Starscan

Johnson Space Center
Astronomical Society

Volume 27, Number 5 May 2011

Jim Wessel's Finished Astronomy Chair

TABLE OF CONTENTS

MESSAGE FROM THE *EL PRESIDENTE* — 3

LETTER FROM THE EDITOR & LETTERS TO THE EDITOR — 3
CONNIE HAVILAND

STAR PARTY DATES — 4
BOB TAYLOR

WHAT'S HAPPENING AT THE GEORGE!!! —4
CYNTHIA GUSTAVA

FAMILY SPACE DAY SCHEDULE/LPI -4

Hindsight 20/20—Building an Astronomers Chair Part 7—5

Why Are There Carbon Stars? - 6-7

NASA Announces Results of Epic Space-Time Experiment 7-8

Free-Floating Planets May Be More Common Than Stars –9-10

SUNRISE/SUNSET FOR HOUSTON—11

PHASES OF THE MOON - 12

MAGAZINE SUBSCRIPTION MESSAGE - 13

FOR SALE — 13

LOCAL ASTRONOMY CLUB INFORMATION— 14

LIST OF OFFICERS AND THE "LIGHTER SIDE"—15

ASTRONOMY AND KIDS — 16-21
CONNIE HAVILAND

Un mensaje del Presidente
(A message from the President)

Nothing solicited at this time… Stay tuned.

LETTER FROM THE EDITOR
By David Haviland

With apologies the Starscan is finally back up and running. Between a job change and a few other things the Starscan sort of fell through the cracks.

LETTER TO THE EDITOR

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Charlie Hudson has a interesting post about stars.. See inside!

Star Parties for 2010
Bob Taylor



Stay tuned…

What's Happening at the George!!!

Need volunteers

Saturday Public Observing – All times are dusk to 11:00 p.m..Please contact the following building manager teams to volunteer:

Saturday Public Observing – All times are dusk to 11:00 p.m. Please contact the following building manager teams to volunteer:

May 21 – Building Managers Leonard Ferguson / Cynthia Gustava

May 28– Building Managers Mary Lockwood / Joe Mills

Watch Out For That Hole!!
Impacts!!

June 18th, 2011 10am to 1pm

For more information e-mail Spaceday@lpi.usra.edu or call Yolonda at 281-486-2106.

For more information, go to
http://www.lpi.usra.edu/education/space_days/
Or call Katy at (281) 486-2106
3600 Bay Area Boulevard, Houston, Texas

This Month: A Final Conclusion. Part 7, by Jim Wessel

Hindsight is 20/20 vision

1. I should have made the attachment site under the seat larger to nearly the same size as the plastic seat bottom. This would have increased the strength of the armrests (the fulcrum point between the lever of the armrest would have been further out towards the bend). The pound or so of weight increase would have been worth the increased rigidity and stability of the armrests. If, for whatever reason my manufactured boat seat is compromised, I will likely bite the bullet financially and completely design my second generation seat from scratch and in doing so increase the bottom attachment site as a result.
2. I could have saved myself about $15.00 had I of bought the final thicker metal armrest supports first, rather than finding out after the first attempt that the initial thinner set wasn't up to the job. If you are going to build armrests for your chair, do yourself a favor and get the thickest metal supports that you can actually bend right from the start.
3. I wish I would have painted the seat attachment wood, armrest supports, and armrests proper as individual components BEFORE assembling them. Disassembling the parts of the attachment site on the underside of the seat might cause stripping inside the four screw housings inside the plastic base of the boat seat, so it was not done. Likewise, painting the footrest first before attaching the rope would have been a bit neater too. This is purely a cosmetic issue and doesn't detract from the final construction.

Ideally, I would have designed the finalized red LED light system before completing the stool. John and I had the stool completely built before we thought idea #1 about incorporating some sort of protective lighting system to prevent tripping in the dark from the spread out 'feet' of the stool. This meant disassembling a few parts of the pedestal and it also meant touching up paint afterwards. Both were relatively cosmetic, but they both required some effort, all the same.

Render unto Caesar the things which are Caesar's…

To say that I owe John Boyd a debt is an understatement. Almost two years ago, he allowed me to use his Celestron 8" CPC SCT and all the accessories. With it, I rekindled my enthusiasm for viewing the nighttime sky, and successfully completed my Double Star observing certification through the Astronomy League. Even now that I have my own telescope, John continues to allow me the use of some of his eyepieces so that I have a more diverse set for use. To this day we exchange magazines which allow me to keep up to date in astronomy without having to pay for my pursuit of my passion out of pocket. And now he gives me this latest gift, his unwavering attention to detail and woodworking craftsmanship that resulted in an outstandingly functional astronomy stool that will likely be passed from me to my daughters as they develop their own interests in stargazing. For this, and your continuing friendship John, I say "THANK YOU". This wonderful tool would not have had its polish or precision without your input and effort.

