



Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers May 2023

**Events: General Meeting,
Monday, February 6, 2023, at the
Ronald H. Roberts Temecula
Library, Room B, 30600 Pauba
Rd, and/or ZOOM, at 6:00 PM.**

- IFI & Gallery by Clark Williams
- History of Palomar Observatory by Curtis Croulet
- Refreshments by Saldana Family
- Star Parties at South Coast Winery every Friday evening in May.
- For upcoming school Star Parties check the Calendar on the [web page](#).



NGC 2419: Intergalactic Wanderer
Credit: ESA/Hubble
NASA APOD 13 April 2023

Globular cluster NGC 2419 is thought to be a visitor from another galaxy. At 300,000 light years away, its motion suggests that it came from the Sagittarius Dwarf Spheroidal Galaxy.

General information:

Subscription to the TVA is included in the annual \$25 membership (regular members) donation (\$9 student; \$35 family).

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WHAT'S INSIDE THIS MONTH:

Cosmic Comments
by President Mark Baker

Looking Up Redux
compiled by Clark Williams

**Random Thought – Life in the
Shooting Gallery**
by Chuck Dyson

Another Look
by Dave Phelps

My First Dobsonian SCT Project
by Will Kramer

Send newsletter submissions to Sharon Smith <sas19502000@yahoo.com> by the 20th of the month for the next month's issue.



Cosmic Comments – May 2023

By Mark Baker

Okay... I'm a hypocrite!!! I bemoan the fact that humans are still so Neanderthal in their launch capabilities... I mean they're still burning things!!! The solution is right in front of them and someone will someday figure it out... the strongest force in the Universe is still not understood, but learning to use it, and override it, will be a huge technological breakthrough that will usher in exponentially greater opportunities in so many aspects.

You want a launch system?? Put a field around an object that blocks gravity and that object will immediately launch at a straight line tangent to Earth's surface at over 1600kmh (1000mph)... without any means of propulsion!!! You'll be above atmosphere in under 6 minutes... something worth pondering!!!

BUT... I'm a hypocrite because I'm a rocket boy and LOVE the thrill of seeing them take off and head skyward, whether it was the makeshift ones of my youth or the Starship launch of today. It may have failed at separation but the launch was awesome... the most powerful in history!!! So I'll take a little hypocrisy on my part, complain about launch mechanisms, but enjoy every second of them getting up and getting gone...

Also... this is a repeat from two years ago as the sentiment is still the same, BUT it is now:
Ingenuity 50, Mars atmosphere 0...!!! Go Ginny...!!!
Ingenuity 1, Mars atmosphere 0...

Whenever Humanity manages to eke out a victory over Nature, it's worth noting and yes, celebrating...!!!

But what do such accomplishments have to do with Astronomy?? Simply put, it's BECAUSE people have Looked Up through the ages and wondered that we are pursuing the understanding of what's out there...

Can you imagine the absolute joy the ancient giants upon whose shoulders we now stand would experience if they could see what their work has wrought?? And just think, through our Outreach efforts, we may be instrumental in inspiring the next giants that come along... That is why I am such a huge proponent of Star Parties... TVA provides an opportunity for so many that they normally wouldn't have, or even think about perhaps. There's more to our efforts than Ooh's and Aah's... but I'll take them!!!

Again, as always, I thank TVA for their contributions to promoting such a positive and healthy desire to take on Nature and eke out small wins that become huge Victories in the long run... you may be tiny, but you are not insignificant!!! You do make a difference...

Clear, Dark Skies my Friends...



Looking Up Redux – May 2023

Compiled by Clark Williams
from these sources:

SeaSky.org

Wikipedia.com

in-the-sky.org

The American Meteor Society, Ltd.

cometwatch.co.uk

NASA.gov

TVA App (2.0.1296)

FullAndNewMoon App (2.0)

Starry Night Pro Plus 7 (7.6.3.1373)

SkySafari 6 Pro (6.1.1)

Stellarium (0.18.2)

timeanddate.com/astronomy

<https://www.fourmilab.ch/earthview/pacalc.html>



ALL TIMES ARE LOCAL PACIFIC TIME (PST / PDT) UNLESS NOTED OTHERWISE

Times are given in 24-hour time as: (hh is hours, mm minutes, ss seconds)

hh:mm:ss or hhmmss

hhmm+ (time of the next day)

hhmm- (time of the previous day)

hhmm (seconds not shown)

yyymmddThhmmss (Full date as: year month day Time separator hours minutes seconds)

Moon Phases for the month by date:

Friday the 5th @1035 FULL in LIBRA

Friday the 12th @0729 THIRD QTR in CAPRICORNUS

Friday the 19th @0854 NEW in TAURUS

Saturday the 27th @0823 First QTR in LEO

Perigee comes on 2023-05-11 @ **0459** – 369,344 km (229,500 mi)

Apogee comes on 2023-05-26 @ **0140** – 404,509 km (251,350 mi)

2023 has: (12) new moons, (12) 1st Qtr moons, (13) Full moons, (12) 3rd Qtr moons

(1) Blue moon and (0) Black moons

Daylight Savings: Starts: 2023-Mar-12 : Ends: 2023-Nov-05 (CA does not keep PDT year-round)

Luna: Luna is waxing gibbous on the first of the month, headed for Full on the 5th rising at **1548**, transiting at **2210** and setting by **0427+**. Luna by mid-month is waning crescent at 13% illumination. Rising at **0331-** and transiting at **0941** setting at **1555**. By the-end-of-the-month Luna is waxing gibbous, 89% illuminated, rising at **1633** transiting at **2211** and setting by **0348+**.



Highlights: (distilled from: [SeaSky.org](https://www.seasky.org) and Clark's planetary Orrey program[s])

May 5 - Full Moon. The Moon will be located on the opposite side of the Earth as the Sun and its face will be fully illuminated. This phase occurs at **1035**. This full moon was known by early Native American tribes as the Flower Moon because this was the time of year when spring flowers appeared in abundance. This moon has also been known as the Corn Planting Moon and the Milk Moon.

