

Astro-Genie

Don Surles

It had been a long time since he had been out observing. Work, family and the weather conspired to keep our once devoted astro observer away from the eyepiece. But, tonight, even though it was terribly cold, he packed up his beloved scope, eyepieces, filters and charts and made his way to a favorite secluded dark sky site. And he found himself alone...none of his usual comrades showed up. So, he resolved to search out those elusive faint fuzzies as long as the skies permitted.

For the first few hours everything was normal. The scope performed, the sky delivered object after object. His Naglers provided the best of views. His filters improved the contrast of those faintest of fuzzies. The star charts seemed to provide uncanny roadmaps to even the most elusive objects.

Then it happened...cold and fatigue set in...it was obvious sleep would soon become necessary. But our dedicated observer fought the urge and stayed at the eyepiece, object after object, even though he knew he was fighting a losing battle. Sleep and cold were creeping up and would soon overpower his desire to look in the eyepiece.

So, our observer got his astro blanket and sat down in the observing chair...to rest his eyes for only a minute. That's when it happened. He decided to rub a chemical hand warmer pack so that his hands would remain warm. Only a slight rub and poof! A genie appeared right there at the focuser. Our dedicated observer could hardly believe his tired eyes. "Yes, I am an astro-genie. My name is Al Mead-estron-agler and since you are such a dedicated observer - out here all by yourself on such a cold night - I am here to grant you three astro wishes", announced the astro-genie.

"Why did you choose to come tonight? What did I do to warrant your visit?" asked our numb struck observer. "I come only when the magic hand warmer pack is activated. You chose the time of my arrival. Now, what is your first wish? I must warn you that although I am bound to grant three astro wishes...be careful of what you wish for because wishes can have consequences" said the genie.

Oh my, thought our surprised and fortunate observer. What could I wish for? An idea popped into his fatigued mind..."I wish to have a set of Televue Ethos eyepieces"...no sooner had he uttered those words...the UPS man in shorts appeared with a delivery from Televue. And it was a full set of Ethos eyepieces!

"So, my devoted observer, what is your second wish?" asked the genie. And he again admonished the fortunate observer about possible negative consequences associated with genie-granted wishes. Our observer thought about how many times the discussion amongst his peers would turn to the desire for darker skies. And that lead him to "I wish for our skies to be dark where we observe"...and immediately, there was the genie holding a rheostat in his hand...slowly the skies darkened as the genie turned the rheostat. And our observer was amazed as the skies darkened, nebulae and globulars and galaxies popped into naked eye view...they appeared to be tufts of white cotton hanging on black velvet! "Thank you, Al Mead-estron-agler, this is a very dark sky!" said our observer.

"My friend, the night is getting colder. Could you make that final wish so I can get back to the tropics? The beaches are nice and, there are some lady genies...you do remember the "I Dream of Jeannie" genie don't you? Now, what is that final wish? Just remember the possibility of negative wish consequences" said our astro-genie.

Well, what the heck...our astronomer was very happy with the new Ethos eyepiece set and those dark skies were just incredible. There had been no negative consequences...and feeling lucky with what the astro-genie, Al Mead-estron-agler, had delivered so far he decided to "go for the big one". He had always wanted "the big one".

"I wish you could replace my old scope with the best selling refractor in the world"...as his words came forth he watched as his trusted, dependable C-8 disappeared and in it's place appeared a brand new 60mm Tasco refractor...with a .965 focuser.

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Constellations

A lot of us can recognize the constellations that we see from 40° North latitude. A few of the constellations are dim; with help they can be located.

My question, who decided that these ARE the constellations? Did someone just say these stars make up Gemini, and those stars are Leo, and that's it! Did all constellations gain acceptance?

Well, it turns out not all constellations gained favor and live forever in the night sky.

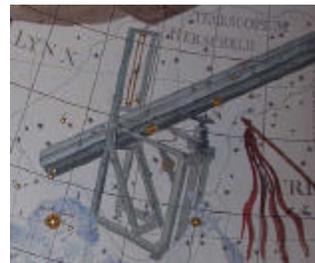
Below are just a few suggested constellations that fell by the wayside.

Telescopium Herschelii - Created by astronomer priest Abbe Maximilian Hell in 1781. This constellation was made to honor the famous English astronomer Sir William Herschel. The constellation was constructed out of stars that were part of Gemini and Auriga. It is ignored by modern astronomers.

Custos Messium - Created by Joseph Jerome le Francais de La Lande in 1775 from dim stars found between Camelopardolis, Cassiopeia, and Cepheus. The constellation represents a farmer harvesting wheat. This area of the sky had previously been known as the "Wheat Field". Another name for the constellation was Le Messier, in honor of the comet hunter Charles Messier. It is no longer recognized.



