

# GuideStar



October, 2012  
Volume 30, #10

## *At the October 5 Meeting*

### **Abell Planetaries**

*Larry Mitchell, HAS Member*

A planetary nebula is the near-final stage of existence of a low mass star. What remains of the star is no longer fusing chemical elements and the only source of energy for the object is residual heat. The planetary nebulae only show themselves to us for 60,000 years or so, a blink of an eye in cosmic time.

These are the dim ones — average about 15th magnitude and they require a dark sky to see. Planetary nebulae are normally small objects on the sky but can usually be seen as ‘non-stellar’ (that is, not a point source). They were called ‘planetary nebulae’ not because they are or have anything to do with planets, but because they looked like they *might* be planets to early observers.

Larry will tell you about the objects and what you need to do to see them.

**The *GuideStar* is the winner of the 2012  
Astronomical League Mabel Sterns  
Newsletter award.**



The Houston Astronomical Society is a member of the Astronomical League.

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#### HAS Web Page:

<http://www.AstronomyHouston.org>

See the *GuideStar's* Monthly Calendar of Events to confirm dates and times of all events for the month, and check the Web Page for any last minute changes.

#### Schedule of meeting activities:

All meetings are at the University of Houston Science and Research building. See the inside back page for directions to the location.

Novice meeting: ..... 7:00 p.m.

Justin McCollum — "A Brief Tour of the Winter Constellations"

General meeting: ..... 8:00 p.m.

**See last page for directions  
and more information.**

## The Houston Astronomical Society

The Houston Astronomical Society is a non-profit corporation organized under section 501 (C) 3 of the Internal Revenue Code. The Society was formed for education and scientific purposes. All contributions and gifts are deductible for federal income tax purposes. General membership meetings are open to the public and attendance is encouraged.

### Officers & Past President

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 Vice Pres: Bill Pellerin ..... C:713-598-8543  
 Secretary: Doug McCormick ..... C:281-932-6082  
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 By-Laws Review ... Scott Mitchell ..... H:281-293-7818

### Advisors

Dr. Reginald DuFour, Rice Univ.  
 Dr. Lawrence Pinsky, U. of H.  
 Dr. Lawrence Armendarez, U. of St. Thomas

### Dues and Membership Information

Annual Dues:Regular .....\$36  
 Associate .....\$6  
 Sustaining .....\$50  
 Student .....\$12  
 Honorary ..... N/C

All members have the right to participate in Society functions and to use the Observatory Site. Regular and Student Members receive a subscription to *The Reflector*. *The GuideStar*, the monthly publication of the Houston Astronomical Society is available on the web site. Associate Members, immediate family members of a Regular Member, have all membership rights, but do not receive publications. Sustaining members have the same rights as regular members with the additional dues treated as a donation to the Society. *Sky & Telescope* and *Astronomy* magazines are available to members at a discount.

**Membership Application:** Send funds to address shown on last page of *GuideStar*. Attention - Treasurer, along with the following information: Name, Address, Phone Number, Special Interests in Astronomy, Do you own a Telescope? (If so, what kind?), and where you first heard of H.A.S.

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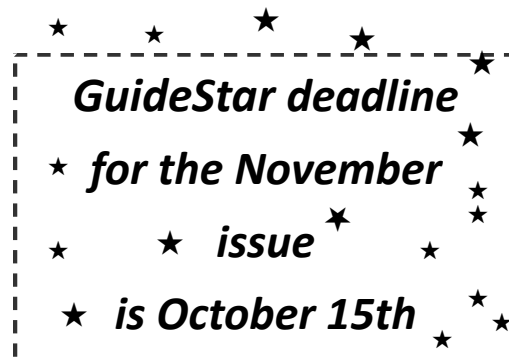
## Other Meetings...

**Johnson Space Center Astronomical Society** meets in the the Lunar and Planetary Institute on the 2nd Friday of each month. Web site: [www.jscas.net](http://www.jscas.net)

**Fort Bend Astronomy Club** meets the third Friday of the month at 8:00 p.m. at the First Colony conference Center. Novice meeting begins at 7:00, regular meeting begins at 8:00. Web site: <http://www.fbac.org>

**North Houston Astronomy Club** meets at 7:30 p.m. on the 4th Friday of each month in the Teaching Theatre of the Student Center at Kingwood College. Call 281-312-1650 or E-mail [bill.leach@nhmccd.edu](mailto:bill.leach@nhmccd.edu). Web site: [www.astronomyclub.org](http://www.astronomyclub.org)

**Brazosport Astronomy Club** meets the third Tuesday of each month at the Brazosport planetarium at 7:45 p.m. The Brazosport planetarium is located at 400 College Boulevard, Clute, TX, 77531. For more information call 979-265-3376



## President's Message

by Gordon Houston, President

### Hello HAS,

It is with much thought and contemplation that I have come to the decision not to run for re-election next year. The decision is based on the realization of what my priorities and goals are at the present time and those things that conflict with achieving those goals. My expectations when I got on the board were that I would finish my Master of Science in Astronomy and then have time to commit to being President. As many of you are aware from my presentation at the September meeting, I am currently working on a PHD in archaeoastronomy. As my supervisor always says, "you cannot always predict in science where you end up." I have found this to be so true in several respects. First, I never expected to continue my studies, but this PHD program became available just as I finished my masters. Then secondly, I thought my original research project would have been in the Republic of Georgia, requiring annual type extended trips, but has ended up in west Texas with monthly visits. My studies there will continue for the next 12-15 months. The whole process requires more time than one can imagine.

I hope that I have contributed to the furthering of the Houston Astronomical Society. As I have had the opportunity to look over the history of HAS leadership, I see many people who have served in different capacities and not always in succession from one position to another. That said, I look forward to the day that I can volunteer again in some capacity, but for the interim, I must become the black hole and focus strictly on my studies. I have written on many occasions in the past about volunteering and I hope that some of you will step up in the interim to help keep HAS the best society in Houston, Texas.

I always like to take this opportunity to point out special contributions to HAS and this month, I would like to thank Don Taylor for his excellent astrophotography pictures he has been providing as door prizes. I hope I have not been too harsh on the 'game show' contestants, but I want them to earn Don's work and not just receive them by having a ticket drawn out of a bucket. Don's photos take great effort and much appreciated and prized by those who receive them. I believe Don has also started a new trend, as Richard Nugent also provided a Venus Transit collage for a door prize this past month and thank you Richard for your picture.