Here's a candid picture of the master craftsman himself , John Boyd:

The Finale

Here is the total assembled stool, foot rest, desk, red LED lighting system, and desk lighting system. It was a lot of fun to build and I look forward to many years of its use.

Why Are There Carbon Stars?

By Charlie Hudson

Ever since Alicia Tristan gave her talk "Carbon Stars" to the club, I have been puzzled by one feature. Why is carbon on the outside of the star? The only way I knew at the time (which was contradicted by what Tristan said) is that the hydrogen has been partly converted into heavier elements and the remainder blown away in a stellar wind. The only kind of stars I knew of that are like that are Wolf-Rayet stars. On the other hand, if carbon stars are not Wolf-Rayet stars, and lighter elements are present, why are these lighter elements not the ones on the outside of the star? Bill Pellerin clearly explained that carbon stars are not Wolf-Rayet stars. His explanation was that the carbon is "dredged up" out of the innards of the star. He dIdn't explain how this dredge process works.

Following Tristan's talk, I tried to find out something about the stars on the internet. I didn't find much illuminating, although I am not a very skillful internet surfer. I also haven't read anything about carbon stars in astronomy books. I want to make a suggestion about the mechanism of the dredging process. If anyone has better info, I would appreciate it if he (she) would communicate it to me.

I would propose (following Tristan and Pellerin) that a carbon star starts out as a normal star of less than 8 solar masses. The star is rotating and near the end of its life as a fusion-shining star. Before becoming a carbon star, it is stratified with a degenerate carbon (C) core, which is inert to further fusion (except as explained below), a helium (He) layer outside the core fusing He into C, and hydrogen on the outside. If the star is hot enough (which means massive enough), then at and near the boundary between the He and C, some of the He and C fuse to produce oxygen (O). The He – C fusion produces energy which stirs the He-C boundary layer by convection, and keeps the O near the bottom of the He layer for a while. The O is inert to further fusion in this sort of low-mass star. However, as the O content of that layer rises, the He and C content of this layer falls, and the rate of He – C fusion falls, which causes the convective stirring of that layer to fall also.

The He, being less dense than the O, migrates upward, out of the boundary layer. That leads to a partial segregation of the O above the C core. A rotating gas ball (or even a solid ball like the Earth) will assume the shape of an oblate spheroid, as Jupiter and the Sun do. The O mixed with He at this point is lighter than the degenerate (highly compressed, with the electrons free to move throughout the core rather than attached to individual atoms) C core because the latter is so highly compressed. However, the O is heavier than the He, so the O tends to migrate toward the poles of the star, which are closer to the center. Thus O lakes develop at high latitudes between the He and C layers.

As the lighter He continues to escape from the lakes, the O can be compressed until it becomes degenerate, just like the C below it. Now, however, the O is more dense than the C, so the O rushes into the center of the star along the poles. This displaces the C outward. The star must conserve angular momentum. When the heavier O rushes toward the center, the lighter C must take on the angular momentum formerly possessed by the O. That means it increases its rotational speed. However, the increase in speed of the C must be larger than the decrease in speed of the O, because angular momentum is mvr, mass times velocity times distance from the center perpendicular to the rotational axis, and the O is more massive than the C. Another way for the C to carry more angular momentum is to increase its distance from the center. This is the dredge-up mechanism. The C is ejected to the outer layers of the star along the equator of the star, and then spreads out to the N and S.

