May 2009

Volume 23 Issue 5

The Observer

East Valley Astronomy Club

Inside this Issue:

From the Desk of the President
by David Douglass

We are well into Spring, with the Summer months coming on fast. EVAC's school outreach program has about come to an end for this school year, with May showing no activity after the May 1st Butler School event. Our Events Coordinator, Randy Peterson, along with his crew of handy volunteers can take a well deserved break, and spend more time on their own personal observing. The schedule this year has been busy for sure.

The two main astronomy internet forums for Arizona, being the AZ-Observing list, and EVACOnline list, are busy with lots of discussion regarding star parties, and just plain group observing schedules. It seems that a lot of people are "getting out" to the darker observing sites, and looking up at the skies. And I think that is a good thing. Many of our members completed a large number of Messier object sightings during the Messier Marathon. Hopefully, those that did not complete all 110 items, will continue to work on the list, and thus complete the EVAC Messier program. If you are not working on one of the EVAC observing programs, why not get started! Personally, I am currently working on the Globular Cluster and Planetary nebulae programs.

Many people are starting to plan summer vacations. As I write this, I am sitting in my motorhome, in beautiful Camas Valley, Oregon. We are visiting with my wife's brother out in the fantastic Oregon rural country. As we have been traveling, I am just amazed in the evening about the various "sky views" that are available in many of the towns we pass through. Just simply fantastic! And yes, I did bring along my ETX-90 to enjoy some viewing "on the road".

Continued on page 12

The Backyard Astronomer
Top 10 Star Party FAQs *by Bill Dellinges*

After years of public star parties, I have noticed there are a handful of frequently asked questions (FAQs) that inevitably come up. Do any of the following questions sound familiar to you?

1) Have you ever seen a UFO? No. I have seen a few very bright meteors that would make youy hair stand on end. I have also seen a few strange things in the sky which I later learned were missile launches or spent stages burning up in the atmosphere.

2) Where did you get that green laser? I can count on this question coming up at EVERY star party now. Sometimes it seems like the laser is a bigger hit than the telescope. I tell them to look at ads in the back of astronomy magazines or enter "green lasers" in their search engines. I try to emphasize they are not toys and can be dangerous if mishandled.

3) How did you get into astronomy? When I was 12 years old (1955), I happened to open an astronomy book in my Junior High School library. The pictures in it blew me away. I was fascinated by the black and white "plates" (as they were called in those days) of galaxies, nebulae and stars. From that point on, astronomy became a life long hobby.

4) Where is the North Star? 4b) I thought it was supposed to be the brightest star in the sky? You can usually count on 4b following 4! I point out Polaris is the only star near the huge void around the Celestial North Pole and that the two end stars in the Big Dipper's bowl point more or less to it. Then you wait for question 4b. To which you answer: the North Star is

Continued on page 2

Upcoming Events:

Public Star Party - May 8

Monthly General Meeting - May 15

Local Star Party - May 16

Deep Sky Star Party - May 23

Check out all of the upcoming club events in the Calendars on page 8

The Backyard Astronomer

Continued from page 1 not noted for being an especially bright star. In fact, it's only the 49th brightest star in the sky. It is famous for being a good indicator of north AND is the only star in the sky that does not move because Earth's rotational axis happens to point almost directly at it (thus all stars seem to rotate counterclockwise around it). (For more on this subject, see "Pole Stars of the Future", Sky and Telescope, March 2008, p. 66).

5) What is a black hole? In a nutshell, it's a collapsed massive star. A star is a big ball of hydrogen gas in balance between outward pressure of energy produced by nuclear fusion at its core and gravity compressing the star. Eventually useable fuel in the core is exhausted. Without outward pressure holding the star up, the downward force of gravity dominates and the star collapses. In stars several times the mass of the Sun, the in-falling mass cannot be stopped. Several Suns' worth of mass get smaller and smaller as it falls towards the stars center. In just a second or so, the object is reduced in size from a normal large star, to a Sun, an Earth, tennis ball, pinhead, etc. No known law of physics can stop the collapse. Eventually a point is reached where the extreme density and reduced radius of the object results in its escape velocity equaling the speed of light. So now, nothing can get out. A black hole has formed. "Black" because no light gets out, "hole" because there is now a hole in the fabric of space-time. Speaking of space-time, there is not enough of it here (space and time, no pun intended) to discuss other interesting aspects of black holes.

6) What is a shooting star? It is not a star that has fallen out of the night sky! It amazes me how many people think it is. "shooting star" is a misnomer. It's actually a small particle of debris from space plunging into our atmosphere and burning up at an altitude of about 50 miles due to friction with the air. We call this object a meteor (Gk: things in the air). In space they are referred to as meteoroids, on the ground meteorites. The typical meteor you see in the night sky is the size of a grain of sand. They come from various sources like liberated dust grains from comets, chips off asteroids, or left-over material from the proto Solar System.

7) What does a telescope like this cost? The answer depends on the telescope I'm using. If it's my C-8, I say "about $1500." The 3.5" Questar, $4000. Most people seem to think the C-8 is a bargain, and say "I thought it would have been more than that." The Questar price usually induces a heart attack. I try to point out you don't need to spend that much money to see what they're viewing in my scope. A decent $300-$600 telescope will show them pretty much the same thing, especially on the brighter objects. Well, almost as well.

8) How do they know how far away a star is? Wow. That's a whole chapter in an astronomy book. We're pretty busy at star parties, so I try to be brief - they get the bare bones explanation. Out to about 100 light years (and I think this range may have increased with orbiting observatories) astronomers use the parallax method to determine distances by noting the shift of background stars at two different points in Earth's orbit 6 months apart. Out to about 20 million light years, the Period-Luminosity law of Cepheid variable stars is used to determine distance. Further out, astronomers compare the brightness of remote objects with similar objects closer to us. Additionally, Hubble's Law describing red shifts of receding galaxies (due to the expansion of the universe) can be used for most galaxies to gage distance. Using several of these techniques on a given object can be a useful safeguard in verifying distances.