Finally, I first want to recognize the Two Minute Drill observing tip presenters in September, which were Planetary-Chris Mendell, and Deep Sky-John Haynes. These messages were quick and concise. I look forward to hearing the October TMDs. Until then, keep observing and

*Clear Skies*

*Ad astra,*

*..Gordon Houston*

*President HAS*



## Observations... of the editor

by Bill Pellerin, GuideStar Editor

### HAS Elections...

As Vice-President, I have had the task of putting together a nominating committee for next year's candidates.

Our nominating committee is:

- Bill Pellerin—Chair
- Steve Fast
- Bill Flanagan
- Doug McCormick
- Don Selle

As I write this we are close to having a complete slate of candidates and we will present this list to you at the October meeting. You will have the opportunity to nominate yourself or any other member (membership is required by the by-laws) for any office. If you nominate someone else, please be sure that he or she is a willing candidate.

Thank you to the nominating committee members. While we're not across the finish line yet, I am grateful for your help so far.

### Finally, it's Fall

Fall began on September 22, at 9:49 a.m. CDT. While I haven't had much observing time recently, the nights that I have been out have been considerably more comfortable. So we can now look forward to cooler, longer nights and the fall and winter constellations.

The news about mosquitoes and the West Nile Virus this summer was scary. I hope that as we move into fall, the bugs go away and we can enjoy our nights outdoors in peace. Thanks to Bob Rogers for helping us through mosquito season by giving us tips on avoiding bites at a HAS meeting earlier this year.

### The Struve Family

Last month, the 'Shallow Sky' object was a pair of Struve double stars. I wrote a new article, called "The Struve Family and Double Stars" and it is now on the Astronomical League web site ([www.astroleague.org](http://www.astroleague.org)). If you have an interest in the Struve double star lists, check out this article.

### Making Changes

I've changed the software I use to operate my CCD camera for doing variable star photometry. It's a step in the right direction because the new software better integrates the imaging process with the analysis process. More simply, the new software populates the FITS header (a part of the file which carries

information about how the picture was taken) with more information and this facilitates the analysis process.

It's always a challenge to make these kinds of 'improvements' because it changes almost everything. The setup process is different, the imaging process is different, and the data preparation process is different. The analysis uses the same process — online software provided via the AAVSO (American Association of Variable Star Observers).

Here's what's important — if you are making a change to your observing or imaging process give some thought to how it's going to impact what you do. Write it down... really. I have several pages of notes associated with this change in my procedures. What worked, what didn't, what problems I encountered and how I worked around them. Problems I still have but haven't resolved yet. It's always interesting to me that when I see things on paper (or on the computer screen) I'm no longer required to remember them, and I'm free to think about them. Is this right? Does that make sense? Am I missing something? Could this be done easier?

Try it. You won't be disappointed with the results.

***Until next time...***

***clear skies and new moons!***

*..Bill*

# Why the Stars Shine

By Don Selle

***“Science is the one human activity that is truly progressive.” Edwin Powell Hubble***

“I can find in my undergraduate classes, bright students who do not know that the stars rise and set at night, or even that the Sun is a star.”  
Carl Sagan

Humans are creatures of habit, it’s built into us. It’s an evolutionary adaptation that enhances our chances of survival in the natural world. We like things to be normal and routine, and for most of us, it takes a lot to change our patterns of behavior and of thought.

But nothing progresses if it is constant or follows the same patterns over and over again. Because our thought processes follow common, established patterns, we often need a challenge to jolt us into finding a “new normal”, a new way of looking at things.

T. S. Kuhn, was a physicist, historian and philosopher of science who has been an influential voice in describing the process of the development of science. His book “The Structure of Scientific Revolutions” published in 1962 introduced the concept of a “paradigm shift”, or a shift from one set of standard explanations or theories or body of shared knowledge to another<sup>1</sup>.



**T. S. Kuhn**

*Wikipedia Commons*

This very influential view of science holds that in an accepted paradigm, the work of science is to solve the puzzles that are presented so that the body of knowledge is increased. In the course of this “normal science” anomalies will turn up which will eventually create a crisis, which will lead ultimately to the stress necessary to produce a new paradigm<sup>2</sup>. In other words, it is the intellectual stress caused by facts or predictions that we cannot fit into an existing pattern, that cause us to shift our view and adopt a new way of looking at things. The history of our understanding of the stars, why they shine and how they evolve, when viewed in this light provides a good example of Kuhn’s view of how science makes progress.

As human civilization developed, the ability to recognize star patterns would evolve to the lore of the constellations, and recognition that some stars, (the planets) did not stay fixed at all but wandered through the heavens. The human need to exert personal control is probably what lead to the establishment of astrology in ancient Babylon, and which eventually also lead to the astronomical philosophies of the ancient Greeks .

In the astronomy of Aristotle ( the culmination of the work of several philosophers who preceded him) the universe was constructed of a series of nested rotating spheres upon which the Moon, Sun, planets and stars were fixed. These spheres and their rotation were developed as an explanation of how the stars and planets moved in the night sky. It was Aristotle who first proposed that the stars are attached to the inside of the outermost (and therefore fastest moving) of the spheres, and that their glow is due to the friction caused as they flowed through the ether (or perfect fifth element) which filled the void between the spheres.

About 500 years after Aristotle’s death, Claudius Ptolemy added to Aristotle’s astronomy but he did not change it. He could better calculate the positions of the planets, Sun and Moon, but the paradigm of the crystalline spheres and the world view they embodied remained the same throughout middle ages.