May 5 - Penumbral Lunar Eclipse. A penumbral lunar eclipse occurs when the Moon passes through the Earth's partial shadow, or penumbra. During this type of eclipse the Moon will darken slightly but not completely. The eclipse will be visible throughout all of Asia and Australia and parts of eastern Europe and eastern Africa. (NASA Map and Eclipse Information)

May 6, 7 - Eta Aquarids Meteor Shower. The Eta Aquarids is an above average shower, capable of producing up to 60 meteors per hour at its peak. Most of the activity is seen in the Southern Hemisphere. In the Northern Hemisphere, the rate can reach about 30 meteors per hour. It is produced by dust particles left behind by comet Halley, which has been observed since ancient times. The shower runs annually from April 19 to May 28. It peaks this year on the night of May 6 and the morning of the May 7. The nearly full moon will be a problem this year, blocking out all but the brightest meteors. If you are patient, you should still be able to catch a few good ones. Best viewing will be from a dark location after midnight. Meteors will radiate from the constellation Aquarius, but can appear anywhere in the sky.

May 19 - New Moon. The Moon will be located on the same side of the Earth as the Sun and will not be visible in the night sky. This phase occurs at **0854**. This is the best time of the month to observe faint objects such as galaxies and star clusters because there is no moonlight to interfere.

May 29 - Mercury at Greatest Western Elongation. The planet Mercury reaches greatest western elongation of 24.9 degrees from the Sun. This is the best time to view Mercury since it will be at its highest point above the horizon in the morning sky. Look for the planet low in the eastern sky just before sunrise.



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Algol minima: (All times Pacific Time)

05/02/2023	0712
05/05/2023	0401
05/08/2023	0050
05/10/2023	2139
05/13/2023	1828
05/16/2023	1517
05/19/2023	1206
05/22/2023	0855
05/25/2023	0544
05/28/2023	0233
05/30/2023	2322



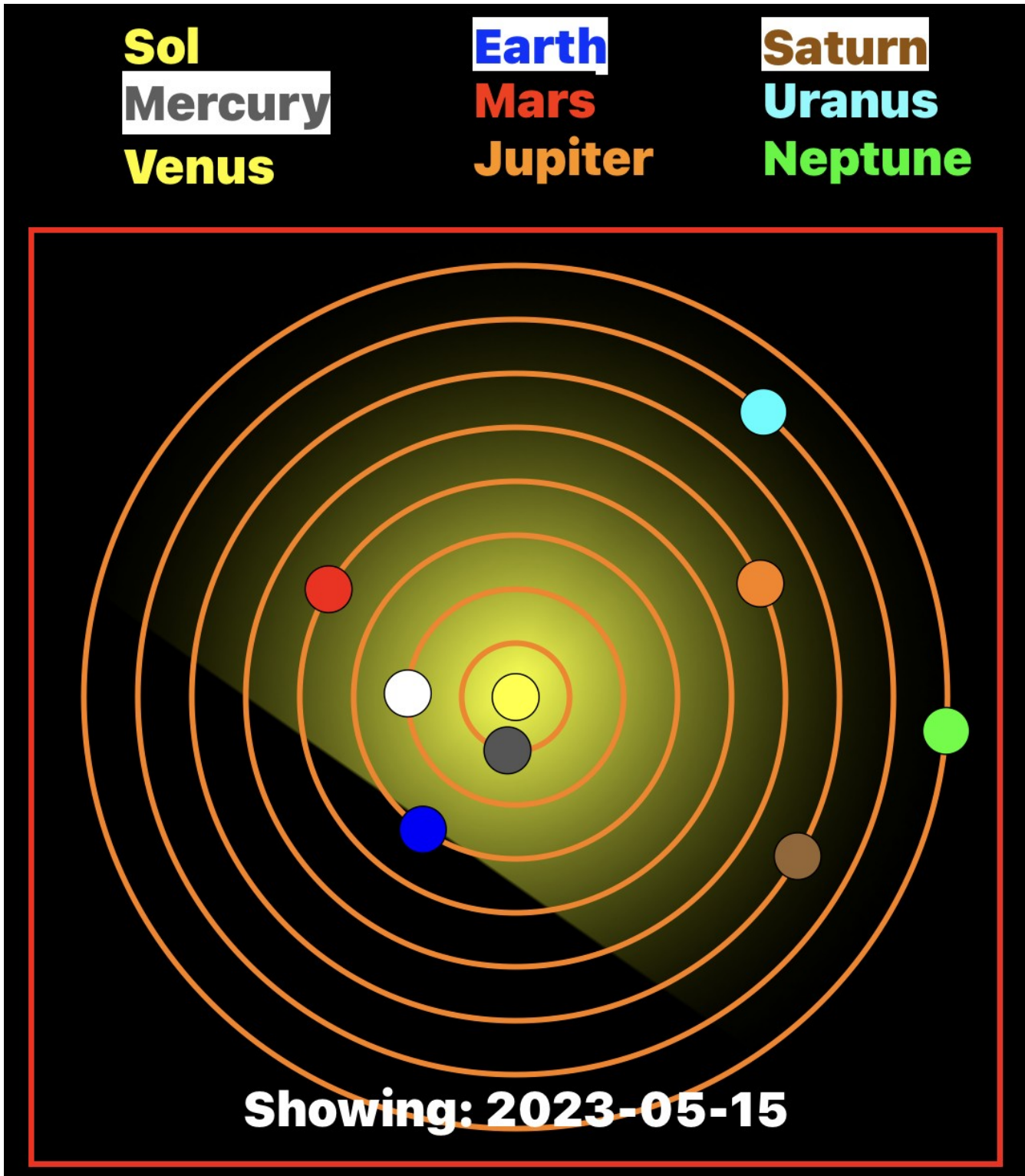


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Planets:

Planetary Positions May 2023: (from TVA App iOS version)