Globus Aerostaticus - Created by Joseph Jerome le Francais de La Lande in 1798 to honor the hot-air balloon, which was considered a scientific breakthrough of the time. The constellation was composed of dim stars that were located between Capricornus and Microscopium. It is not used by astronomers.



Musca Borealis - Located just above Aries. Early renditions of the constellation had it being either a bee or as a wasp. Musca Borealis is no longer recognized as a separate constellation, its stars having been incorporated into Aries.



Escape at Bedtime, by Robert Louis Stevenson

The lights from the parlour and kitchen shone out
Through the blinds and the windows and bars;
And high overhead and all moving about,
There were thousands of millions of stars.
There ne'er were such thousands of leaves on a tree
Nor of people in church or the Park,
As the crowds of the stars that looked down upon me,
And that glittered and winked in the dark.
The Dog, and the Plough, and the Hunter, and all,
And the star of the sailor, and Mars,
These shone in the sky, and the pail by the wall
Would be half full of water and stars.
They saw me at last, and they chased me with cries,
And they soon had me packed into bed;
But the glory kept shining and bright in my eyes,
And the stars going round in my head.

Dr. Marc Rayman

Urban astronomers are always wishing for darker skies. But that complaint is due to light from Earth. What about the light coming from the night sky itself? When you think about it, why is the sky dark at all?

Of course, space appears dark at night because that is when our side of Earth faces away from the Sun. But what about all those other suns? Our own Milky Way galaxy contains over 200 billion stars, and the entire universe probably contains over 100 billion galaxies. You might suppose that that many stars would light up the night like daytime!

Until the 20th century, astronomers didn't think it was even possible to count all the stars in the universe. They thought the universe was infinite and unchanging.

Besides being very hard to imagine, the trouble with an infinite universe is that no matter where you look in the night sky, you should see a star. Stars should overlap each other in the sky like tree trunks in the middle of a very thick forest. But, if this were the case, the sky would be blazing with light. This problem greatly troubled astronomers and became known as "Olbers' Paradox" after the 19th century astronomer Heinrich Olbers who wrote about it, although he was not the first to raise this astronomical mystery.

To try to explain the paradox, some 19th century scientists thought that dust clouds between the stars must be absorbing a lot of the starlight so it wouldn't shine through to us. But later scientists realized that the dust itself would absorb so much energy from the starlight that eventually it would glow as hot and bright as the stars themselves.

Astronomers now realize that the universe is not infinite. A finite universe—that is, a universe of limited size—even one with trillions of stars, just wouldn't have enough stars to light up all of space.

Although the idea of a finite universe explains why Earth's sky is dark at night, other factors work to make it even darker.

The universe is expanding. As a result, the light that leaves a distant galaxy today will have much farther to travel to our eyes than the light that left it a million years ago or even one year ago. That means the amount of light energy reaching us from distant stars dwindles all the time. And the farther away the star, the less bright it will look to us.

Also, because space is expanding, the wavelengths of the light passing through it are expanding. Thus, the farther the light has traveled, the more red-shifted (and lower in energy) it becomes, perhaps red-shifting right out of the visible range. So, even darker skies prevail.

The universe, both finite in size and finite in age, is full of wonderful sights. See some bright, beautiful images of faraway galaxies against the blackness of space at the Space Place image galleries. Visit <http://spaceplace.nasa.gov/search/?q=gallery>.



This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

This Hubble Space Telescope image of Galaxy NGC 4414 was used to help calculate the expansion rate of the universe. The galaxy is about 60 million light-years away. Credit: NASA and The Hubble Heritage Team (STScI/AURA)

POP Quiz— Thanks for joining the Quiz-of-the-month! This month you have to match the photos below to their correct identity. Use of the internet is forbidden. Sky atlases can be used, but only the ones in print. No computer atlases. The first gets 10 out of 10 wins! Good Luck !

