Snake River Skies

The Newsletter of the Magic Valley Astronomical Society

www.mvastro.org

Membership Meeting

Saturday, June 13th 2015
7:00pm at the
Herrett Center for Arts & Science
College of Southern Idaho.

Public Star Party Follows at the Centennial Observatory

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Magic Valley Astronomical Society is a member of the Astronomical League

M-51 imaged by
Rick Widmer &
Ken Thomason
Herrett Telescope
Shotwell Camera

President's Message

Colleagues,

As much as our field is a field that requires consumption of knowledge through study, a.k.a. monthly presentations, it's also one where far more of the rewards come from getting out in the field. June is set up with that in mind. While there is no presentation for the second Saturday, there are plenty of chances to get out under the skies. If you're looking for public outreach, we've got opportunities for you. If you're looking for some time with your scope among your colleagues, we've got opportunities for you.

Friday, June 12th gives you such an option. If you're into public outreach, please meet us over at the Filer Fairgrounds to show off the stars to the Girl Scouts at their Jubilation. If you want to just be among colleagues, go instead to Craters of the Moon National Monument either that night or Saturday the 13th. Having said that, we don't want to leave Chris Anderson over at the Herrett Center's Centennial Observatory in the lurch. Those of us who will be in Twin Falls on the 13th are going to help out at the monthly star party there. In fact, a couple of us are looking to restart an old tradition: Putting up scopes on the lawn in front of the Herrett Center.

When the dust settles on that weekend, we're going to go back to the Hagerman Fossil Beds National Monument on June 20th and help them out in their bid to become a Dark Sky Preserve, just as Capitol Reef in Utah landed earlier this year. Chris Anderson and Paul McClain have been using the National Monument's deep sky meter and are coming up with readings that confirm what we know about Idaho, that our state has some of the best skies in the country. This is a process that's going to take some time, but it's been an eye-opener so far.
And with summer underway, there's always the weekly solar session at the Centennial Observatory. Wednesday, May 27, saw several prominences and a large filament visible in the scope, and that was on a day that featured no sunspots and partly cloudy weather. If you're available on Wednesdays between 1:30 and 3:30 p.m., by all means, come on by and say hello.

All this activity leads to another realization: The outside world is paying attention to MVAS. Weather cancelled the May Three Creek activity, and we hope to restart it in the Fall. We've had three other requests for star parties, and were only able to fit one of those in. In addition, there have been questions about our loaner scopes. Just those two issues alone require the attention of the board, and with that in mind, I want to remind you that board meetings are open to the public, for we can always use more input on these issues and others that need our attention as we continue to try to strengthen MVAS. If you're interested, board meetings are set for the second Saturday of each month at 5:45 p.m. at the Herrett Center unless otherwise announced. June will be a challenge to get a meeting in, but if we have to change the time or place of the meeting, we'll let you know.

In the meantime, enjoy the skies as the rain starts to slack off. We look forward to seeing and hearing about your latest endeavors.

Clear Views,
Rob Mayer

Calendars for June

Event Calendar

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2 Full Moon Strawberry Moon 	3	4 Moon at Greatest S Declination -18.4°	5	6
7	8	9 Last Quarter 	10	11	12 Girl Scout Jubilation 	13 Girl Scout Jubilation 
14 Flag Day 	15	16 New Moon Lunation 1144 	17 Moon at Greatest N Declination +18.4°	18	19	20 Hagerman Fossil Beds N.M. Star Party 
21 Father's Day Summer Solstice 	22	23	24 First Quarter 	25	26	27
28	29	30				

Snake River Skies is the Newsletter of the Magic Valley Astronomical Society and is published electronically once a month.

June Celestial Calendar and Trivia

6/1 Saturn is 1.9 degrees south of the Moon.
6/2 Mercury is at aphelion today; Full Moon (known as the Flower, Rose or Strawberry Moon).
6/4 A double Galilean satellite shadow transit begins at 22:58
6/6 Venus is at greatest eastern elongation (45.4 degrees); asteroid 1 Ceres is stationary.
6/9 Neptune is 3 degrees south of the Moon; Last Quarter Moon.
6/10 The Moon is at perigee, subtending 32' 17" from a distance of 369,711 kilometers (229,728 miles); the Curtiss Cross, an X-shaped illumination effect located between the craters Parry and Gambart, is predicted to occur at 00:30
6/11 Uranus is 0.5 degree north of the Moon, Mercury is stationary.
6/12 Asteroid 2 Pallas (magnitude 8.6) is at opposition at 19:00; Neptune is stationary.
6/14 The earliest sunrise of the year at latitude 40 degrees north occurs today; Mars is in conjunction with the Sun.
6/15 Mercury is 0.04 degree north of the Moon; the Moon is 1 degree north of the first-magnitude star Aldebaran (Alpha Tauri).
6/16 New Moon (lunation 1144) occurs at 14:05
6/17 The earliest morning twilight of the year at latitude 40 degrees north occurs today
6/20 Venus is 6 degrees north of the Moon at 17:00
6/21 Jupiter is 5 degrees north of the Moon; summer solstice in the northern hemisphere occurs at 10:38
6/23 Mercury is at its greatest heliocentric latitude south today; the Moon is at apogee, subtending 29' 38" from a distance of 404,132 kilometers (251,116 miles).
6/24 The latest evening twilight of the year at latitude 40 degrees north occurs today; the Purbach Cross or Lunar X, an X-shaped illumination effect involving various rims and ridges between the craters La Caille, Blanchinus, and Purbach, is predicted to occur at 20:40; Mercury is 2 degrees north of Aldebaran at 8:00; First Quarter Moon occurs; Mercury is at greatest western elongation (22.5 degrees).
6/27 The latest sunset of the year at latitude 40 degrees north occurs today
6/29 Saturn is 2 degrees south of the Moon.
6/30 Venus and Jupiter are within 18 arc-minutes of each other today

Giovanni Cassini (1625-1712), Charles Messier (1730-1817), and George Ellery Hale (1868-1938) were born this month.

The usually minor June Boötid meteor shower peaks on the morning of June 27th. June Boötids are the slowest of all meteors, travelling at 18 kilometers (11 miles) per second. A dark window begins at approximately 2:00 a.m. local daylight time when the waxing crescent Moon sets.

Information on Iridium flares and passes of the ISS, the Tiangong-1, the USAF's X-37B, the HST, and other satellites can be found at http://www.heavens-above.com/

The Moon is 13.8 days old, is illuminated 97.0%, and is located in Libra on June 1st at 0:00 UT. The Moon is at its greatest northern declination of +18.5 degrees on June 16th and at its greatest southern declination of -18.4 degrees on June 3rd. Longitudinal libration is at a maximum of +5.0 degrees on June 17th and a minimum of -5.2 degrees on June 2nd and -5.8 degrees on June 29th. Latitudinal libration is at a maximum of +6.5 degrees on June 17th and a minimum of -6.6 degrees on June 4th. The Moon passes one degree north of Aldebaran on June 15th. The waxing gibbous Moon will occult the fourth-magnitude star Theta Librae for observers in eastern North America on the evening of June 28th. For further information on this event, consult page 53 of the June issue of Sky & Telescope. See http://www.lunar-occ...ota/iotandx.htm for information on lunar occultations taking place this month. Visit http://saberdoesthes...does-the-stars/ for tips on spotting extreme crescent Moons. Times and dates for the lunar light rays predicted to occur this month are available at http://www.lunar-occ...o/rays/rays.htm

The Sun is located in Taurus on June 1. The Sun reaches its farthest position north for the year on June 21st. There are 15 hours of daylight at latitude 40 degrees north on the day of the summer solstice.