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- **Mercury:** Mercury is lost in the Sun in the beginning of the month. Mercury by mid-month has become a morning object rising at **0501**, setting at **1806**. On the 29th Mercury will be at greatest western elongation of 24.9 degrees from the Sun. (See Highlights above). By the 31st Mercury as a morning object rises at **0429** transits at **1109** and sets at **1750**.
- **Venus:** Is the Evening Star on the first of the month. Venus rises at **0822**, transits at **1541** and sets at **2301**. Venus is 66% illuminated and has an apparent magnitude of -4.13. By mid-month Venus is still the Evening Star rising at **0834**, transiting at 1544 and setting by **2315**. By end of month Venus is still the Evening Star rising at **0851**, transiting at **1604** and setting at **2316**.
- **Mars:** Mars is an evening object on the first of the month. Mars rises at **1023**, transits at **1736** and sets by **0048+**. By mid-month Mars is rising at **1007**, transits at **1715** and doesn't set until **0023+**. End-of-month finds the Warrior rising at **0949** transiting at **1650** and setting at **2351+**.
- **Jupiter:** Jupiter is a morning object on the first of the month. Jupiter rises at **0522**, transits at **1151** and sets at **1819**. By mid-month Jove as an morning object rises at **0437**. Mercury will be just below and to the east with about a 5° separation between the two planets. Jupiter transits at **1108** and sets at **1740**. Come the end-of-month Jupiter rises at **0344** and sets at **1946**.
- **Saturn:** Saturn is a morning object on the first of the month rising at **0308**, transiting at **0842** and setting at **1417**. Saturn by mid month rises by **0216**, transiting at **0751** and setting at **1326**. By the end-of-the-month Saturn rises by **0115**, transits at **0650** and set at **1226**.
- **Uranus:** Uranus is very close to the Sun this month. On the first of the month Uranus is an evening object rising at **0625**, transiting at **1315** and setting at **2005**. By the ides Uranus is lost to the Sun. End-of-month finds Uranus as a morning object rising at 0432, transiting at 1124 and setting at **1816**. Uranus will be about 5° south and east of Mercury
- **Neptune:** Neptune in the beginning of the month is a morning object. Neptune rises at **0404**, transits at **1001** and sets by **1558**. . By the 15th Neptune rise at 0310, transits at 0907 and sets by 1505. The 19% illuminated Moon will be rising in 21-minutes offering a great imaging opportunity. They will be separated by 5° 18'. By the end of the month Neptune is rising at **0208**, transiting at **0806** and set by **1403**.
- **Pluto:** Pluto on the first of the month is a morning object rising at **0124**, transiting at **0624** and setting at **1124**. By mid-month Pluto is rising by **0029**, transiting by **0529** and sets by **1029**. Pluto's apparent magnitude is 14.43 so good luck if you're looking. By the 31st Pluto is rising at **2326**– transits at **0425** and sets at **0925**.

Asteroids:

- Still a dearth of asteroids. I searched for asteroids in 2023 with a reasonable magnitude; say less than or equal to +10 in May there is nothing except the regulars: Juno, Vesta, Hebe, Eros and Herculina. So consult your local planetarium software or try: <https://www.asteroids.near.com/year?year=2023>

Meteors:

- Eta Aquarids Meteor Shower. (see Highlights above)

Comets: come in various classifications:

- 1) Short Period comets – further broken down into:
 - Halley Type: The Halley Types are believed to come from the Kuiper Belt and have periods in excess of 20-years.
 - Jupiter Type: The Jupiter types have a period less than or equal to 20-years.
 - Short period comets May have a near circular orbit or an elliptical orbit. The latter being far more common.



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- 2) Long Period comets – thought to originate from the Oort cloud these comets have periods of over 200 years and have random inclinations around the celestial sphere.

No comets of interest this month at time of writing.

Deep Sky:

Notes:

L/Z abbreviation for ALT/AZ

R/D abbreviation for Right Ascension/Declination

α is right ascension

δ is declination

In each case, unless otherwise noted, you should look for the following on or about the 15th Day of May 2023 at 2100 PDT and you will have about 20 minutes of viewing time total.

Lets take a look at some unusual objects:

- UGC 10822:



Illustration 1: By en:NASA, en:STScI, en:WikiSky - en:WikiSky's snapshot tool - [1], Public Domain, <https://commons.wikimedia.org/w/index.php?curid=7826258>

The Draco Dwarf Galaxy (UGC 10822). The Draco Dwarf is a spheroidal galaxy which was discovered by Albert George Wilson of Lowell Observatory in 1954 on photographic plates of the National Geographic Society's Palomar Observatory Sky Survey (POSS). It is part of the Local Group and a satellite galaxy of the Milky Way galaxy. The Draco Dwarf is situated in the direction of the Draco Constellation at 34.6° above the galactic plane. (Wikipedia)

o **NGC 7789:**



Illustration 2: Von Credit Line and Copyright Adam Block/Mount Lemmon SkyCenter/University of Arizona - <http://www.caelumobservatory.com/gallery/n3750.shtml>, CC BY-SA 3.0 us, <https://commons.wikimedia.org/w/index.php?curid=20533817>

NGC 3746 is a SBab-type barred spiral galaxy in the constellation of Leo. The galaxy was discovered by British astronomer Ralph Copeland on February 9, 1874.

The galaxy NCG 3746 forms together with NGC 3745, NGC 3748, NGC 3750, NGC 3751, NGC 3753 and NGC 3754 the galaxy group Arp 320 and complemented by the galaxy PGC 36010 the Hickson Compact Group (HCG) 57. Halton Arp structured his catalog more unusually Galaxies in groups according to purely morphological criteria. This group of galaxies belongs to the class of groups of galaxies. (Wikipedia)

May is great for both viewing and imaging. Spend some time outside with your scope. Spring is here!

For now – Keep looking up.



RANDOM THOUGHT May 2023

By Chuck Dyson

LIFE IN THE SHOOTING GALLERY

I was reading an article by the late Steven J. Gould who started out his professional life as a geologist but became fascinated by evolution and then spent his life looking at and explaining how evolution worked. In this article Steven made the statement “The miracle is not that there is life on Earth.” Wow I thought that is quite the statement to make and I wondered how he would defend it. In his next sentence Steven said, “The miracle is that life has been on Earth for almost four billion years without a single day of interruption.”

I do not know about you but I have had plenty of days of interruption in my life and for the most part I just shrug my shoulders and hope that tomorrow is better and comes with no interruptions. For the life of Earth though there is just a little difference, if there were to be even a single day of interruption things would not resume or get back to normal for maybe a billion years. Around 4.7 billion years ago the Earth was formed. The local neighborhood was full of newly formed planets/minor planets moons and as luck would have it a Mars sized neighbor smashed into Earth 4.5 billion years ago. This impact added to Earth’s mass, formed the Moon (this is the leading Moon formation theory), and sterilized Earth if there was any life on it. 800 million years later, 3.7 billion years ago, we have the first definite signs of life on Earth.

