20:45	06:39	18:53
9/25/2020	14:45	23:40	06:43	18:46
9/30/2020	18:04	04:37	06:46	18:39

Planet Data*

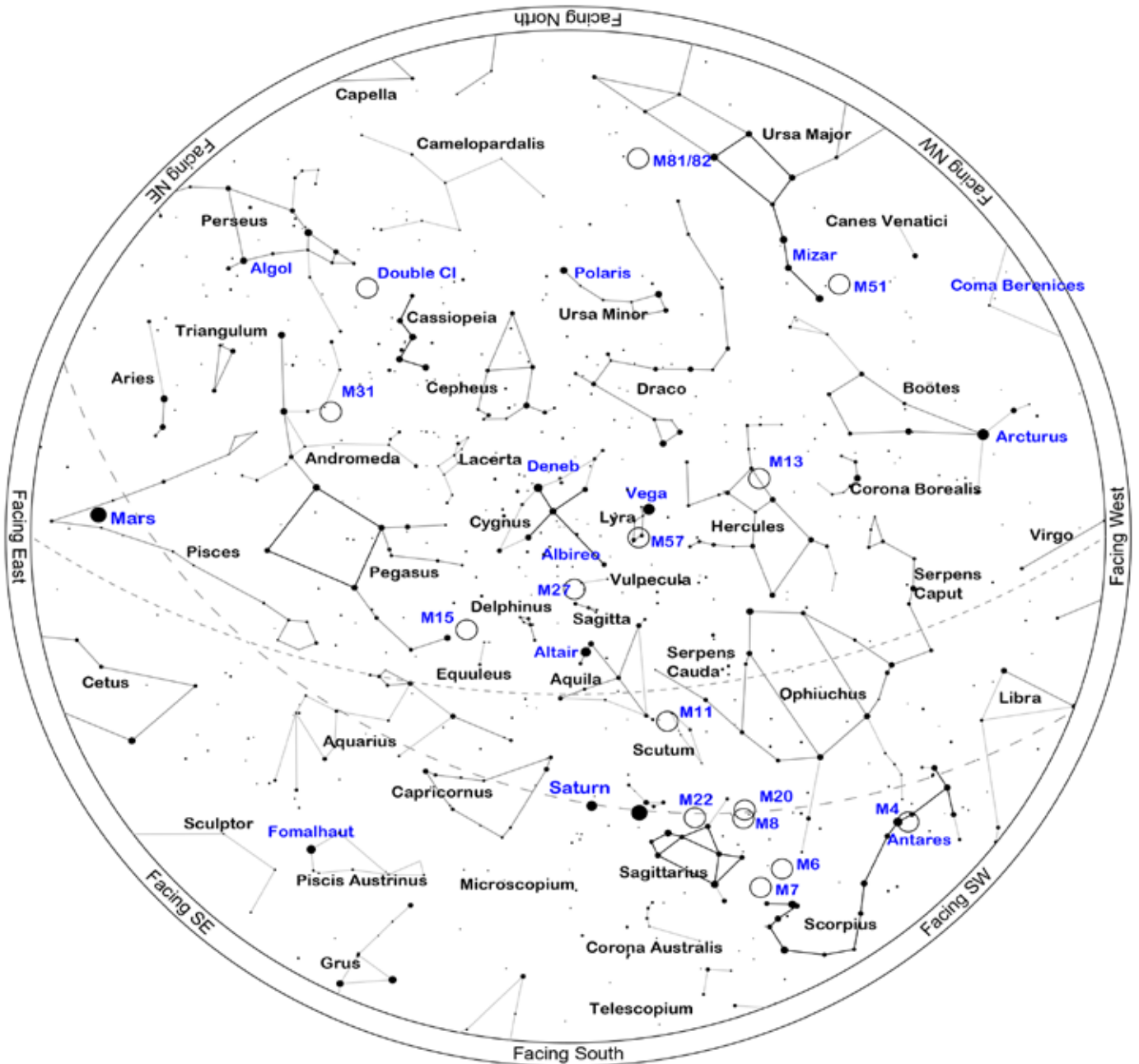
Sept 1					
	Rise	Transit	Set	Mag	Phase%
Mercury	07:27	13:42	19:56	-0.68	91.93
Venus	02:54	09:53	16:53	-4.20	59.67
Mars	21:37	04:01	10:21	-1.81	91.96
Jupiter	16:31	21:26	02:25	-2.60	99.40
Saturn	17:01	22:01	03:05	0.32	99.88