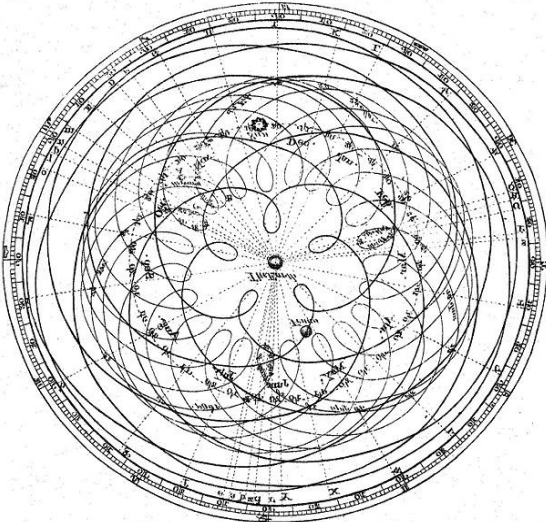
The “Copernican Revolution” of the Renaissance is the epitome of a “Kuhnian” paradigm shift. Nicholas Copernicus challenged the old view of astronomy which held that Earth was the center of all things and replaced it with a sun-centered universe. Copernicus realized that the Ptolemy’s system could result in predictions of planetary positions that were quite inaccurate and set out to find a way to improve these predictions. His answer would create a new way to calculate the movements of the planets. It would not be much more accurate than Ptolemy’s, since like Ptolemy, Copernicus used circular orbits, but it was much easier to use.

It would take the combined work of Tycho Brahe, Johannes Keppler and Isaac Newton to finish the job that Copernicus started. The extensive and accurate observations of

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planetary positions made by Tycho fueled the mathematical genius of



*Apparent motion of the Sun and planets with Earth at the center. Wikimedia Commons*

in its orbit around Earth. While it did nothing directly to advance our understanding of why stars shine, it opened the door to viewing the heavenly bodies as subject to the same physical forces that were evident here on Earth, and to the further deduction that perhaps they were made of the same stuff. The Sun also began to be understood to be a star like all of the others, just much closer to Earth.

In the 18th century, this led to speculation that the Sun was powered by earthly processes like combustion. One such idea was that the Sun was made of burning coal. Subsequent calculations showed that if this were so, the Sun would have burned through its fuel in only a couple of thousand years, less than the length of recorded history. The theory was extended to allow the Sun to be bombarded by thousands of coal like meteors. This did not work either, as Earth was not similarly under such assault, and the mass added to the Sun over the millennia would change the orbit of Earth, an effect that was also not observed.

Fast forward to the early 19th century. Here, Joseph Fraunhofer, a talented optician, telescope and instrument maker invented the spectroscope in 1814. With this instrument, he was able to determine that the same bright line that he saw coming from a campfire was present in the light of the Sun. He would go on to catalog 574 fixed dark lines in the solar spectrum. In 1859, these lines were shown by Gustav Kirchhoff and Robert Bunsen to be absorption lines created when colder chemical elements in the Sun's atmosphere absorb light at very specific wavelengths. The pair were able to determine the spectral lines for many earthly elements, and later identify their distinctive pattern in the dark line absorption spectra. They therefore, proved that the Sun contained the same earthly elements. It was made from the same stuff that we are.

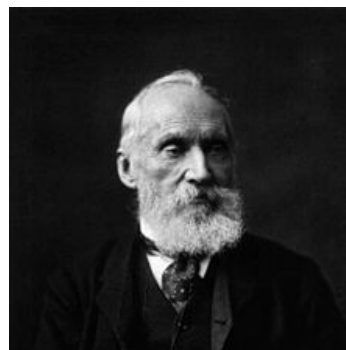
At the same time, considerable progress was being made in the science of heat transfer and thermodynamics. This was the basis for pow-

er Kepler who deduced the laws of planetary motion. Newton took the laws of Kepler, and showed that they were a manifestation of his own law of gravitation, and made it a "universal" law by showing that the Moon was constantly "falling" towards Earth, under the influence of gravity. The Moon in doing so, obeyed the "planetary" laws

ering the Industrial Revolution. One of the key contributors to this knowledge was William Thomson, later to be elevated to the peerage with the title of Lord Kelvin. Both he and his contemporary, Herman Helmholtz, realized that the gravitational attraction of masses of gas could be converted into kinetic energy, the energy of motion. They also realized that kinetic energy in a gas was the same as heat.

They theorized that a spherical body of gas (such as the Sun) would contract due to gravity. As this contraction occurred, the gravitational potential energy, would be converted into kinetic energy or heat, and radiate away into the surrounding space<sup>3</sup>, hitting Earth and making life on this planet possible. The heating of the gas would increase the pressure and balance the contraction.

As energy radiated away from the Sun, it would continue to contract, but the contraction in a single year would be on the order of a few hundred miles – a pittance compared to the diameter of the Sun. Thomson used this approach to determine that the Sun would continue to shine for about 18 million



*William Thomson, Lord Kelvin  
Wikimedia Commons*

years, an eternity when compared to the age of Earth which was held to be about 6,000 years at that time.

Unfortunately, the "Kelvin Luminosity" as it came to be known, was the victim of another paradigm shift, but one from outside of the field of astronomy. This one came in the fields of geology and geophysics. During the end of the 19th century geological evidence such as estimates of the rate of sedimentation were used to estimate the age of Earth. These estimates, initially in the range of several hundred million years, were used as evidence to support Charles Darwin's theory of evolution by natural se-

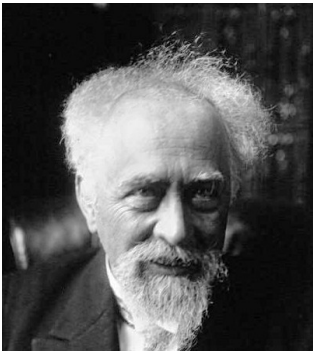
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lection which would require Earth to be at least this old for the theory to work. They had the opposite effect on Thomson's estimate of the Sun's age, and hence its source of energy, for it was inconceivable that Earth could be vastly older than the star it orbits.

This controversy was finally settled in 1907 with the development of the technique of dating rocks by measuring the relative amounts of the radioactive decay products of uranium. This led to the consensus that Earth, and hence the Sun, were at least several billion years old. It was also recognized that this process released heat, and while it was released in sufficient quantities to support the temperature of Earth, it was not at all enough to be the source of energy of the Sun.

One of the final clues to puzzle was however at hand. Einstein's publication in 1905 of a paper asking the question "does the inertia of a body depend on its energy content?" included the now famous equation  $E=mc^2$ . Clearly this was a potential source for the Sun's energy, as the conversion of only small amounts of matter would yield huge quantities of energy, due to the fact that the speed of light ( $c$ ) is so huge.



