Houston Astronomical Society

July, 2012

GuideStar

July, 2012

Volume 30, #7

At the July 6 Meeting

Other Planetary Systems

Brian Cudnik

With 778 planets and counting outside of the local solar system, astronomers are tallying up a catalogue of "strange new worlds". Add to this the over 3,000 planet candidates from the Kepler mission and we are beginning to see that our corner of the galaxy is just teeming with planets.

Brian will give an overview of this fascinating area of astronomy 20 years after the first planets were discovered outside of our solar system (the 3 planets around the Virgo pulsar PSR B1257+12) and speculate on what some of these planetary systems and worlds may be like.

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

Highlights:

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 McCollumn—"A Tour of the Summer 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.

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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

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-mailbill.leach@nhmccd.edu. Web site: 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

GuideStar deadline for the August issue is July 15th

President's Message

by Gordon Houston, President

Hello HAS,

Awards for the Houston Astronomical Society

It was with great pleasure that I announced to our society, on the netslyder, that **Bill Pellerin** has been awarded the 2012 Mabel Sterns **Newsletter Award** by the Astronomical League. Then, the AL **Webmaster award** was announced and I had the double pleasure of announcing the 2012 award to our webmaster, **Jeffery McLaughlin**. Communication is at the heart of success for any organization and we are privileged to have the best in both areas, in the same year. Wow!!! There are over 15,000 members of the Astronomical League, most participating in over 300 member societies, which means that these awards are a significant achievement by Bill and Jeffery.

In speaking with AL President, Carroll Iorg, the competition for the Mabel Sterns Newsletter Award is the most competitive of all the AL awards. Bill's long dedication as editor of the *GuideStar* is to be commended. The committee who selected the AL Webmaster Award indicated that Jeffery's work stood out so far above the rest, that their decision was easy. Jeffery's work is a key to recent membership growth. Please let Bill and Jeffery know how much their efforts are appreciated. We will have a dual public ceremony at the August 2012 meeting to recognize their work.

Transit of Venus at Bear Creek Park a great success

The transit of Venus event at Bear Creek Park turned out to be one of the most enjoyable events in recent memory. The weather gods were in our favor, as the Sun was obscured by clouds for the first time at about the 2 hour and 15 minute mark into the transit. This means we had clear viewing for first and second contacts. This contrasts to the many stories on the netslyder of people driving in many different directions, fearing a clouded event.

We had 38 telescopes but fewer operators. The rolling attendance through the event was around 140 and so with a great telescope to attendance ratio, everyone had time to observe the transit, take photographs through many telescopes, and take time to talk about astronomy and the Houston Astronomical Society.

I want to welcome the new members who joined since attending the event. I want to thank John Haynes for bringing out the clubs loaner scope inventory with solar filters, Steve Fast for making the flyer, and Mike Rao for his publicity efforts.

Thanks to Two Minute Drill presenters

Finally, I first want to recognize the Two Minute Drill observing tip presenters in May Lunar-Mac Hooton, Planetary-Karen McGowan, and Deep Sky-Clayton Jeter. I look forward to hearing the July TMDs. Until then, keep observing and Clear Skies.

Ad astra,

..Gordon Houston

President HAS

July/August

Calendar

Date	Time	Event
July		
3	1:51 p.m.	Full Moon
6	7:00 p.m.	HAS Novice Meeting, U of H
	8:00 p.m.	HAS General Meeting, U of H
10	8:48 p.m.	Moon at last quarter
14		Prime Night, Columbus Site
18	11:23 p.m.	New Moon
26	3:56 a.m.	Moon at first quarter
August		
1	10:26 p.m.	Full Moon
3	7:00 p.m.	HAS Novice Meeting, U of H
	8:00 p.m	HAS General Meeting, U of H
8	7:30 p.m.	HAS Board Meeting HEB Community Meeting Room I-10W @ Bunker Hill
9	1:56 p.m.	Moon at last quarter
12		Perseid Meters Peak
15	4:00 a.m.	Venus at greatest elongation west
16	7:00 a.m.	Mercury at greatest elongation west
17	10:53 a.m.	New Moon
18		Prime Night, Columbus Site
24	7:00 a.m.	Neptune @ opposition
	8:54 a.m.	Moon at first quarter
31	8:57 a.m.	Full Moon

Send calendar events to Doug McCormick - skygazer10@sbcglobal.net

For the latest information on club events, go to http://www.astronomyhouston.org/

Check the web site: www.astronomyhouston.org

The HAS website not only has news and information about our society, but also a variety of features to manage your membership and connect with other club members. Current members can post photos, trade gear, pay dues, manage discount magazine subscriptions, swap stories in the forum, and more.

Questions about the site? Need a hand to get your account set up?
Contact webmaster@astronomyhouston.org.

Follow the *GuideStar* on Twitter at:

GuideStar_HAS

Join Facebook and look for:

Houston Astronomical Society

Starline

Call 832-go4-HAS0 (**832-464-4270**) for the latest information on the meeting and other information about activities within the HAS.

HAS Board Meeting

HAS Board meetings are scheduled regularly (see the calendar, above). All members are invited to attend these meetings, but only board members can vote on issues brought before the board.