Brightness, apparent size, illumination, distance from the Earth in astronomical units, and location data for the planets and Pluto on June 1: Mercury (not visible, 12.2", 0% illuminated, 0.55 a.u., Taurus), Venus (magnitude -4.4, 22.1", 53% illuminated, 0.76 a.u., Gemini), Mars (magnitude +1.5, 3.7", 100% illuminated, 2.55 a.u., Taurus), Jupiter (magnitude -1.9, 34.6", 99% illuminated, 5.69 a.u., Gemini), Saturn (magnitude +0.1, 18.5", 100% illuminated, 8.98 a.u., Libra), Uranus on June 16th (magnitude +5.9, 3.5", 100% illuminated, 20.41 a.u., Pisces), Neptune on June 16th (magnitude +7.9, 2.3", 100% illuminated, 29.69 a.u., Aquarius) and Pluto on June 16th (magnitude +14.1, 0.1", 100% illuminated, 31.94 a.u., Sagittarius).

Venus and Jupiter are in the west and Saturn is in the southeast in the evening sky. At midnight, Saturn lies in the south. Mercury can be found in the northeast, Uranus in the east, and Neptune in the southeast at dawn.

At midmonth, Mercury is visible in morning twilight, Venus sets at 11:00 p.m. local daylight time, Jupiter sets at midnight, and Saturn transits the meridian at 11:00 p.m. local daylight time and sets at 4:00 a.m. local daylight time for observers at latitude 40 degrees north.

Mercury is at aphelion on June 2nd and is stationary on June 11th. The Moon occults Mercury on June 15th from Micronesia and southern Asia. Mercury is at its greatest heliocentric latitude south on June 23rd. The speediest planet passes two degrees north of Aldebaran and is at greatest western elongation on June 24th.

Venus continues to grow in apparent size (22.1 to 31.8 arc seconds) but shrinks in illumination (53 to 35%) this month. As June begins, it sets about 3.5 hours after the Sun. Venus departs Gemini and enters Cancer on June 3rd. It will achieve dichotomy (50% illumination) on June 5th. Venus reaches greatest eastern elongation on June 6th. On June 12th and June 13th, it passes less than one degree north of the open cluster M44 (the Beehive Cluster or Praesepe). The brightest planet is located six degrees north of the Moon on the morning of June 20th. It crosses into Leo on June 25th. Venus and Jupiter are separated by twenty degrees as June begins but are less than one third of a degree apart by June 30th. The two planets display nearly the same apparent diameter on that date but Venus is some 13 times brighter. This extremely close conjunction is the first and the best of three to occur this year. Venus and Jupiter lie within two degrees of each other for eight evenings in late June and early July.

Mars is in conjunction with the Sun on June 14th and is consequently not visible this month. It enters the constellation on Gemini on June 25th.

The gas giant Jupiter disappears into the glare of evening twilight by the end of June. A mutual event involving Ganymede and Io is visible from the eastern half of North America on the evening of June 3rd. Io is partially eclipsed by Ganymede for a total of 28 minutes beginning at 9:43 p.m. EDT. A double Galilean satellite shadow transit involving Io and Ganymede begins at 12:58 a.m. EDT on June 4th. Jupiter exits Cancer and enters Leo on June 9th. On June 21st, Jupiter passes five degrees north of the Moon. Browse http://www.skyandtel...watching-tools/ or http://www.projectpl...om/jeve_grs.htm in order to determine transit times of Jupiter's central meridian by the Great Red Spot. GRS transit times are also available on page 53 of the June issue of Sky & Telescope. Javascript Jupiter at http://www.shallowsky.com/jupiter/ shows Galilean satellite events, along with GRS transits.

At midmonth, Saturn shines at magnitude 0.1 and spans 18.4 arc seconds as it retrogrades in Libra. Its rings subtend 42 arc seconds and are inclined by 24 degrees. Saturn passes with two arc minutes of a seventh-magnitude field star on June 23rd and June 24th. Saturn's peculiar satellite Iapetus shines at tenth magnitude when it is situated north of the planet on June 7th through June 9th and at eleventh magnitude as it approaches greatest eastern elongation on June 28th. For more on Saturn's satellites, browse http://www.skyandtel...watching-tools/

During June, Uranus lies within one degree of the fifth-magnitude star Zeta Piscium. On June 18th, Uranus passes one half degree south of that star. Uranus is one half of a degree north of the Moon on June 11th, with an occultation taking place in the south Pacific and part of Australia.

Neptune is located two degrees southwest of the fourth-magnitude star Lambda Aquarii. It rises after midnight. Neptune is 3 degrees south of the Moon on the night of June 8th. Neptune begins retrograde motion on June 12th.

Finder charts for Uranus and Neptune can be found at http://www.nakedeyep....com/uranus.htm and http://www.nakedeyep...com/neptune.htm

Pluto lies in northern Sagittarius, about one half of a degree north of the fifth-magnitude star Xi1 Sagittarii. A finder chart is available on pages 50 and 51 of the June issue of Sky & Telescope and at http://www.bluewater...luto_2015_1.pdf

For more on the planets and how to locate them, browse http://www.nakedeyeplanets.com/

Comet C/2013 US10 (Catalina) may reach eighth or ninth magnitude as it passes southward through Sculptor in June. Comet C/2014 Q2 (Lovejoy) has maintained its brightness to a remarkable degree. Click on http://freestarchart...inder_Chart.pdf for a finder chart showing the position of Comet Lovejoy in early June. Visit http://cometchasing.skyhound.com/ and http://www.aerith.ne...t/future-n.html for additional information on this and other comets visible during June.

Asteroid 2 Pallas glides westward through the constellation of Hercules this month. The large main-belt asteroid shines at magnitude 8.6 when it reaches opposition on the evening of June 11th. It's positioned less than one degree southeast of

the fourth-magnitude star Lambda Herculis on that date. 2 Pallas passes 33 arc minutes south of Lambda Herculis on the following three nights. On June 30th, it lies some 26 arc minutes east of the third-magnitude star Delta Herculis. Other asteroids eleventh magnitude or brighter reaching opposition this month include 72 Feronia (June 8th), 51 Nemausa (June 9th), 92 Undina (June 16th), and 32 Pomona (June 18th). Information on asteroid occultations taking place this month is available at http://www.asteroido.../2015_06_si.htm

Forty binary and multiple stars for June: Struve 1812, Kappa Bootis, Otto Struve 279, Iota Bootis, Struve 1825, Struve 1835, Pi Bootis, Epsilon Bootis, Struve 1889, 39 Bootis, Xi Bootis, Struve 1910, Delta Bootis, Mu Bootis (Bootes); Struve 1803 (Canes Venatici); Struve 1932, Struve 1964, Zeta Coronae Borealis, Struve 1973, Otto Struve 302 (Corona Borealis); Struve 1927, Struve 1984, Struve 2054, Eta Draconis, 17-16 Draconis, 17 Draconis (Draco); 54 Hydrae (Hydra); Struve 1919, 5 Serpentis, 6 Serpentis, Struve 1950, Delta Serpentis, Otto Struve 300, Beta Serpentis, Struve 1985 (Serpens Caput); Struve 1831 (Ursa Major); Pi-1 Ursae Minoris (Ursa Minor); Struve 1802, Struve 1833, Phi Virginis (Virgo)