From 3.7 billion years ago to today life on Earth has faced at least six major challenges to survival, a major challenge can roughly be described as 50% to 85% of all life dying off. The exact causes of the extinction events are various and controversial; however, they include the following: the appearance of free oxygen, if you are a cell that is not designed to use oxygen it kills you; the disappearance of oxygen, if you are a cell that is designed to use oxygen the lack of it kills you (think of low environmental oxygen as a total body heart attack; global glacial periods, as temperatures cool plants stop growing, reproducing, and producing oxygen then as food and oxygen disappears the animals die (this is one of those environmental feed-back loops you are always hearing about), glacial die offs are not controversial; volcano eruptions again not controversial as we have had recent examples of what they can do (Mt. St. Helens erupted in 1980 ejected .24 cubic miles of ash into the atmosphere and disrupted life on the West Coast for weeks. In 1815 Mt. Tambora erupted and ejected 36 cubic miles of ash into the atmosphere and created in 1816 the year without summer crops failed and over 100,000 people died from the world wide famine. 630 thousand years ago the Yellowstone caldera ejected 240 cubic miles into the atmosphere. Do you want to guess what that did to the Earth’s atmosphere?? The “good news” is there is ample geological evidence of even larger eruptions; so, yes, volcanoes cause mass extinctions.). Our last player is space junk, stuff left over from the formation of the solar system. Author’s note #1: when one looks for an exact definition of a comet, asteroid, meteorite, or dwarf planet reason and proportion fly out the window as everyone seems to have, and publish, their own definition. For the purpose of this paper a comet will be a small (greater than 10 meters) irregularly shaped body that is rich in volatile compounds, an asteroid is a small (greater than 10 meters) irregularly shaped body devoid of volatile compounds, a meteorite is



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any small (less than 10 meters) irregularly shaped body, and a dwarf planet is any body (not circling a planet) that is large enough to be spherical and not irregularly shaped (a small spherical body circling a planet is generally called a satellite planet). Author's note #2: you are free to call the two chunks of rock orbiting Mars anything you want, everyone else does. The three big questions are; where are these small bodies, how many of them are there, and do they really hit Earth? The short answers are; everywhere, billions upon billions, and yes.

In his Planetary science course Mike Brown of Caltech emphasized that no computer simulation of the formation of our solar system works until the amount of material at the start is at least 10 times the material that is in the solar system today. Even accounting for the material that was deorbited into the Sun and accelerated out of the solar system there is plenty of material left over to bang into Earth. This leftover stuff is labeled by its location in the solar system. Apollo asteroids are ones that have orbits that cross the Earth's orbital plane and are also called Near Earth asteroids (NEAs). These are obviously ones of great concern. Asteroids between Mars and Jupiter are said to be from the main Asteroid Belt and can be and are nudged out of their orbits by Jupiter, other asteroids, and Mars. Our next stop is the Kuiper Belt, Pluto is a Kuiper Belt object, this disk goes from 30 AU (1 AU is the distance from the Sun to Earth) to 50 AU. The Kuiper Belt has two major components to it, a stable disk and a scattered disc. Almost all of the Kuiper belt objects that come into the inner solar system are from the scattered disk. Comets from the scattered disc all have orbital periods of 200 years or less and are called short period comets. Because both the Asteroid Belt objects and the Kuiper Belt objects have orbits that are in the orbital plane of the planets, their asteroids and comets always come in on the ecliptic plane and are relatively easy to search for. Next stop is the hypothetical Oort Cloud, it is said to be hypothetical because no one has ever seen any object in this cloud only the long period comets. Long period comets have orbital periods greater than 200 years, that come into the inner solar system. The Oort Cloud is thought to start at 2,000 AU and go to 200,000 AU, these distances are inferred from the orbital periods of the comets. It is called a cloud and not a belt or disk because its comets come into the inner solar system from all angles. So to find these comets the astronomers must search the entire sky for them and not just the ecliptic plane as they do for short period comets. Because of Oumuamua and Borisov two objects that have been identified as interstellar objects; however, with such a small sample size what the average interstellar traveler could look like and where in the sky it could come from is any ones guess.

Quote from the B612 Foundation (A private foundation that seeks to identify hazardous asteroids and comets.) "It's a 100 percent certainty we'll be hit by a devastating asteroid, but we're not 100 percent sure when." What are the chances? A 20 meter rock, Chelyabinsk Russia asteroid sized object, once a year. The Arizona Barrington crater produced by a 50 meter rock, every 750 years. A 250 meter rock, good-by Denmark, every 60,000 years. A 1,000 meter rock, good-by France, every 60,000 years. A 5 to 10 kilometer rock gives you a 110 mile diameter crater in Mexico and a dinosaur free world happens every 20 million years or so. It does appear that we could be just a little overdue for another big hit.

What can we do to avoid the BIG HIT? First we must find and identify the asteroids that are hazardous. This is a never ending job because of the small but repeated gravitational interactions with planets, moons, and other asteroids the orbits will drift and shift over time, at this time NASA will only make orbital predictions up to 100 years into the future. Comets are



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different from asteroids as they are usually only discoverable, on their first orbit, when they are about 5 AU from the Sun, that's the orbit of Jupiter. At 5 AU the ultraviolet light from the Sun starts to sublimate, goes from a solid directly to a gas, the comets volatiles and astronomers can identify it as a comet by the glowing cloud of gas around it. The journey from 5 AU to Earth takes 4 to 5 months and that is not enough time for us to do anything to change the comet's orbit. However, at this time astronomers feel that they have discovered greater than 90% on NEA's that are greater than one kilometer in diameter and around 60% of objects 140 meters in diameter. Of the known asteroids none are predicted to hit Earth in the next hundred years. Several countries have launched probes to different asteroids and comets to study them up close. One Osiris -Rex has sampled the asteroid Bennu and will return those samples to Earth on Sept 24 of this year. Japan also has several probes that will be returning samples from different asteroids, the more we know the better we can prepare. Finally NASA in November of 2021 launched the Double Asteroid Reduction Test (DART) with the goal of seeing how a 2/3 ton impactor could change the orbit of a 5.5 million ton asteroid in orbit around a much larger asteroid. The impactor, traveling at 4.1 miles per second did change the orbiters speed by a little over 4%. If our target asteroid was aimed at the center of Earth we would need to hit it 10 years before the Earth impact date in order to change the orbit enough for it to miss the Earth. This is why the 4 to 5 month time frame for comets makes Astronomers nervous, but it is a start.