Observations... of the editor

by Bill Pellerin, GuideStar Editor

GuideStar Wins Astro League Award

By now you probably know that the *GuideStar* has won the Astronomical League Mabel Sterns Newsletter award. While I'm extraordinarily pleased to have this award come to the Houston Astronomical Society I know that the *GuideStar* is not the product of any one person's effort. All of the writers who contribute to the publication share in this award. Thank you for your contributions over the years — those who contribute now and those who have done so in the past.

Thanks to Gordon Houston who submitted the nomination and to Bill Flanagan who helped write the application letter. It was all a surprise to me.

I will miss the July meeting because I'll be at the Astronomical League conference in Chicago..

When I put the *GuideStar* together my goal is to provide the best publication and the best information I can to the members of the HAS. Thank you for reading the newsletter, and, as always, I welcome any feedback.

Web Site Gets Astro League Award

Just announced — the Astronomical League is giving its award for the best web site to the HAS. The site is maintained by Jeffery MacLaughlin, and it's beautiful. Jeffrey has added many new features to the site over time and made it a very user friendly place to visit.

One of the major innovations was a feature to allow new members to join the HAS and existing members to renew directly from the web site. Look for more features to come in the near future.

The message the awards for the web site and for the *GuideStar* is that the Houston Astronomical Society is a great organization — one that gets things done for its members and is always looking for ways to improve member services. All of the programs within the organization deserve credit for making the HAS what it is today.

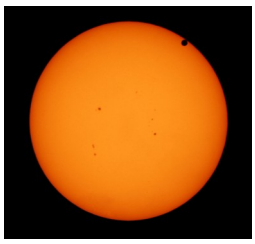
Did You See the Transit?

Our weather on the day of the Venus transit, June 5, was iffy. Some weather maps showed the northern half of the state of Texas clouded out. All was well by the time the transit happened and almost everybody in the Houston area got at least a glimpse of the event.

I saw it, and I was delighted that I got to see it. When you read the history of the Venus transit events you come to appreciate the effort that early astronomers made to see one.

I read *The Transits of Venus* by William Sheehan and John Westfall before the event. This book gives the entire history of these events from the first observation through the most recent, 2004. as of the writing of the book. Even though the event is over for this year, the history hasn't changed, and it's fascinating.

Thanks to everyone who shared a photo of the transit. This one shows the event at approximately second contact.



We have a long wait for the next one in December 2117. We can only wonder what new discoveries will be made between now and then. What will amateur astronomers be doing in 2117? Hard to imagine.

Until next time...

clear skies and new moons!

..Bill

Secrets of the Stars

by Don Selle

"No pessimist ever discovered the secret of the stars or sailed to uncharted land or opened a new doorway for the human spirit" – Hellen Keller

Over the last few years, my pursuit of astronomy has expanded to include the study of the history of astronomy. For me, studying astronomy both from the historical point of view, as well as learning astronomy facts and theory has been interesting and rewarding. Knowing how an astronomer made the observations that led to some new insight, what questions were in mind, what obstacles were overcome and how the new insight led to future discoveries lays a foundation for my own understanding. Besides, the stories behind the facts and theory are themselves fascinating , full of interesting individuals who were driven to learn about the stars. It intrigues me that many were amateurs like me.

In an odd way, I see analogy between my own beginnings in astronomy and the beginnings of the science itself. My entry to amateur astronomy was similar to that of many others who started in era of high tech amateur gear. I'd hit middle age and started to search for a hobby of that could provide an outlet from professional life – preferably one that I could pursue into my later years. Given my long interest in astronomy and all things space, my choice was really inevitable.

I decided to start out modestly for an initial trial. After purchasing a non- goto 90mm Mak-Cas scope and planetarium software for my computer. I eagerly anticipated the end of the rain clouds and the clear summer night skies that were sure to come (if only I'd wait patiently!).

You all know what comes next – frustration as I realized that taming the little scope would be more difficult than I had imagined. I could easily find the moon and that was pretty cool, then I began to be able to find the brighter stars with some regularity. I even managed to find Jupiter and that was even cooler. But the star clusters and galaxies so easily seen in the planetarium software were mysteriously absent from my eyepiece.

The bright and obvious celestial features probably attracted mankind's attention first. The rotation of the stars, and the phases of the moon are obvious and easy to study. We know that that many ancient cultures kept track of the sky, most likely to keep track of the passage of the year. When certain bright stars were in particular positions, it signified that it was time to plant or to hunt a certain animal. Evidence of this is found in ancient pictographs and in structures arranged to mark annual astronomic alignments of brighter stars and planets. Some of these like Stonehenge, are of such a scale as to be monuments to peoples long forgotten.

The ancients Greeks and Romans used the bright moon and its phases to establish a calendar to keep track of the passage of days, but the cycle of the moon while constant soon gets out of phase with the sun and seasons. It was Julius Caesar in 46 BC who reformed the calendar to conform to the solar year of 365 and 1/4 days, and this calendar continued in use into the 16th century.

Early Bronze Age cultures (and others like the Chinese) divided the sky up into the constellations using the patterns of fixed stars. These early cultures all developed myths associated with the constellations and with many individual stars. Some of these included creation myths and others were religious in nature. Many of these early constellations were carried forward by the Greeks and in the 2nd century were listed in Ptolemy's Almagest. Some of these survive today as part of the 88 constellations recognized by the International Astronomical Union (IAU).