Notable carbon star for June: V Coronae Borealis

Fifty deep-sky objects for June: NGC 5466, NGC 5676, NGC 5689 (Bootes); M102 (NGC 5866), NGC 5678, NGC 5879, NGC 5905, NGC 5907, NGC 5908, NGC 5949, NGC 5963, NGC 5965, NGC 5982, NGC 5985, NGC 6015 (Draco); NGC 5694 (Hydra); NGC 5728, NGC 5791, NGC 5796, NGC 5812, NGC 5861, NGC 5878, NGC 5897 (Libra); M5, NGC 5921, NGC 5957, NGC 5962, NGC 5970, NGC 5984 (Serpens Caput); M101, NGC 5473, NGC 5474, NGC 5485, NGC 5585, NGC 5631 (Ursa Major); NGC 5566, NGC 5634, NGC 5701, NGC 5713, NGC 5746, NGC 5750, NGC 5775, NGC 5806, NGC 5813, NGC 5831, NGC 5838, NGC 5846, NGC 5850, NGC 5854, NGC 5864 (Virgo)

Top ten deep-sky objects for June: M5, M101, M102, NGC 5566, NGC 5585, NGC 5689, NGC 5746, NGC 5813, NGC 5838, NGC 5907

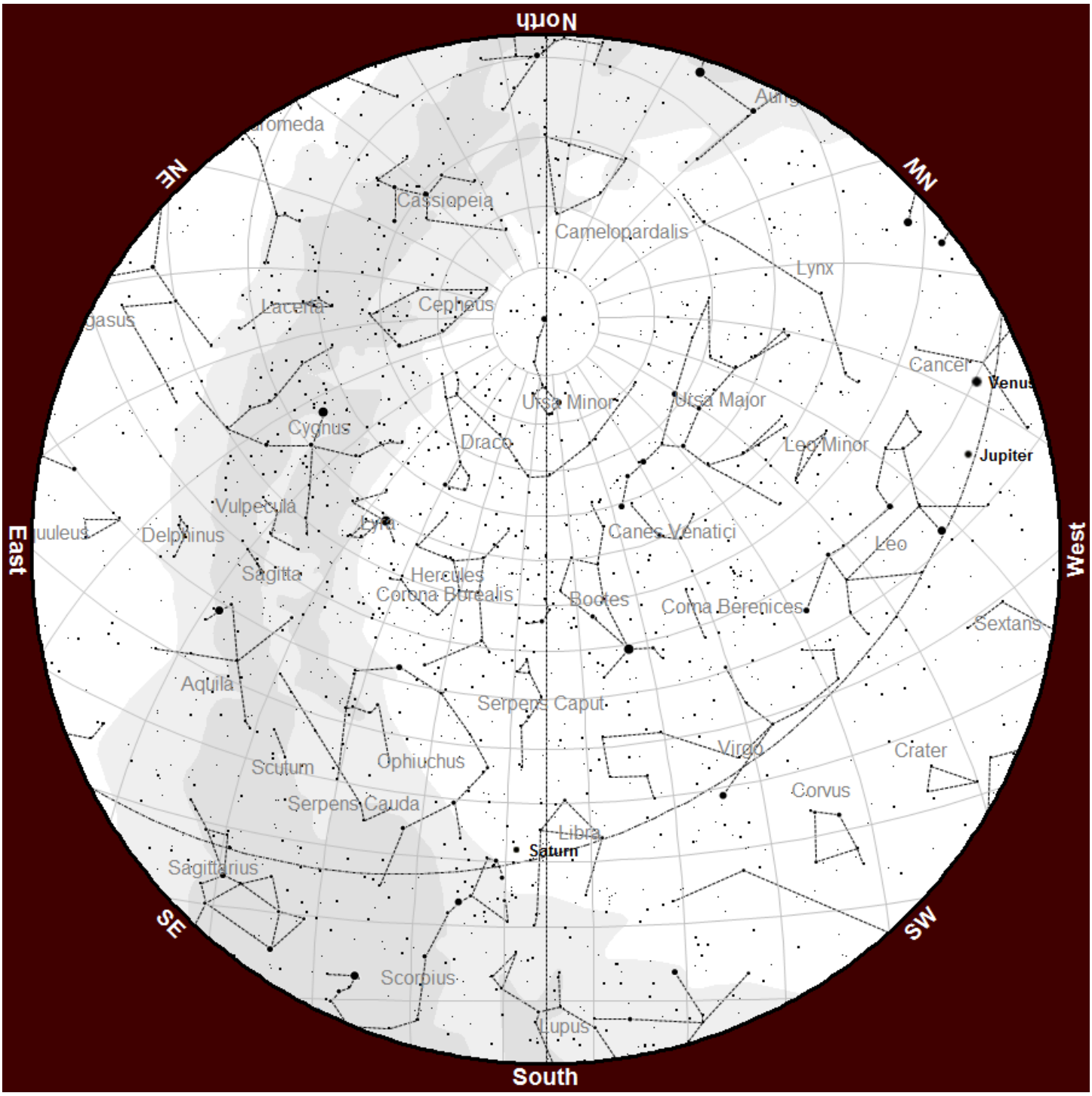
Top five deep-sky binocular objects for June: M5, M101, M102, NGC 5466, NGC 5907

Challenge deep-sky object for June: Abell 2065

The objects listed above are located between 14:00 and 16:00 hours of right ascension.

Abell 2065 is a highly concentrated galaxy cluster in the constellation of Corona Borealis containing over 400 member galaxies.

Planisphere for June



Mid-month, 23:30 (11:30pm end of astronomical twilight).

Planisphere courtesy of Chris Anderson, Observatory Manager, Herrett Center College of Southern Idaho, Twin Falls, ID

Be Safe – Get Out There – Explore Your Universe

Looking Through the Eyepiece

The Eagle and the Snake

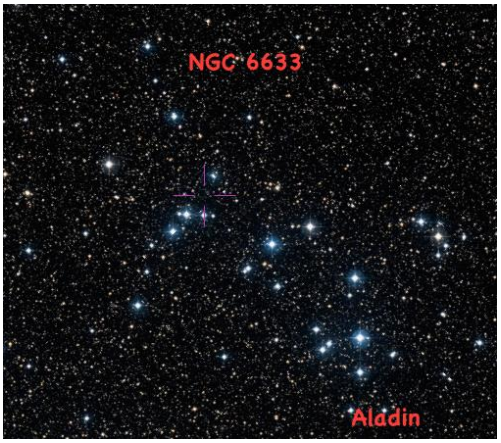
Steve Bell

From the southwestern part of Aquila, The Eagle, and into Ophiuchus, The Serpent Bearer, lies Serpens Cauda, the eastern part of Serpens, which is broken by Ophiuchus. Within this area are four nice deep sky objects, three open clusters and a planetary nebula. The three open clusters are large and bright and are accessible with 50mm binoculars. The planetary is small, but bright, and is a vivid green color. You June even be able to identify it with binoculars, but a telescope is a safer bet.

Con	Object	RA	Dec	Mag	Size
Ser	IC4756	18 38 54	+05 27 00	5	52
Oph	NGC6633	18 27 42	+06 34 00	4.6	27
Oph	NGC6572	18 12 06	+06 51 00	9	0.1
Oph	IC4665	17 46 30	+05 39 00	4.2	41

IC 4756 is a large, moderately bright OC, almost a degree in diameter. It is naked-eye visible under very dark skies as a small circular hazy patch. Through a 4" refractor, it was large, loose and irregularly shaped, containing 50+ stars. Through 20x80 binoculars, it spread about 1/3 the field of view and was more "in character" than when viewed with a telescope.

IC 4756 is about 1600 light years distant and some 700 million years old.

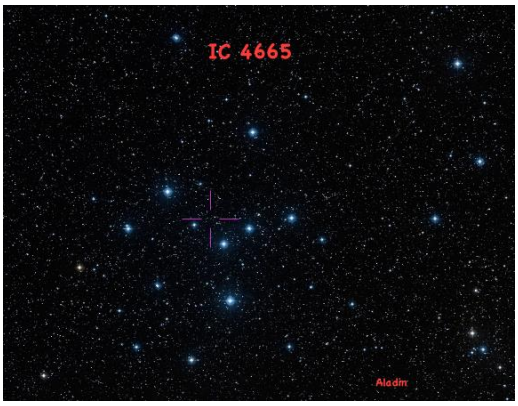


NGC 6633 is a bright, moderately large cluster about 1/3 degree in its long dimension. Through an 8" SCT, the cluster appeared large and loose at 64X, irregular, with a hint of unresolved stars in the background. In 20x80 binoculars, it was relatively large, irregular, and revealed about 15 stars resolved.