Cheers & keep looking up
Because astronomers need your help finding comets

Chuck

other but the illustrious personality Tycho Brahe, in 1602, cataloged the stars separately.

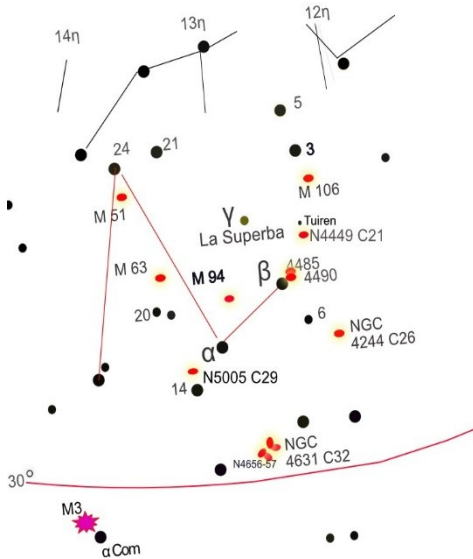


Berenice II

<https://www.britannica.com/biography/Berenice-II>

Looking at Coma Berenices the constellation, Wow, she's great. Then, when you read the histories of Berenice the person, you'll find that her life was full of politics, family and sadly, loss. Berenice was a queen of Egypt in the later years of the Ptolemaic dynasty during Greek's ascendancy. Berenice's husband, also her brother, went to war and we are told that Berenice promised her hair to Aphrodite if her husband came home safely. Thus, it happened and Berenice's hair was placed in a temple to Aphrodite soon after which it was promptly stolen. Clearly this was done by divine intent and Berenice's hair was placed in the heavens for all to admire.

Of course there is not all that much to admire with just your eyes alone. Back in her time, the dark skies along the Nile allowed us to see a sprinkling of fainter naked eye stars. Alpha, Beta and Gamma are the three brightest stars in Coma, each at 4th magnitude. Alpha's name is Diadem and is a double of equal 5th magnitude stars. 5th magnitude 41 Comae Berenices has a planet and 31 Comae Berenices has been foisted with the rather unfortunate name of Polaris Galacticum Borealis, a misspelling, as the closest star to the North Galactic pole. By the way, since Polaris is feminine, the correct spelling should be Polaris Galactia Borealis. I doubt either will catch on.



Canis Venatici is another story. Considered by Ptolemy as "unformed" stars in Ursa Major it wasn't until Hevelius added the dogs to his atlas in 1687 that that area was identified as a constellation.

Again, as happened before, Canis Venatici became a constellation by mis-translation. In Ptolemy's text, some of the stars in Boötes represent the Herdsman's club or even a shepherd's crook as can be seen on a few very old celestial globes. This was before the alternate designation of Bootes as hunting the bear rather than a shepherd or herdsman. The translator loosely translated the Greek word for club to the Arabic for spear-shaft with a hook, what we would identify today as a Halberd. When the Arabic phrase he used was later translated to Latin, the translator erred again and mistook one of the

Arabic words as meaning dogs.

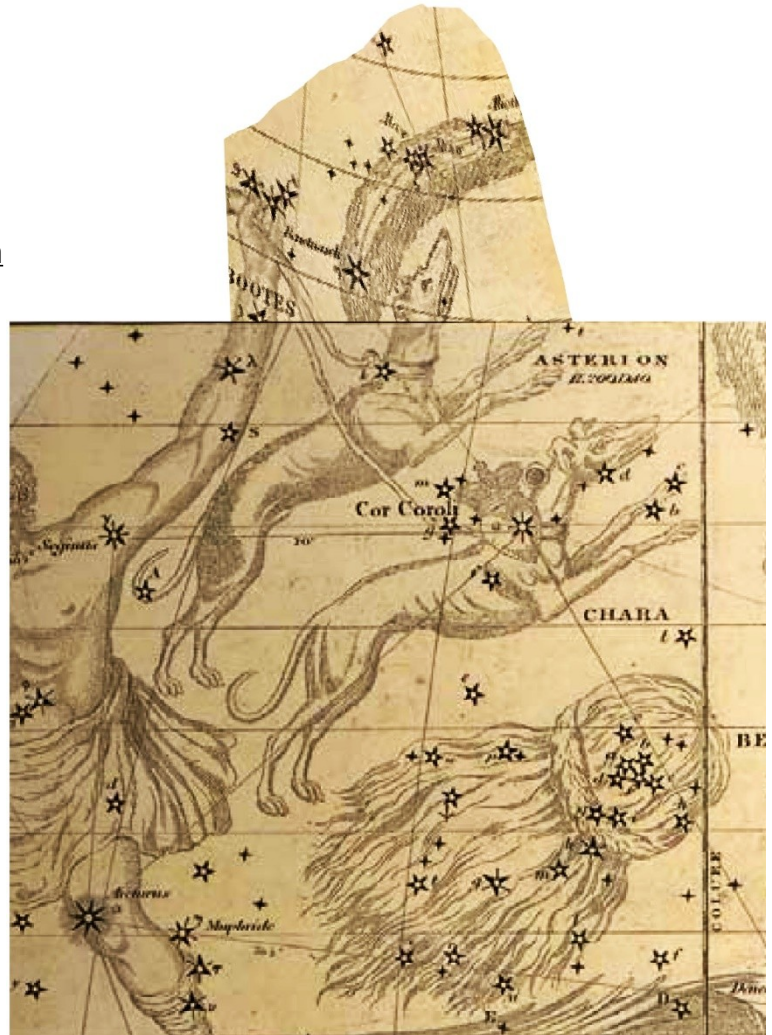
Early in the 1500's a mathematician and mapmaker named Petrus Apianus drew his chart with dogs. Later that century Mercator, same one as before, followed with his globe showing the

dogs. Hevelius was next in the 17th century showing his now famous collection of new constellations.

The constellation chart of the dogs is from two pages of Elijah Burrit's "Geography of the Heavens" published in 1873 and found in the Library of Congress. I clipped pieces from two separate maps and merged them together.