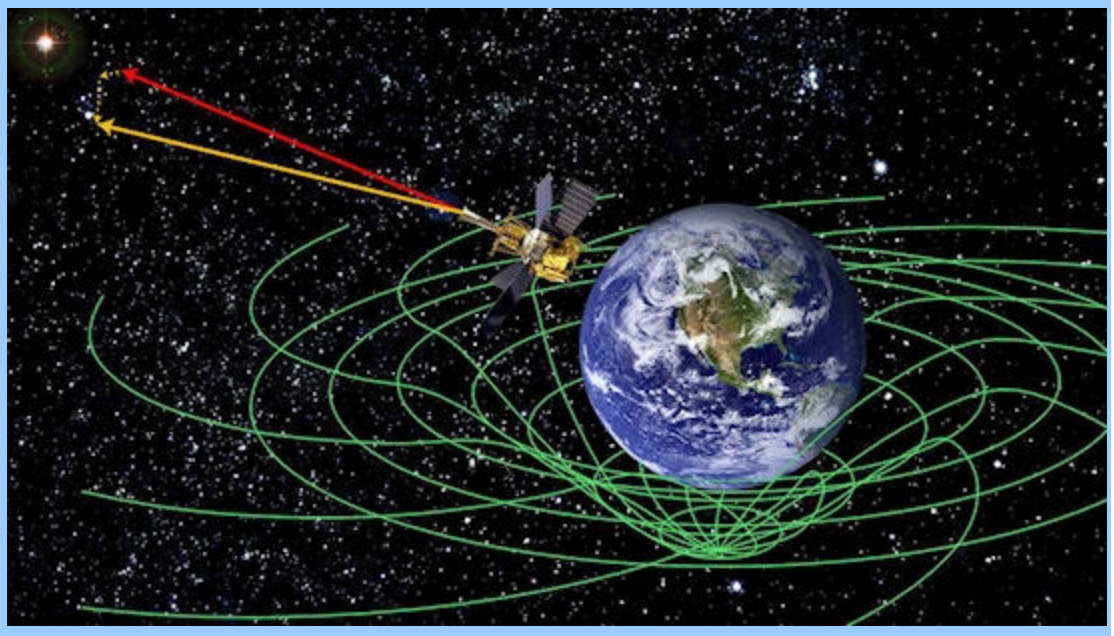
As I said above, if anyone knows better, I would appreciate it if he/she would enlighten me.

hudsonc@tamug.edu

NASA Announces Results of Epic Space-Time Experiment

http://science.nasa.gov/science-news/science-at-nasa/2011/04may_epic/

dr.tony.phillips@earthlink.net



May 4, 2011: Einstein was right again. There *is* a space-time vortex around Earth, and its shape precisely matches the predictions of Einstein's theory of gravity.

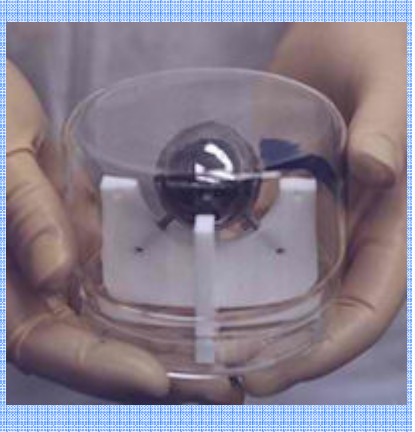
Researchers confirmed these points at a press conference today at NASA headquarters where they announced the long-awaited results of Gravity Probe B (GP-B).

"The space-time around Earth appears to be distorted just as general relativity predicts," says Stanford University physicist Francis Everitt, principal investigator of the Gravity Probe B mission.

."This is an epic result," adds Clifford Will of Washington University in St. Louis. An expert in Einstein's theories, Will chairs an independent panel of the National Research Council set up by NASA in 1998 to monitor and review the results of Gravity Probe B. "One day," he predicts, "this will be written up in textbooks as one of the classic experiments in the history of physics."

Time and space, according to Einstein's theories of relativity, are woven together, forming a four-dimensional fabric called "space-time." The mass of Earth dimples this fabric, much like a heavy person sitting in the middle of a trampoline. Gravity, says Einstein, is simply the motion of objects following the curvaceous lines of the dimple. If Earth were stationary, that would be the end of the story. But Earth is not stationary. Our planet spins, and the spin should twist the dimple, slightly, pulling it around into a 4-dimensional swirl. This is what GP-B went to space in 2004 to check.

The idea behind the experiment is simple: Put a spinning gyroscope into orbit around the Earth, with the spin axis pointed toward some distant star as a fixed reference point. Free from external forces, the gyroscope's axis should continue pointing at the star--forever. But if space is twisted, the direction of the gyroscope's axis should drift over time. By noting this change in direction relative to the star, the twists of space-time could be measured.



In practice, the experiment is tremendously difficult. The four gyroscopes in GP-B are the most perfect spheres ever made by humans. These ping pong-sized balls of fused quartz and silicon are 1.5 inches across and never vary from a perfect sphere by more than 40 atomic layers. If the gyroscopes weren't so spherical, their spin axes would wobble even without the effects of relativity.

According to calculations, the twisted space-time around Earth should cause the axes of the gyros to drift merely 0.041 arcseconds over a year. An arcsecond is 1/3600th of a degree. To measure this angle reasonably well, GP-B needed a fantastic precision of 0.0005 arcseconds. It's like measuring the thickness of a sheet of paper held edge-on 100 miles away.

"GP-B researchers had to invent whole new technologies to make this possible," notes Will. They developed a "drag free" satellite that could brush against the outer layers of Earth's atmosphere without disturbing the gyros. They figured out how to keep Earth's magnetic field from penetrating the spacecraft. And they created a device to measure the spin of a gyro--*without touching the gyro*. More information about these technologies may be found in the Science@NASA story "A Pocket of Near-Perfection."

