Outdoors

Upstate NY stargazing in October: Prominent constellations of summer and winter visible on Autumn nights

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By Special to nyup.com

star 1.jpg

This photo, taken by a stationary camera at Mount Megantic National Park in Quebec, captured a fireball that shot over Montreal Wednesday night. The "bolide," a rock entering Earth's atmosphere, was seen across the Northeast. The Summer Triangle is shown as a red overlay.

(ASTROLab du parc national du Mont-Megantic)

By Damian Allis | Contributing writer

At least one camera and hundreds of witnesses watched a fireball blaze across the northwest sky on the night of Wednesday, September 21st. As reported by the American Meteor Society and covered on syracuse.com, over 360 reports came in from observers as far west as Buffalo and as far east as the New Brunswick border of Maine.

The rare event raises several questions. How big was it? Did any large pieces of it land? If so, where? Would your insurance policy cover any property damage? And just how much would the rock be worth? The market for the collectable bits of the solar system is quite healthy - depending on the size and composition, you're lucky find on an afternoon walk could fetch hundreds or, in some cases, many thousands of dollars - not a bad haul after a small initial investment in a strong magnet, a walking stick, and a book on identification.

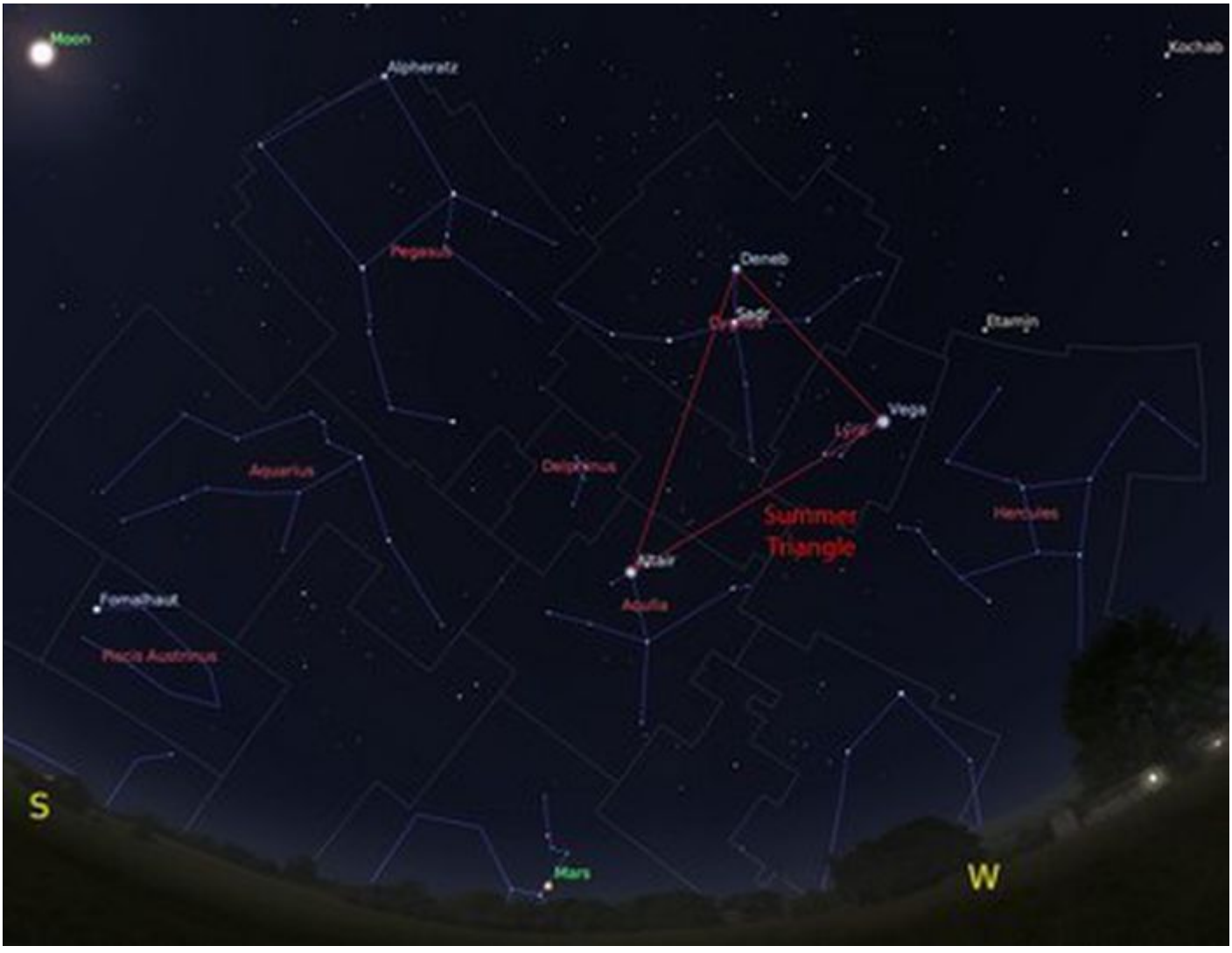
There's an adage "The Great Giza Pyramid is still curing," referring to the half-million tons of mortar still, after 4500 years, undergoing the chemistry of hardening to some exceptionally small amount. Similar can be said of the solar system. Roughly 4.5 billion years after its formation from a gigantic cloud of gas and microscopic particles, the largest bodies in the solar system, including the Sun, planets and moons, dwarf planets, and asteroids, are still accruing mass as gravity and their own motions draw tiny particles towards them.