Sept 15					
	Rise	Transit	Set	Mag	Phase%
Mercury	08:19	14:05	19:51	-0.12	80.35
Venus	03:10	10:02	16:54	-4.14	65.14
Mars	20:42	03:07	09:28	-2.16	95.47
Jupiter	15:35	20:30	01:29	-2.51	99.20
Saturn	16:05	21:04	02:08	0.39	99.82

Sept 30					
	Rise	Transit	Set	Mag	Phase%
Mercury	08:54	14:15	19:35	0.05	62.34
Venus	03:32	10:12	16:51	-4.09	71.34
Mars	19:34	01:58	08:17	-2.47	98.77
Jupiter	14:38	19:33	00:28	-2.41	99.07
Saturn	15:05	20:05	01:08	0.47	99.77

*Sun, Moon and Planetary date based on Quartz Hill, CA

Sky Chart



Location: Palmdale, CA 93551

Latitude: 34° 36' N, longitude: 118° 11' W

Time: 2020 September 19, 21:00 (UTC -07:00)

Powered by: Heavens-Above.com

Suggested Observing List

The list below contains objects that will be visible on the night of the AVAC Deep Sky Star Party or the Saturday nearest the New Moon, in this case September 19, 2020. The list is sorted by the transit time of the object.

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC5447	Neb	UMa	14h 02m 29s	+54° 16.3'		03:46	15:02	02:18
M101	Galaxy	UMa	14h 03m 13s	+54° 20.9'	8.2	03:43	15:03	02:22
NGC5461	Neb	UMa	14h 03m 42s	+54° 19.0'		03:45	15:03	02:21
NGC5485	Galaxy	UMa	14h 07m 11s	+55° 00.0'	11.5	Circum	15:07	Circum
NGC5460	Open	Cen	14h 07m 27s	-48° 20.6'	5.6	12:24	15:07	17:49
NGC5500	Galaxy	Boo	14h 10m 15s	+48° 32.7'	14.0	05:37	15:10	00:42
IC991	Galaxy	Vir	14h 17m 48s	-13° 52.3'	13.0	09:54	15:17	20:41
HR5362	Dbl	Lup	14h 20m 10s	-43° 03.5'	5.6	11:56	15:20	18:44
IC4406	P Neb	Lup	14h 22m 26s	-44° 09.0'	11.0	12:05	15:22	18:38
HR5409	Triple	Vir	14h 28m 12s	-02° 13.6'	4.8	09:31	15:28	21:24