Pulling off the experiment was an exceptional challenge. But after a year of data-taking and nearly five years of analysis, the GP-B scientists appear to have done it. "We measured a geodetic precession of 6.600 plus or minus 0.017 arcseconds and a frame dragging effect of 0.039 plus or minus 0.007 arcseconds," says Everitt. For readers who are not experts in relativity: *Geodetic precession* is the amount of wobble caused by the static mass of the Earth (the dimple in spacetime) and the *frame dragging effect* is the amount of wobble caused by the spin of the Earth (the twist in spacetime). Both values are in precise accord with Einstein's predictions.

"In the opinion of the committee that I chair, this effort was truly heroic. We were just blown away," says Will. The results of Gravity Probe B give physicists renewed confidence that the strange predictions of Einstein's theory are indeed correct, and that these predictions may be applied elsewhere. The type of spacetime vortex that exists around Earth is duplicated and magnified elsewhere in the cosmos--around massive neutron stars, black holes, and active galactic nuclei. "If you tried to spin a gyroscope in the severely twisted space-time around a black hole," says Will, "it wouldn't just gently precess by a fraction of a degree. It would wobble crazily and possibly even flip over."

In binary black hole systems--that is, where one black hole orbits another black hole--the black holes themselves are spinning and thus behave like gyroscopes. Imagine a system of orbiting, spinning, wobbling, flipping black holes! That's the sort of thing general relativity predicts and which GP-B tells us can really be true. The scientific legacy of GP-B isn't limited to general relativity. The project also touched the lives of hundreds of young scientists: "Because it was based at a university many students were able to work on the project," says Everitt. "More than 86 PhD theses at Stanford plus 14 more at other Universities were granted to students working on GP-B. Several hundred undergraduates and 55 high-school students also participated, including astronaut Sally Ride and eventual Nobel Laureate Eric Cornell."

NASA funding for Gravity Probe B began in the fall of 1963. That means Everitt and some colleagues have been planning, promoting, building, operating, and analyzing data from the experiment for more than 47 years—truly, an epic effort.

What's next? Everitt recalls some advice given to him by his thesis advisor and Nobel Laureate Patrick M.S. Blackett: "If you can't think of what physics to do next, invent some new technology, and it will lead to new physics." "Well," says Everitt, "we invented 13 new technologies for Gravity Probe B. Who knows where they will take us?"

This epic might just be getting started, after all….

Free-Floating Planets May Be More Common Than Stars

http://science.nasa.gov/science-news/science-at-nasa/2011/18may_orphanplanets/

May 18, 2011: Astronomers have discovered a new class of Jupiter-sized planets floating alone in the dark of space, away from the light of a star. The team believes these lone worlds are probably outcasts from developing planetary systems and, moreover, they could be twice as numerous as the stars themselves.

This artist's concept illustrates a Jupiter-like planet alone in the dark of space, floating freely without a parent star. [larger image →] [video →]

"Although free-floating planets have been predicted, they finally have been detected," said Mario Perez, exoplanet program scientist at NASA Headquarters in Washington. "[This has] major implications for models of planetary formation and evolution."

The discovery is based on a joint Japan-New Zealand survey that scanned the center of the Milky Way galaxy during 2006 and 2007, revealing evidence for up to 10 free-floating planets roughly the mass of Jupiter. The isolated orbs, also known as orphan planets, are difficult to spot, and had gone undetected until now. The planets are located at an average approximate distance of 10,000 to 20,000 light years from Earth. This could be just the tip of the iceberg. The team estimates there are about twice as many free-floating Jupiter-mass planets as stars. In addition, these worlds are thought to be at least as common as planets that orbit stars. This adds up to hundreds of billions of lone planets in our Milky Way galaxy alone.

"Our survey is like a population census," said David Bennett, a NASA and National Science Foundation-funded co-author of the study from the University of Notre Dame in South Bend, Ind. "We sampled a portion of the galaxy, and based on these data, can estimate overall numbers in the galaxy."

The study, led by Takahiro Sumi from Osaka University in Japan, appears in the May 19 issue of the journal Nature. The survey is not sensitive to planets smaller than Jupiter and Saturn, but theories suggest lower-mass planets like Earth should be ejected from their stars more often. As a result, they are thought to be more common than free-floating Jupiters.

Previous observations spotted a handful of free-floating planet-like objects within star-forming clusters, with masses three times that of Jupiter. But scientists suspect the gaseous bodies form more like stars than planets. These small, dim orbs, called brown dwarfs, grow from collapsing balls of gas and dust, but lack the mass to ignite their nuclear fuel and shine with starlight. It is thought the smallest brown dwarfs are approximately the size of large planets.