The patterns of stars in the constellations probably helped early astronomers track the movement of the sky and the planets within it. The study of *astrology* became widespread and long lasting. Casting futures based on the locations of the planets within the constellations (apparently uncorrected for precession) continues to this day.

I too, determined that I needed to study and learn the constellations if I was ever going to find any elusive DSOs. My planetarium software and other references I was using seemed to group DSOs by constellation, and in truth, if I was going to learn to star hop, I realized I needed to know where to start hopping from.

My first success with the little 90mm scope came on a weekend trip to the Texas Hill Country where with much darker skies than in my sky bright suburban backyard, a red dot finder, and a wide field eyepiece, I finally figured out that I could change the view in my planetarium program so it would match the orientation of stars in my eyepiece. Within mere minutes, I was

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able to find M13 and marvel at what I saw. Within the next two hours, I was able to find several other Messier objects . From there on, it was the Messier objects I began to focus on. The stars that I had struggled to find a few months before became trail markers – a means to finding my target DSO but not worthy of much attention otherwise. After all – they were just stars.

Greek philosophy attempted to explain the stars and their movements in the heavens through the use of logic and deduction. The main theories of the earth-centered and sun-centered universe were both advanced in this way, and both celestial systems competed for primacy from the 4th century BC until the 17th century when the Copernican system started to take hold, and was clearly proven in 1728 when James Bradley proved the earth orbited the sun when he discovered and measured the aberration of starlight.

The Greeks also began to use a more scientific approach to try to understand the universe, using methods of observation and analysis. They were successful (if not so accurate) in measuring the scale of the Solar System, and set a precedent of observations determining reality. Though the science of astronomy had its successes, it could not match the success of the Greek philosophy of astronomy, especially that of Aristotle.

Aristotle was an extremely influential authority on the natural world. His ideas were widely accepted and adapted to many areas of human life and thought. He argued that the perfectly spherical stars resided on the inside of the perfect sphere of the heavens in a divine realm separated from the imperfect earth at its center. In his universe, the stars were made of a divine substance, a fifth element (quintessence) most perfect above all, that was separate from the corruptible earthly elements of fire, air, earth, and water. The space between earth and heaven contained the spheres of the wandering planets and was filled with the ether (ethereal) which caused the stars to glow by friction as they speedily circled the earth.

Astronomy over the next 2,000 years was practiced by a few learned men, who plotted the positions of the stars and sought to calculate the positions of the planets using measurements of how they traveled between the fixed stars. Attempts to learn the secrets of the stars were probably few and, at any rate, not much noticed by historians. It was probably this idea of the divine and constant perfection of the stars in their places on the heavenly vault which stifled the desire to learn more. The stars were untouchable and incomprehensible in their divine perfection.

There was the occasional comet, or nova, sighted. In fact it was the appearance of a supernova in 1572 which brought Tycho Brahe to prominence and to devote his life to the measurement of the positions of the stars and planets so that he might perfect the method of predicting their future paths. Tycho carried the precision of these measurements to about one minute of arc or about as fine an angle as the unaided eye can see. Variable stars also came to be known in the late sixteenth century and were sought out thereafter.

It was not until 1718 that Edmond Halley pierced the notion that the stars are eternal and unchanging. He published an account of his comparison of his own observations of the locations of the brightest stars with those recorded in Ptolomey's Almagest eighteen centuries earlier.

"It is scarce credible that the ancients could be deceived in so plain a matter…" he said. It was obvious that these bright stars had movements of their own that were perceptible over a period of very many lifetimes. With this observation, Halley cracked the perfect crystalline spheres of the heavens and led the way to a true quest for the secrets of the stars.

Following Halley's lead, was John Goodricke a profoundly deaf young man who in 1783 at the age of 19 submitted a paper on the variable star Algol to the Royal Society in London. He later won its prestigious Copley Medal. Tragically Goodricke died of pneumonia at the age of 21 only days after being elected a fellow of the Royal Society.

Goodricke and his friend, Edward Piggott, (who confirmed his observations) accurately measured the very regular period of the star and even proposed that the variability was caused by a small dim star orbiting the brighter Algol. Both observation and prediction have stood the test of time.

Goodricke also identified the star delta Cephei as a variable star, the first of a very important class of stars called the Cephid variables. The brightness of these stars is directly related to their period of variability. This and the fact that they are very bright stars would help astronomers measure great distances and allowed Edwin Hubble to prove that galaxies exist outside of the Milky Way and establish that our universe is expanding.

As I gained experience with my little 90 mm scope, my confidence grew that I could star hop my way to find almost anything it could see. I'd read of a near earth asteroid that was expected to have a close approach to earth inside the moon's orbit. It was expected to be bright enough to be seen in my little scope and I became determined to

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observe it myself.

Weeks ahead of the event, I found its track in my planetarium program and began to plan how I would snag it, plotting several fields of view through which the asteroid would pass. Days ahead of the event, aided with a radio tuned to WWV I rehearsed finding the fields, one by one.

When the evening of the event came, I was set up well ahead of time. Everything was set and I found the first field. The time ticked off my radio until it became clear that the asteroid should already have passed through my field of view – and I saw nothing! I quickly shifted to the second field, then the third and NOTHING!

In retrospect, I had not considered the night's poor transparency. The scattered light in my suburban sky had hidden the asteroid from me. I was tired and frustrated, and stricken by aperture fever. By 2 am I had a cure. I did what every red blooded amateur astronomer would do. I ordered a new 8 inch goto SCT over the internet.