The calculations vary, but an estimated 60 tons of debris falls from space each day into our atmosphere. Much of this is in the form of microscopic particles that burn up on entry. Some falls into our many oceans, with only the rare lucky observer seeing the streak to know what direction the fish were startled in. To the benefit of professional meteor hunters, some bolides land on the Earth's many deserts, the

largest being Antarctica. Be it in oppressive heat or frigid cold, finding a large rock on the ground with nothing but sand or ice for hundreds of miles in every direction is a good early indicator that the rock may have come from "up there" and not "over there."

Sixty tons across an entire planet is a very small amount, making bright fireball captures a rare treat to any observer. We can hedge our bets at seeing many shooting stars by observing during meteor showers, but anyone outside for a few hours of observing will very likely see at least one or two random bright streaks. All you need do is keep your eyes to the sky and out of an eyepiece - and certainty away from a smartphone.

Your First Steps Outside:



The view looking south at 10:00 p.m. on October 15th (except for the changing Moon position, this mid-month view is accurate for all of October). Image made with Stellarium.

Items and events listed below assume you're outside and observing between 8 p.m. and midnight throughout October anywhere in New York state. The longer you're

outside and away from indoor or bright lights, the better your dark adaption will be. If you must use your smartphone, find a red-light app or piece of red acetate, else set your brightness as low as possible.

Mars continues to be our best nighttime observing target, and will be visible in our evening sky until well into June of next year. Look to the southwest for an orange star - with Antares in Scorpius set below the horizon by 8:00 p.m. mid-month, it is the only bright orange target in the sky.