On the other hand, it is likely that some planets are ejected from their early, turbulent solar systems, due to close gravitational encounters with other planets or stars. Without a star to circle, these planets would move through the galaxy as our sun and others stars do, in stable orbits around the galaxy's center. The discovery of 10 free-floating Jupiters supports the ejection scenario, though it's possible both mechanisms are at play.

"If free-floating planets formed like stars, then we would have expected to see only one or two of them in our survey instead of 10," Bennett said. "Our results suggest that planetary systems often become unstable, with planets being kicked out from their places of birth."

The observations cannot rule out the possibility that some of these planets may be in orbit around distant stars, but other research indicates Jupiter-mass planets in such distant orbits are rare.

The survey, the Microlensing Observations in Astrophysics (MOA), is named in part after a giant wingless, extinct bird family from New Zealand called the moa. A 5.9-foot (1.8-meter) telescope at Mount John University Observatory in New Zealand is used to regularly scan the copious stars at the center of our galaxy for gravitational microlensing events. These occur when something, such as a star or planet, passes in front of another more distant star. The passing body's gravity warps the light of the background star, causing it to magnify and brighten. Heftier passing bodies, like massive stars, will warp the light of the background star to a greater extent,resulting in brightening events that can last weeks. Small planet-size bodies will cause less of a distortion, and brighten a star for only a few days or less.

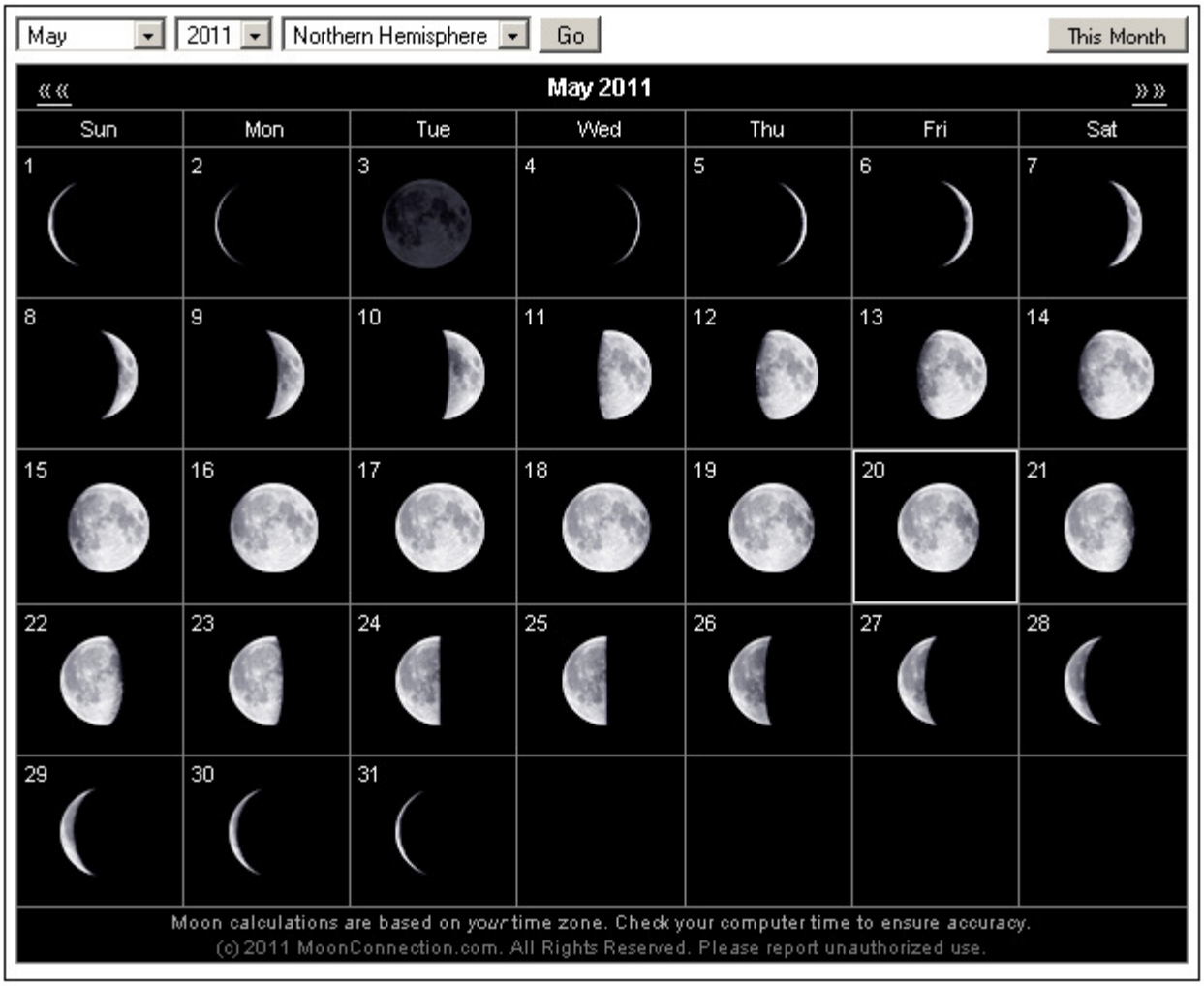
A second microlensing survey group, the Optical Gravitational Lensing Experiment (OGLE), contributed to this discovery using a 4.2-foot (1.3 meter) telescope in Chile. The OGLE group also observed many of the same events, and their observations independently confirmed the analysis of the MOA group.