9) What power is your telescope? The neophyte must be informed that a telescope does not have a set power. We use different eyepieces to get different powers for different uses. For general observation, we often use our lowest power. High power is reserved for close up views of the moon, planets, planetary nebulae and splitting difficult double stars. Power is determined by dividing the focal length of the telescope by the focal length of the eyepiece.

10) Do you think there is life on other planets? Yes. If it happened here, why shouldn't it happen elsewhere? It's estimated that there are 100 billion galaxies, each with 100 billion stars (more or less). That's a lot of stars. Planets are a natural byproduct of the formation of stars. While it's possible some stars may not have planets, most probably do. So we're talking a lot of planets. Some planets may not be suitable to life (too hot or too cold), but the sheer numbers of them might find some in the habitable zone of their sun where life can be supported. Now if we're talking intelligent life, that's another matter. Probably only a fraction of planets with life may see a species rise to an intelligent level. This whole subject is a very speculative matter. Many factors must be taken into account. To get an idea of the possibilities involved in this interesting subject, enter "Drake Equation" in a search engine.

I should make copies of this article and when asked one of the questions, circle it and silently hand it to the enquirer. That would save a lot of wear and tear on my voice!

Alternatives to Black Holes, Part One

by Henry De Jonge IV

In the next two articles we will look at some strange alternatives to black holes, (as if black holes weren't strange enough already!) and their astrophysical implications. I have often wondered what else could be showing the same effects as a black hole (BH), that is what else could occupy the same small space and have such a tremendous gravitational affects on the surrounding space time. Some new form of space time or matter/energy perhaps? Remember that as of yet no black hole or event horizon has been positively detected, all we see are the effects of such an object on its surroundings and then infer its existence. BH's are well founded in theory and do the best job of fulfilling the effects and predictions that accompany them. However let's take a look at some of the main interesting theoretical alternatives for fun and speculation. In part 1 we will look at two of the most common alternatives and in part 2 we will review some others.

The Gravastar

Alternatives to BH's come mainly from the quantum gravity arena and are attempts to take into account both quantum mechanical theory and relativity theory. These "non standard" models have been proposed as an alternative to black holes, mainly to avoid difficulties with event horizons and singularities, (infinities). Another guideline is the "principle of finiteness" which states that a satisfactory theory should avoid physical quantities becoming infinite. They also reflect the key property in quantum mechanics of there being a definite smallest size, (quanta) of time, matter, energy, and space.

Although evidence for the existence of black holes is very convincing, it has recently been argued that observational data can provide strong arguments in favor of the existence of event horizons but cannot fundamentally prove they exist. This skepticism has inspired new and fascinating ideas. Recall that the interior structure of "standard" BH's has also not been satisfactorily determined and is still open to considerable debate. Such models doing away with the problems of the singularity at the origin and the event horizon, have been discussed on and off in scientific papers for many years.

The first alternative we will talk about is called a gravastar or gravitational vacuum star. There are a variety of theoretical models describing gravastars. The main gravastar model was proposed by Pawel Mazur and Emil Mottola in 2001 and is referred to as the MM model. In this 3 layer model, (all models are solutions to Einstein's equations) a massive star in its late stages could end its life as a very compact object whose radius would be very close to the Schwarzschild radius without having an event horizon or a central singularity. For this to happen, a phase transition, (quantum vacuum change) is expected to take place at or near the location where the event horizon would have been formed. The interior of what would have been the black hole is replaced by a compact portion of de-Sitter space-time with negative pressure, (a sort of void in space time) to fight the pull of gravity.

For someone looking at such a core it would appear like a Bose-Einstein condensate, which is like a super cooled fluid in which all the atoms behave like a single large atom. De-Sitter space time is spatially flat and assumes that matter and energy densities are equal to zero. It also has no big bang singularity, instead it allows a minimum size at the beginning of time and then expansion forever, and is also a vacuum energy density dominated universe, (which means a large cosmological constant). It is not a real representation of our universe but often has a good theoretical usefulness.

This strange core is surrounded by a thin shell of ultra-stiff matter with positive pressure with an external Schwarzschild, (static, non-rotating BH) space time. Thus the outside looks and behaves mostly like a regular BH. However this fluid like gravastar model has no singularity at the origin and no event horizon, while its rigid surface is located at a radius slightly greater than the Schwarzschild radius.

In another gravastar model which is a modified MM version, the quantum vacuum also undergoes a phase transition at or near the location where the event horizon is expected to form. However this modified MM model is constructed as an onion-like structure with five layers and with the same overall layout as the standard MM model.

Another type of gravastar model originating from string theory is electrodynamic in nature. Here a wide variety of gravastar models utilizing nonlinear electrodynamics are constructed. These magnetic gravastars may be interpreted as self-gravitating, magnetic monopoles, (also never detected) with an electric charge. The interior, (with a repulsive nature) nonlinear electrodynamic geometries are matched to an exterior Schwarzschild space time at a junction interface, thus again avoiding the problems related to singularities and event horizons.

In general, gravastars can be constructed, (via models) to be arbitrarily compact, with an external surface which is only infinitesimally larger than the horizon of a black hole with the same mass. As a result, any electromagnetic radiation from the surface of a gravastar will suffer from basically the same gravitational redshift as that of a black hole. This will make it difficult, if not impossible to distinguish the two when only electromagnetic radiation is detected. It is important to mention that for a self-gravitating object (solution to Einstein's equations) to be considered as a possible alternative to a BH, the surface redshift should be able to reach values that are higher than that of ordinary objects.