NGC 6633 is about a thousand light years distant with an estimated age of 660 million years.

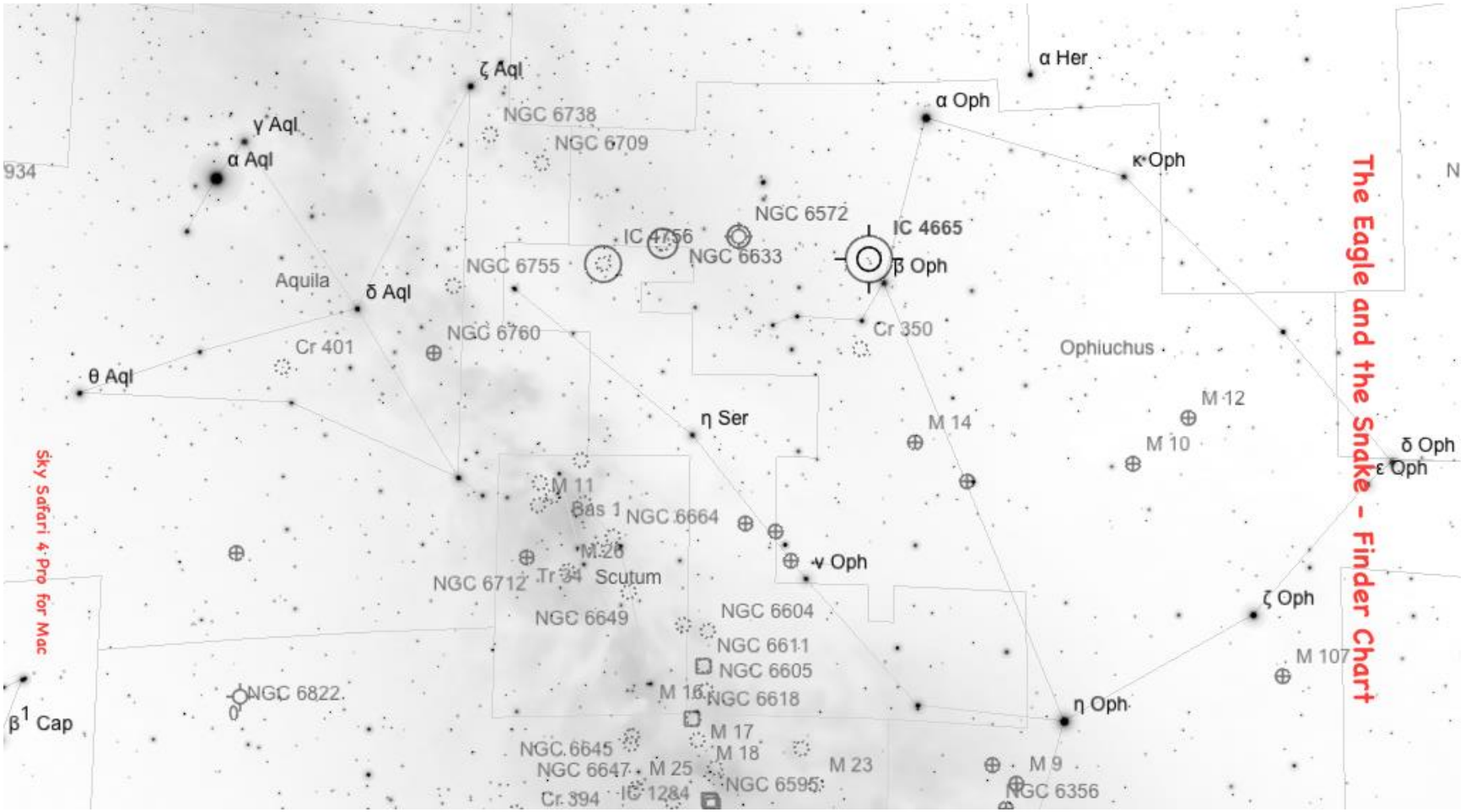
NGC 6572 is a small, but bright, planetary nebula. At low magnification, it appears star-like, but with an intense blue-green color. Through an 8" SCT at 147X, it appeared very green with high brightness. It was improved with a UHC-class filter. This is a nice planetary for amateur class scopes. You might even be able to identify it with binoculars due to its color.

NGC 6572 is a young planetary some few thousands of years old and lies some 3500 light years away.



IC 4665 is a bright open cluster as suitable to binoculars as a telescope. At high power it loses its character. It is large and bright with most stars the same blue-white magnitude. Use low power. Through a 4" refractor at 31X, it showed about 20 stars, a wedge shape, and was visible in an 8x50 finder. It was seen in better context with 10x70 binoculars, appearing more circular, all stars about the same brightness.

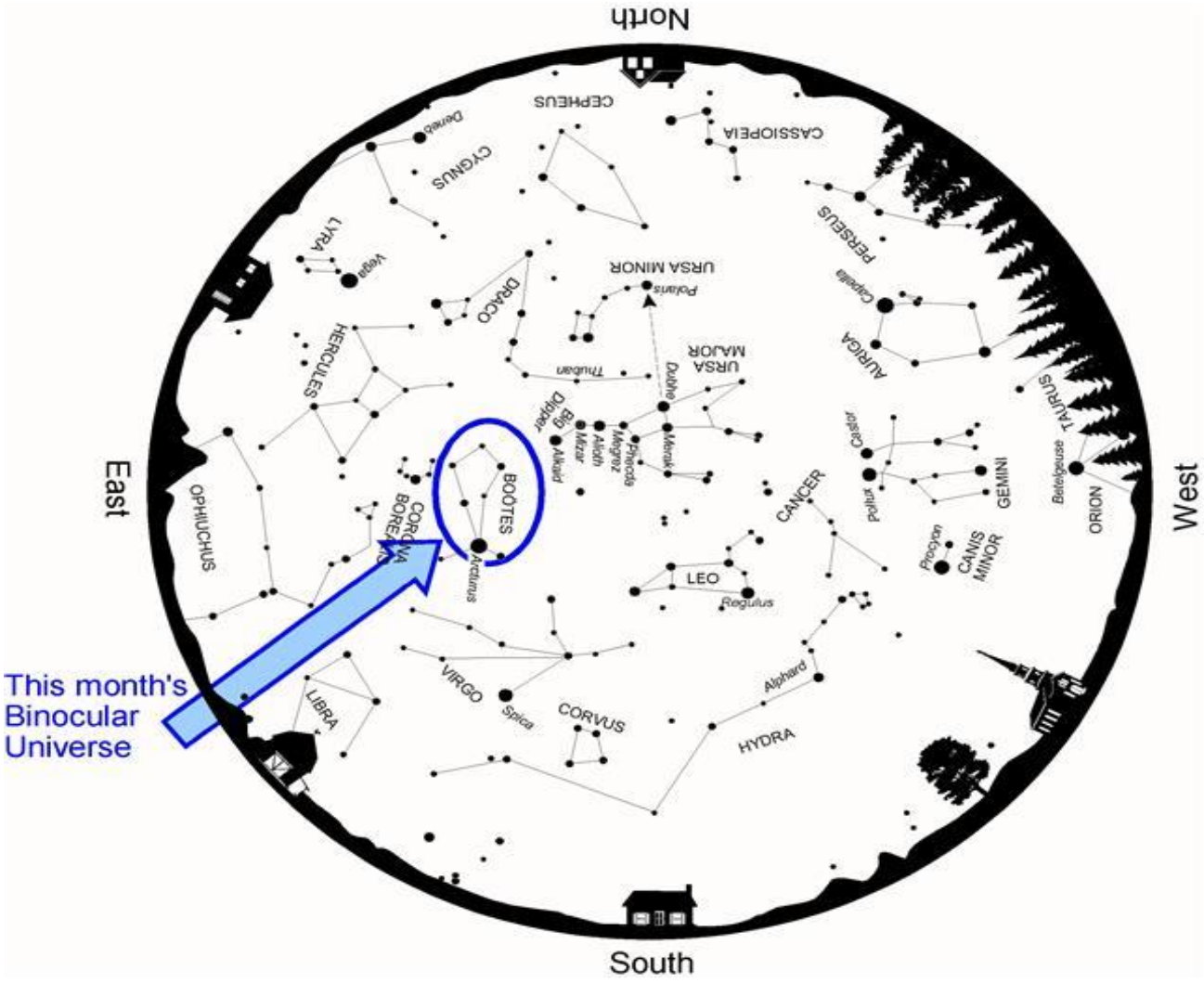
IC 4665 is about 1400 light years away, 36 million years old, and approaching us at 12km/sec.