NGC5669	Galaxy	Boo	14h 32m 44s	+09° 53.4'	12.0	09:02	15:32	22:03
NGC5689	Galaxy	Boo	14h 35m 30s	+48° 44.5'	11.9	06:00	15:35	01:10
M102	Galaxy	Dra	15h 06m 30s	+55° 45.7'	10.8	Circum	16:06	Circum
NGC5875	Galaxy	Boo	15h 09m 13s	+52° 31.6'	13.0	05:40	16:09	02:37
NGC5907	Galaxy	Dra	15h 15m 54s	+56° 19.7'	11.4	Circum	16:15	Circum
NGC5882	P Neb	Lup	15h 16m 50s	-45° 38.9'	11.0	13:11	16:16	19:22
NGC5897	Globular	Lib	15h 17m 24s	-21° 00.6'	8.6	11:15	16:17	21:18
M5	Globular	Ser	15h 18m 33s	+02° 04.9'	7.0	10:09	16:18	22:26
Barnard228	DkNeb	Lup	15h 44m 00s	-34° 30.0'		12:33	16:43	20:54
IC4593	P Neb	Her	16h 11m 44s	+12° 04.3'	11.0	10:34	17:11	23:48
IC4592	Neb	Sco	16h 11m 59s	-19° 27.4'		12:05	17:11	22:18
M80	Globular	Sco	16h 17m 03s	-22° 58.5'	8.5	12:22	17:16	22:11
IC4601	Neb	Sco	16h 20m 18s	-20° 04.9'		12:15	17:20	22:24
Abell38	P Neb	Sco	16h 23m 17s	-31° 44.9'	11.7	13:00	17:23	21:45
M4	Globular	Sco	16h 23m 35s	-26° 31.5'	7.5	12:40	17:23	22:06
IC4603	Neb	Oph	16h 25m 24s	-24° 28.0'		12:35	17:25	22:15
IC4604	Neb	Oph	16h 25m 33s	-23° 26.5'		12:32	17:25	22:18
NGC6124	Open	Sco	16h 25m 36s	-40° 40.0'	5.8	13:46	17:25	21:04
Abell39	P Neb	Her	16h 27m 33s	+27° 54.5'	12.9	09:58	17:27	00:56
IC4605	Neb	Sco	16h 30m 12s	-25° 06.8'		12:42	17:30	22:17
NGC6153	P Neb	Sco	16h 31m 31s	-40° 15.2'	12.0	13:50	17:31	21:12
NGC6181	Galaxy	Her	16h 32m 21s	+19° 49.5'	11.9	10:31	17:32	00:33
NGC6171	Globular	Oph	16h 32m 32s	-13° 03.1'	8.1	12:06	17:32	22:58
NGC6178	Open	Sco	16h 35m 47s	-45° 38.6'	7.2	14:30	17:35	20:41
NGC6193	Open	Ara	16h 41m 18s	-48° 46.0'	5.2	15:02	17:41	20:19
M13	Globular	Her	16h 41m 41s	+36° 27.5'	7.0	09:34	17:41	01:48