It may be impossible then to give observational proof for the existence of a black-hole horizon if only electromagnetic radiation is received and thus tell apart a black hole from a gravastar. How else could we distinguish a gravastar from a normal BH? One question to ask is whether or not a gravastar is stable against perturbations that come for example from infalling matter? Would an external observer then be able to distinguish it from a black hole? Theories indicate that a gravastar is stable to such perturbations, however it is possible to distinguish it from a black hole if gravitational radiation is produced. This radiation could be produced by irregular perturbations of the gravastar or by any difference in the decay time of such perturbations when compared to a BH. However it is also not certain that gravastars would be

Continued on page 4

Alternatives to Black Holes, Part One

Continued from page 3

stable under such perturbations if they were rotating. In the future gravity wave detection may give us an answer as to the feasibility of their existence.

As alternatives to black holes, gravastars have also received some attention recently, partially due to the tight connection between the cosmological constant and a currently accelerating universe. Although the existence of gravastars is theoretically allowed by mathematical models and cannot be completely excluded, the results show that even if gravastars exist, they do not also exclude the existence of black holes. What a strange universe it would be if both could be found!

In the figure above we see a model of a gravastar. Λ represents the cosmological constant.

Dark Energy Stars

In this alternative originally proposed by George Chapline in 2005, we replace the interior space-time with a solution governed by dark energy. These alternatives resemble the gravastars supported by nonlinear electrodynamics we looked at earlier and are like gravastars with a dark energy core. When infalling matter passes the event horizon it is converted to dark energy which has a negative pressure against gravity and prevents a singularity from forming. Now, the idea of dark energy, (sort of an exotic cosmic fluid) is that of a spatially homogeneous cosmic fluid with negative pressure. This is what is thought to be causing our universe to accelerate its expansion.

This main motivation behind the idea of dark energy stars comes from the fact that recent observations have confirmed an accelerated cosmic expansion, for which dark energy is a possible cause. This possibility of the existence of dark energy has opened up many new ideas and possibilities in theoretical research. Evidence of universal expansion has been shown independently from both measurements of supernovae type Ia and from cosmic microwave background radiation.

These solutions of Einstein equations known as dark energy stars, (or dark energy gravastars) may possibly originate from early density fluctuations in the cosmological background. It is not known however how such inhomogeneities in the dark energy may have been formed. A possible explanation may be the beginning seed of a dark energy star forms through a density, (gravity) perturbation.

Several dark energy stellar configurations are possible. The first is that of a constant energy density, and the second choice, that of a decreasing energy density in the star's interior. It is found like with gravastars, stable regions exist, that would be close to where the event horizon is expected to form, so that it would be difficult to distinguish the event horizon of the dark energy stars from a black hole, (via electromagnetic radiation). Would gravitational radiation detection also help us here? Dark energy stars also provide us with a natural scenario for the existence of exotic geometries such as wormholes, which we will look at next.

Thus we see that the universe may be a bit weirder than we thought with different types of "black holes" in existence simultaneously. In the next installment we will look at more black hole variations and briefly touch upon wormholes.

◐ First Quarter Moon on May 1 at 13:44

● Full Moon on May 8 at 21:02

◑ Last Quarter Moon on May 17 at 00:26

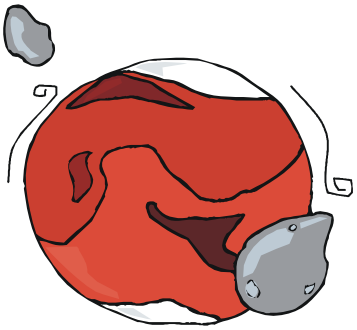
○ New Moon on May 24 at 05:11

May Guest Speaker: Jack Farmer

Dr. Jack D. Farmer received degrees in Geology from California State University, Chico (B.A.), the University of Kansas (M.S.) and U.C. Davis (Ph.D.) and has since held positions as Senior Museum Scientist and Lecturer (U.C. Davis), Senior Petroleum Geologist (Exxon, Western Division Production, Los Angeles), and Visiting and Adjunct Professorships in the Dept. of Earth and Space Sciences at UCLA.

Jack joined NASA-Ames Research Center in 1991 as a National Research Council Senior Fellow. In 1994 he became a Civil Servant and Research Scientist in the Exobiology Branch. In August of 1998, he accepted a tenured faculty position at Arizona State University with the Department of Geological Sciences. Immediately after his arrival he assumed the leadership for the NASA funded Astrobiology program at ASU. His interests include early biosphere evolution, the microbiology and biosedimentology of thermal springs and other extreme environments, and strategies for exploring Mars and other bodies in the Solar System for a past or present biosphere.

Currently, Jack is the Director of the Astrobiology Program at Arizona State University. He is a member of the National Academies Space Studies Board, is a participating Scientist on the Mars Exploration Rover Mission serving as a long-term planning lead and member of Geology theme group, representing Astrobiology. He is Chair for the Geobiology-Geomicrobiology Division of the Geolological Society of America. He has testified before Congress, providing testimony to the House Committee on Science Subcommittee on Space and Aeronautics. He has held appointments on various advisory committees to NASA including the Space Science Advisory Committee (SSAC), the Solar System Exploration Sub-Committee (SSES), the Solar System Exploration Roadmap Development Team, Instrumentation for Mars Exploration Working Group, Mars Ad hoc Science Team (MAST), Mars 2003 Landing Site Steering Committee, Mars 2005 Orbiter Mission Science Definition Team, JPL's Microrobotics Science Advisory Group, the Mars 2001-2005 Science Working Group, and the Mars 2001 Science Definition Team. He has served as Chair of the NASA Mars Exploration Program Analysis Group (MEPAG), Chair of the NASA Astrobiology Mars Focus Group and was also Vice Chairman of the Native American Advisory Committee at NASA Ames Research Center. He has served on the American Geophysical Union (AGU) Biogeoscience Meetings Committee. He is a member of Geological Society of America, the American Geophysical Union, the Paleontological Society, and is Sequoyah Fellow of the American Indian Science and Engineering Society.