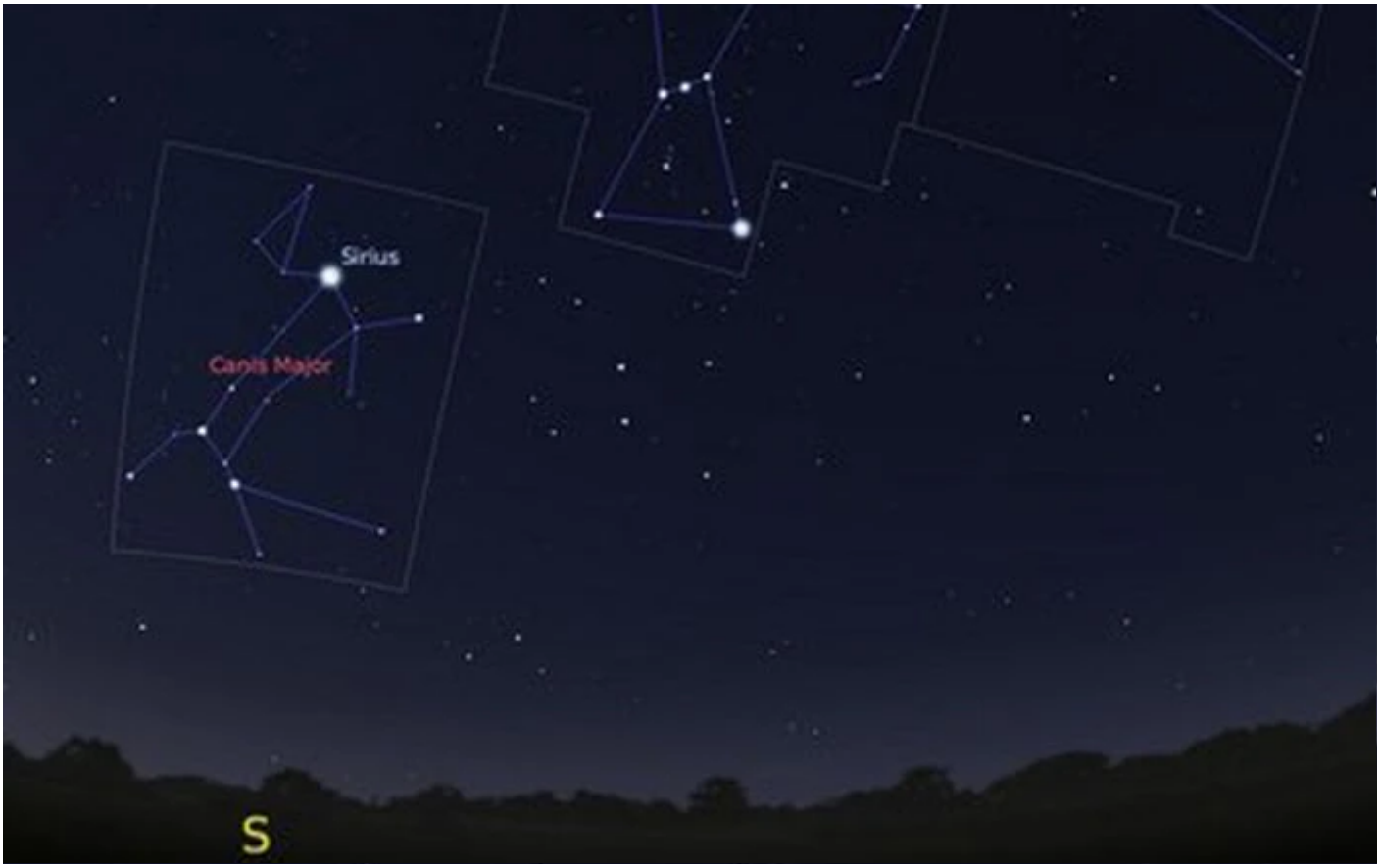
Saturn is still visible in the early evening skies, low in the southwest before 9:00 p.m. in early in October and before 8:00 p.m. towards the end of the month. Only a few months back, we used Mars as a guide to finding the dimmer Saturn. This month, we get a new, much brighter marker in the form of Venus.

Venus is spectacular in the early evening sky and will only get brighter as we move into November. It is unmistakable after sunset to the southwest but sets below the horizon around 8:00 p.m. each night.

The Summer Triangle, our highlight in the August and September observing articles, is still present as autumn arrives. During our usual observing hours, its bright corner star Vega goes from pointing west at the beginning of the month to pointing northwest by month's end.

Be there no doubt, "Winter is coming." For us, the celestial markers include the Pleiades, followed soon to their east by the head of Taurus the Bull, both of which are visible before 10 p.m. mid-month. Those who make it to midnight are rewarded with Orion the Hunter, whose three-star belt is among the most prominent star arrangements in the nighttime sky. Their view in the early October morning is shown below looking south - a sneak preview of their observing time dominance yet to come in the winter months.

Early Riser Alert:



The prominent winter constellations, visible to the south in the early morning this month.

The early risers among us have already seen the best of Winter for a few months! The train of the Pleiades, Taurus, and Orion are the brightest collective eye candy in the sky each year, sailing high and to the south in the early morning.

Jupiter and Mercury: Starting around mid-October, Jupiter will peak above the Western horizon just after 6:30 a.m. However bright it may appear, do not confuse it with Sirius, the most brilliant star in the night sky. By the time Jupiter peers over the horizon, Sirius will be nearly due-south and unmissable, trailing just to the east of Orion the Hunter.