Desert Sky Observer

www.avastronomyclub.org

September 2020

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6210	P Neb	Her	16h 44m 30s	+23° 48.0'	9.0	10:30	17:44	00:58
Barnard44a	DkNeb	Sco	16h 44m 45s	-40° 20.0'		14:03	17:44	21:25
NGC6204	Open	Ara	16h 46m 09s	-47° 01.0'	8.2	14:51	17:46	20:40
M12	Globular	Oph	16h 47m 14s	-01° 56.8'	8.0	11:49	17:47	23:44
NGC6231	Open	Sco	16h 54m 00s	-41° 48.0'	2.6	14:21	17:53	21:25
IC4628	Neb	Sco	16h 56m 58s	-40° 27.3'		14:16	17:56	21:36
NGC6254	Globular	Oph	16h 57m 09s	-04° 05.9'	6.6	12:05	17:57	23:48
Barnard47	DkNeb	Oph	16h 59m 42s	-22° 38.0'		13:03	17:59	22:55
M62	Globular	Oph	17h 01m 13s	-30° 06.7'	8.0	13:32	18:01	22:30
M19	Globular	Oph	17h 02m 38s	-26° 16.0'	8.5	13:19	18:02	22:46
Barnard51	DkNeb	Oph	17h 04m 44s	-22° 15.0'		13:07	18:04	23:02
IC4637	P Neb	Sco	17h 05m 10s	-40° 53.1'	14.0	14:27	18:05	21:42
Barnard56	DkNeb	Sco	17h 08m 48s	-32° 05.0'		13:47	18:08	22:29
Barnard59	DkNeb	Oph	17h 11m 23s	-27° 29.0'		13:32	18:11	22:50
NGC6302	P Neb	Sco	17h 13m 42s	-37° 06.0'	9.6	14:15	18:13	22:11
Barnard251	DkNeb	Oph	17h 13m 48s	-20° 09.0'		13:09	18:13	23:17
Barnard63	DkNeb	Oph	17h 16m 00s	-21° 28.0'		13:15	18:15	23:15
M92	Globular	Her	17h 17m 07s	+43° 08.1'	7.5	09:30	18:17	03:03
M9	Globular	Oph	17h 19m 12s	-18° 31.0'	9.0	13:09	18:19	23:28
NGC6326	P Neb	Ara	17h 20m 46s	-51° 45.2'	12.0	16:16	18:20	20:24
Barnard256	DkNeb	Oph	17h 22m 12s	-28° 49.0'		13:48	18:22	22:56
Barnard67a	DkNeb	Oph	17h 22m 30s	-21° 53.0'		13:23	18:22	23:21
Barnard71	DkNeb	Oph	17h 23m 02s	-24° 00.0'		13:31	18:22	23:14
NGC6357	Neb	Sco	17h 24m 43s	-34° 12.1'		14:12	18:24	22:36
IC4651	Open	Ara	17h 24m 52s	-49° 56.5'	6.9	15:58	18:24	20:50
Abell41	P Neb	Ser	17h 29m 04s	-15° 13.3'	13.9	13:09	18:28	23:48
Abell42	P Neb	Oph	17h 31m 31s	-08° 19.1'	14.6	12:51	18:31	00:11
Barnard78	DkNeb	Oph	17h 32m 00s	-25° 35.0'		13:45	18:31	23:17
NGC6388	Globular	Sco	17h 36m 17s	-44° 44.1'	6.9	15:23	18:36	21:48
M14	Globular	Oph	17h 37m 36s	-03° 14.7'	9.5	12:43	18:37	00:31
Barnard276	DkNeb	Oph	17h 39m 39s	-19° 49.0'		13:34	18:39	23:44
M6	Open	Sco	17h 40m 20s	-32° 15.2'	4.5	14:20	18:40	23:00
NGC6397	Globular	Ara	17h 40m 42s	-53° 40.0'	5.6	17:07	18:40	20:13
NGC6426	Globular	Oph	17h 44m 55s	+03° 10.1'	11.2	12:33	18:44	00:56
Barnard83a	DkNeb	Sgr	17h 45m 18s	-20° 00.0'		13:40	18:45	23:49
IC4665	Open	Oph	17h 46m 30s	+05° 39.0'	4.2	12:27	18:46	01:04
NGC6445	P Neb	Sgr	17h 49m 15s	-20° 00.6'	13.0	13:44	18:49	23:53
NGC6503	Galaxy	Dra	17h 49m 27s	+70° 08.6'	10.2	Circum	18:49	Circum
NGC6441	Globular	Sco	17h 50m 13s	-37° 03.0'	7.4	14:51	18:50	22:48
Barnard283	DkNeb	Sco	17h 51m 00s	-33° 52.0'		14:37	18:50	23:04
Barnard285	DkNeb	Ser	17h 51m 32s	-12° 52.0'		13:24	18:51	00:17