New EVAC Members in April

Michael Large - Mesa, AZ

George Legge - Mesa, AZ

Michael Zelechowski - Phoenix, AZ

Orion 8" F10 SCT & SkyView Pro Equatorial Mount

Standards include: XLT coatings, 24mm Plossl and manual for mount.
Extras include: Pro GoTo Upgrade Kit, v 3.20, firmware upgraded, cable and documentation manual for GoTo upgrade kit, polar axis finder and 12v battery. List price $1999.00

This equipment is 18 months old. Used sparingly because 14.5" Dob gets preference. Reason for sale is to finance an upgrade.

Sale price $1600.00

If you are interested in seeing this telescope contact AJ Crayon at 602-938-3277 or e-mail at acrayon@cox.net

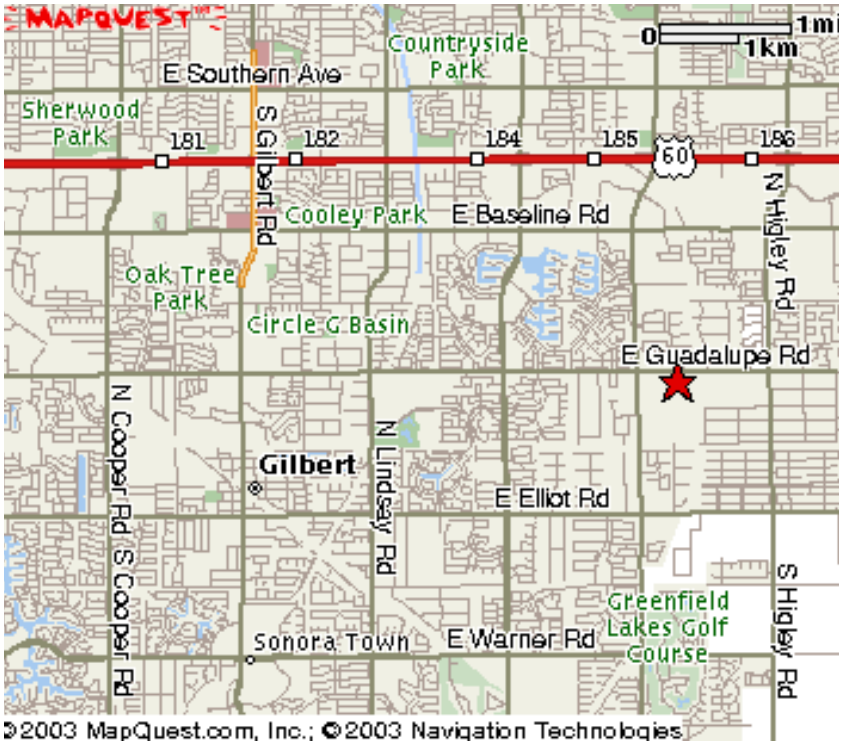
14½" f4.3 Starmaster Hybrid

2007 fully-loaded Starmaster Hybrid Newtonian (14½" f4.3) with Zambuto mirror. Includes the SkyCommander XP4 Flash DSC with dew shield, SkyTracker GOTO/Then Track system, Feathertouch focuser, wheelbarrow handles, Telrad with dew cover, and gel-cell batteries. It also comes with the removable mirror/cell and transport box, shroud, truss pole case, and Telegizmos scope cover. Offering it here before listing on Astromart. On a local sale I'll also include a Kendricks 2" laser collimator.
A new Starmaster, configured as this one is, would cost about $9,000 plus shipping.

Online flyer: http://galaxytoday.info/sm14/sm14.pdf

$5,400

Peter Argenziano
480-684-2848
news@evaconline.org



Upcoming Meetings

May 15

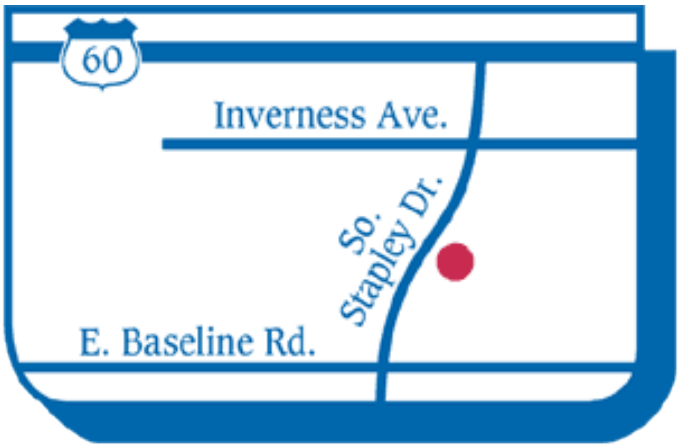
June 19

July 17

August 21

September 18

October 23

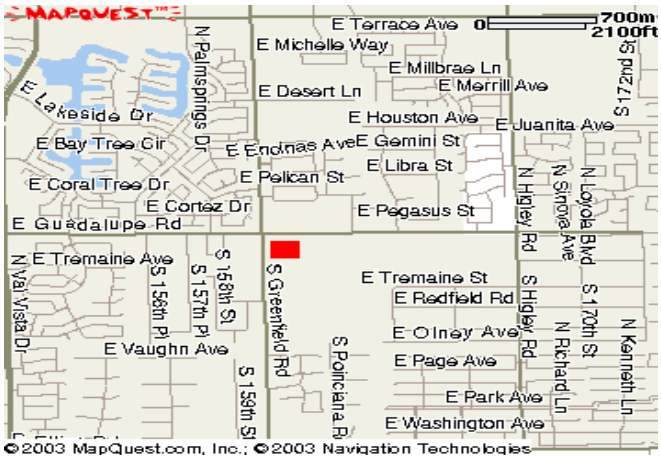


The monthly general meeting is your chance to find out what other club members are up to, learn about upcoming club events and listen to presentations by professional and well-known amateur astronomers.