It was Galileo who ushered in the telescope era in astronomy by turning his newly made telescope with a tiny objective on the moon and the stars. What he saw defied the divine perfection theorized by Aristotle, and convinced Galileo that the sun centered solar system of Copernicus was real.

Aperture fever completely overtook amateur William Herschel. At one point, his house in Bath England was totally committed to the craft of telescope making. The effort paid him handsomely when he discovered a new planet Uranus. For this achievement, he was granted a Royal appointment and an annuity which allowed him to devote his life to astronomy. His dedication to astronomy, hard work and long life helped Herschel to become the most prolific observer ever. His example of the value of large telescopes to astronomy paved the way for future research.

It was the development of new instruments, such as the spectroscope and the use of photographic plates in the later half of the 19th century which propelled stellar astronomy and proved that the stars are made of the same materials we are familiar with – not some perfect divine substance never to be touched or known. With these instruments, astronomers began to accumulate huge amounts of data from which they could begin to tease out the details of the life and evolution of stars, and develop the knowledge of other galaxies around us.

My journey has taken me on to learn the techniques of astrophotography. There's a pretty steep learning curve but I know by now that I am determined enough and have the skills needed to be successful. Other amateurs routinely contribute to the body of knowledge through variable star observations, supernova searches and even by observing exoplanets transiting other stars.

Whether professional or amateur, we are all connected in our pursuit of astronomy, and to gaining an understanding of the universe - the secret of the stars. We all come to it with a measure of curiosity, and wonder. It is by persistence and belief in ourselves that we succeed.

For Sale

10 Acres with Observing Site near Leakey

This 10-acre parcel of land in the dark skies north of Leakey TX is all set up for astronomy or astrophotography. Great access off paved Ranch Road 336 right onto the high part of the land at 2240' elevation with excellent views in all directions. There are two concrete pads measuring 8' x 10', and one pad (that housed an observatory) that measures 12' x 12'. Each pad is laid out with the sides N/S, E/W, and each has a reinforced concrete pier that is isolated from the pads so that no vibrations are transferred into the piers.

Also included is a 26 ½ ft. travel trailer, a water trailer with two 225 gal. tanks, and a shed with 200 W of solar panels to charge batteries on travel trailer. Asking price is $29,900. Owner carry at 7.5% for 15 years with 20% down. Call Lee at 210-275-3355 or 719-207-4716 to arrange a visit or ask questions.

Just Looking

A *GuideStar* Interview by Clayton L. Jeter

Meg Stewart — Science Student

I first met Meg Stewart and her parents at a star party in La-Grange about two years ago. She was about 10 years old at the time and I must admit, she had more knowledge and desire for observing the night sky than I did when I was 10.

She also owns her own Newtonian telescope… an astronomical tool that I would have drooled over to have owned back in the hey-day. When I was 10 years old back in 58' (giving my age away), I only had a used, crude, and optically poor 'Sears and Roebuck' 7x35mm binocular.

I've heard it spoken that many years ago, the amateur astronomer had inky-black dark skies while using their small aperture telescopes. Today, we have the opposite. The sky is washed-out with light pollution, but we now use superior large aperture equipment. Go figure.

Let's read about Meg's ideas here and get her perspective on how the younger generation and she are pursuing their interest in astronomy. Here's Meg Stewart…

The Meg Stewart bio…

I am 12 years old. I live in Carmine, Texas near Highway 290. I go to Round Top-Carmine Elementary in Round Top about 8 miles away. I only have 12 people in my 6th grade class. At lunch, we can all fit at one table. It is fun being a student in a small class because we have a lot of attention from the teachers even though we talk so loudly that we sound like a class of 30.

My hobbies are riding my bike, reading, playing outside, and naming stars and constellations. I have fun arguing and discussing with my parents about what star is which and trying to name constellations or planets we think we see.

I first joined the stargazing group, Colorado Valley Dark-Sky Explorers, about 2 years ago. We (my mom and I) went to the La Grange High School in a field overlooking a row of trees on the edge of the Colorado River. (It was too dark to tell exactly where I was.) We learned about constellations and stars that I hadn't really paid much attention to before. I had a blast!

The Meg Stewart interview…

Clayton: Hi Meg. It's great to have you here for some questions and answers about your astronomy. How did you first become interested in astronomy?

Meg: My mom saw an ad in the newspaper about a star party. We both thought it would be fun, so we went.

Clayton: Do you think that by becoming involved in astronomy, it has somehow rubbed off on your friends at school?

Meg: Yes. Some of my friends ask me about astronomy or if I can fix their telescope.

Clayton: Tell us about your telescope? What all do you observe with it? Have you got a favorite object?

Meg: I have an 8 inch Orion Dob. I love looking at M1, M16, M27 & M42 (my favorite).

Clayton: How well do you know your way around all those constellations? What star atlas do you use?

Meg: I don't use an atlas; I use the moon or Orion as a reference. If it's in is the summer, I use Scorpio.

Clayton: Do you have an astronomy mentor?

Meg: Yes, Chris Westall (the president of the LaGrange club)

Clayton: Are any of your family or neighbors interested in your hobby? Do they observe too? Where exactly do you observe with your telescope?