The northern dog Hevelius named Asterion or Star and the southern dog Chara, meaning Joy.

The name Chara later began to be used specifically to refer to the star Chara – β Canum Venaticorum.



Firmamentum Sobiescianum

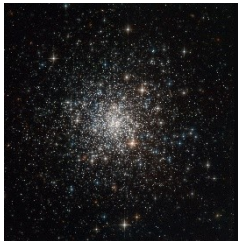


So, in 1690 Hevelius added the Giraffe, the Unicorn, the Little Lion, the Little Triangle, Herschel's Telescope and the Lynx. The drawing to the left is a portion of the front piece of Hevelius's atlas "[Firmamentum Sobiescianum](#)" printed in 1687. It shows Lynx, Canis Venatici, Vulpecula, Leo Minor and Lacerta. In the top left is Cerberus, since forgotten as is Herschel's Telescope.

Canes Venatici contains four named stars. The star names are Chara, Cor Caroli, La Superba, and Tuiren.

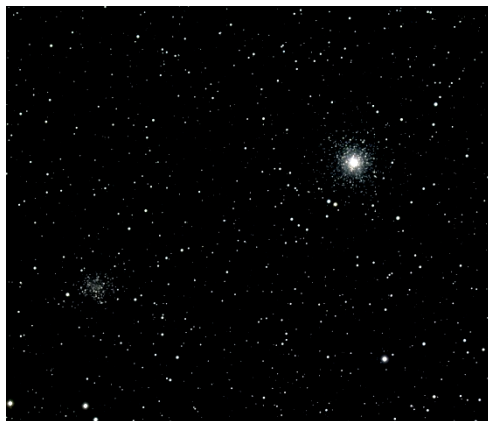
La Superba has interest because it is the brightest carbon star of its designation in the sky, meaning it is very red. Cor Caroli is a double but the interesting one is 12th magnitude Tuiren, HAT-P-36. Tuiren has a Jupiter sized planet named Bran. The names come from Irish folklore.

Between the two constellations are four globular clusters; M3-6th mag., M53-7th mag, NGC 5053-9th mag and NGC 4147- 10th magnitude.



<https://ocastronomers.org/wp-content/uploads/2019/01/m003.jpg>

<https://www.flickr.com/search/?text=ngc4147>



<https://ocastronomers.org/wp-content/uploads/2019/01/M53-00X-LRGB-A2B-OCA.jpg>



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Coma Berenices contains Messier objects: M53, M64 (Black Eye), M85, M88, M91, M98, M99, M100. and the Caldwell objects: C35, C36, C38. Canis Venatici has Messier's M3, M51 (Whirlpool), M63 (Sunflower), M94, M106, and the Caldwell objects: C21, C26, C29, C32 (Whale).

In addition there is NGC 4565 (Needle) [Joe Neu's favorite], Melotte 111, the Coma Star Cluster and the Coma Galaxy Cluster.

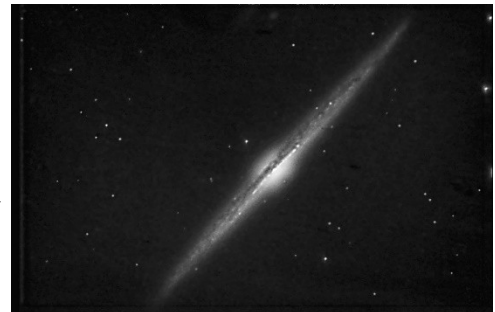
There are a number of Caldwell objects close to each other at the border between the two constellations, all great star party objects. Caldwell's 32-Whale, 35-Coma Star Cluster, 36 and 38-Needle.



Coma_Cluster_CE_20040409_01.jpg

Needle Galaxy (NGC 4565) – Bill Hall

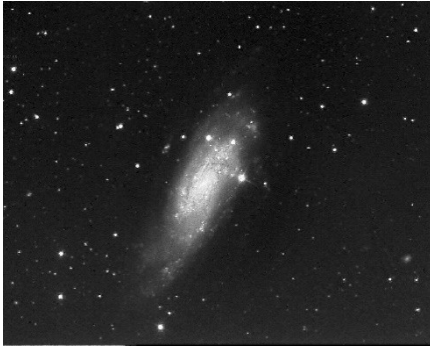
<https://ocastronomers.org/wp-content/uploads/2018/12/NGC4565-80mC6F875r.jpg>



Whale Galaxy (NGC 4631, Caldwell 32, Arp 281)

<https://ocastronomers.org/wp-content/uploads/2018/12/ngc4631-whale.jpg>

Greg Pyros2007 Larry Arnold



https://ocastronomers.org/wp-content/uploads/2018/12/NGC4559_CE_20050312_01.jpg Chuck Edmonds 2005

The individual galaxies are each in the 9th magnitude, so easy to find. C35, the Coma Cluster is more for pleasurable galaxy hopping, striving to identify each galaxy as you find it.

The other three Caldwell objects are Caldwell 21, C26-the Silver Needle and C29, all big and all 10th magnitude.



NGC 5005 (Caldwell 29) <https://www.astrobin.com/3iza07/?q=ngc 5005>
Aurelio55



<https://www.flickr.com/search/?text=caldwell 26> Crowson 2020

NGC 4449 <https://www.astrobin.com/ccnrzb/J/?q=ngc 4449> Robert S

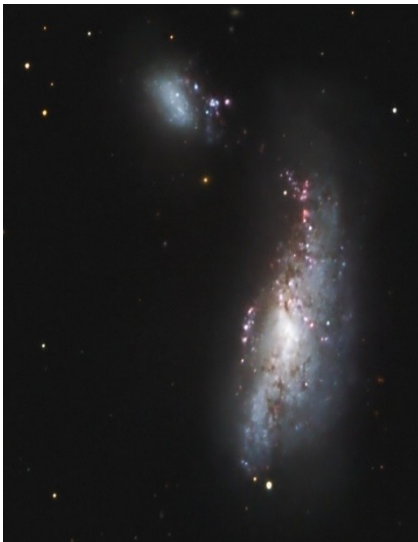


Also near the border between the two constellations near Gamma γ Com is the Coma Star Cluster, also known as Melotte 111 and Collinder 256. Mel 111 is a nice sprinkling of 5th+ magnitude stars. As previously mentioned, some references state that Mel 111 was the original Berenices Hair.