Our meetings are held on the third Friday of each month at the Southeast Regional Library in Gilbert. The library is located at 775 N. Greenfield Road; on the southeast corner of Greenfield and Guadalupe Roads.

Meetings begin at 7:30 pm.

Visitors are always welcome!



Southeast Regional Library
775 N. Greenfield Road
Gilbert, Az. 85234

All are welcome to attend the pre-meeting dinner at 5:30 pm. We meet at Old Country Buffet, located at 1855 S. Stapley Drive in Mesa. The restaurant is in the plaza on the northeast corner of Stapley and Baseline Roads, just south of US60.

Old Country Buffet
1855 S. Stapley Drive
Mesa, Az. 85204

Likewise, all are invited to meet for coffee and more astro talk after the meeting at Denny's on Cooper (Stapley), between Baseline and Guadalupe Roads.

Denny's
1368 N. Cooper
Gilbert, Az. 85233

May 2009

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	**2**
3	4	5	6	7	**8**	9
10	11	12	13	14	**15**	**16**
17	18	19	20	21	**22**	**23**
24	25	26	27	28	29	30
31						

May 1 - Butler School Star Party

May 2 - IYA at Az Science Center

May 8 - Public Star Party at Riparian Preserve in Gilbert

May 15 - General Meeting at SE Regional Library in Gilbert

May 16 - Local Star Party at Boyce Thompson Arboretum

May 22 - RTMC starts

May 23 - Deep Sky Star Party at Vekol

June 2009

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3	4	5	6
7	8	9	10	11	**12**	**13**
14	15	16	17	18	**19**	**20**
21	22	23	24	25	26	27
28	29	30				

June 12 - Public Star Party at Riparian Preserve in Gilbert

June 13 - Local Star Party at Boyce Thompson Arboretum

June 13 - Grand Canyon Star Party

June 19 - General Meeting at Southeast Regional Library in Gilbert

June 20 - Deep Sky Star Party at Vekol Road

East Valley Astronomy Club -- 2009 Membership Form

Please complete this form and return it to the club Treasurer at the next meeting or mail it to EVAC, PO Box 2202, Mesa, Az, 85214-2202. Please include a check or money order made payable to EVAC for the appropriate amount.

IMPORTANT: All memberships expire on December 31 of each year.

Select one of the following:

☐ New Member ☐ Renewal ☐ Change of Address

New Member Dues (dues are prorated, select according to the month you are joining the club):

☐ **$30.00 Individual** January through March

☐ **$35.00 Family** January through March

☐ **$15.00 Individual** July through September

☐ **$17.50 Family** July through September

☐ **$22.50 Individual** April through June

☐ **$26.25 Family** April through June

☐ **$37.50 Individual** October through December

☐ **$43.75 Family** October through December

Includes dues for the following year

Renewal (current members only):

☐ **$30.00 Individual** ☐ **$35.00 Family**

Magazine Subscriptions (include renewal notices):

☐ **$34.00** Astronomy ☐ **$33.00** Sky & Telescope

Name Badges:

☐ **$10.00** Each (including postage) Quantity: _____

Name to imprint: _____

Total amount enclosed: _____

Please make check or money order payable to EVAC

☐ Payment was remitted separately using PayPal ☐ Payment was remitted separately using my financial institution's online bill payment feature

Name: _____ Phone: _____

Address: _____ Email: _____

☐ Publish email address on website

City, State, Zip: _____ URL: _____

How would you like to receive your monthly newsletter? (choose one option):

☐ Electronic delivery (PDF) *Included with membership* ☐ US Mail **Please add $10 to the total payment**

Areas of Interest (check all that apply):

☐ General Observing ☐ Cosmology

☐ Lunar Observing ☐ Telescope Making

☐ Planetary Observing ☐ Astrophotography

☐ Deep Sky Observing ☐ Other

Please describe your astronomy equipment:

Would you be interested in attending a beginner's workshop? ☐ Yes ☐ No

How did you discover East Valley Astronomy Club? _____

PO Box 2202
Mesa, AZ 85214-2202
www.eastvalleyastronomy.org

All members are required to have a liability release form (waiver) on file. Please complete one and forward to the Treasurer with your membership application or renewal.

Liability Release Form

In consideration of attending any publicized Star Party hosted by the East Valley Astronomy Club (hereinafter referred to as "EVAC") I hereby affirm that I and my family agree to hold EVAC harmless from any claims, liabilities, losses, demands, causes of action, suits and expenses (including attorney fees), which may directly or indirectly be connected to EVAC and/or my presence on the premises of any EVAC Star Party and related areas.

I further agree to indemnify any party indicated above should such party suffer any claims, liabilities, losses, demands, causes of action, suits and expenses (including attorney fees), caused directly or indirectly by my negligent or intentional acts, or failure to act, or if such acts or failures to act are directly or indirectly caused by any person in my family or associates while participating in an EVAC Star Party.

My signature upon this form also indicates agreement and acceptance on behalf of all minor children (under 18 years of age) under my care in attendance.

EVAC only recognizes those who are members or invitees and who also have a signed Liability Release Form on file as participants at an EVAC Star Party.