For more information about exoplanet research, visit http://planetquest.jpl.nasa.gov/

This box is not intentionally left blank but is a reminder that you too can submit things for publication in the start scan!!!

Please see Jim Wessel if you are interested in buying his 8” OTA!

PHASES OF THE MOON FOR THE MONTH OF MAY 2011



SUNRISE AND SUNSET SCHEDULE FOR MAY 2011

May 2011

Houston, Texas

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1 Twi N: 5:44 Sunrise: 6:40 Sunset: 19:58 Twi N: 20:53 Moonrise: 5:25 Moonset: 18:50	2 Twi N: 5:43 Sunrise: 6:39 Sunset: 19:58 Twi N: 20:54 Moonrise: 5:59 Moonset: 19:46	3 Twi N: 5:42 Sunrise: 6:38 Sunset: 19:59 Twi N: 20:55 Moonrise: 6:37 Moonset: 20:41 New Moon: 0:52	4 Twi N: 5:41 Sunrise: 6:37 Sunset: 20:00 Twi N: 20:55 Moonrise: 7:20 Moonset: 21:37	5 Twi N: 5:40 Sunrise: 6:36 Sunset: 20:00 Twi N: 20:56 Moonrise: 8:07 Moonset: 22:31	6 Twi N: 5:39 Sunrise: 6:35 Sunset: 20:01 Twi N: 20:57 Moonrise: 9:00 Moonset: 23:23	7 Twi N: 5:39 Sunrise: 6:35 Sunset: 20:02 Twi N: 20:58 Moonrise: 9:57 Moonset: none
8 Twi N: 5:38 Sunrise: 6:34 Sunset: 20:02 Twi N: 20:59 Moonrise: 10:57 Moonset: 0:10	9 Twi N: 5:37 Sunrise: 6:33 Sunset: 20:03 Twi N: 20:59 Moonrise: 11:59 Moonset: 0:54	10 Twi N: 5:36 Sunrise: 6:32 Sunset: 20:04 Twi N: 21:00 Moonrise: 13:02 Moonset: 1:35 First Qtr: 14:34	11 Twi N: 5:35 Sunrise: 6:32 Sunset: 20:04 Twi N: 21:01 Moonrise: 14:06 Moonset: 2:13	12 Twi N: 5:34 Sunrise: 6:31 Sunset: 20:05 Twi N: 21:02 Moonrise: 15:10 Moonset: 2:50	13 Twi N: 5:33 Sunrise: 6:30 Sunset: 20:06 Twi N: 21:03 Moonrise: 16:16 Moonset: 3:26	14 Twi N: 5:33 Sunrise: 6:30 Sunset: 20:06 Twi N: 21:03 Moonrise: 17:23 Moonset: 4:05
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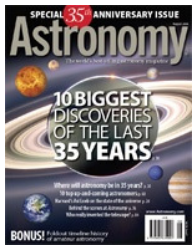
Daylight Saving/Summer Time is in effect for the entire month.

Folks:
In times past, people that have wanted to take advantage of the club discount have had to write their check, put it in with the renewal slip, and then either mail it to me at my home or chase me down at a meeting. In most cases, within a week, I have sent out the renewal. Sometimes, and I don't really mind, the renewals have gone out at my expense for the postage. Without hesitation, question, or fail, it is not the most efficient means to maintain club subscriptions. So as secretary, I'd like to try something new...

You get all your stuff ready for the subscription, whether it be Astronomy or Sky & Telescope, you keep it - you hang on to it. Email (most reliable) or tell me when you see me that you want to take advantage of the club discount for either or both of these publications and that you need a supporting letter. What I'll do is get the letter together and email the "letter from the treasurer/secretary" back to you as a PDF. You print it off, and enclose it with your renewal. For this to work your computer must have Adobe Reader (which is free) and a means to print it. I would like this procedure to become the "Standard Operating Procedure" for Astronomy/S&T discounts through JSCAS. For those still not in the computer age, we can process things as we have in the past.