Melotte 111 <https://nicolasillustrations.co>

There are some very interesting regions sprinkled about the two constellations. Between Beta and Gamma Comae Berenices is a number of stunning areas. Close to Beta is the North Galactic Pole (Polaris Galactia Borealis). Between it and Beta is NGC 4889 13th mag.– Caldwell 35 and one of the central galaxies of the Coma Cluster – Abell 1656. Further along are NGC 4559, 10th mag. – Caldwell 36, followed soon after by NGC 4565 10th mag. – Caldwell 38 and Gamma Comae Berenices, anchored by the huge Comae Berenices Star Cluster, Melotte 111, chock full of 4th and 5th magnitude stars. Near Gamma is 10th magnitude NGC 4274, brightest member of a compact group.

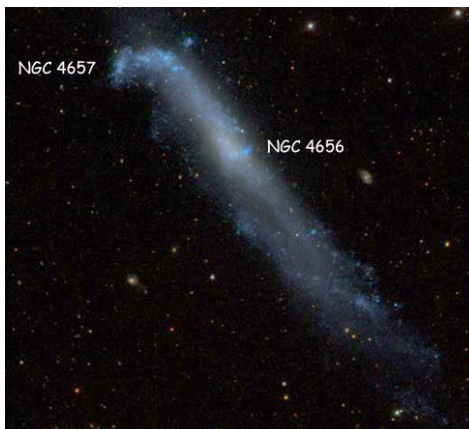


There is also an interesting area around Beta Canum Venaticorum. The planet Tuiren is near. Very close to the “Cocoon” galaxy, NGC 4485 and its companion NGC 4490.

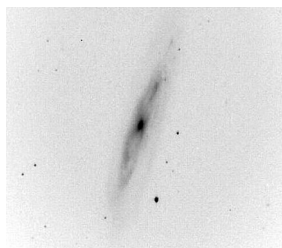
[https://www.astrobin.com/245205/?q=ngc 4490](https://www.astrobin.com/245205/?q=ngc+4490) Carsten Dosche 1916

Down near the bottom of Cvn near C32, the Whale, is a very interesting galaxy that deserves some study. NGC4656 and NGC4647 are what appears to be a single highly distorted 11th magnitude galaxy spread out on its long axis, slightly resembling a hockey stick. In actuality, there are two galaxy nuclei to find. Near the center is NGC 4656 and at the top of this image at the crook of the shaft is NGC 4657.

<https://cseligman.com/text/atlas/ngc46a.htm>



At long last we come to that swarm of galaxies near Coma Berenices border with Virgo. There are seven bright Messier galaxies grouped together: M's 64, the black eye, 85, 88, 91, 98, 99 and 100.



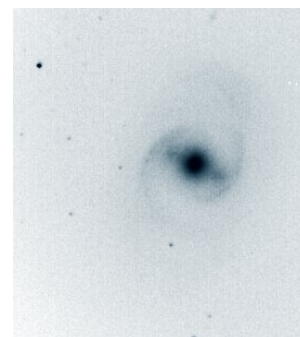
M98

M98 has an almost edge on tilt towards us so it is narrow and long. At 10th magnitude it is bright and should hold up to some magnification. It is almost 10 min across, so you may be able to see some detail in the arms.

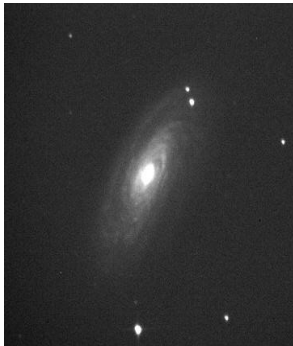
<https://ocaastronomers.org/wp-content/uploads/2019/01/m098.jpg>

M91 is interesting. Although it is a magnitude fainter than many of its neighbors at 11th, it is one of those distinct barred galaxies that show off very nicely. I massaged this image to bring out the spiral arms a little more. You can see the original by clicking on the hyperlink.

<https://ocaastronomers.org/wpcontent/uploads/2019/01/m091.jpg>



M91



M88

Tilted away or maybe towards us at what looks like a 60° angle, 10th magnitude M88 is one of the crown jewels of the Virgo cluster.

<https://ocaastronomers.org/wp-content/uploads/2019/01/m088.jpg> - 30-second exposure, taken on 15 May 1994

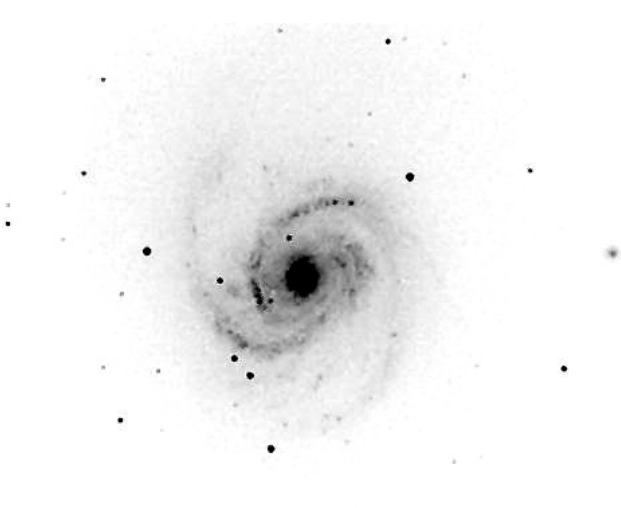
M99 is another supernova hunting ground. It is 10th magnitude. Be sure to try to see how the one spiral arm juts out from the main galactic disk. Is there maybe an invisible companion near?

<https://ocaastronomers.org/wp-content/uploads/2018/12/M99-colored.jpg>



M100 is one of the largest members of the Virgo cluster and is very bright at 10th magnitude. It has two bright spiral arms and a bright nucleus. M100 is also a happy hunting ground for supernova searchers, the last one in 2006. If you have a slightly larger telescope, look for M100's 15th magnitude companion galaxy NGC 4323.

<https://ocaastronomers.org/wp-content/uploads/2019/01/m100.jpg>





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The [Black Eye Galaxy](#) (Messier 64) is a spiral galaxy with an apparent magnitude of 9.36, it is a laboratory in the study in galactic dynamics.