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Highlights from the June Meeting of the Houston Astronomical Society

- HAS President, Gordon Houston, welcomed the new members and visitors present at the meeting.
- HAS Vice President, Bill Pellerin, previewed the June edition of the *GuideStar* Newsletter.
- Novice Chair, Justin McCollum, gave the comet report, which is available on the HAS Website.
- Membership Chair, Steve Fast, asked anyone with a nametag problem to get with him.
- Field Trip/Observing Chair, Don Selle, recapped the May 19th star party and noted the next event is in September.
- Loaner Scope Chair, John Haynes, covered how the loaner scope program works and pointed interested members to the HAS Website for more information.
- James Wooten solicited volunteers to show the public the June 5th transit of Venus at the HMNS facilities.
- Gordon Houston covered the details of the HAS Venus Transit event at Bear Creek Park.
- Steve Goldberg introduced the speaker for the evening, Bob Taylor of JSCAS. Bob delivered his presentation entitled, "2011 Astronomy Year In Review."

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Meg: Yes, both of my parents do. I use it sometimes during the star parties at different locations in central Texas.

Clayton: How would you like to travel to the ISS (International Space Station)? Better yet, observe from the ISS?

Meg: I think it would be fun, but severely dangerous.

Clayton: Do you think you'll still be interested in this science in the next 5 to 10 years? What will keep you interested?

Meg: I'm not sure about that one. I think so. My science class in school might keep me interested.

Clayton: Ever dream about a larger telescope with more light gathering capability? Or is that just too much to haul around?

Meg: It is too much. I would like to look through someone else's.

Clayton: It seems in recent years that the younger people are not that interested in amateur astronomy. Is your school striving in any way to teach astronomy… or any of the other sciences?

Meg: Not really. It is sad because I think they should. Though science is one of our longest classes.

Clayton: Do you have any helpful advice to pass on to observers in your age group who are just starting to get the bug?

Meg: I would say to just start asking questions.

Clayton: Is there an email address that you have that a Houston Astronomical Society member could contact you for an additional question or two?

Meg: meggymoo500@hotmail.com

Clayton: Thanks Meg for taking the time to share your interest and thoughts within our HAS newsletter, the *GuideStar*. We wish you luck with all of your astronomy interests. Please come visit our society when in the Houston area, we'd love to see you.

Meg: I will try to visit sometime. I am in Houston often visiting family.

Clayton: Clear skies always,

Meg: Thanks Clayton!

How Many Discoveries Can You Make in a Month?

By Dr. Tony Phillips

NASA Space Place

This year NASA has announced the discovery of 11 planetary systems hosting 26 planets; a gigantic cluster of galaxies known as "El Gordo;" a star exploding 9 billion light years away; alien matter stealing into the solar system; massive bullets of plasma racing out of the galactic center; and hundreds of unknown objects emitting high-energy photons at the edge of the electromagnetic spectrum.

That was just January.

Within NASA's Science Mission Directorate, the Astrophysics Division produces such a list nearly every month. Indeed, at this very moment, data is pouring in from dozens of spacecraft and orbiting observatories.

"The Hubble, Spitzer, Chandra, and Fermi space telescopes continue to make groundbreaking discoveries on an almost daily basis," says NASA Administrator Charlie Bolden.

NASA astrophysicists and their colleagues conduct an ambitious research program stretching from the edge of the solar system to the edge of the observable Universe. Their work is guided in large part by the National Research Council's Decadal Survey of Astronomy and Astrophysics, which identified the following priorities:

Artist's concepts such as this one are based on infrared spectrometer data from NASA's Spitzer Space Telescope. This rendering depicts a quadruple-star system called HD 98800. The system is approximately 10 million years old and is located 150 light-years away in the constellation Crater. Credit: NASA/JPL-Caltech/T. Pyle (SSC)

- Finding new planets—and possibly new life—around other stars.
- Discovering the nature of dark energy and dark matter.
- Understanding how stars and galaxies have evolved since the Big Bang.
- Studying exotic physics in extreme places like black holes.

Observing time on Hubble and the other "Great Observatories" is allocated accordingly.

Smaller missions are important, too: The Kepler spacecraft, which is only "medium-sized" by NASA standards, has single-handedly identified more than 2300 planet candidates. Recent finds include planets with double suns, massive "super-Earths" and "hot Jupiters," and a miniature solar system. It seems to be only a matter of time before Kepler locates an Earth-sized world in the Goldilocks zone of its parent star, just right for life.

A future astrophysics mission, the James Webb Space Telescope, will be able to study the atmospheres of many of the worlds Kepler is discovering now. The telescope's spectrometers can reveal the chemistry of distant exoplanets, offering clues to their climate, cloud cover, and possibilities for life.

That's not the telescope's prime mission, though. With a primary mirror almost 3 times as wide as Hubble's, and a special sensitivity to penetrating infrared radiation, Webb is designed to look into the most distant recesses of the universe to see how the first stars and galaxies formed after the Big Bang. It is, in short, a Genesis Machine.

Says Bolden, "We're on track in the construction of the James Webb Space Telescope, the most sophisticated science telescope ever constructed to help us reveal the mysteries of the cosmos in ways never before possible." Liftoff is currently scheduled for 2018.

How long will the list of discoveries be in January of that year? Stay tuned for Astrophysics.

For more on NASA's astrophysics missions, check out http://science.nasa.gov/astrophysics/.