Jean Perrin in 1926  
Wikipedia Commons

This was also the beginning of a new paradigm in physics which would lead to Einstein's relativistic universe, composed not just of three dimensional space but of four dimensional space time. As powerful

as Special Relativity would be in predicting the behavior of the universe, it alone could not solve the problem of why stars shine.

In 1919 the French physicist Jean Perrin took on the problem. He had previously helped to establish that atoms were a reality through his experiments, and would later win the Nobel Prize for his work proving the existence of molecules. Perrin noted that the atomic weight of helium weighed slightly less (about 1% less) than would four hydrogen atoms which he envisioned could be combined to form Helium<sup>4</sup>. While the difference in mass was very small, the energy released would be enormous. Perrin had found the right answer but did not have the knowledge necessary to describe the process in detail. The repulsive electrical charge would keep the four protons of hydrogen from merging to create helium and setting free the energy equivalent to the lost mass.

Famed Astrophysicist Arthur Eddington was convinced. He had taken Kelvin's calculations of stellar density and temperature much further and found the temperatures and pressures at the center of the stars would be hellish, reaching as high as 10 million degrees K. Though, like Perrin, he did not have a physical model for how four hydrogen atoms could collide with such energy that they would fuse into Helium, he was convinced that this occurred due to the fact that Helium existed in stars. In fact his belief in this was so strong, he challenged his critics to

"go find a hotter place" than the interior of a star.

Discovery of the mechanism for the creation of most of a star's energy would have to await the new paradigm of quantum mechanics. In 1928, Russian American particle physicist George Gamow, would realize that it was statistically possible for one proton to "tunnel" through the repulsive electric charge of another proton to fuse together.

Finally in 1938, physicist Hans Bethe<sup>5</sup> would work out in detail the series of nuclear reactions that could occur in the center of a star which leads to the formation of Helium and release of energy. He and others would also establish another series of reactions that power stars much larger than our Sun, and ultimately produce all of the elements, including those we are made of. Truly we are stardust.

So after looking at the stars for millennia, and studying them scientifically for about 400 years, mankind finally can answer the question of why the stars shine, and in doing so, we come full circle. The answer is not a simple answer but it is profound for it leads to the realization that without the stars, we would not exist to look at them, and without the stars shining, we might never have asked the question nor been challenged to find the answer.

#### Notes

1. Wikipedia.org – Article on T.S.Kuhn
2. J. Bernard Cohen – "Revolution in Science" 1985, The Belknap Press of the Harvard University Press, pgs 26-27
3. Marcia Bartusiak – Archives of the Universe, Vintage Books, pg 349
4. Ibid, pg 350
5. Ibid, pg 351-2

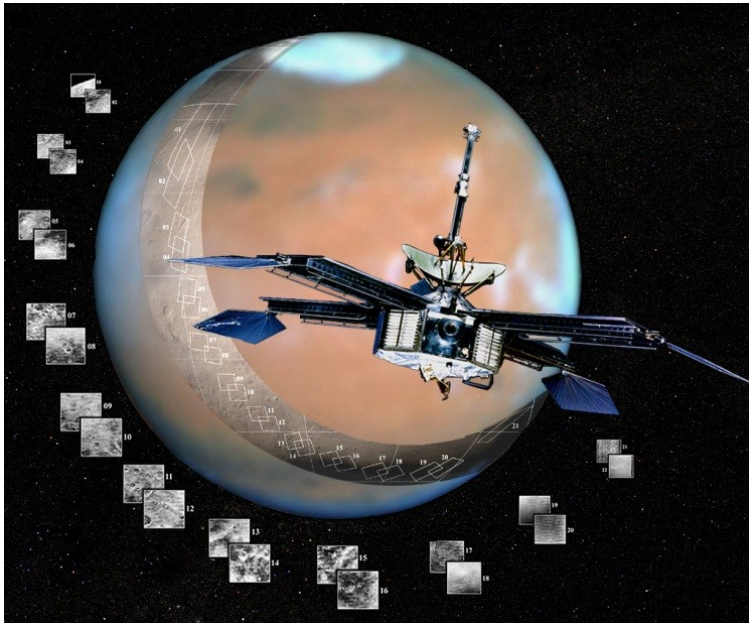


# Doing Science with a Spacecraft's Signal

By David Doody

Mariner 2 to Venus, the first interplanetary flight, was launched August 27 fifty years ago. This was a time when scientists were first learning that Venus might not harbor jungles under its thick atmosphere after all. A Russian scientist had discovered that atmosphere during the rare Venus transit of 1761, because of the effects of sunlight from behind.

Mariner 2 proved interplanetary flight was possible, and our ability to take close-up images of other planets would be richly rewarding in scientific return. But it also meant we could use the spacecraft itself as a "light" source, planting it behind an object of our choosing and making direct measurements.



*In this poster art of Mariner 4, you can see the parabolic reflector atop the spacecraft bus. Like the reflector inside a flashlight, it sends a beam of electromagnetic energy in a particular direction. Credit: NASA/JPL/Corby*

Mariner 4 did the first occultation experiment of this sort when it passed behind Mars as seen from Earth in July 1965. But, instead of visible light from the Sun, this occultation experiment used the spacecraft's approximately 2-GHz radio signal.

The Mariner 4 experiment revealed Mars' thin atmosphere. Since then, successful radio science occultation experiments have been conducted at every planet and many large moons. And another one is on schedule to investigate Pluto and its companion Charon, when the New Horizons spacecraft flies by in July 2015. Also, during that flyby, a different kind of radio science occultation experiment will investigate the gravitational field.

## NASA Space Place

The most recent radio science occultation experiment took place September 2, 2012, when the Cassini spacecraft carried its three transmitters behind Saturn. These three different frequencies are all kept precisely "in tune" with one another, based on a reference frequency sent from Earth. Compared to observations of the free space for calibration just before ingress to occultation, the experiment makes it possible to tease out a wide variety of components in Saturn's ionosphere and atmosphere.

Occultation experiments comprise only one of many categories of radio science experiments. Others include tests of General Relativity, studying the solar corona, mapping gravity fields, determining mass, and more. They all rely on NASA's Deep Space Network to capture the signals, which are then archived and studied.