The Eagle and the Snake – Finder Chart
Sky Safari 4 Pro for Mac
N
ζ Aql
γ Aql
α Aql
δ Aql
θ Aql
Aquila
Cr 401
NGC 6738
NGC 6709
NGC 6572
IC 4756
NGC 6633
NGC 6755
NGC 6760
α Her
α Oph
κ Oph
IC 4665
β Oph
Cr 350
Ophiuchus
M 12
M 10
M 14
δ Oph
ε Oph
η Ser
M 11
Bas 1
NGC 6664
M 26
NGC 6712
Tr 34
Scutum
ν Oph
NGC 6649
NGC 6604
NGC 6611
NGC 6605
M 16
NGC 6618
M 17
M 18
M 23
M 9
NGC 6356
NGC 6645
NGC 6647
M 25
NGC 6595
Cr 394
IC 1284
ζ Oph
M 107
η Oph
NGC 6822
β1 Cap

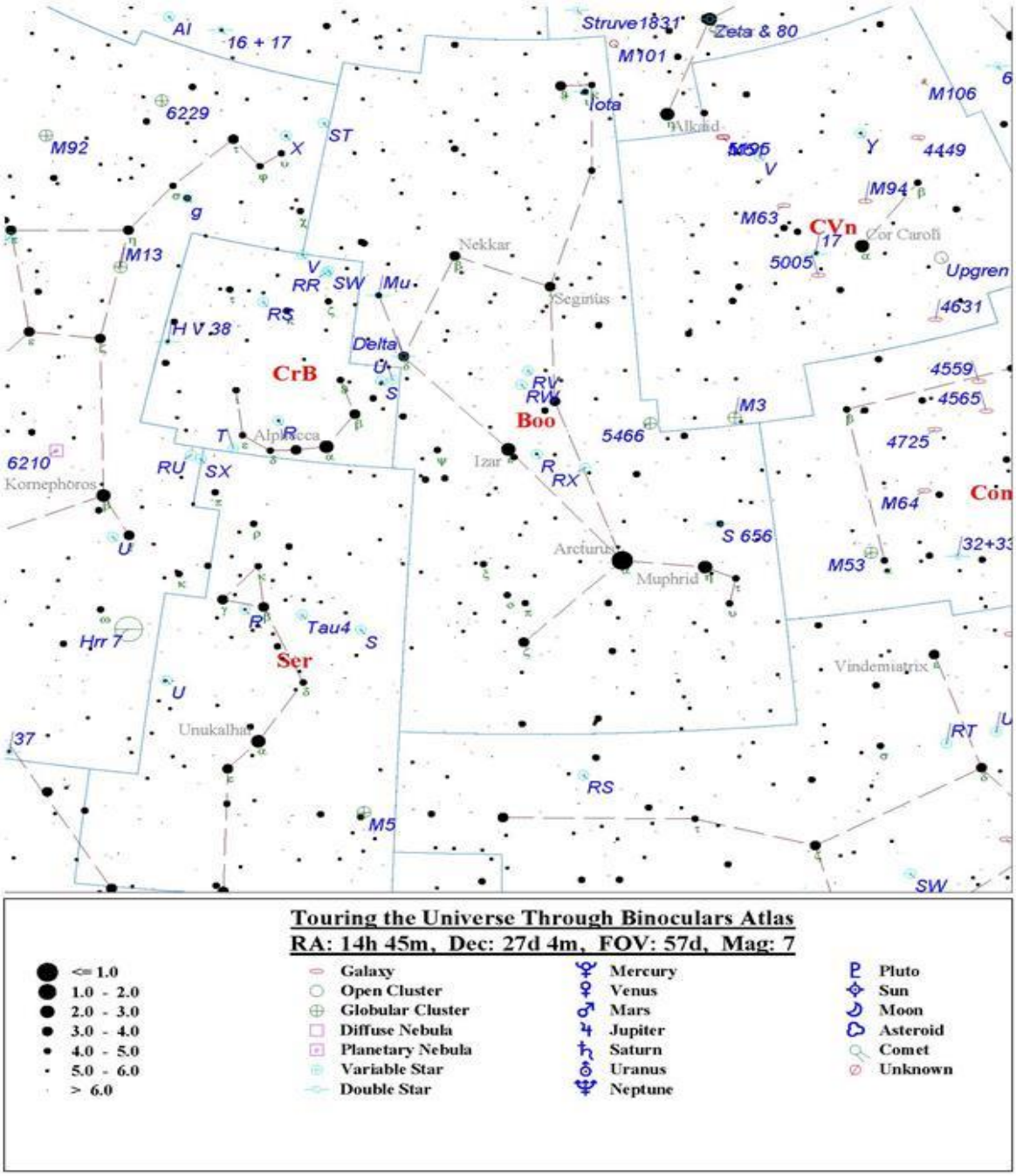
Let's Go Fly a Kite
Article by: Phil Harrington
June 2015

The kite-shaped pattern of stars that we know as Boötes (pronounced Boh-oh-teez) is one of the oldest constellations in the entire sky. Some say that it dates back to ancient Babylon, when they were used to depict the god Enlil, patron god of farmers. Others trace it to Sumeria, where it represented "The Man Who Drove the Great Cart" (our Big Dipper).

Homer was first to use the name Boötes (in Greek, Βοώτης) in the classic The Odyssey, although the tie-in to Greek mythology has never been well established. Many mythology scholars believe that Boötes represents Philomenus, a plowman who legend has it drove oxen. Like the Sumerian link, the "Big Dipper" was portrayed as a cart being pulled by Philomenus' oxen. Actually seeing a herdsman or a plowman among his stars can prove just as challenging as trying to establish the exact origin of Boötes. Our 21st-century imaginations usually find it easier to trace out a kite or an ice cream cone in this region rather than a human form, as our ancestors did.



Above: Spring star map from Star Watch by Phil Harrington.
Click the chart to open a printable PDF version in a new window



Above: Finder chart for this month's Binocular Universe.

Chart adapted from **Touring the Universe through Binoculars Atlas** *(TUBA)*
Click the chart to open a printable PDF version in a new window.