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ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M7	Open	Sco	17h 53m 51s	-34° 47.6'	3.5	14:44	18:53	23:02
IC4670	Neb	Sgr	17h 55m 07s	-21° 44.6'		13:55	18:55	23:54
NGC6501	Galaxy	Her	17h 56m 04s	+18° 22.3'	12.3	11:59	18:55	01:52
M23	Open	Sgr	17h 57m 04s	-18° 59.1'	6.0	13:49	18:56	00:04
NGC6543	P Neb	Dra	17h 58m 36s	+66° 38.0'	8.1	Circum	18:58	Circum
NGC6496	Globular	Sco	17h 59m 04s	-44° 16.0'	9.2	15:43	18:58	22:14
Barnard291	DkNeb	Sgr	17h 59m 43s	-33° 53.0'		14:46	18:59	23:12
Barnard292	DkNeb	Sgr	18h 00m 34s	-33° 20.0'		14:44	19:00	23:16
Barnard293	DkNeb	Sgr	18h 01m 12s	-35° 20.0'		14:54	19:01	23:07
M20	Open+D Neb	Sgr	18h 02m 42s	-22° 58.2'	5.0	14:07	19:02	23:57
M8	Open+D Neb	Sgr	18h 03m 41s	-24° 22.7'	5.0	14:13	19:03	23:53
Barnard295	DkNeb	Sgr	18h 04m 05s	-31° 09.0'		14:39	19:04	23:28
M21	Open	Sgr	18h 04m 13s	-22° 29.3'	7.0	14:07	19:04	00:00
NGC6530	Open	Sgr	18h 04m 31s	-24° 21.5'	4.6	14:14	19:04	23:54
NGC6528	Globular	Sgr	18h 04m 50s	-30° 03.3'	9.5	14:35	19:04	23:33
IC4684	Neb	Sgr	18h 09m 08s	-23° 26.1'		14:15	19:09	00:02
IC4685	Neb	Sgr	18h 09m 18s	-23° 59.2'		14:17	19:09	00:00
Barnard303	DkNeb	Sgr	18h 09m 28s	-23° 59.0'		14:17	19:09	00:00
IC1274	Neb	Sgr	18h 09m 51s	-23° 38.8'		14:17	19:09	00:02
IC1275	Neb	Sgr	18h 10m 07s	-23° 45.7'		14:17	19:10	00:02
NGC6572	P Neb	Oph	18h 12m 06s	+06° 51.2'	9.0	12:50	19:12	01:33
NGC6567	P Neb	Sgr	18h 13m 45s	-19° 04.5'	12.0	14:05	19:13	00:21
IC4701	Neb	Sgr	18h 16m 36s	-16° 38.0'		14:01	19:16	00:31
Barnard93	DkNeb	Sgr	18h 16m 53s	-18° 03.0'		14:05	19:16	00:27
IC1284	Neb	Sgr	18h 17m 39s	-19° 40.3'		14:11	19:17	00:23
M24	Open	Sgr	18h 18m 26s	-18° 24.3'	4.5	14:08	19:18	00:28
M16	Open+D Neb	Ser	18h 18m 48s	-13° 48.3'	6.5	13:54	19:18	00:42
Barnard308	DkNeb	Sgr	18h 19m 08s	-22° 14.0'		14:21	19:19	00:16
M18	Open	Sgr	18h 19m 58s	-17° 06.1'	8.0	14:06	19:19	00:33
M17	Open+D Neb	Sgr	18h 20m 47s	-16° 10.3'	7.0	14:04	19:20	00:37
HR6923	Mult	Dra	18h 23m 54s	+58° 48.0'	5.0	Circum	19:23	Circum
M28	Globular	Sgr	18h 24m 33s	-24° 52.1'	8.5	14:36	19:24	00:12
Barnard95	DkNeb	Sct	18h 25m 35s	-11° 44.0'		13:55	19:25	00:55
Barnard97	DkNeb	Sct	18h 29m 05s	-09° 55.0'		13:53	19:29	01:04
Abell44	P Neb	Sgr	18h 30m 11s	-16° 45.4'	12.6	14:15	19:30	00:44
NGC6637	Globular	Sgr	18h 31m 23s	-32° 20.8'	7.7	15:11	19:31	23:51
IC1287	Neb	Sct	18h 31m 26s	-10° 47.7'		13:58	19:31	01:03
M25	Open	Sgr	18h 31m 42s	-19° 07.0'	6.5	14:24	19:31	00:39
IC4725	Open	Sgr	18h 31m 48s	-19° 06.7'	4.6	14:24	19:31	00:39
NGC6642	Globular	Sgr	18h 31m 54s	-23° 28.5'	8.8	14:38	19:31	00:25
NGC6644	P Neb	Sgr	18h 32m 35s	-25° 07.7'	12.0	14:44	19:32	00:20