Find out more about spacecraft science experiments in "Basics of Space Flight," a website and book by this author, <http://jpl.nasa.gov/basics>. Kids can learn all about NASA's Deep Space Network by playing the "Uplink-Downlink" game at <http://spaceplace.nasa.gov/dsn-game>.

# Observatory Corner

*By Bob Rogers, Observatory Chairman*

## ***Hello everyone.***

The work continues on the Observatory upkeep and repairs. Allen Wilkerson has put in a lot of weekends at the site working on the Observatory and doing a lot of mowing. He has the place looking really good. Thanks Allen for your help.

I also want to announce that there is a new Internet service at the site that is free to everyone who uses the site. In the next week or so, there will be a user agreement/guidelines that will be posted on the web site in order to get the password. Mike Edstrom is working on the details for this. I want to thank the HAS Board for their help on this.

Allen Wilkerson found an eyepiece on the field a couple of weeks ago before mowing. He sent an email out on the list server about it, but didn't get a response. He said it appears to be an expensive eyepiece. If you have lost an eyepiece in the last couple of weeks, please contact Allen Wilkerson at 832-265-4773.

On the weekend of September 29/30, I will be having a work weekend at the site. I have Boy Scout Troop 404 from Pearland coming out for that weekend to help. If you would like to help that weekend, either call or email me to include you in on the food. These guys make a great cobbler.

The following weekend is the HAS Picnic at the Observatory site. Here is the copy of the email that went out on the list server –

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## ***October 06, 2012, 2:00PM: HAS Club Picnic and Star Party***

**Please RSVP so we can get a head count for food - details below**

Attention all HAS members! You are cordially invited to attend the upcoming club picnic and star party at the Columbus dark site. We have some special activities lined up especially for novice observers this year. If you've never been out to the Columbus site, this would be a great night to visit! You'll have a chance to get better acquainted with your fellow members, enjoy the (hopefully) cooling fall weather, and most of all, enjoy a chance to truly see the night sky.

2:00 PM: Gates unlocked

3:00 PM: Caravan to the site for new members

We will meet at the Chevron station in Columbus (exit 696) at 3:00PM and caravan to the site. If you need help finding the way, join the caravan!

4:00 PM: Site orientation with Bob Rogers



You don't need to have taken the orientation prior to coming. Bob will be offering an orientation session on site

- Please bring a red light flashlight to protect others night vision

5:00 PM: Picnic

HAS chefs will demonstrate their culinary magic on a barbecue grill. Also, we'll have some door prizes for old hands and newbies!

Also...

Constellation tour

Start learning the night sky

Novice assistance

Set up and alignment of scopes

Suggested list of objects to find

Help with star hopping

Open observatory

HAS members will be operating the club's observatory scopes and sharing interesting sights

Light windows — Midnight and 2:00 AM if you want to leave

**Please RSVP to Don Selle  
(donselle@earthlink.net)**

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**Want more information on novice events?**

Contact Steve Fast

([steve.fast@post.harvard.edu](mailto:steve.fast@post.harvard.edu)) OR Rene Gedaly ([rsgedaly@comcast.net](mailto:rsgedaly@comcast.net))

And the work goes on ....

I **do need** to remind everyone that we need to start filling out Log Reports at the site so I can give this information to the Fondren

*(Continued on page 11)*

## *The Perpetual Novice*

*By Rene Gedaly*

I finally did it. I hopped in the car and made the trip to Columbus—alone and in the middle of the week—because it was going to be good weather and I wanted, I needed, to make progress on my observing list.

And what a great trip. The grounds looked terrific and I was able to open locked gates and keyed entries by myself. But as I first drove onto the field, I decided to stop and take a little time to survey the property, to make it mine.

When I was newly married, my husband's mother invited me on a trip to the family beach cabin. I was a member now, and she wanted to welcome me there. One of the first chores we did together was to run a load of laundry and fold the beach towels. She and I folded differently, but that simple act helped me feel like I belonged there. It made the place my own.

I drove over to the bunkhouse, admiring the trailers on either side, and parked. I grabbed my overnight bag and made my way to the back with a hand free to punch in the code. With a little tug, the door opened to a tidy, red-lighted cavern. Instinctively I flipped the switch; nothing happened. Then I saw the pull cord for the white lights. Someone had put thought into the design, no blinding light to ruin night vision, mine or others, had I entered the bunkhouse at night. A small fridge was there, a microwave, cupboards, two armchairs...cozy. I rolled out my sleeping bag onto a bunk in the newly curtained-off section and then returned to the field to set up my table, books, and binoculars on one of the concrete pads.

Before long, I was greeted by a new member who'd brought her adult son with her. She, too, was determined to get out to the site, but not knowing what she'd find, was a little concerned about observing alone. We exchanged numbers and now neither one of us has to prod sons or husbands into accompanying us, though I imagine, in time, a solitary trip won't be out of the question.

It was a fine night—clear and cool, 4/5 seeing, 4/5 transparency—and, after two years of learning to star hop old school, I finally completed my binocular messier list. If that weren't enough, the next morning cell coverage kicked in through the bunkhouse walls and hubby woke me in time to see the space shuttle fly over Columbus.

These are the kind of nights, the kind of experiences, that can turn a perpetual novice into a real amateur. As hobbies go, astronomy has a steep learning curve—armchair, visual, or imaging. But if we make it ours, it's a comfortable one to live in.

The dark site, the HAS Observatory, is all of ours. Come visit soon and fold some towels of your own.

*(Continued from page 10)*

Foundation. The property is on a 99 year lease and part of the Lease agreement is that HAS needs to report every year to the Fonden Foundation that the Property is being used. The Log Reports are located in the box in the middle of the field. Just open the cover, fill out the report and then slide it into the slot that is in the inside of the cover and then close the box. It is very important that everyone fill out a Log Report so that we are showing that the Observing site is being used. Your help on this is very much appreciated.

If you have a Randalls card, and have not done so, please have it coded for the Houston Astronomical Society. Our number is #6618. The Society gets 1% of the gross sales that members spend at Randalls. Randalls totals up the amount spent each quarter and will send us a check if the amount goes over \$2,500.00, otherwise the total roles over to the next quarter or zeros out at the end of the calendar year. So please link your Randalls card to the Houston Astronomical Society so that the society can benefit from this Ran-

dalls program. Our number is #6618. This is very easy to do, just go to the Courtesy Booth and tell the person there what you want to do.