<https://ocastronomers.org/wp-content/uploads/2018/12/M64-36mddpccdshpr1-copy>.



M85 is a double galaxy field made up of a large 10th magnitude spiral and a smaller 11th magnitude barred spiral. It is also a hunting ground for supernova.

<http://www.astronomersdoitinthedark.com/index.php?c=135&p=500>

This is beautiful piece of sky. Of course this is just a primer on these beautiful spring constellations. Deep dives into galaxies and clusters of galaxies and even more await you.

Dark Skys

Dave Phelps

My First Dobsonian SCT Project! By Will Kramer

For a couple years now, I have been working with a Meade 10" SCT, which came with tube rings, but no mount. I had adapted it to an old pipe fitting mount that I built in the late 70's, and this set up was at least adequate enough to show me what a powerful scope this is. But one cold evening this past fall, the 40-degree temperatures and the huge combination of scope and counterweights caused the poor old mount to stiffen up, since it does not rotate on real bearings. Almost immediately though, the frame of a small round, metal table I had put out in the back yard, caught my attention, and set in motion a string of ideas that would lead to the really neat project I will tell you about here.

First of all, after the most recent small Dobsonian conversions I worked on, I had not planned to take on any more, but the components that I would work with for this project just happened to be the same size, as if they were meant to be, so I could not pass on this opportunity! Taking measurements, I discovered that the frame of the metal table was two feet in diameter. Lowes carries nice pre-formed wooden table tops that are two feet in diameter! And Hanks Hardware carries plywood disks that are 2 feet in diameter, that are perfect for round Dobsonian bases! Hmm, many large SCT's (like Mark's C11), are mounted on computer driven alt-azimuth mounts that are higher up so the eyepiece is in a comfortable location, so could it be possible to place a larger Dobsonian base on a solid table top to also keep the eyepiece in a high enough location? The gears were turning now – OK, the Dobbie base will need a light but solid platform to set on, but the metal table is stronger on the top, so it will have to be flipped over, with the wooden table top as the platform to set the mount on the "bottom" of the legs. I etched four small circles on the bottom of the table top, so the four legs of the frame can "click" into the table top, and prevent it from sliding once the mount is placed on top of it.



Next, I was back at Lowes again selecting the wood that would be needed for the sides of the mount and the altitude bearings, and it worked out that the dimensions were such that basic cuts were all that were needed to make all the parts required. Only one small 6" square of wood was not used! My experience with my Dobbie projects for the TVA helped a lot. For example, the round altitude bearings I used are from Home Depot, the same 6" PVC caps I also used on the TVA 10" Dobbie conversion, and the reinforcement inner sleeves are from the left-over piece of 6" PVC pipe I used on that project. Hand cutting the PVC parts to the correct size was time consuming, as were the curved cuts on the wooden sides for the altitude bearings, but a neat little coping saw I found at Harbor Freight in Murrieta made these custom cuts much easier than

before! Measuring and marking the exact locations to drill the holes for the wood screws that will hold the mount together was probably the most challenging, and I have found that no matter how accurately I mark and drill the holes, it always seems that the grain of the wood or different hardness of the layers of plywood, can still cause the angle to be out of line just a little, so I just had to work with the pieces while putting them together to make everything line up the best I could. And the wooden base came together within acceptable Dobbie parameters!



By now, the 3 pre-drilled Teflon pads had arrived from AstroGoods in eBay, so I could complete the Azimuth bearing also. Instead of using Formica or a similar material for the Teflon pads to slide on, I just sanded the underside of the Azimuth surface to be as smooth as possible, so there would be very minimal friction. With short tube Dobs (and what could be shorter than an SCT OTA!), you don't have much leverage while moving the scope in azimuth, the way you do with a longer optical tube, so you need just enough friction for the scope to stay right where you want it.



Next, "Staining Day" came along! For the last little Dobbie project I worked on, I had selected a very small can of Old Masters "Early American" wiping stain, so I decided to continue with that color for this mount too. There was only about half a can left so I thought for sure I'd have to go out and buy another can to finish this project, but as it turned out, by applying the stain carefully, I was actually able to finish this whole mount before the can ran out! This was true of other leftover supplies from prior projects – I was able to use them up for this mount, and that really helped reduce the expenses this time.



Now, I was finally able to start putting all the parts together! The sides for the altitude bearings were attached to the large rings for the OTA, and I glued felt strips into the crescent cutouts on the sides for the bearings to fit into. The last challenge to deal with was exactly where to drill the holes for the circular side bearings (PVC caps) on the sides. This is critical for the scope's balance, as the short tube cannot be slid back and forth in the rings to get the correct balance. I looked at many photos of Meade and Celestron alt-azimuth mounted Schmidt Cassegrain's to try to determine where the side bearings are located, and I also tried holding the heavy 10" OTA to feel where the balance point would be. I selected a spot, drilled the holes, and attached the altitude bearings to the side pieces. Then, I placed the tube into the ring assembly, and it was ready to be set upon the Dobsonian base! Would the balance be OK? Well, I got kind of lucky – it was "front" heavy, but then it occurred to me that I have a whole set of heavier 2" eyepieces that I have only used with my 15 inch Dob, so I don't see them very often, as I have not used the "big" Dob as much as I want to. So, with the 2" eyepieces, I found that the balance is acceptable, and the only thing I couldn't account for was the weight of the heavy 15" long dew shield I have been using for this scope. I thought of attaching a small weight to the handle on the back side of the optical tube to counterbalance the long dew shield, but the cleanest way to get the balance just right was to make a new light weight posterboard dew shield that does not affect the scope's balance at all.



First light for this "Dobsonian" SCT set up went well! There is a very slight wobble from the mount being set up high on the table top, but it calms down in seconds, and does not interfere



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with focusing. The azimuth movement is smooth, and the altitude motion is steady, but I have found that with most short focus Dob setups, that it is easier to use two hands to move the scope, so you can better control the fine motions of finding and keeping objects in the field of view. Right now, because of the new configuration, there isn't a place to attach a finder scope, but the latches that hold the tube in the rings are directly on top of the scope, so I could conveniently sight right along the tube to easily find the objects I was looking for! This has been a very enjoyable and worthwhile project, and I can already tell that it will be much easier to observe with the Meade 10" SCT from now on!



The TVA is a member club of [The Astronomical League](#)