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NGC6647	Open	Sgr	18h 32m 49s	-17° 13.6'	8.0	14:19	19:32	00:46
IC4732	P Neb	Sgr	18h 33m 55s	-22° 38.6'	13.0	14:37	19:33	00:29
NGC6656	Globular	Sgr	18h 36m 24s	-23° 54.2'	5.1	14:44	19:36	00:28
IC4756	Open	Ser	18h 38m 54s	+05° 27.0'	5.0	13:20	19:38	01:56
NGC6681	Globular	Sgr	18h 43m 12s	-32° 17.4'	8.1	15:23	19:43	00:03
NGC6694	Open	Sct	18h 45m 18s	-09° 23.0'	8.0	14:08	19:45	01:21
IC4776	P Neb	Sgr	18h 45m 51s	-33° 20.5'	12.0	15:30	19:45	00:01
Barnard318	DkNeb	Sct	18h 49m 42s	-06° 23.0'		14:04	19:49	01:34
M11	Open	Sct	18h 51m 05s	-06° 16.1'	7.0	14:05	19:51	01:36
M57	P Neb	Lyr	18h 53m 35s	+33° 01.7'	9.5	12:03	19:53	03:44
Barnard117	DkNeb	Sct	18h 53m 43s	-07° 24.0'		14:11	19:53	01:35
NGC6715	Globular	Sgr	18h 55m 03s	-30° 28.7'	7.7	15:27	19:54	00:22
NGC6717	Globular	Sgr	18h 55m 06s	-22° 42.0'	9.2	14:59	19:55	00:50
Barnard122	DkNeb	Sct	18h 56m 48s	-04° 45.0'		14:07	19:56	01:46
Barnard123	DkNeb	Sct	18h 57m 39s	-04° 43.0'		14:07	19:57	01:47
NGC6723	Globular	Sgr	18h 59m 33s	-36° 37.9'	7.3	15:59	19:59	23:59
Barnard128	DkNeb	Aql	19h 01m 40s	-04° 34.0'		14:11	20:01	01:51
NGC6729	BrNeb	CrA	19h 01m 54s	-36° 57.0'		16:03	20:01	00:00
Barnard326	DkNeb	Aql	19h 03m 00s	-00° 23.0'		14:01	20:02	02:04
NGC6749	Globular	Aql	19h 05m 15s	+01° 54.0'	11.1	13:57	20:05	02:13
Barnard329	DkNeb	Aql	19h 06m 59s	+03° 11.0'		13:55	20:06	02:18
NGC6760	Globular	Aql	19h 11m 12s	+01° 01.8'	9.1	14:05	20:11	02:16
Abell56	P Neb	Aql	19h 13m 07s	+02° 52.8'	12.4	14:02	20:13	02:23
NGC6772	P Neb	Aql	19h 14m 36s	-02° 42.4'	14.0	14:19	20:14	02:09
Barnard138	DkNeb	Aql	19h 16m 00s	+00° 13.0'		14:12	20:15	02:19
M56	Globular	Lyr	19h 16m 36s	+30° 11.0'	9.5	12:38	20:16	03:54
NGC6778	P Neb	Aql	19h 18m 25s	-01° 35.7'	13.0	14:19	20:18	02:16
Abell61	P Neb	Cyg	19h 19m 10s	+46° 14.5'	13.0	11:08	20:19	05:29
Barnard140	DkNeb	Aql	19h 19m 49s	+05° 13.0'		14:02	20:19	02:36
NGC6790	P Neb	Aql	19h 22m 57s	+01° 30.8'	10.0	14:15	20:22	02:29
NGC6803	P Neb	Aql	19h 31m 16s	+10° 03.3'	11.0	14:00	20:31	03:02
NGC6804	P Neb	Aql	19h 31m 35s	+09° 13.5'	12.0	14:02	20:31	03:00
Abell62	P Neb	Aql	19h 33m 18s	+10° 37.0'	13.0	14:00	20:33	03:05
NGC6807	P Neb	Aql	19h 34m 34s	+05° 41.0'	14.0	14:15	20:34	02:53
M55	Globular	Sgr	19h 40m 00s	-30° 57.7'	7.0	16:14	20:39	01:05
NGC6813	Neb	Vul	19h 40m 22s	+27° 18.5'		13:13	20:40	04:07
NGC6820	Neb	Vul	19h 42m 28s	+23° 05.2'		13:30	20:42	03:54
Barnard338	DkNeb	Aql	19h 43m 02s	+07° 27.0'		14:19	20:42	03:06