If you have any suggestions or thoughts for the site, let me know.

Thanks,

*Bob Rogers*

**Observatory Chairman**  
**281-460-1573**  
**siteworkerbob@hotmail.com**

**Trailer/RV spots available free for weekend use at the site. Contact the Observatory Chairman, Bob Rogers [siteworkerbob@hotmail.com](mailto:siteworkerbob@hotmail.com) for more information**

# Leslie Peltier

## The World's Greatest Amateur Astronomer

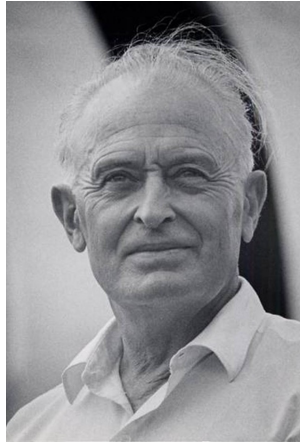
By Mike Simonsen, *Simostronomy*

<http://simostronomy.blogspot.com/>

**"The world's greatest non-professional astronomer."**

That is what Harlow Shapley called Leslie Peltier. If that is true, then why don't more people know about Peltier? I think the simple truth is he was a very private, soft-spoken man, who never sought the limelight and would have been embarrassed by all the attention he gets nowadays.

I've tried several times to write about Leslie Peltier, but every time before, I have begun thumbing through his classic book, *Starlight Nights*, for references and quotes and ended up reading the whole thing from cover to cover again instead of writing the piece that was my original intention. I'll never get tired of reading it. There are a lot of books that tell you **how** to observe the heavens and what you will find when you do, but this book always reminds me of **why** I love to be out under the stars at the eyepiece of a telescope, soaking in the sounds and smells of nature and admiring the majesty of the universe with my own eyes.



Born in January 1900, on a farm outside of Delphos, Ohio, Leslie grew up in a less complicated time, among the forests and farm fields of the area he lived his entire life. If he was famous for anything, it was his unwillingness to leave his home. He had everything he needed right there in Delphos- his family, his home, his gardens, and his observatories. Why would he want to leave any of that? So it was, that later in his life people made the pilgrimage to come visit him. Leslie was not likely to be making a public appearance anywhere near you. You had to go to the mountain.

As a boy Leslie was fascinated by the natural world around him. He read books from his family's home library and learned about the flora and fauna that appeared on and around his home in nature guides, such as Wood's *Natural History* and Gray's *Botany*. He thoroughly enjoyed identifying each new butterfly, bird and flower. In 1977 he published *The Place On Jennings Creek*, a book relating the past 25 years of gardens and critters that shared the natural setting of his home with Leslie and his wife, Dorothy.

It's kind of surprising that it took Leslie until he was in high school to realize that his natural world extended upwards, over the tree tops,

past the clouds and out into the Universe into the night sky. He recalls in *Starlight Nights* the moment it dawned in him that he could name all the butterflies on his farm but didn't know the names of any of the stars in the heavens. One evening in May-

*"Something- perhaps it was a meteor- caused me to look up for a moment. Then, literally out of that clear sky, I suddenly asked myself: "Why do I not know a single one of those stars?"*

Thus began an epic journey of discovery and observation that lasted the rest of his life. Peltier learned the stars on his own using only his eyes for the first year. He always felt this was the best way to learn the sky, as opposed to having someone teach the constellations or telescopic showpieces without investing the time and effort to become familiar with each one and its place in the heavens.

*"Each star had cost an effort. For each there had been planning, watching and anticipation. Each one recalled to me a place, a time, a season. Each one now has a personality. The stars, in short, had become my stars."*

His first telescope was purchased with earnings from picking strawberries. He had to pick 900 quarts at two cents a piece one summer to save up the \$18.00 for his mail order 2" spyglass telescope. He made his

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own alt-azimuth mount for the telescope out of a leftover fence post, an old grind stone and discarded two by fours. This telescope served him well as he learned the sky and how to use a telescope to view the heavens.

His fatal attraction to variable stars and the AAVSO began when he wrote a letter to AAVSO founder, William Tyler Olcott asking how he could contribute to science with his small telescope. Olcott wrote back explaining that observing variable stars was an exciting and scientifically useful way to spend ones time under the stars, and from the time Leslie was eighteen until his death in 1980 he never missed sending in a monthly report of variable star observations to AAVSO headquarters in Cambridge, MA. His description of how variable star observing changed his life forever is something I have quoted often to many people.

*"Life was never quite the same for me after that winter walk to town. The charts that I brought home with me were potent and ensnaring and I feel it my duty to warn any others who may show signs of star susceptibility that they approach the observing of variable stars with the utmost caution. It is easy to become an addict and, as usual, the longer the indulgence is continued the more difficult it becomes to go back to a normal life."*

In 1919, Peltier was given the first of several telescopes that would be loaned, or given to him outright, based on his exceptional observing skills and perseverance. The AAVSO loaned him a 4-inch refractor with which to make variable star observations, and he immediately put it to good use by observing even fainter variable stars. Two years later, after enduring hundreds of nights in the dew and cold his father suggested it was time they build a proper observatory for Leslie. This observatory soon housed an even larger telescope, the 'Comet-Catcher.'

In 1925, he discovered his first comet, using the Comet-Catcher, a 6-inch refractor on loan from Henry Norris Russell of Princeton University. He would go on to discover 11 more comets in his lifetime, the last one in 1954. He also discovered four naked eye novae and made a habit of checking up on some old novae that still varied and occasionally had recurrent outbursts.

In 1959, life took a very unexpected turn when Miami of Ohio University offered to give Leslie their 12-inch Clark refractor, complete with observatory, dome and transit room! The entire observatory was cut into sections and delivered 125 miles to the Peltier home, where it was re-assembled and served Leslie as he strove to observe the faint minima of many of the variables he followed for decades. With this telescope he could follow stars down to 15th or 16th magnitude, far fainter than his other telescopes would allow. In total, Leslie Peltier

submitted over 132,000 variable star observations to the AAVSO, making him one of the all-time leading observers in history.