Kids can get some of their mind-boggling astrophysics questions answered by resident Space Place astrophysicist "Dr. Marc" at http://spaceplace.nasa.gov/dr-marc-space.

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

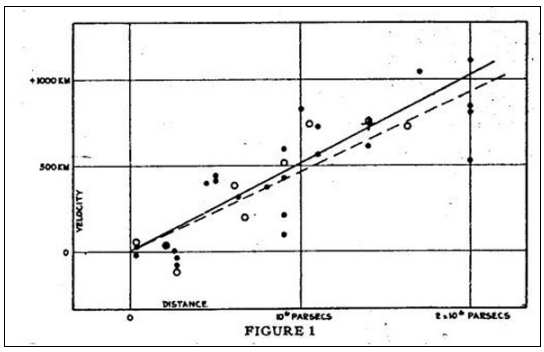
Who Really Discovered the Expanding Universe?

By Jennifer Ouellette, Discovery News Space

http://news.discovery.com/contributors/jennifer-ouellette/

Astronomer Edwin Hubble's landmark paper on the rate of expansion of the universe was published in 1929, overturning the long-held belief among scientists that the universe was static and unchanging.

That's why the Hubble Constant (the number that describes the rate of expansion) is named after him, not to mention the Hubble Space Telescope.



Hubble's graph of redshift (velocity) versus distance.

Less well known is that Hubble might not have been the first the person to make this momentous discovery.

A Belgian priest and cosmologist named Georges Lemaitre published a paper reaching very similar conclusions *two years earlier*. It's a contentious issue among cosmologists, needless to say.

The problem was, Lemaitre's paper was in French, and appeared in a rather obscure journal: *Annals of the Brussels Scientific Society*. This limited its distribution throughout the scientific community (at least initially).

Edwin Hubble

Yet even when his paper was finally translated and broadly disseminated, certain key elements went missing, sparking rumors that prominent scientists -- Sir Arthur Eddington, perhaps, or even Hubble himself -- had deliberately "censored" Lemaitre's paper to ensure Hubble's scientific legacy.

What happened? The answer might lie in a new article in *Nature* by cosmologist and author Mario Livio.

It's a long, complicated story, but here's the short version...

In the late 1920s, astronomer Edwin Hubble was studying distant galaxies at the Carnegie Observatories in Pasadena, home of the spanking new 100-inch Hooker telescope on Mount Wilson.

He measured the brightness of so-called Cepheid variable stars -- a type of periodically pulsing star -- based on the "Period-Luminosity Relation" discovered by Henrietta Swan Leavitt. Basically, if you know how long it takes for the star to go from bright to dim, this will tell you how bright it actually is. And once you know that, you have a means of measuring distance.

So Hubble was able to deduce the relative distance of the galaxies. He combined those observations with data collected in 1912 by Vesto Slipher. Slipher is usually credited with being the first to notice that the light the galaxies emitted had a pronounced "shift" toward the red end of the electromagnetic spectrum, indicating that they were moving away from earth.

BIG PIC: Hubble Stares Deep into Dust-Choked Galaxy

Next Hubble plotted the velocity (indicated by the redshift) against relative distance, to get the graph at the top of this page. To a casual observer, it might seem like a random number of points scattered about, with some clustering hinting at a possible pattern.

But Hubble wasn't a casual observer, he was a genius. He looked at that graph and drew a straight line through all those data points. As telescope resolutions improved over the ensuing decades, Hubble's half-intuitive leap proved correct. Plot the same

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data today, and the points will fall neatly along the line Hubble drew.

In mathematical terms, that straight line indicates a linear function. That is, the redshift of distant galaxies increased as a linear function of their distance. Hubble reasoned (correctly) that the longer the light has been traveling, the more time there has been for space to expand, and hence the greater the red shift of the light's wavelength.

NEWS: Galaxies That Don't Recycle Live Hard, Die Young

So he proposed a law: the greater the distance between any two galaxies, the greater their relative speed of separation. Based on that law, he arrived at an inescapable conclusion: the cosmos was still expanding. And that, of course, changed everything in the field of cosmology.

Now back to Lemaitre.

The academic quibbling usually hinges on whether Lemaitre fully derived Hubble's law on his own from actual observational data, or limited his analysis to theoretical predictions. Lemaitre did rely on data, it turns out -- the same redshift data from Slipher's observations, combined with estimates of galaxy distances inferred from Hubble's own observations, published in 1926. And he also correctly concluded that this meant the universe was expanding, not static.

Sean Carroll wrote about this over at Cosmic Variance back in 2007:

> *Lemaitre didn't have very good data (and what he did was partly from Hubble, I gather). And for whatever reason, he did not plot velocity vs. distance. Instead, he seems to have taken the average velocity (which was known since the work of Vesto Slipher to be nonzero) and divided by some estimated average distance! If Hubble's Law — the linear relation between velocity and distance — is true, that will correctly get you Hubble's constant, but it's definitely not enough to establish Hubble's Law. If you have derived the law theoretically from the principles of general relativity applied to an expanding universe, and are convinced you are correct, maybe all you care about is fixing the value of the one free parameter in your model. But I think it's still correct to say that credit for Hubble's Law goes to Hubble — although it's equally correct to remind people of the crucial role that Lemaitre played in the development of modern cosmology.*

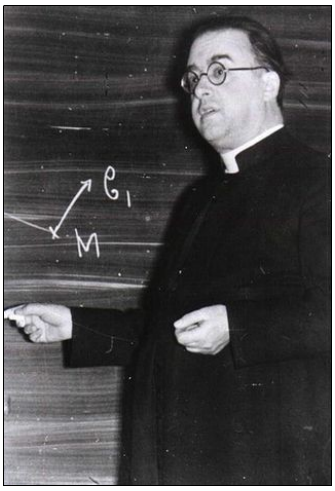
Eventually, of course, Lemaitre's crucial role was recognized: among others, Eddington published a long commentary on the work in 1930, calling it "brilliant." Thanks to Eddington, Lemaitre's original paper was translated and published again in 1931.