Clear skies,
David Haviland



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Any adverse effect of artificial light including sky glow, glare, light trespass, light clutter, decreased visibility at night, and energy waste.

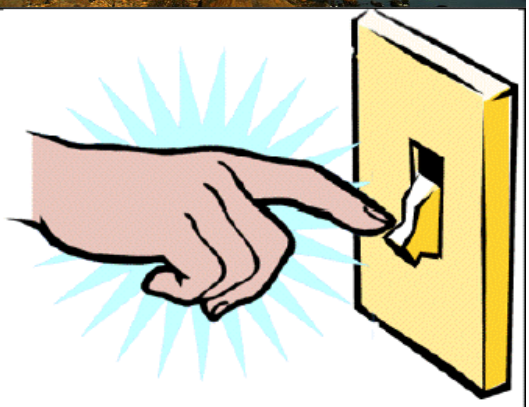
.Do you have a question about light pollution, protecting the night sky, or IDA's resources? **Get Help from IDA** http://www.darksky.org/mc/page.do?sitePageId=56399

Photograph © Phil Hart

IDA
THE LIGHT POLLUTION AUTHORITY

Help turn off the lights...

Join the
International Dark-Sky Association (IDA)
http://www.darksky.org
"To preserve and protect the nighttime environment and our heritage of dark skies through quality outdoor lighting."



Houston Area Astronomy Clubs

Brazosport Astronomy Club
Meets the Third Tuesday of the month, 7:45p.m.
At the Planetarium
400 College Drive
Clute, Texas (For more information, contact Judi James at the Planetarium 979-265-3376)

Fort Bend Astronomy Club http://www.fbac.org
Meets the third Friday of the month, 7:00 p.m.
Houston Community College Southwest Campus—Main Lecture Hall
10141 Cash Rd
Stafford, Texas 77477

Houston Astronomical Society http://spacibm.rice/edu/~has
Meets the first Friday of the month, 8:00 p.m.
University of Houston, University Park
Science and Research Building, Room 117

North Houston Astronomy Club http://www.astronomyclub.org
Meets the fourth Friday of the month, 7:30 p.m.
In the Teaching Theatre at Kingwood College
20000 Kingwood Drive
Kingwood, Texas

Galveston Stargazers
Meets the first Wednesday of the month At Home Cut Donuts, 6807 Stewart Rd, Galveston, TX
From 7PM to 9PM.
Contact: Jim Gilliam at Jim.Gilliam@dars.state.tx.us or
At (409)795-3620, M - F, 8AM to 5PM

Starscan Submission Procedures

Original articles of some relation to astronomy will be accepted up to 6 p. m. (18:00 hrs) on the 25th of each month. THE most convenient way to submit articles or a Calendar of Events is by email and is preferred, but hard copies (CD, disk) are also accepted. All articles must include author's name and phone number. Also include any picture credits. Word, WordPerfect, and text files will be accepted. I have set up a special email account so that I can keep all of the Starscan articles, pictures, information, etc, separate from all of the other email I get. This makes is much easier to edit and set up the Starscan

Please send all submissions to:
conniesstarscanaccount@gmail.com

The author of individual articles bears all responsibility for publishing any e-mail addresses in the article on the World Wide Web

Johnson Space Center
Astronomical Society

2008-Club Officers

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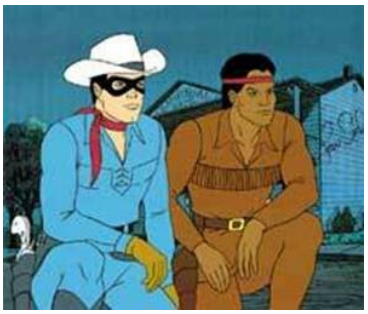
Vice President – Aldora Louw
Secretary – David Haviland
Starscan Editor – David Haviland
Star Party Chairperson – BobTaylor
Librarian – Bob and Karen Taylor
Historian – Chris Randall
Scientific Expeditions – Paul Maley
Web Master—Chris Randall

SIGS

Observing Awards – Triple Nickel
Astronomy 101 — Triple Nickel
CCD Imaging – Al Kelly
Binocular Observing – "OPEN"
Telescope Making – Bob Taylor
Deep Sky Observing – Hernan Contreras

WHO SAID ASTRONOMERS DO NOT HAVE A SENSE OF HUMOR?



The Lone Ranger and Tonto went camping in the desert. After they got their tent all set up, both men fell sound asleep. Some hours later, Tonto wakes the Lone Ranger and says, 'Kemo Sabe, look towards sky, what you see? '

'The Lone Ranger replies, 'I see millions of stars.'

'What does that tell you?' asked Tonto.