A

B

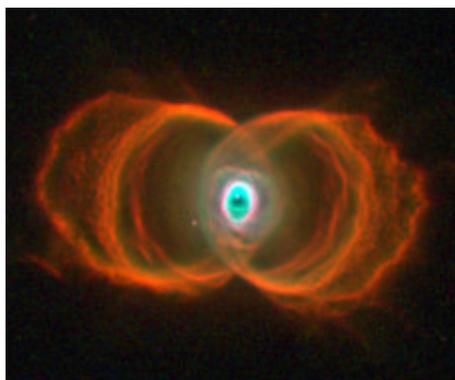
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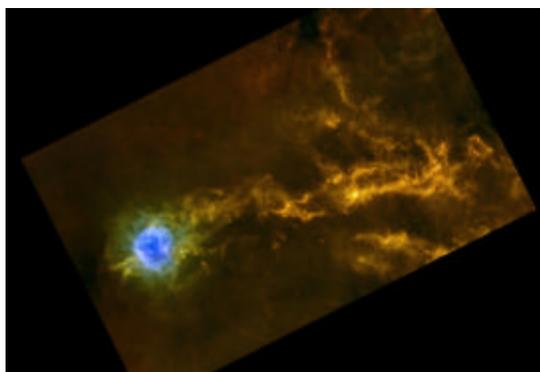
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_____ Comet Garradd and Messier 15, _____ Dusty Iris Nebula, _____ Herschel's Cocoon,
 _____ MyCn18: An Hourglass Planetary Nebula, _____ NGC 3314: When Galaxies Overlap,
 _____ NGC 6188 and NGC 6164, _____ NGC 7331—The Deer Lick Group, _____ Shapley 1: An
 Annular Planetary Nebula, _____ The Leo Triplet Galaxies

Answers on pg. 7.

Alien Observing...

Don Surles

It has been a long week...work...new tires...clogged toilet...sick cat. Finally Saturday night is here, the sky is clear, my scope is collimated, my Naglers are clean, and I am here at the eyepiece of my scope with a fresh bottle of Wild Turkey - Rare Breed, of course.

As the sky darkened I checked the alignment of the finder and Telrad with Arcturus in the eyepiece...a quick tweak and everything checked out. Then, just to get the night started on the right note I broke the seal on the Rare Breed...yep, poured a good amount over some ice and let it mellow. Did you know Rare Breed enhances the Nagler viewing pleasure? Kinda like putting contrast filters on the eye...and it also causes those Naglers to expand their field of view...sometimes they exceed 100 degrees. Oh, that sky is so dark! Soon, that Rare Breed in the bottle is getting restless ...just looking for an opportunity to get out and do some observing. So, I poured another good amount onto the ice and let it mellow...for just a few minutes before sipping this astro-enhancing elixir and slipping in a big, new 20MM Nagler to view a deep sky faint fuzzy.

Putting my eye up to that big Nagler was like putting steel next to a magnet...there was a strange attraction twixt my eye and that big Nagler. I could not take my eye away...it was scary...very scary... my eye was being pulled toward the Nagler. I could not resist the reflex of pushing the scope away from me...suddenly the scope jolted away from me...I was free...and the scope swung all the way around...360 degrees...something told me this was gonna be an unusual night of observing. As the scope came to rest I noticed an apparition taking shape there next to the big Nagler. The shape was nebulous...it had a greenish hue...and it quickly morphed into the shape of a typical grey alien...but it had long blond hair. I rubbed my eyes...the right one was still smarting from that Nagler attraction...and I took another good sip from my Rare Breed. The apparition became very obvious...almost a solid...and then SHE spoke...yes, I know aliens are supposed to be of the male gender but this one was definitely feminine. Even HER typical alien grey form was feminine. SHE said, "Hello, my name is Andromeda. I am a galactic groupie and I am here to help you do some real, out of this world observing tonight. All you have to do is close your eyes and we will be on our way...By the way, what are you drinking?" "Rare Breed" I said, and poured her a glass. God, I was glad this was a feminine alien...at least there would be none of the diddling our good ol abducted boys from Alabama report.

You know what they say in those alien movies when the aliens invade Earth..."Earthling, resistance is futile"...I've always believed that if any life form invades Earth, resistance would indeed be futile...so I didn't resist...just took another sip of that Rare Breed...and closed my eyes as I felt myself squeezing thru that big Nagler for a real "Space Walk".

Andromeda became a really nice "being" once we passed thru the Nagler...but she definitely had a green complexion that was made even more green when contrasted against that golden long blond hair. Betcha didn't know aliens had hair...but this one was a Galactic Groupie so hair was appropriate. I also noticed her lipstick was very green and it had a fresh green smell...kinda like a mountain pine forest on a clear day.

"So, let's begin our observing...where would you like to start?" Andromeda asked. I remembered the Ring Nebula from my college astronomy course...so "Let's see the Ring Nebula" and immediately we were INSIDE THE RING looking out! Damn...this is a different view! We sailed inside, around, thru and out of the Ring...Dude, that was one spectacular view. Andromeda then asked for the next object...and I asked for the most photographed object in the heavens...the Horsehead. Poof! We were there...and to my surprise...the Horsehead is actually a complete horse. To my amazement, Andromeda was holding a bridle and saddle. Andromeda actually saddled that horse and the two of us rode that steed all thru Orion. We galloped thru the Trapezium, raced thru the Nebula and then tied the horse to his hitching post in the exact position as before so that only his head is visible...just barely visible.