Jupiter and Mercury will make a bright and very close pairing on the eastern horizon on October 11th, then Jupiter will rise a bit earlier each night, clearing the eastern horizon around 5:30 a.m. by month's end.

Space Mission Updates:

Space missions, like ordinary folks and mythological characters alike, are conceived, shine for a time, and eventually make their way into the footnotes of history. September saw this cycle in full effect and we'd me remiss in not making some mention.

Rosetta At Comet 67P - As of the morning of September 30th, the European Space

Agency (ESA) Rosetta spacecraft is now a permanent, and permanently dented, resident of Comet 67P/Churyumov-Gerasimenko. With over 116,000 images and unprecedented scientific observations to its name, the orbiting probe now joins its Philae lander on the comet's surface, albeit with a much harder landing, as mission controllers crash-landed the probe onto the comet. The mission team will spends many years studying the collected data to learn more about the history of our solar system.

Hubble On Europa - NASA's Hubble Space Telescope made a most interesting discovery for those contemplating the possibilities of life beyond our own humble planet. Jupiter's moon Europa joins Saturn's moon Enceladus as a place where plumes of subsurface liquid water appear to be spewing out into space before falling back down. This is a boon for NASA engineers, as it means that we could possibly collect samples of their liquid oceans without having to land and drill through many miles of ice. In the case Europa, its subsurface ocean is estimated to contain twice as much liquid water as all of the Earth's oceans combined. Europa one of Jupiter's four bright Galilean moons and an easy find in low-power binoculars.

SpaceX To Mars - This past Tuesday, September 27th, Elon Musk put forth his company's vision - as well as a few component prototypes - for the large-scale colonization of our next-best stomping ground in the solar system. The entire talk has been posted to youtube, providing a glimpse at what SpaceX is actively working on to get humans reliably off of Earth (hopefully well before the 2048 elections). Space enthusiasts everywhere marvel at the fact that, if the engineering skills - and the market - are there, anyone who can come up with the ticket price will have the opportunity to stare back at the Earth through their own telescopes in the few decades to come.

ISS And Other Bright Flyovers:

Satellite flyovers are commonplace, with several bright passes per hour, yet a thrill to new observers of all ages. Few flyovers compare in brightness or interest to the International Space Station. The flyovers of the football-sized craft with its massive solar panel arrays can be predicted to within several seconds and take several minutes to complete.

October flyovers look to be quite impressive during our usual observing window, including bright double flyovers on October 11th, 13th, and 15th. You'll note the near-90 minute gap between flyovers these nights, the amount of time it takes for the ISS to make it around the Earth once. Simply go out a few minutes before the start time, orient yourself, and look for what will at first seem like a distant plane.

Satellite fly-bys

Date	Brightness	Approx. Start	Start Direction	Approx. End	End Direction
10/1	extremely	7:42 PM	SW	7:47 PM	E/NE
10/2	very	8:26 PM	W	8:30 PM	N
10/3	very	7:34 PM	W/SW	7:40 PM	NE
10/4	moderately	8:19 PM	W/NW	8:23 PM	N/NE
10/5	moderately	7:26 PM	W	7:32 PM	NE
10/6	moderately	8:12 PM	NW	8:15 PM	N/NE
10/7	moderately	7:19 PM	W/NW	7:24 PM	NE
10/8	moderately	8:04 PM	NW	8:07 PM	N/NE
10/9	moderately	7:12 PM	NW	7:16 PM	NE
10/10	moderately	7:56 PM	NW	7:59 PM	N/NE
10/11	moderately	7:04 PM	NW	7:08 PM	NE
10/11	moderately	8:40 PM	NW	8:41 PM	N/NW
10/12	very	7:48 PM	NW	7:51 PM	NE
10/13	very	6:56 PM	NW	7:01 PM	E/NE
10/13	very	8:32 PM	NW	8:34 PM	NW
10/14	extremely	7:40 PM	NW	7:43 PM	E/NE
10/15	very	6:47 PM	NW	6:53 PM	E
10/15	very	8:24 PM	W/NW	8:26 PM	W
10/16	extremely	7:31 PM	W/NW	7:36 PM	SE
10/18	very	7:23 PM	W/NW	7:29 PM	S/SE