Please print name here ***Date***

Please sign name here

PO Box 2202
Mesa, AZ 85214-2202
www.eastvalleyastronomy.org

NASA's Space Place

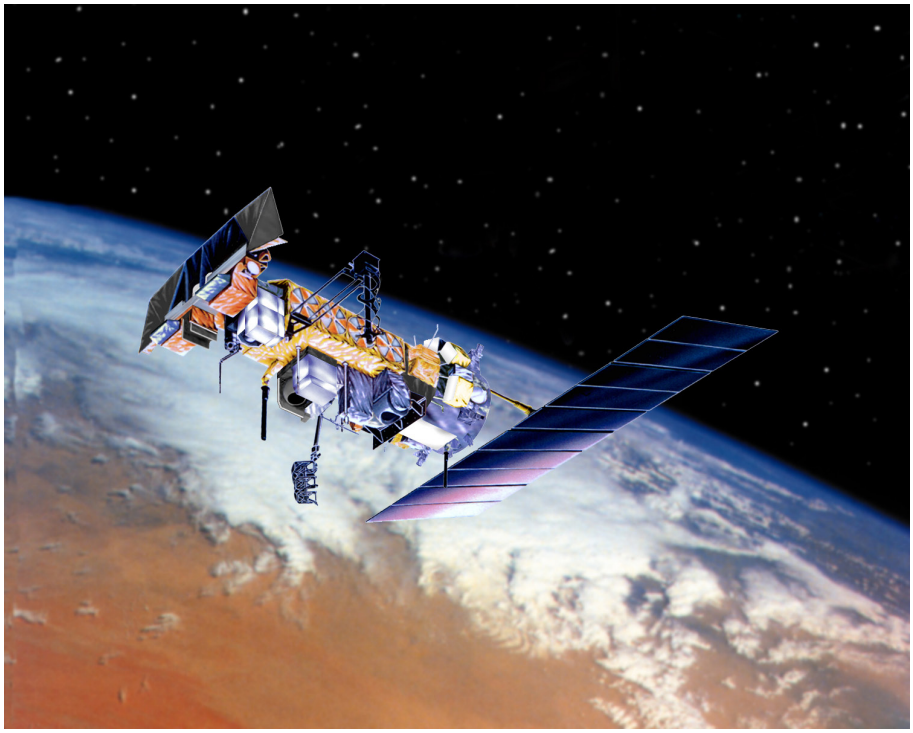
The Swiss Army Knife of Weather Satellites

Spotting volcanic eruptions, monitoring the health of crops, pinpointing distress signals for search and rescue teams.

It's not what you might expect from a weather satellite. But these are just a few of the abilities of NOAA's newest polar-orbiting weather satellite, launched by NASA on February 6 and turned over to NOAA for full-time operations on February 26.

Formerly called NOAA-N Prime and now renamed NOAA-19, it is the last in its line of weather satellites that stretches back almost 50 years to the dawn of the Space Age. Over the decades, the abilities of these Television Infrared Observation Satellites (TIROS) have gradually improved and expanded, starting from the grainy, black-and-white images of Earth's cloud cover taken by TIROS-1 and culminating in NOAA-19's amazing array of capabilities.

"This TIROS series has become quite the Swiss army knife of weather satellites, and NOAA-19 is the most capable one yet," says Tom Wrublewski, NOAA-19 Satellite Acquisition Manager at NASA's Goddard Space Flight Center in Greenbelt, Maryland.



The new NOAA-19 is the last and most capable in the long line of Television Infrared Observation Satellites (TIROS).

The evolution of TIROS began in 1998 with NOAA-K. The satellites have carried microwave sensors that can measure temperature variations as small as 1 degree Celsius between Earth's surface and an altitude of 40 kilometers—even through clouds. Other missions have added the ability to track large icebergs for cargo ships, monitor sea surface temperatures to aid climate change research, measure the amount of ozone in Earth's protective ozone layer, and even detect hazardous particles from solar flares that can affect communications and endanger satellites, astronauts in orbit, and city power grids.

NOAA-19 marks the end of the TIROS line, and for the next four years it will bridge the gap to a new series of satellites called the National Polar-orbiting Operational Environmental Satellite System. NPOESS will merge civilian and military weather satellites into a single system. Like NOAA-19, NPOESS satellites will orbit Earth from pole to pole, circling the planet roughly every 100 minutes and observing every location at least twice each day.

NPOESS will have yet more capabilities drawn from its military heritage. Dim-light sensors will improve observations of the Earth at night, and the satellites will better monitor winds over the ocean — important information for ships at sea and for weather and climate models.

"A lot more capability is going to come out of NPOESS, improving upon the 161 various environmental data products we already produce today," Wrublewski says.

Not even a Swiss army knife can do that many things, he points out.

For more on the NPOESS, check out http://www.npoess.noaa.gov. Kids can find out about another NOAA satellite capability—tracking endangered migrating species—and play a fun memory game at http://spaceplace.nasa.gov/en/kids/poes_tracking.

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

If It's Clear...

by Fulton Wright, Jr.
Prescott Astronomy Club

May 2009

Shamelessly stolen information from Sky & Telescope magazine, Astronomy magazine, and anywhere else I can find info. When gauging distances, remember that the Moon is ½ a degree or 30 arc minutes in diameter. All times are Mountain Standard Time.

On Friday, May 1, the Moon is at first quarter.

On Friday, May 8, the full Moon rises at 7:22 PM (2 minutes after sunset) spoiling any deep sky observing for the whole night.

On Thursday, May 14, starting at 10:35 PM, you will have your 6th chance (out of 10) to see Titan's shadow on Saturn. I have barely seen it with a 6 inch telescope, so it can be done. Saturn sets at 2:27 AM with Titan's shadow still on it. (Rhea's shadow also fell on Jupiter at 1:26 AM, but it should be too small to see.)