"So where do we go next?" asked Andromeda. I could see she was a bit greener due to the heat of this nebulous neighborhood so I suggested we take trip to Mars to enjoy a cooler climate. And immediately we were on the ice caps of Mars - at El Grande' Martian Ski Lodge. And of course we skied the advanced skiers' slopes. The cool temps were welcome - Andromeda's complexion became a lighter shade of green.

Andromeda suggested we visit the Lagoon...Hell, let's go...Road Trip! Dude, there were surfers in the Lagoon...nice wave action...so, we joined the surfers for some wave action of

our own. I was amazed that a galactic groupie could surf better than an earthling. This was some very superb up close observing...just a bit more detail than available in a C-8.

Well, what could be next? Every amateur astronomer likes comets, so, I asked Andromeda if we could visit a comet. "Sure, we can." And there we were...in the midst of a comet's tail. What a mess...all dusty and gassy! Ooooh. Nasty! And then Andromeda gave me the news...only one more object and our observing session would be over. Oh my...what would my last object be? What would your last up close and personal object be?

There is only one object that should be the last on the nightly observing list...Stephan's Quintet. Andromeda whooshed us thru the Great Square of Pegasus to Markab and then northeast to 6331...and Stephan's Quintet came into view. There was a lead guitar, a drummer, rhythm guitar, a keyboard and a lead singer with a heavenly voice. The Quintet sure does look different up close and personal. This view of the Quintet is certainly better than any I have ever had when closing out an observing session.

My, My, What a night of observing! Here I am, all mellow just relaxing in my observing chair...did I really see all those objects...and so close! I must be dreaming...no, I am awake and dawn is coming. Well, it must have been the Rare Breed. Damn, the Rare Breed? Again, I thought I must have been dreaming but there is the empty bottle...and beside it sits two glasses. One of them has green lipstick on it... Andromeda was indeed the night's Rare Breed.

GRAIL and the Mystery of the Missing Moon

Sept. 7, 2011: As early as Sept. 8th, NASA's GRAIL mission will blast off to uncover some of the mysteries beneath the surface of the Moon. That cratered gray exterior hides some tantalizing things - even, perhaps, a long-lost companion.

The "Big Splat." Four snapshots (right) from a computer simulation of a collision between the Moon and a smaller companion show how the splattered companion moon forms a mountainous region on one side of the Moon.

If a paper published recently in the journal Nature* is right, two moons once graced our night skies. The proposition has not been proven, but has drawn widespread attention.

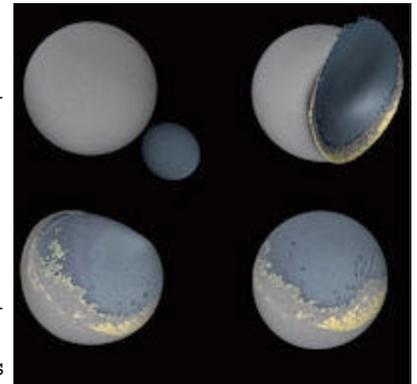
"It's an intriguing idea," says David Smith, GRAIL's deputy principal investigator at MIT. "And it would be a way to explain one of the great perplexities of the Earth-Moon system - the Moon's strangely asymmetrical nature. Its near and far sides are substantially different."

The Moon's near side, facing us, is dominated by vast smooth 'seas' of ancient hardened lava. In contrast, the far side is marked by mountainous highlands. Researchers have long struggled to account for the differences, and the "two moon" theory introduced by Martin Jutzi and Erik Asphaug of the University of California at Santa Cruz is the latest attempt.

Scientists agree that when a Mars-sized object crashed into our planet about 4 billion years ago, the resulting debris cloud coalesced to form the Moon. Jutzi and Asphaug posit that the debris cloud actually formed two moons. A second, smaller chunk of debris landed in just the right orbit to lead or follow the bigger Moon around Earth.