The Moon

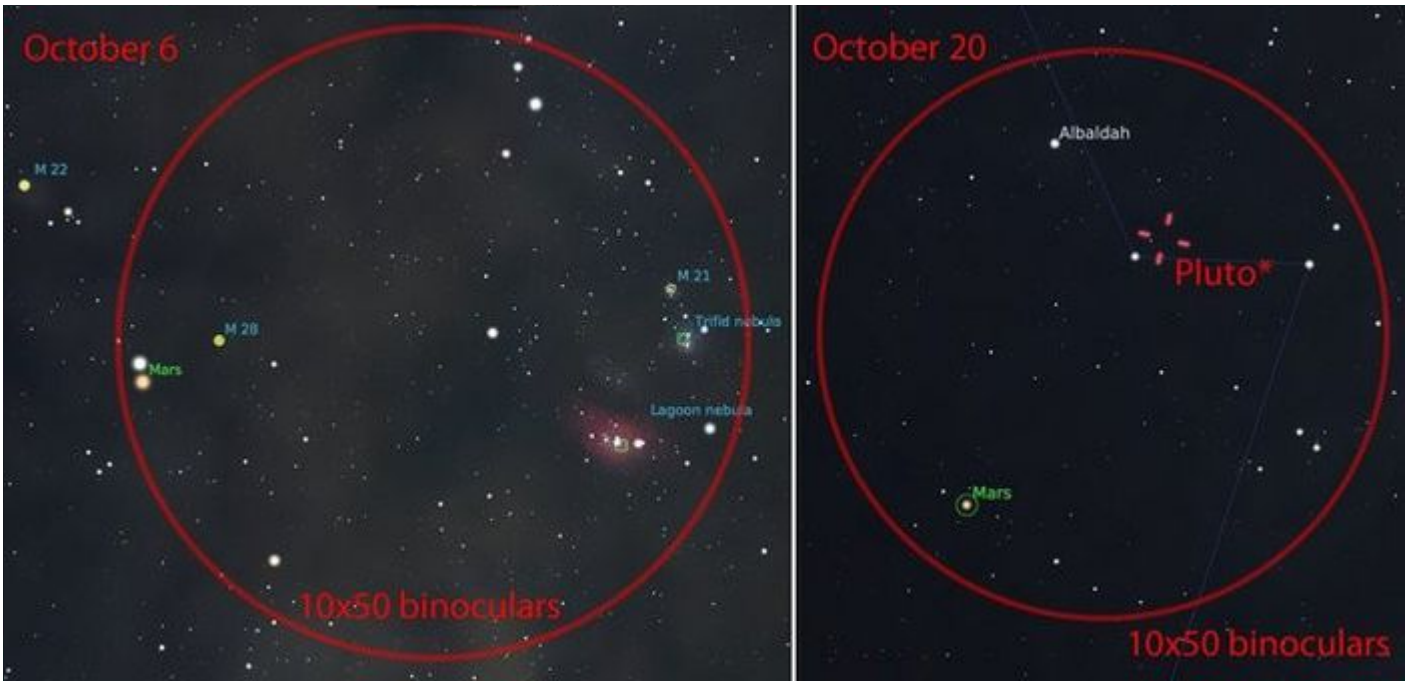
New:	First Quarter:	Full:	Third Quarter:
Oct. 1	Oct. 9	Oct. 16	Oct. 22

The moon's increasing brightness as full moon approaches washes out fainter stars, random meteors, and other celestial objects - this is bad for most observing, but excellent for new observers, as only the brightest stars (those that mark the major constellations) and planets remain visible for your easy identification. If you've never tried it, the moon is a wonderful binocular object.

Many astronomy clubs worldwide are preparing for the International Observe The Moon Night, which happens on Saturday night, October 8th. If the skies remain clear, the Technology Alliance of Central New York (tacny.org) and CNY Observers (cnyo.org) will be holding a special free lecture and observing session hosted by The MOST in Armory Square, downtown Syracuse, from 7 to 9 p.m.