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ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6818	P Neb	Sgr	19h 43m 58s	-14° 09.1'	10.0	15:21	20:43	02:06
NGC6826	P Neb	Cyg	19h 44m 48s	+50° 31.0'	8.8	10:48	20:44	06:41
Abell65	P Neb	Sgr	19h 46m 34s	-23° 08.2'	13.1	15:52	20:46	01:40
NGC6838	Globular	Sge	19h 53m 46s	+18° 46.6'	8.3	13:56	20:53	03:51
NGC6842	P Neb	Vul	19h 55m 02s	+29° 17.3'	14.0	13:20	20:54	04:29
HR7619	Mult	Cyg	19h 55m 38s	+52° 26.3'	4.9	10:28	20:55	07:22
Abell66	P Neb	Sgr	19h 57m 32s	-21° 36.6'	14.1	15:57	20:57	01:56
Barnard144	DkNeb	Cyg	19h 58m 00s	+35° 20.0'		12:56	20:57	04:59
NGC6853	P Neb	Vul	19h 59m 36s	+22° 43.2'	8.1	13:49	20:59	04:09
NGC6857	Neb	Cyg	20h 02m 48s	+33° 31.4'	11.4	13:09	21:02	04:55
IC4954	Neb	Vul	20h 04m 45s	+29° 15.1'		13:30	21:04	04:39
M75	Globular	Sgr	20h 06m 05s	-21° 55.3'	9.5	16:07	21:06	02:04
Barnard342	DkNeb	Cyg	20h 09m 30s	+41° 12.0'		12:35	21:09	05:42
NGC6885	Open	Vul	20h 12m 00s	+26° 29.0'	5.9	13:48	21:11	04:35
NGC6891	P Neb	Del	20h 15m 09s	+12° 42.2'	12.0	14:36	21:15	03:53
NGC6894	P Neb	Cyg	20h 16m 24s	+30° 33.9'	14.0	13:36	21:16	04:56
IC4997	P Neb	Sge	20h 20m 09s	+16° 43.9'	12.0	14:29	21:20	04:10
Barnard345	DkNeb	Cyg	20h 21m 00s	+46° 33.0'		12:07	21:20	06:34
NGC6913	Open	Cyg	20h 23m 57s	+38° 30.5'	6.6	13:06	21:23	05:41
Abell70	P Neb	Aql	20h 31m 33s	-07° 05.3'	14.3	15:48	21:31	03:14
Barnard348	DkNeb	Cyg	20h 34m 00s	+42° 05.0'		12:54	21:33	06:13
NGC6940	Open	Vul	20h 34m 26s	+28° 17.0'	6.3	14:03	21:34	05:05
NGC6960	Neb	Cyg	20h 45m 58s	+30° 35.6'		14:05	21:45	05:25
IC5068	Neb	Cyg	20h 50m 29s	+42° 28.6'		13:08	21:50	06:32
NGC6979	Neb	Cyg	20h 51m 00s	+32° 09.0'	11.0	14:04	21:50	05:37
IC5070	Neb	Cyg	20h 51m 00s	+44° 24.1'		12:55	21:50	06:46
NGC6981	Globular	Aqr	20h 53m 28s	-12° 32.2'	9.4	16:25	21:53	03:20
IC5076	Neb	Cyg	20h 55m 33s	+47° 23.7'		12:34	21:55	07:16
IC1340	Neb	Cyg	20h 56m 08s	+31° 02.8'		14:14	21:56	05:37
NGC6992	Neb	Cyg	20h 56m 19s	+31° 44.6'		14:11	21:56	05:41
NGC6996	Open	Cyg	20h 56m 30s	+44° 38.0'	10.0	12:58	21:56	06:53
NGC6997	Open	Cyg	20h 56m 39s	+44° 37.9'	10.0	12:59	21:56	06:54
Barnard352	DkNeb	Cyg	20h 57m 10s	+45° 53.0'		12:49	21:57	07:04
Barnard354	DkNeb	Cep	20h 58m 00s	+58° 09.0'		Circum	21:57	Circum
NGC7000	BrNeb	Cyg	20h 58m 48s	+44° 20.0'		13:03	21:58	06:53
M73	Open+Asterism	Aqr	20h 58m 56s	-12° 38.1'	9.0	16:31	21:58	03:26
NGC7006	Globular	Del	21h 01m 30s	+16° 11.0'	10.6	15:12	22:01	04:50
NGC7009	P Neb	Aqr	21h 04m 12s	-11° 22.0'	8.0	16:33	22:04	03:35
NGC7027	P Neb	Cyg	21h 07m 02s	+42° 14.1'	10.0	13:26	22:06	06:47
Barnard151	DkNeb	Cep	21h 08m 13s	+56° 19.0'		Circum	22:08	Circum

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