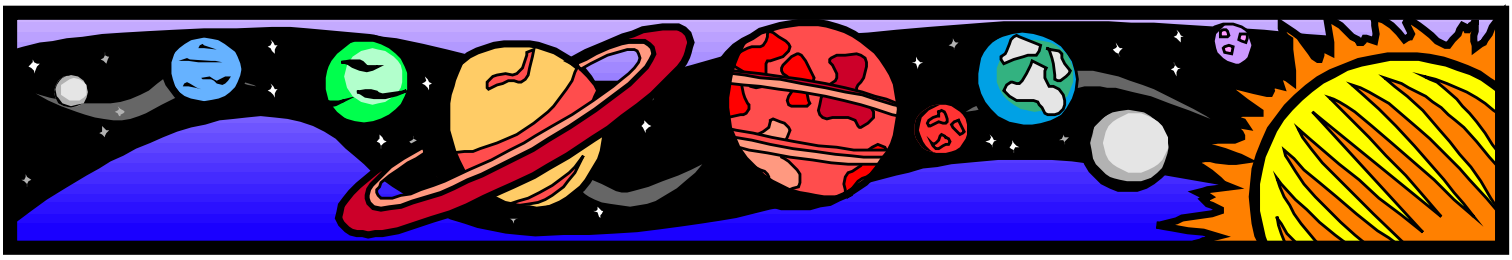
On Saturday, May 16, the Moon is at third quarter.

On Sunday, May 17, about 3:00 AM, the Moon is 3 degrees to the left of Jupiter, Neptune is 1 degree from Jupiter (in the same direction), and Io's shadow is on Jupiter. Neptune moves to 1/2 degree north of Jupiter by May 27.

On Saturday, May 23, it is new Moon, so you have all night to look for dim stuff.

On Saturday, May 30, the Moon is at first quarter phase.

On Saturday, May 30, starting at 9:45 PM, Titan's shadow falls on Saturn for the 7th time. Saturn sets at 1:24 AM with the shadow still on the planet.



From the Desk of the President

That is my reminder to many of you who are planning trips. Don't forget your telescope!

Continued from page 1 I will be back home for the May General Membership meeting on May 15th. Our primary speaker will be Jack Farmer of the ASU School of Earth and Space Exploration. He will be speaking on Astrobiology. Rick Tejera, from the Phoenix astronomy club SAC (Saguaro Astronomy Club) will also be in attendance to present award to EVAC members who earned them at the recent SAC sponsored Messier Marathon.

I remain hopeful that Meade will be able to present their new telescope, the ETX-LS to us during the "Show and Tell" portion of the May meeting. We have tried to schedule that for several months now, but there have been delays. If they can make it, Brian Dewelles, the local Meade representative, will be displaying the telescope, and after the meeting, will be set up at the GRCO for people to observe with it if they wish. Once we know if Meade can make it or not, a message will be sent via the EVACONLINE list.

There have been a few other members asking for some time to make "mini" presentations during Show and Tell. If you have something that you would like to share with the membership, send me an email at president@evaconline.org and we shall get you scheduled.

The June meeting is definitely one to mark on your calendar too. Ted Dunham of the Lowell Observatory, is a member of the Keppler Mission team, and will be talking to us about the current Keppler mission to find Earth-size planets in the habitable zones of stars.

Keep Looking Up!

Feb. 13, 2009

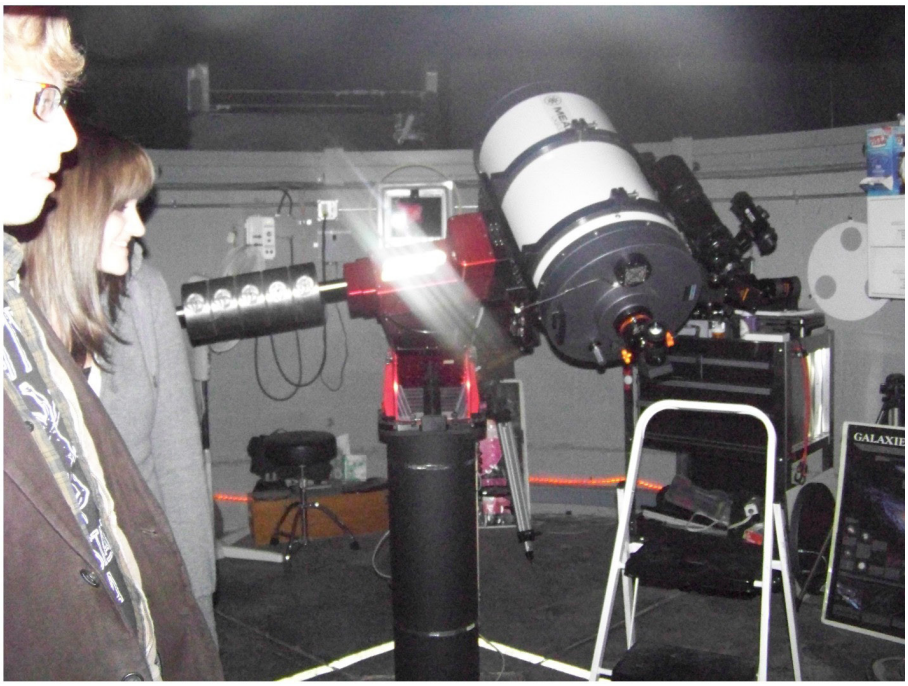
GRCO

Gilbert Rotary Centennial Observatory
Operated by volunteers from
East Valley Astronomy Club
Martin Thompson, Observatory Manager

Joan Thompson and Mary Douglas

Continuous outside DVD movies currently showingd
"Eyes On the Skies"

Picture at right taken inside the Observatory which is open every Friday and Saturday evening from dusk to 9:00pm - weather permitting.