Planets:

Mars: Mars spends the entire month in the zodiacal constellation Sagittarius, setting below the western horizon before 11 p.m. each night. As we look at Mars, we're looking in the direction of the galactic center, meaning we've the opportunity to see a few deep space objects through binoculars by first finding Mars itself. From October 1st to 6th, Mars will share your 10x50 binocular field of view with the Lagoon and Trifid Nebulae. From October 3rd to the 15th, keen observers can use Mars to find the globular clusters M22 and M28 - each composed of tens of thousands of stars. From October 11th to October 26th, you can even see where the dwarf planet Pluto is, although you've no actual hope of seeing the pinpoint of light itself without excellent skies and a very large telescope.



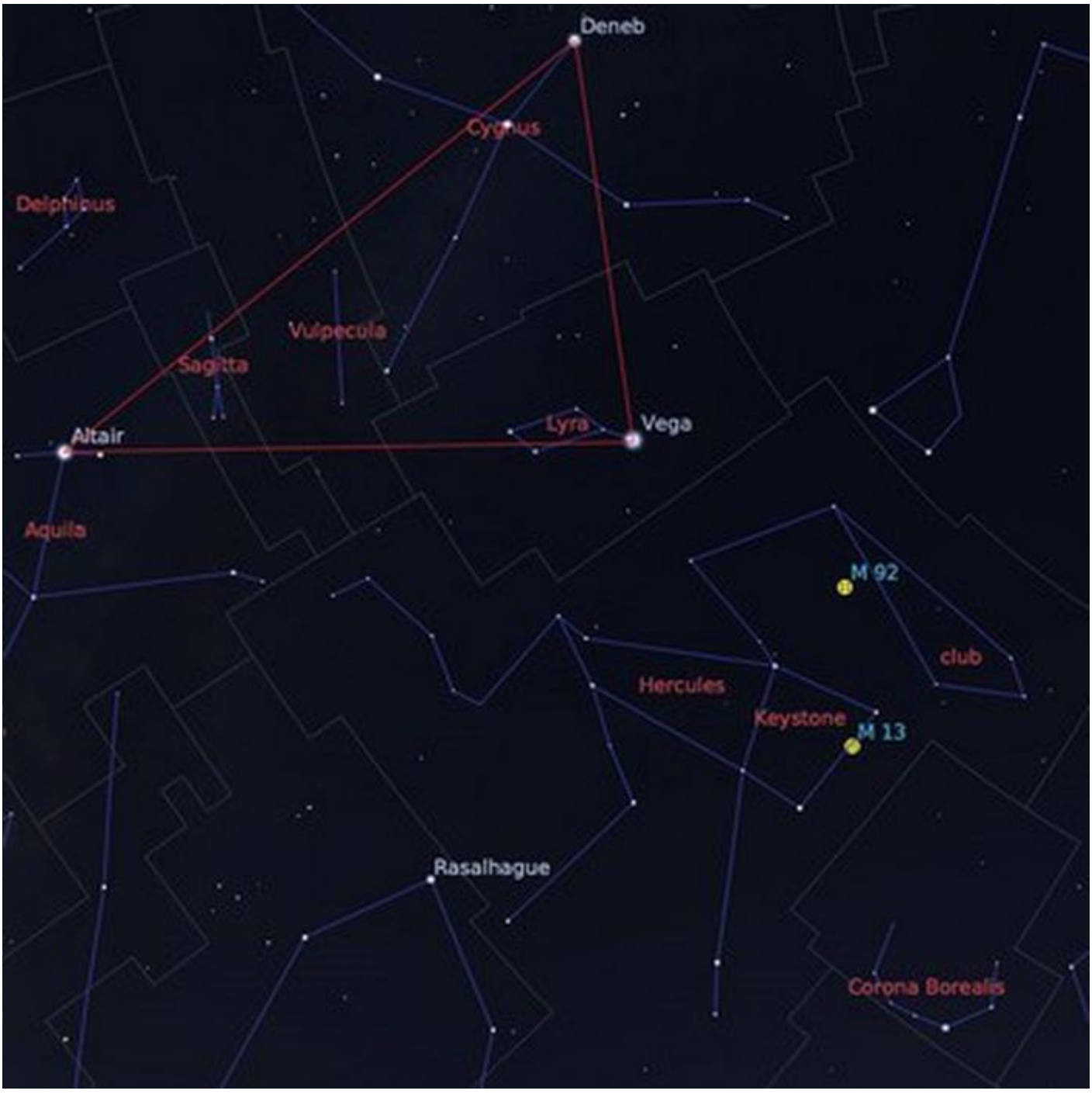
Use Mars to find deep sky objects this month. To the left, the view through 10x50 binoculars, showing the Lagoon and Trifid Nebulae at the opposite edge from Mars (M22 and M28 also shown close to Mars). On October 20th, the closest pass of Mars to Pluto (*Pluto will be too dim to be seen).