Peltier's life was a long, steady, calm procession of days and nights lived to the fullest and enjoyed for their blessings, punctuated by events like the appearance of a new comet or nova, or unexpected recognitions for doing what Leslie would have done even if no one noticed.

Overcoming his lack of formal education, Leslie dropped out of school after the 10th grade to work on his father's farm, he received an honorary doctorate from Bowling Green State University in 1947. In 1965, a mountain in California, home of the AAVSO's Ford Observatory, was named Mt. Peltier in his honor. In 1975, he received an honorary high school diploma from his home town's Delphos Jefferson High School.

In his obituary, written by friend and fellow AAVSOer, Carolyn Hurless, she says,

*"Leslie was able to accomplish all he did because he was a private person. He lived exactly as he wanted to. He did nothing he didn't wish to do and was able to say "no" very easily. He was very uncomfortable with those who sought him out because he was famous, but to those fellow variable star observers who visited, he was a warm and welcoming individual."*

Shortly after his death in 1980, the Astronomical League established The Leslie C. Peltier Award "to be presented to an amateur astronomer who contributes to astronomy observations of lasting significance," and that is where our histories

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finally intersect. In July 2012, I became the 30th recipient of the Leslie Peltier Award at the Astronomical League Convention in Chicago, Illinois.

Finding myself uncharacteristically speechless and unprepared, this is what I wish I would have said when asked to say a few words.

"I've known about Leslie Peltier, the great amateur astronomer and variable star observer, for years. I've heard the reverence in people's voices when he is mentioned in conversation.

I've read *Starlight Nights* more than any other book I can think of. And when I do, I'm always struck by the similarities in our experiences.

I too learned the sky and the names of all the stars and constellations on my own, through books and star charts borrowed from the library. I earned the money to buy my first telescope by getting up early in the morning and delivering papers door to door for far longer than I ever dreamed I could endure. His story about seeing something in the sky he couldn't explain during the UFO crazed 1950's, and the fact that it turned out to be geese flying in formation, is exactly like the story I have told my friends and will share with my grandchildren one day, about a winter night in 1980. I too, have received a telescope on loan from the AAVSO, as well as a CCD with which to observe variable stars. Even the opening paragraphs of *Starlight Nights*, where he describes walking down the path towards the two stark-white structures as night falls reminds me of my walk to my observatories each clear night.

But when he writes about his love of variable stars, and how he gets excited each night, year after year, to go spend some time with his old friends, that is when I hear my passion and my words coming out of his mouth. I am a hopeless variable star addict like Leslie, having now submitted over 80,000 observations of my own to the AAVSO.

Awards and accolades are great, but like Leslie, I would have done it all anyway. I don't think I really had a choice.



It is because of **who** this award is named for that it means so very much to me. I'd like to thank my wife, Irene, for supporting me and enabling my addiction. Thank you to the Astronomical League for this very special and meaningful recognition. And thank you, Leslie Peltier, for being an inspiration and role model for amateur astronomers everywhere who want to reach for the stars and explore the Universe on their own terms, in their own time and in their own way."

## ***Kids Outreach & Public Star Parties, October - December 2012***

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**Event:** Fathers & Flashlights

**Type:** Urban Overnight Camp for Kids & Dads. Numerous organized activities.

**Date:** Saturday, 10/6/2012

**Time:** 8:00 PM - 9:30 PM (tentative)

**Location:** West University Little League Field (University Blvd @ Auden Street)

**Event:** Camp for All / Candlelighters

**Type:** Observing – Kids from MD Anderson and Texas Childrens'

**Date:** Friday, 10/12/2012

**Time:** 6:00 PM – 9:00 PM

**Location:** Camp for All near Brenham, TX

**Event:** Thornton Middle School

**Type:** **Urban** School Star Party – Astronomy is the Main Event!

**Date:** Friday, 11/16/2012 (1/18/2013 as rain date)

**Time:** 6:30 PM – 8:30 PM

**Location:** 19802 Kieth Harrow Blvd., Katy, Texas, 77449 (off Fry Road)

**Event:** Arcadian West Star Party

**Type:** **Urban** Observing & Talk for Apartment Complex

**Date:** Monday, 11/19/2012

**Time:** 7:00 PM – 9:00 PM

**Location:** Arcadian West Apartments, 14220 Park Row, Houston, TX 77084 TX

**Event:** Tinsley Elementary "The Great Reading Campout"

**Type:** Elementary School Literature & Science Night. Numerous organized activities.

**Date:** Thursday, 11/29/2012

**Time:** 6:00 PM - 8:00 PM

**Location:** Tinsley Elementary, 11035 Bob White Dr., Houston, TX 77096 (southwest side of Houston, near Fondren @ West Bellfort)

**Name:** The Houston Arboretum Spring Star Party

**Type:** Mostly Adults – Arboretum Members. An evening at the Arboretum. Food & Drink!

**Date:** Saturday, 12/08/2012

**Time:** 7:00 PM – 9:00 PM (tentative)

**Location:** Houston Arboretum, 4501 Woodway Drive

**Event:** Tents in Town

**Type:** Urban Overnight Camp for Kids & Parents. Numerous organized activities.

**Date:** Saturday, 4/06/2013

**Time:** 6:00 PM - 9:00 PM

**Location:** Zindler Park, 7008 South Rice, Bellaire, TX 77401

**Details – especially times – are subject to change**

## Shallow Sky Object of the Month

# Great Square of Pegasus

**Object:** Great Square of Pegasus

**Class:** Asterism

**Constellation:** Pegasus

**Magnitude:**

**Scheat (NW corner): 2.4**

**Markab (SW corner): 2.5**

**Algenib (SE corner): 2.8**

**Alpheratz (NE corner): 2.1**

**R.A.:** 23 h 38 m (appx center of square)

**Dec:** 22 deg 14 min (appx center of square)

### Why this is interesting:

This is a large area of the sky, taking up approximately 184 square degrees (my estimate) and many astronomers say that there's not much of interest within that square.

The knock on the Great Square of Pegasus is that it is devoid of stars. It's not, of course, but there aren't a surplus of bright stars within the square. The brightest star I could find shines at magnitude 4.4, not so bright.