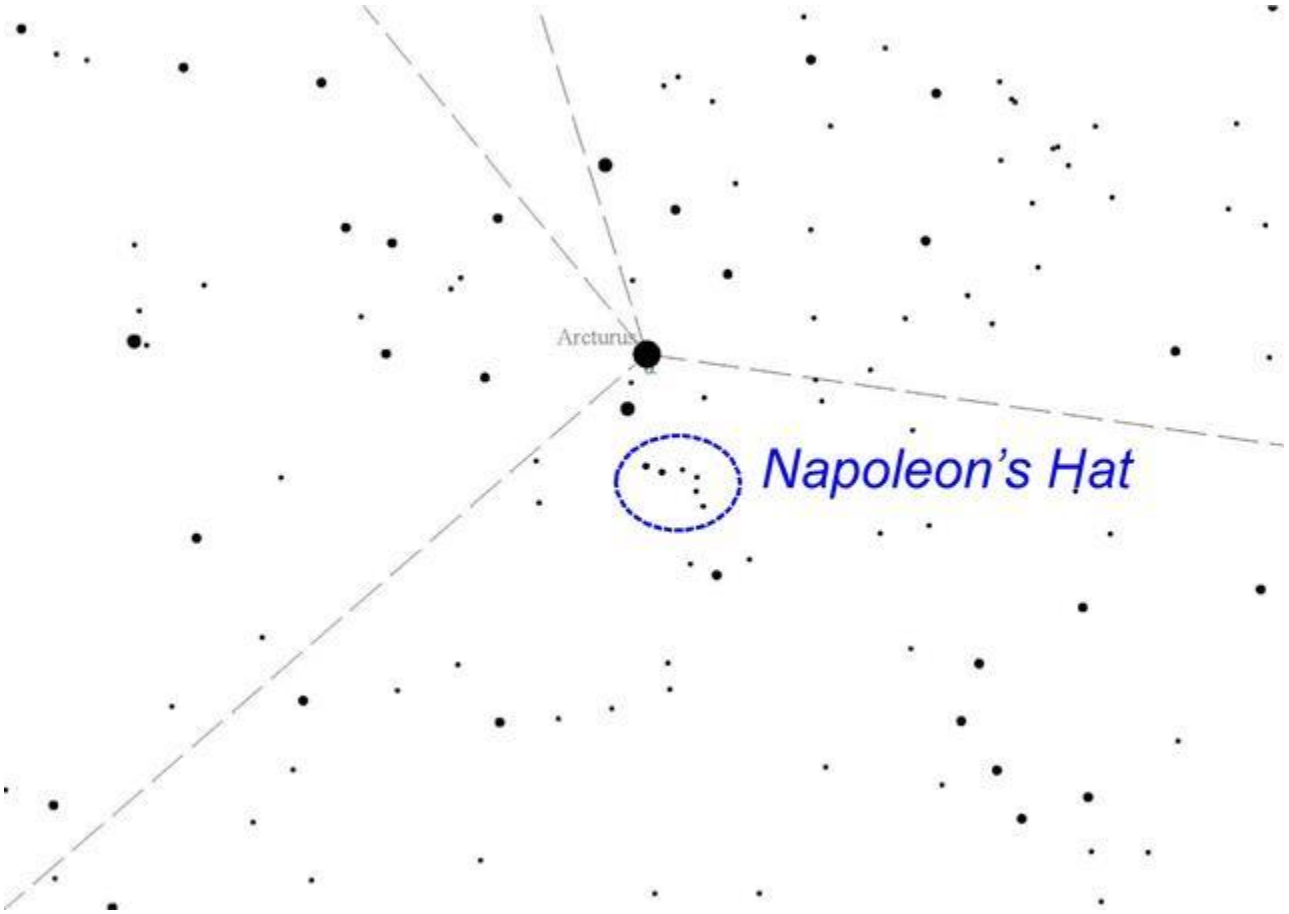
There is no mistaking the identity of the constellation's brightest star, **Arcturus**. Arcturus, shining at a dazzling magnitude +0.04, is the brightest star north of the celestial equator and fourth brightest in the entire sky. Its distinctive orangish hue is instantly apparent through a telescope, binoculars, or the naked eye. The orange color tells us that Arcturus is cooler than our sun. Technically, it is a type K0 III orange giant, with a luminosity 110 times greater than the sun. Spectroscopic studies reveal that all of the fusible hydrogen in its core has been depleted, having been converted to helium. The core is shrinking and becoming hotter, but it has not yet reached conditions to support helium fusion; instead, Arcturus' energy comes from hydrogen fusion occurring in a shell surrounding the core.

Arcturus is only 37 light years away, making it one of our Sun's more impressive neighbors. That means the starlight we are seeing tonight left Arcturus in 1978, the year that my wife and I met at college! What were you doing 37 years ago?

Maybe dancing to that year's #1 song on the Billboard charts, "Shadow Dancing" by Andy Gibb, or watching the year's highest grossing movie, Grease. (Kids, ask your parents or grandparents!) Maybe you weren't even a twinkle in your future parents' eyes! Whatever it was, that's when the light we are seeing tonight left Arcturus.

Although Boötes lacks any attention-getting deep-sky objects, the Herdsman has gathered a few interesting targets that often go missed.

For instance, there's one that hides just 40 arc-minutes south of Arcturus. With steadily support binoculars, a transparent sky, and sharp eyes, look an arc or chain of seven stars right at the brink of visibility. The French amateur astronomer Fulbert Picot is credited with coining the group's name, **Napoleon's Hat**, for its likeness to the emperor's chapeau. Napoleon's Hat is centered at R.A. 14h 14.0m, Dec. +18° 33'. Typical 7x to 10x binoculars will have a tough time spotting all seven of the stars here, as they range in brightness from 9th to 11th magnitude, but my 16x70 giants show them quite plainly.



Above: The asterism Napoleon's Hat lies just south of Arcturus.

Chart adapted from **Touring the Universe through Binoculars Atlas** *(TUBA)*

As long as we are going for big game, let's try for a real challenge. Boötes holds a lone globular cluster just inside its western border adjacent to Canes Venatici. **NGC 5466** shines at only 9th magnitude, and is a taxing test for 4- and 6-inch telescopes depending on sky conditions. But if you wait for that special night, it just might pop out in 50-mm binoculars. You'll need to support your binoculars steadily for this one, and use all the tricks of the trade, such as averted vision. Look for its ethereal glow, only a dim round smudge of gray light, just to the west of a 7th-magnitude star.

If NGC 5466 proved to be just too taxing, but it left you hungering for a globular cluster, then salvation lies just 5° to the west. Crossing quickly into Canes Venatici, we find **M3**, one of the best of its kind in the entire sky. Charles Messier discovered M3 on May 3, 1764. You can discover it for yourself by aiming at the halfway point between Arcturus and the star Cor Caroli in Canes Venatici. Keep an eye out for a right triangle of three dim stars pointing toward the southeast. Spot it? Take a closer look at the point marking the right angle itself. Notice how it is not a perfect point of light, but rather a tiny, fuzzy blob? That's M3.

When we look toward M3, our gaze is crossing nearly 34,000 light years. Right away, knowing the cluster's overall brightness as well as that extreme distance tells you that M3 is no ordinary globular. Indeed, studies show that it is one of the largest members of the Milky Way's family of globular clusters, perhaps containing more than half a million stars.

Back into Boötes, let's ascend the "ice cream cone" to **Delta Boötis**. Delta is a binary system made up of two type-G stars. The primary shines at magnitude 3.5, making it an easy naked-eye find. Its companion, which is separated by 104", shines dimly at magnitude 7.8. The system's primary star is a type G8 III yellow giant that, like Arcturus, is evolving toward the red giant phase of life. The less massive companion is a type G0 V main sequence star, making it very similar to our own G3 V Sun.