Saturn:

Saturn sets early this month to the southwest, gone by 9:00 p.m. at the beginning of the month and by 7:30 p.m. at month's end. Saturn will be just to the east of the crescent moon on October 5th, then makes its way towards the brilliantly bright Venus, reaching its closest approach to Venus on October 29th.

Venus: If you look to the West after sunset, you simply cannot miss Venus. Shining far brighter than any distant plane you might be confusing it with, Venus will be close to the crescent moon on October 3rd and, for the entire month, will set by 8:00 p.m. Starting on Oct. 25th, Venus and Saturn will make a pleasant sight in low-power binoculars until the beginning of November.

Learn A Constellation: Hercules



Use the Summer Triangle to find the keystone of Hercules.

Before he disappears completely from our early-night observing sessions, it is well worth finding one key mythological character, as well as the great observing targets he's guarding.

In the western tradition, the stars of Hercules have been associated with some kind of god or human since Babylonian times. Their identification with the mythological character Hercules goes back at least 2,000 years, giving him seniority enough to be considered among the first of the old 48 constellations of the Northern Hemisphere.

The centuries of stories recounting Hercules' labors are just as grandiose and horrible as the TV and movie ratings will allow, and he's well known to be responsible for more than one altercation in the nighttime sky - he's known to have tangled with Draco, Scorpius, Cancer, and Leo in the distant past.

Hercules' epic story has likely been the topic of fireside chats an uncountable number of times in the past two millennia, but it is a fair bet that some had to step away from the fire to take in the whole constellation. Hercules is the fifth-largest constellation in the sky and, while a number of the stars are moderately bright, one has to take quite a look around to account for all of them. All is far from lost, as the Summer Triangle makes for a perfect pointer to find another shape prominent these past few millennia. Depending on how you visualize the constellation, the head or torso of Hercules is marked by a stellar keystone - a shape found at the top of any ancient stone arch. A number of associated stars make up his arms and legs, giving him the look of either running towards, or swinging a club at, something in the vicinity.

Once you've found the keystone, you've an opportunity to spot two deep sky objects. In low-power binoculars, place the upper left-hand corner of the keystone to the lower-left in your field of view. Off to the upper right, you may be able to spot a small, fuzzy ball. This object is M92, a fairly bright globular cluster.