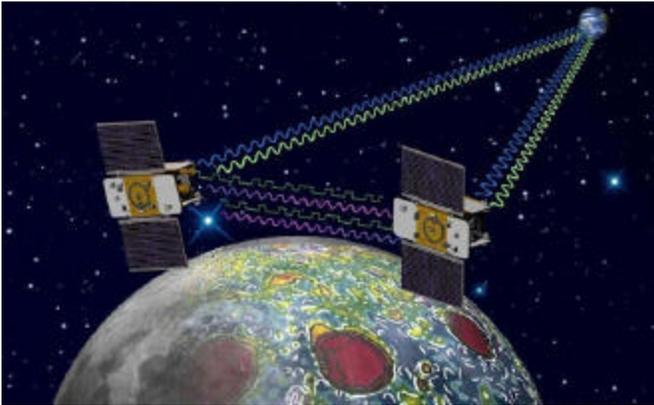
"Normally, such moons accrete into a single body shortly after formation," explains Smith. "But the new theory proposes that the second moon ended up at one of the Lagrange points in the Earth-Moon system."

Lagrange points are a bit like gravitational fly traps. They can hold an object for a long time--but not necessarily forever. The second moon eventually worked its way out and collided with its bigger sister. The collision occurred at such a low velocity that the impact did not form a crater. Instead, the smaller moon 'went splat,' forming the contemporary far side highlands.



Credit: M. Jutzi and E. Asphaug,

Answers to quiz on pg. 5: B Comet Garradd and Messier 15, C Dusty Iris Nebula, G Herschel's Cocoon, D MyCn18: An Hourglass Planetary Nebula, H NGC 3314: When Galaxies Overlap, I NGC 6188 and NGC 6164, E NGC 7331—The Deer Lick Group, F Shapley 1: An Annular Planetary Nebula, A The Leo Triplet Galaxies



In short, the lunar highlands are the lost moon's remains. Flying in formation around the Moon, NASA's twin GRAIL spacecraft will make precise measurements of the lunar gravitational field.

"By probing the Moon's gravity field, GRAIL will 'see' inside the Moon, illuminating the differences between the near and far sides."

GRAIL will fly twin spacecraft around the Moon for several months. All the while, a microwave ranging system will precisely measure the distance between the two spacecraft. By watching that distance expand and contract as

the pair fly over the lunar surface, researchers can map the Moon's underlying gravity field.**

"These measurements will tell us a lot about the distribution of material inside the Moon, and give us pretty definitive information about the differences in the two sides of the Moon's crust and mantle. If the density of crustal material on the lunar far side differs from that on the near side in a particular way, the finding will lend support to the 'two moon' theory."

But this information is just one "piece of the jigsaw puzzle." To prove a sister ever existed, other pieces are needed. NASA's Lunar Reconnaissance Orbiter has already provided key information on the Moon's surface topography. Scientists can also refer to lunar surface chemistry data and look at old seismic information from Apollo for clues. But what's really needed, says Smith, is a sample return mission to the far side to determine the ages of rocks there.

"The smaller moon, if there was one, was about 1/3 the size of our current Moon. So upon collision it would have cooled down faster, and the rocks on the far side, where its remains are thought to have spread, would be older than the ones on the near side."

In any case, we have something new to think about. Shall we try singing "fly me to the moons" or "shine on harvest moons"?

"Don't go changing any song lyrics just yet," says Smith.

Author: [Dauna Coulter](#) | Editor: [Dr. Tony Phillips](#) | Credit: [http://science.nasa.gov/Gravity Recovery and Interior Laboratory](http://science.nasa.gov/Gravity_Recovery_and_Interior_Laboratory) -- GRAIL home page at [nasa.gov](#)

Footnotes:

* Jutzi, M. & Asphaug, E. Nature 476, 69-72 (2011).

** By very precisely measuring the tiny gravitational perturbations of the two satellites at various locations, and then putting all those measurements together for the whole Moon, you get a gravity map. In making all their calculations, the GRAIL team will have to correct for factors such as gravitational pull of the Sun, Earth, and other planets, and general relativity, just to name a few.

GRAIL's launch period opens Sept. 8 and extends through Oct. 19. On each day, there are two separate instantaneous launch opportunities separated in time by approximately 39 minutes. On Sept. 8, the first launch opportunity is at 8:37 a.m. EDT (5:37 a.m. PDT). The second launch opportunity is 9:16 a.m. EDT (6:16 a.m. PDT).

Credits: NASA's Jet Propulsion Laboratory, Pasadena, Calif., manages the GRAIL mission. The Massachusetts Institute of Technology, Cambridge, is home to the mission's principal investigator, Maria Zuber. The GRAIL mission is part of the Discovery Program managed at NASA's Marshall Space Flight Center in Huntsville, Ala. Lockheed Martin Space Systems, Denver, built the spacecraft. Launch management for the mission is the responsibility of NASA's Launch Services Program at the Kennedy Space Center in Florida. JPL is a division of the California Institute of Technology in Pasadena.

How to Join the Delmarva Stargazers: Anyone with an interest in any aspect of astronomy is welcome

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