Further northeast, we have **Mu Boötis**, another binary worthy of note. Mu is also known as Alkalurops, from the Greek word *kalaurops*, meaning "the shepherd's staff." With our binoculars, we can easily make out that Mu is a binary star. Its 6.5-magnitude secondary star lies 108" of arc away from the 4.3-magnitude primary.

But wait, there's more. A close look through a telescope shows that the companion is actually two closely spaced type G stars separated by a scant 1.5 arc-seconds, and labeled Mu-B and Mu-C. They orbit a common center once every 260 years and are separated from one another by about 54 Astronomical Units. Together, they are more than 4,000 AU distant from Mu-A, and take at least 125,000 years to complete an orbit.

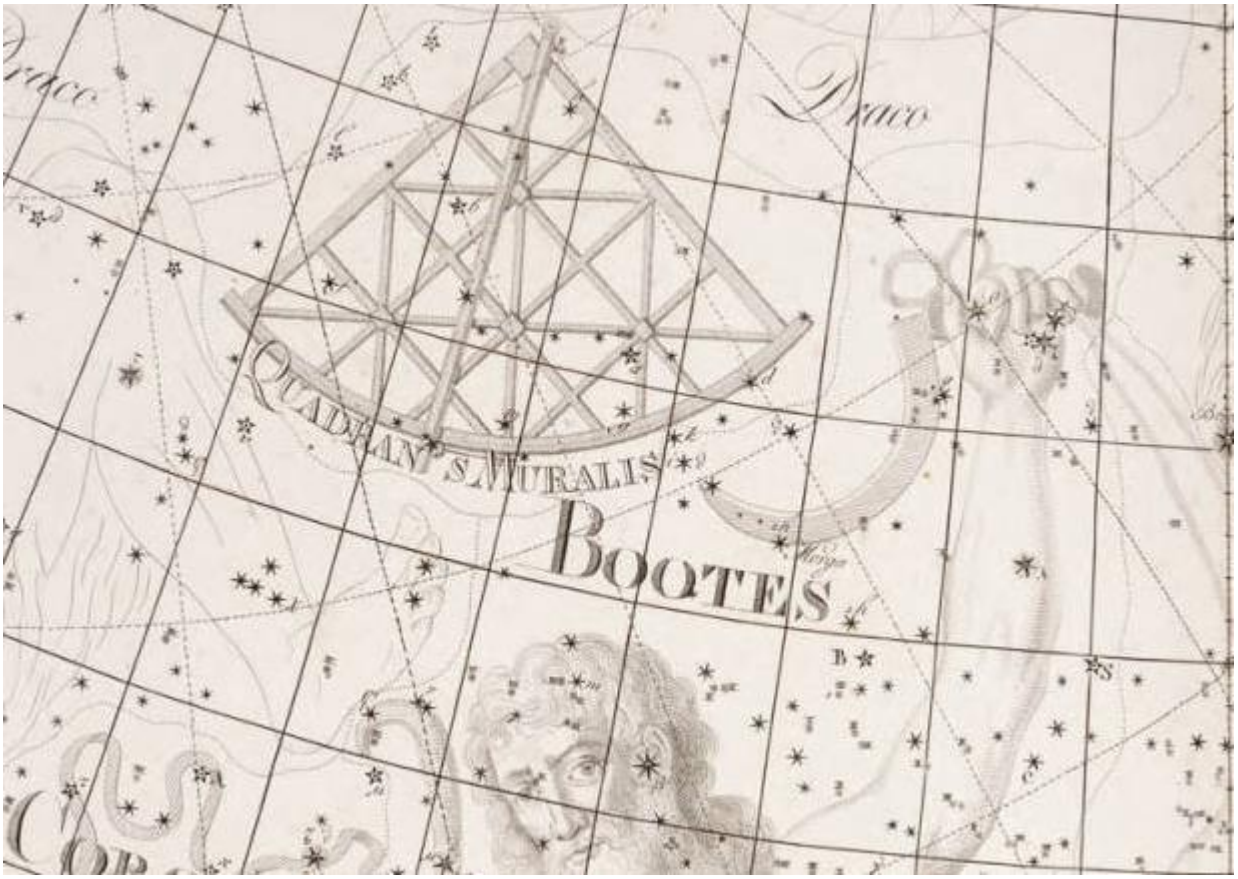
With your eyes alone, look toward the northwestern corner of Boötes, just east of Alkaid (Eta Ursae Majoris) marking the end of the Big Dipper's handle. See a faint glow there? Now, swing your binoculars that way and take another look. You'll discover that naked-eye patch is actually a field of more than half a dozen stars scattered around Kappa and Iota Boötis.

The **Iota Boötis** system is made up of a 5th-magnitude primary and a 7.5-magnitude secondary. They appear separated by 39" of arc, which is right at the edge of resolution through 7x and 8x binoculars on nights of steady seeing. An unrelated 6th-magnitude star to the pair's east may mistakenly give the impression that Iota is actually a triple star system, but it is not. **Kappa** is also a binary star, but with its two components separated by only 13.5", we had best leave them to telescopes.

Kappa and Iota, along with Theta Boötis to their east are often portrayed as the Herdsman's outstretched hand. A smattering of fainter adjacent stars in northern Boötes and nearby Draco were once part of the now defunct constellation **Quadrans Muralis**, the wall-mounted quadrant. First created by French astronomer Joseph Jerome de Lalande in 1795, Quadrans Muralis was drawn from ten stars shining between 5th and 7th magnitudes. Despite Johann Bode later depicting it in his Uranographia star atlas of 1801, the constellation was never widely adapted. Yet, we acknowledge Lalande's wall-mount quadrant every January when we gaze toward the radiant of the annual Quadrantid meteor shower.

The bright star Arcturus blazes high in the northern sky this time of year, and even shines above the northern horizon for observers in the southern hemisphere. You can't miss it… its orange-white light is unmistakable. While Arcturus is pretty enough in its own right, there's a little-known group of dim stars surrounding the bright star. These faint stars are not part of a star cluster, but rather, just a chance alignment of little stars in the line of sight of Arcturus.

Part of this little star group, just south of Arcturus, can be seen in any telescope. At low magnification, it looks like a "Bell Curve" (or a Gaussian, if you're mathematically inclined) about 1/3 of a degree in length. But to Frenchman Fulbert Picot, it looks like the hat of Napoleon. See if you can spot this asterism in a telescope at low magnification, or perhaps in binoculars if you have keen eyes. The image at the top of the page will give you an idea what to look for. And the map below will help you find Arcturus. Remember… the handle of the Big Dipper "arcs to Arcturus…".Arcturus, brightest star in the constellation Bootes



Above: Quadrans Muralis, as depicted on Johann Bode's Uranographia star atlas of 1801.

The late spring sky has plenty to offer binocularists who wait for the sky to darken fully. Here are other targets within Boötes that are worth visiting this month.

Object	Con	Type	R.A. (2000)	Dec	Mag	Size/Sep/ Period	Notes
S 656	Boo	**	13 50.4	+21 17	6.8,7.3	86"	208°(1923)
5466	Boo	GC	14 5.5	+28 32	9.1	11'	*TUB page 98*
Iota	Boo	**	14 16.2	+51 22	4.9,7.5	39"	*TUB page 98* 33°(1942);9198
RX	Boo	Vr	14 24.2	+25 42	8.6-11.3p	340 days	Semi-Regular
R	Boo	Vr	14 37.2	+26 44	6.2-13.1	223.40 days	Long Period Variable
RV	Boo	Vr	14 39.3	+32 32	7.9-9.9p	137 days	Semi-Regular
RW	Boo	Vr	14 41.2	+31 34	8.0-9.5p	209 days	Semi-Regular
Delta	Boo	**	15 15.5	+33 19	3.5,8.7	105"	79°(1976);9559
Mu	Boo	**	15 24.5	+37 23	4.3,6.5	108"	*TUB page 98* 171°(1956);962(

The "G" in GOES Is What Makes It Go

By Ethan Siegel

Going up into space is the best way to view the universe, eliminating all the distortionary effects of weather, clouds, temperature variations and the atmosphere's airflow all in one swoop. It's also the best way, so long as you're up at high enough altitudes, to view an entire 50 percent of Earth all at once. And if you place your observatory at just the right location, you can observe the *same* hemisphere of Earth continuously, tracking the changes and behavior of our atmosphere for many years.