Oddly, however, some of his original calculations -- the ones that specifically related to the Hubble Constant -- were omitted. When this was discovered in 1982, speculation ran rampant, as science historians debated whether the omission had been deliberate, to preserve Hubble's claim to the discovery, or merely done in error.

Now Livio has weighed in on the controversy with the results of his own investigation in the matter in the Nov. 10th issue of *Nature*. He sifted through hundreds of letters preserved by the Royal Astronomical Society, along with minutes from the society's meetings and other archival materials.

And he found that, far from being a pro-Hubble conspiracy, Lemaitre himself omitted the passages. Lemaitre admitted as much in two "smoking gun letters" unearthed by Livio, writing in one:

"I did not find advisable to reprint the provisional discussion of radial velocities which is clearly of no actual interest, and also the geometrical note, which could be replaced by a small bibliography of ancient and new papers on the subject."



Georges Lemaitre

So there was no conspiracy, it seems. Lemaitre apparently recognized that while his own contributions were important, and deserving of recognition, Hubble was the one who deserves credit for Hubble's Law.

"Lemaitre's letter also provides an interesting insight into the scientific psychology of some of the scientists of the 1920s," Livio writes. "Lemaitre was not at all obsessed with establishing priority for his original discovery. Given that Hubble's results had already been published in 1929 he saw no point in repeating his more tentative earlier finding again in 1931."

This content distributed by the

AAVSO Writer's Bureau

Shallow Sky Object of the Month

What was Moving? Venus? Sun?

Object: Sun and Venus during the transit

Why this is interesting:

After viewing the Venus transit I was talking with HAS member Bill Flanagan about the relative movement of the sun and Venus during the transit. In particular, we discussed which object, Venus or the sun, moved the most during the transit and by how much.

It's fairly easy to determine the distance moved based on the positions of the two objects at the beginning of the transit and at the end of the transit. The distance moved from first contact to sunset is:

Venus:	5' 26.3"
Sun:	7' 11.6"

These motions were not along the same or parallel lines, however. In fact the angle between the two paths was about 18 degrees. What is clear is that the sun moved more on the sky than Venus did.

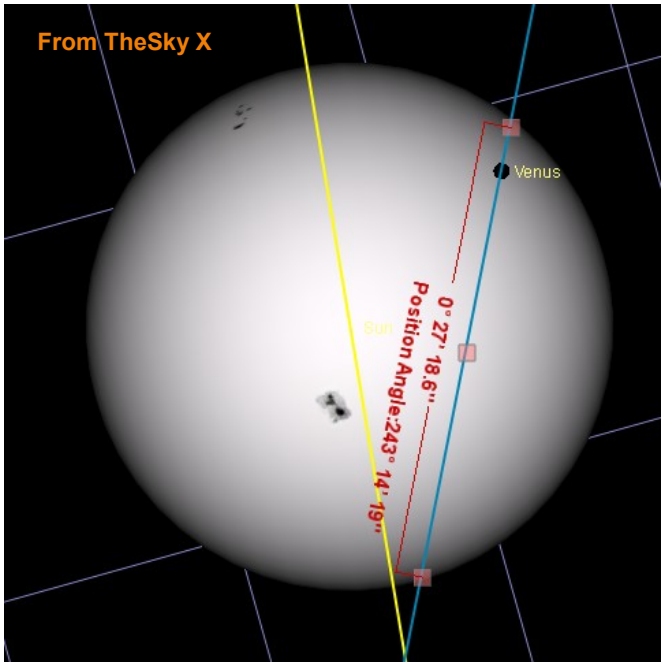
From first contact to fourth contact:

Venus:	11' 14.3"
Sun:	16' 0.2"

Here's the important thing — they were moving in more or less opposite directions. Venus' apparent movement was to the west and the sun's apparent movement was to the east.

All these motions are as seen from the earth, of course. The apparent movement of the sun (compared to the stars) is because of the earth's yearly trip around the sun. From our point of view, the sun moves about 1 degree in the sky each day. There are 360 degrees in a a circle, and 365 days in a year, so 360/365 so the actual movement per day is .986 degrees. The apparent movement of Venus will also include the movement of the earth during the time of the transit. To keep things simple, all of the motions discussed here are relative to the background stars (from an earthling's point of view).

I measured the position angle of movement by simulating the transit in TheSky software. The position angle is the angle in the sky (N being 0 degrees, E being 90 degrees, and so on). Results:



Tracks of Venus (blue line) and the sun (yellow line) during the Venus transit. Since both were moving Venus would exit the sun closer to the northern edge (at the right) than is indicated in this picture. North is to the right (and slightly up) to match the visual impression of the event in the sky

Venus:	244 degrees (due west is 270 deg)
Sun:	82 degrees east (just north of east)

The sun was moving east-north-east on this day, prior to the summer solstice. After June 20, the summer solstice, the sun will begin slowly moving south. By late September, the sun will be at the equator and fall will begin.