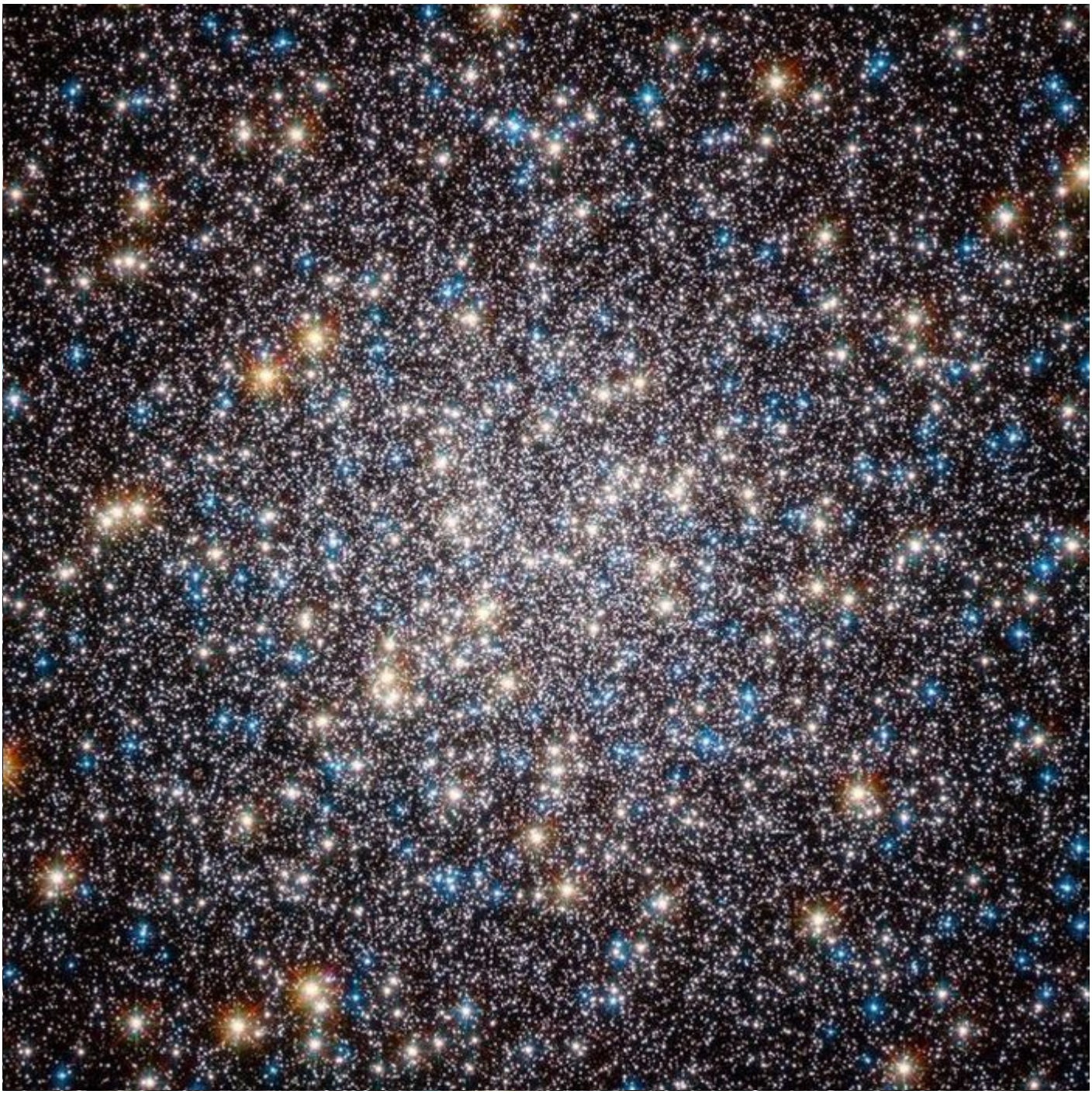
Finding M92 and M13 using stars in the keystone of Hercules. M92 resides at the top of your field of view in 10x50 binoculars when the left keystone corner is at the bottom. Draw a straight line (green) from the left corner stars to find M13.

A good reason to start with M92 is that you'll be far more impressed with the other globular cluster in Hercules. Taking the two left-hand corner stars of the keystone and drawing a long, straight line from them to the right, you will come to another unfocused object at low-power just under the right-most keystone star. This object is one of the great sights in the Northern Hemisphere - the globular cluster M13.

M13 through a medium-sized telescope.

Globular clusters are very tightly packed collections of stars made spherical by

Globular clusters are very tightly-packed collections of stars made spherical by gravitational interactions. They orbit around the massive centers of galaxies just as moons orbit planets. The Milky Way has at least 150 of them. All of the large galaxies we can see easily from Earth have them, and our measurements indicate that they are just as old as the galaxies they orbit. They even look like snapshots of small galaxies, with pulsars, black holes, and even the rare planet having been identified in some so far. Many amateur astronomers love to observe them from Earth, but we can't help but feel sorry for any inhabitants that might be able to survive near them. Being raised within a globular cluster means never having experienced a single dark night of exploring the rest of the universe - nor a break from the blazing glow and intense radiation of those thousands of nearby suns.



The center of M13 through the Hubble Space Telescope

The center of M13 through the Hubble Space Telescope.

Dr. Damian Allis is the director of CNY Observers and a NASA Solar System Ambassador.

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