The trick, believe it or not, was worked out by Kepler some 400 years ago! The same scientist who discovered that planets orbit the sun in ellipses also figured out the relationship between how distant an object needs to be from a much more massive one in order to have a certain orbital period. All you need to know is the period and distance of one satellite for any given body, and you can figure out the necessary distance to have any desired period. Luckily for us, planet Earth has a natural satellite—the moon—and just from that information, we can figure out how distant an artificial satellite would need to be to have an orbital period that exactly matches the length of a day and the rotational speed of Earth. For our world, that means an orbital distance of 42,164 km (26,199 miles) from Earth's center, or 35,786 km (22,236 miles) above mean sea level.

We call that orbit *geosynchronous* or *geostationary*, meaning that a satellite at that distance always remains above the exact same location on our world. Other effects—like solar wind, radiation pressure and the moon—require onboard thrusters to maintain the satellite's precisely desired position above any given point on Earth's surface. While geostationary satellites have been in use since 1963, it was only in 1974 that the Synchronous Meteorological Satellite (SMS) program began to monitor Earth's weather with them, growing into the Geostationary Operational Environmental Satellite (GOES) program the next year. For 40 years now, GOES satellites have monitored the Earth's weather continuously, with a total of 16 satellites having been launched as part of the program. To the delight of NASA (and Ghostbusters) fans everywhere, GOES-R series will launch in 2016, with thrice the spectral information, four times the spatial resolution and five times the coverage speed of its predecessors, with many other improved capabilities. Yet it's the simplicity of gravity and the geostationary "G" in *GOES* that gives us the power to observe our hemisphere all at once, continuously, and for as long as we like!

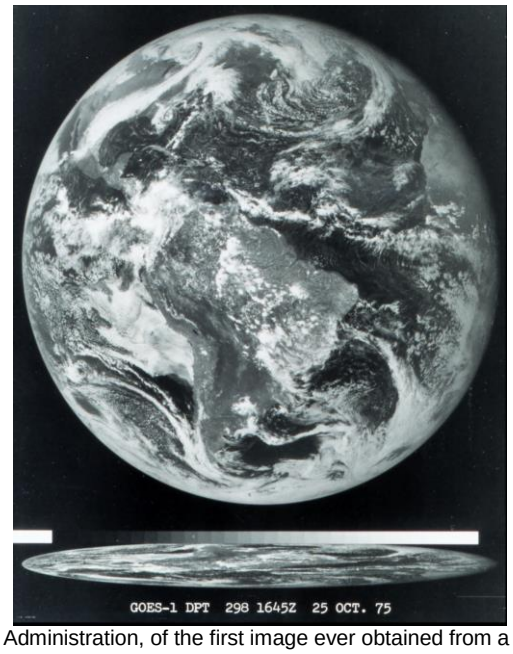


Image credit: National Oceanic and Atmospheric Administration, of the first image ever obtained from a GOES satellite. This image was taken from over 22,000 miles (35,000 km) above the Earth's surface on October 25, 1975.

Observatory and Planetarium

Centennial Observatory at the Herrett Center
College of Southern Idaho – Twin Falls, ID
www.herrett.csi.edu

Event	Place	Date	Time	Admission
Summer Solar Session #1	Centennial Observatory	Wednesday, May 27th	1:30 to 3:30 PM	FREE
Summer Solar Session #2	Centennial Observatory	Wednesday, June 3rd	1:30 to 3:30 PM	FREE
Summer Solar Session #3	Centennial Observatory	Wednesday, June 10th	1:30 to 3:30 PM	FREE
Monthly Free Star Party	Centennial Observatory	Saturday, June 13th	9:45 PM to midnight	FREE
Summer Solar Session #4	Centennial Observatory	Wednesday, June 17th	1:30 to 3:30 PM	FREE
Hagerman Fossil Beds Star Party (2nd annual)	Hagerman Fossil Beds National Monument	Saturday, June 20th	1:00 PM to 12:00+ AM	FREE
Summer Solar Session #5	Centennial Observatory	Wednesday, June 24th	1:30 to 3:30 PM	FREE

Faulkner Planetarium Show Schedule for June

SHOWS
Astronaut (Astro)*
Black Holes: The Other Side of Infinity (Black Holes)*
Dynamic Earth: Exploring Earth's Climate Engine (Dyn Earth)*
Pink Floyd: Dark Side of the Moon (Dark Side)
Rock On Demand (ROCK)
Sea Monsters: A Prehistoric Adventure (Sea Monsters)
Solar System Odyssey (SS Odyssey)

Tuesday					
				7:00	
				(Dyn Earth)*	

Friday					
				7:00	8:00
				(SS Odyssey)	(ROCK)

Saturday					
1:30	2:30	3:30	4:30	7:00	8:00
(Astro)*	(SS Odyssey)	(Sea Monsters)	(SS Odyssey)	(Black Holes)*	(Dark Side)

*Denotes a program with a lives sky tour.

About the Magic Valley Astronomical Society

Magic Valley Astronomical Society
P.O. Box 445
Kimberly, ID, USA 83341

The Magic Valley Astronomical Society (MVAS) was founded in 1976. The Society is a non-profit [501(c) 3] educational and scientific organization dedicated to bringing together people with an interest in astronomy.
In partnership with the Centennial Observatory, Herrett Center, College of Southern Idaho - Twin Falls; we hold regularly scheduled monthly meetings and observation sessions, at which we share information on current astronomical events, tools and techniques for observation, astrophotography, astronomical computer software, and other topics concerning general astronomy. Members enthusiastically share their telescopes and knowledge of the night sky with all who are interested. In addition to our monthly public star parties we hold members only star parties at various locations throughout the Magic Valley.

MVAS promotes the education of astronomy and the exploration of the night sky along with safe solar observing through our public outreach programs. We provide two types of outreach; public star parties and events open to anyone interested in astronomy, and outreach programs for individual groups and organizations (e.g. schools, churches, scout troops, company events, etc.), setting up at your location. All of our outreach programs are provided by MVAS volunteers at no cost. However, MVAS will gladly accept donations. Donations enable us to continue and improve our public outreach programs.

Membership is not just about personal benefits. Your membership dues support the work that the Magic Valley Astronomical Society does in the community to promote the enjoyment and science of astronomy.
Speakers, public star parties, classes and support for astronomy in schoolrooms, and outreach programs just to name a few of the programs that your membership dues support.

Annual Membership dues will be:
$20.00 for individuals, families, $10.00 for students.
Contact Treasurer Jim Tubbs for dues information via e-mail: jtubbs015@msn.com

Donations to our club are always welcome and are even tax deductible. Please contact a board member for details.

Membership Benefits:
Lending Telescopes: The society currently has three telescopes for loan and would gladly accept others please contact President Robert Mayer, for more information on these and other benefits.

Telescopes are an individual thing and not practical for public use. However, everyone should have the experience of a good look at the moon for at least 5 minutes in their life time. It is a dimension and feeling that is unexplainable. Pictures or TV can't give this feeling, awareness, or experience of true dimension. A person will not forget seeing our closest neighbor, the moon. Norman Herrett in a letter to Dr. J. L. Taylor, president of the College of Southern Idaho, Twin Falls, ID, USA circa 1980.