To see if westward movement of Venus happens for every transit I looked at the transits of

June 8, 2004 (N)
December 8, 1882 (S)
December 9, 1874 (S)
June 3, 1769 (N)
June 6, 1761 (N)
December 4, 1639 (S)
December 7, 1631 (S)
May 23, 1526 (N)

(Continued on page 15)

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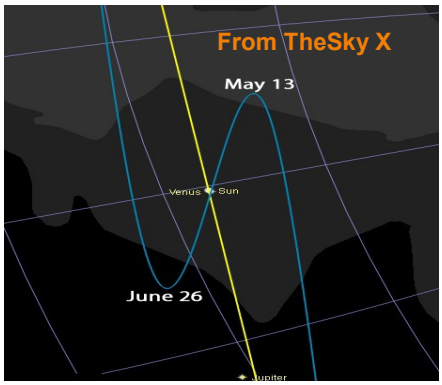
The letter N means that the sun was north of the equator at the time of the transit, and the letter S means that the sun was south of the equator at the time of the transit. The calendar date tells you that this is true.



In any case, the circumstances of each transit are very similar. In each case, Venus is moving southwest in the sky and for each of the May or June events the sun is moving east and slightly north. Again, the calendar tells you that the sun moves to the north until the summer solstice (June 20 this year).

Because the December transits were before the winter solstice, the sun is moving to the east-south-east in early December; Venus was moving to the northwest at the time of the transits.

To the left is a track of the sun and Venus around the time of the 2012 transit. I've included the tracks of Venus (blue line) and of the sun (yellow line. The inflection points, where Venus changes its apparent direction are around May 13 and June 26. The map includes an equatorial grid (lines of RA and Dec) with north to the right.

So, power up your computer and simulate the Venus transit for yourself. Given all the moving objects involved in this transit it's remarkable that anyone could have determined that there would be a Venus transit without electronic computers.

Privacy Policy of the Houston Astronomical Society

The following privacy policy was approved by the HAS board of directors at the June 13, 2012 meeting.

The Houston Astronomical Society (HAS), collects and uses private information about individuals including physical place of residence (mailing address), email address, and phone numbers to conduct its operations. Every reasonable effort is made to prevent private information from being publicly disclosed without the owner's consent.

The HAS will not sell or intentionally distribute this information. HAS membership includes membership in the Astronomical League. So that members will receive the league's quarterly magazine, the *Reflector*, the HAS pays the Astronomical League a portion of each member's dues, and provides the HAS membership mailing address list to the Astronomical League.

If you subscribe to the list server and you send an email via the list server that email includes the sender's (your) email address and it is visible to all recipients.

Information posted by or made available by users of the HAS web site (www.astronomyhouston.org) in the forums, the images (galleries), or other site areas will be available to other site users, including those who are not logged in to the site. The user of the Houston Astronomical Society's web site assumes all risk associated with the use of those features. The HAS utilizes a variety of web analytics software to monitor site traffic. This information is collected in order to assure that website performance adequately meets the needs of its users and to monitor website information security. Collected information may include information about your operating system, screen resolution and browser version ('user agent'). All site traffic is collected in aggregate form; no personally identifiable information is collected at any time.

The HAS is not responsible for any external (non-HAS) site to which we provide a link. Opening an external site from a link on www.astronomyhouston.org will always open a new window. The HAS does not endorse external sites; links are provided as a convenience to our members.

Houston Astronomical Society

GuideStar Advertising Policies

Personal advertisements

- Members in good standing of the Houston Astronomical Society (HAS) may request that an ad be placed in the *GuideStar* for **personal** items (for sale or wanted).
- Items offered for sale must be of interest to amateur astronomers.
- No more than two telescopes may be advertised within any calendar year.
- Ads will not run for more than 3 consecutive months
- Ads will be run on a space-available basis.
- Ads must be provided to the editor in electronic format (email, text file) by the 15th of the month preceding the month-of-issue.

Commercial advertisements

- Advertisement sizes:
  - Full page = 6.875”w x 9”h
  - Half page = 6.875”w x 4.25” h
  - Quarter page = 3.31” w x 4.25” h (allows for column gutter)
- Commercial advertisements will be run in the *GuideStar* at the following fee schedule:

Size	One time	One quarter (3 consecutive months)
Full page	$20.00	$50.00
Half page	$10.00	$25.00
Quarter page	$5.00	$12.50

Artwork provided must be in electronic format (image file, PDF, etc.) and must be in the correct proportions to fit the space provided. Contact editor with questions.

Artwork may be in color or in black and white.

Items or services advertised must be of interest to amateur astronomers

Payment for advertisements must be done in advance (pay to the ‘Houston Astronomical Society’)

Editor’s note — This advertising policy has been approved by the HAS board. There now is a ‘for sale’ discussion on the web site, and any member is welcome to put an ad in the *GuideStar* at no cost. Send it to the editor (see last page for information).

This policy will be in effect until modifications are agreed-to by the board, and it won’t be published in the *GuideStar again* unless significant changes are made.

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

Email: BillPellerin@sbcglobal.net

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, July 6, 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.