by Jan Douglass

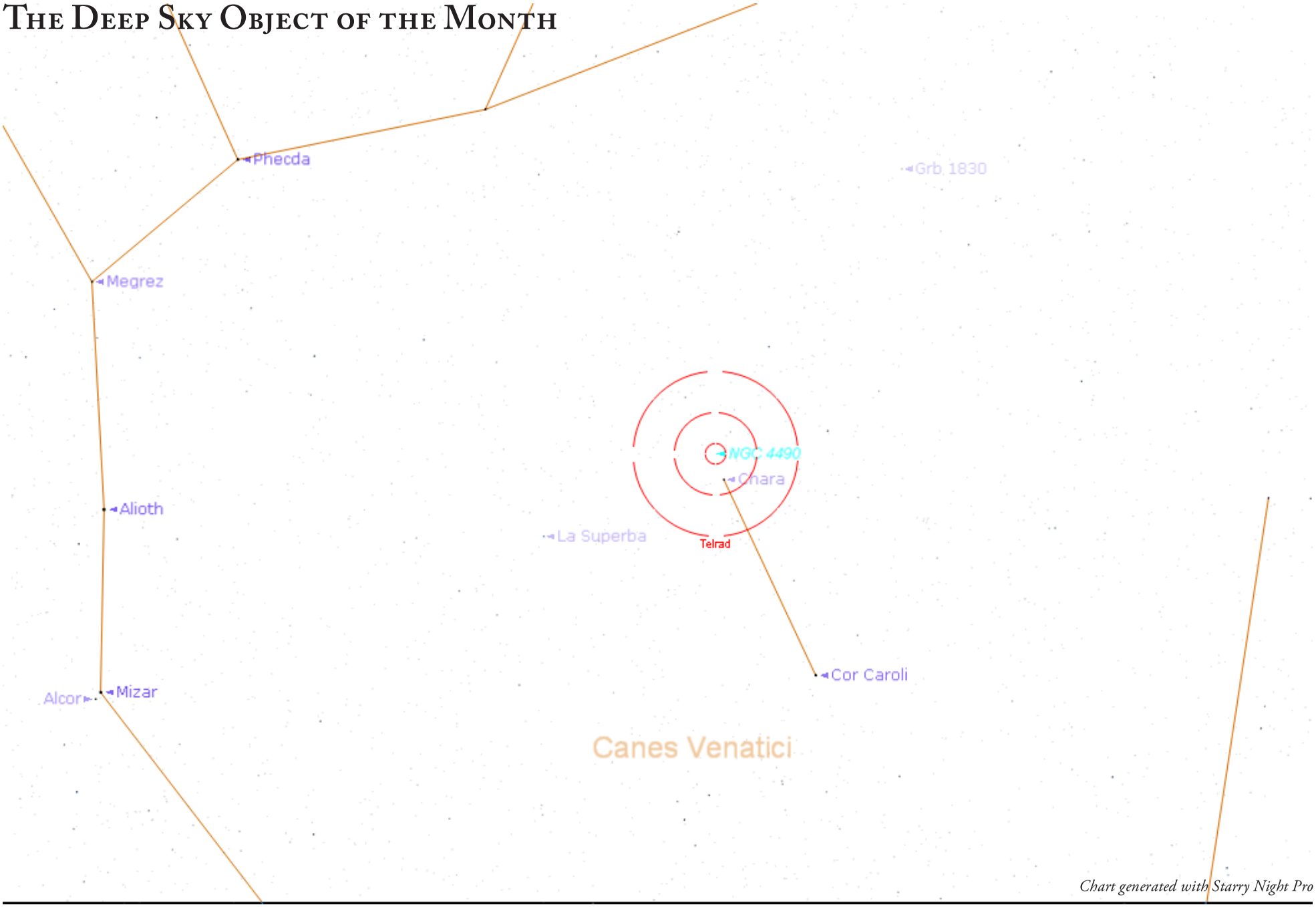


Chart generated with Starry Night Pro

NGC 4490 (Cocoon Galaxy) Galaxy in Canes Venatici

RA 12h 30m 36.4s DEC +41° 38' 37" Magnitude: 9.8 Size: 6.3' x 2.0'

Kyrene del Pueblo Middle School

Outreach Event - March 5, 2009

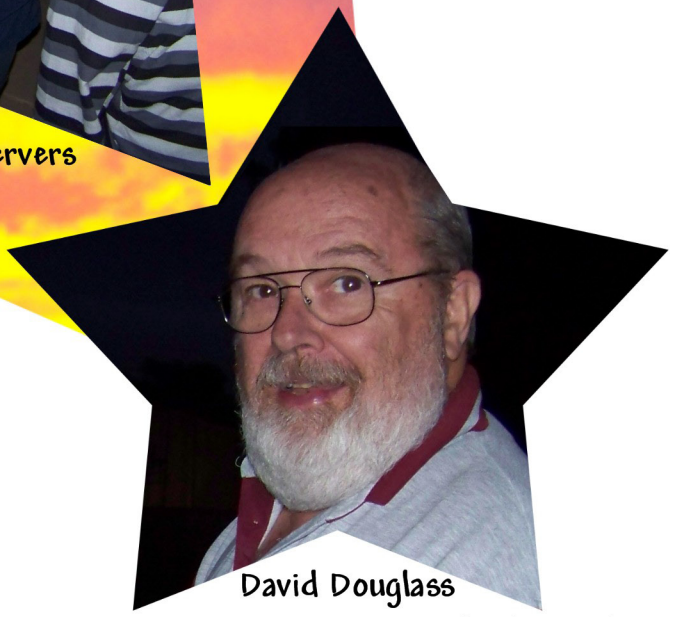
All telescopes were focused on the newly re-discovered M-111, a large open cluster of pulsating red giants.

Randy Peterson

Lynn & Lana Young

Student Observers

Derek Youngson



David Douglass

by Jan Douglass

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Keep Looking Up!

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