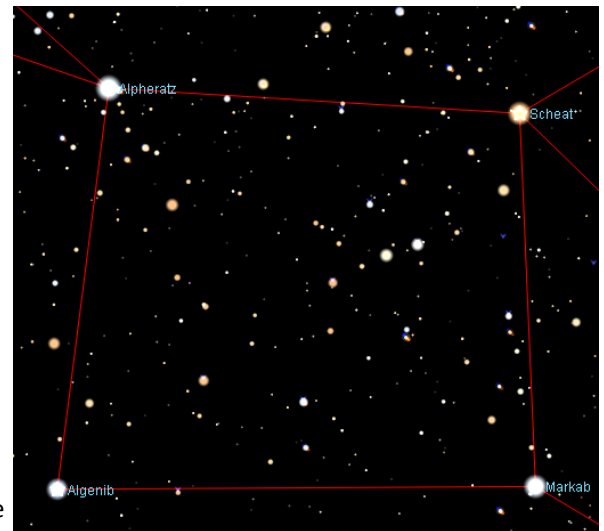
Maybe so, but just outside the western edge of the square is 51 Peg, famous for being the first star other than our sun to have planets discovered. In the October, 2009 *GuideStar*, 51 Peg was the Shallow Sky Object of the Month.

Let's look at the four stars that make up the square in detail.

**Scheat** — This star, being the westernmost, leads the great square through the sky. It's the second brightest star in the square and it's a M (color) star, which means it's reddish. In fact, much of the radiation of this star is in the infrared and is not visible to you. This star is a red giant and is a variable star — it varies by about .5 magnitude. If you look at the light curve for this star at the American Association of Variable Star Observers web site, the period of variation is hard to pick out. See if you can find the period of variability of the star.

**Markab** — is only slightly dimmer than Scheat, when Scheat is at its brightest, but it is a significantly different color. This is a B class star, which means it is much more blue/white. If you compare this star with Scheat, the color contrast will be obvious. Like many stars in the sky the name of this star is Arabic and it may mean the 'saddle' or 'shoulder' depending on the heritage of the name. This is also a highly evolved star, off the main sequence and much larger than our sun.

**Algenib** — Like many of the stars in the great square, this star is a



*The Great Square of Pegasus, North to the top*  
 Star chart generated by TheSkyX © Software Bisque, Inc.  
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few hundred (almost 400) light years away. It's another evolved B star, perhaps as much as 10 times the mass of the Sun and slightly variable (about .1 magnitude). This star is low enough mass that its final phase may be as a white dwarf (the final phase of our Sun). It's a close call, though, and it may yet be massive enough to end life as a supernova.

**Alpheratz** — The brightest star in the great square and officially assigned to the Andromeda constellation, there wouldn't be a square without this star. As early as 1904 it was determined that Alpheratz is a spectroscopic binary (a double star that can only be detected by red/blue shifts as the main star is tugged by its companion). The period of the orbit of the two stars is reported to be 96.7 days. The star is unusual in that it had some heavy metals in its spectra — including mercury.

Finding the Great Square is your gateway toward finding the constellation Andromeda (off the northeast corner of the square), and the Andromeda Galaxy (M31).



# Houston Astronomical Society

P.O. Box 20332

Houston, TX 77225-0332

## General Membership Meeting

The Houston Astronomical Society holds its regular monthly General Membership Meeting on the first Friday of each month, unless rescheduled due to a holiday or a conflict with other events at the University of Houston.

## Board of Directors Meeting

The Board of Directors Meeting is held on dates and at locations scheduled by the board. Information provided to *GuideStar* will be published. The meetings are open to all members of the Society in good standing. Attendance is encouraged.

## GuideStar Information

The H.A.S. *GuideStar* is published monthly by the Houston Astronomical Society. All opinions expressed herein are those of the contributor and not necessarily of Houston Astronomical Society. The monthly Meeting Notice is included herein. *GuideStar* is available on the HAS web site to all members of H.A.S., and to persons interested in the organization's activities. Contributions to *GuideStar* by members are encouraged. Electronic submission is helpful. Submit the article in text, MS-Word format via email BillPellerin@sbcglobal.net. Copy must be received by the 15th of the month for inclusion in the issue to be available near the end of the same month. Or, bring copy to the General Membership Meeting and give it to the Editor, or phone to make special arrangements.

Editing & Production: Bill Pellerin,

713-880-8061

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Advertising: Advertisers may inquire concerning ad rates and availability of space.

The Houston Astronomical Society welcomes you to our organization. The HAS is a group of dedicated amateur astronomers, most of whom are observers, but some are armchair astronomers.

The benefits of membership are:

- Access to our 18 acre observing site west of Houston -- a great place to observe the universe!
- A telescope loaner program -- borrow a HAS telescope and try observing for yourself!
- A monthly novice meeting, site orientation meeting, and general meeting with speakers of interest.
- Opportunities to participate in programs that promote astronomy to the general public (such as Star Parties at schools)
- A yearly all-clubs meeting for Houston area organizations
- Meet other amateurs and share experiences, learn techniques, and swap stories

***You're invited to attend our next meeting.***

***You'll have a great time.***

## ***Houston Astronomical Society***

**Meeting on Friday, October 5, 2012**

**7:00 Novice Meeting, room 116 Science & Research 1 Bldg**

**8:00 General Meeting, room 117 Science & Research 1 Bldg**

## **University of Houston**

### **Directions to meeting:**

#### **From I-45 going south (from downtown)**

- exit at Cullen Boulevard
- turn right on Cullen
- turn right into the parking lot (by the stadium)
- Science and Research is across the street (2nd building back)

#### **From I-45 going north (from NASA/Galveston)**

- exit at Cullen Boulevard
- turn left on Cullen
- turn right into the parking lot (by the stadium)
- Science and Research is across the street (2nd building back)

### **Parking:**

There is Free Parking, **BUT DO NOT PARK IN ANY RESERVED PARKING SPACES AT ANY TIME.**

U of H parking enforcement will ticket your vehicle.

**UPDATE — Due to construction in the stadium parking lot, use entrances 15D and 15F. You can park in this area, but NOT in a RESERVED space.**