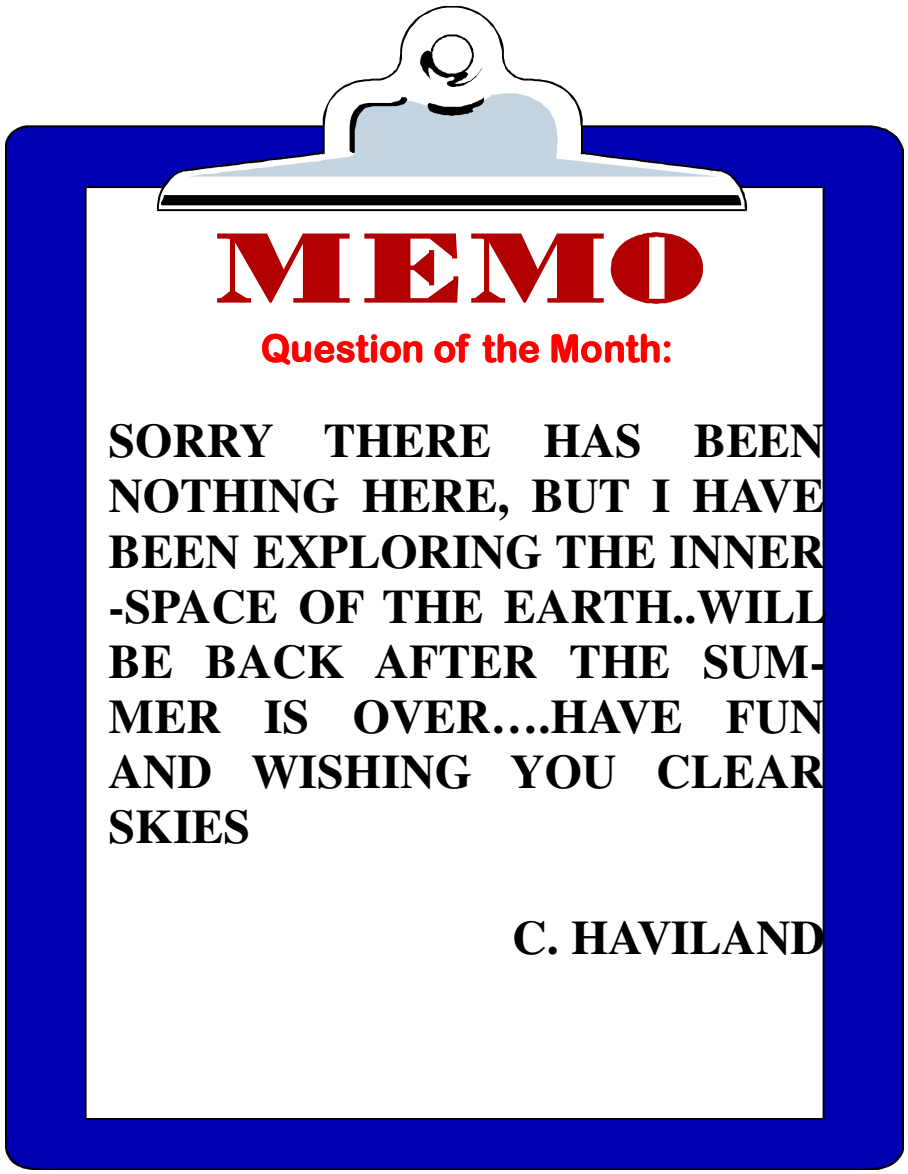
The Lone Ranger ponders for a minute then says, 'Astronomically speaking, it tells me there are millions of galaxies and potentially billions of planets.
Astrologically, it tells me that Saturn is in Leo.
Time wise, it appears to be approximately a quarter past three in the morning. Theologically, the Lord
is all-powerful and we are small and insignificant. Meteorologically, it seems we will have a beautiful day tomorrow. What's it tell you, Tonto?'

'You dumber than buffalo chips. It means someone stole the tent.'

Source: Unknown

Astronomy and Kids

This is the section strictly for kids (or kids at heart). We will be including information, stories, ideas, puzzles or anything that has to do with astronomy. The only difference here is, it will be directed for children. We don't discourage parents or any other adult to get involved. In fact, we encourage it strongly. So we hope you enjoy this section and if it touches a child's interest in astronomy, our goal has been achieved. Enjoy!!



MEMO

Question of the Month:

SORRY THERE HAS BEEN NOTHING HERE, BUT I HAVE BEEN EXPLORING THE INNER -SPACE OF THE EARTH..WILL BE BACK AFTER THE SUMMER IS OVER….HAVE FUN AND WISHING YOU CLEAR SKIES

C. HAVILAND

LEARN YOUR CONSTELLATIONS

Snoopy says, never stop looking up..reach for the stars and may you always have clear skies!!!!