December 2006

Special points of interest:
- Happy Solstice
- Mysteries of the Sun
- Large and Small, Black Holes Feed the Same Way

December Meeting:

Our Mr. Sun

Join us for our annual "family fun" December meeting. This year, we will be viewing the classic Frank Capra educational film, "Our Mr. Sun" from 1956. A surprising amount of the science is still viable 50 years later!

Meeting Information

Wednesday, December 20
7:30 p.m.
Physics-Astronomy Building
Room A102
University of Washington
Seattle

Come early at 7 p.m. for coffee and snacks and to visit with your fellow members!

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Seattle Astronomical Society

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From the President’s Desk…

Happy Solstice!

By Thomas Vaughan

At 4:22pm on December 21, we’ll hit the Winter Solstice. People in Brazil, South Africa, and Australia will enjoy the longest day of summer, and we’ll weather the shortest day of winter. The solstice has been an important event for millenia, and it reminds me of how astronomy and astronomical events have threaded through all of history.

Just today, I read a short synopsis of Hannibal’s crossing of the Alps in October, 218 BC. He was worried about going over the mountains so late in the year, during "the season of the setting of the Pleiades." Remember that, the next time you look up at those bright blue stars--an army of elephants and cavalry crossed the snowy Alps with those on the horizon.

Another article covered the Antikythera Mechanism, a clockwork mechanism built around 100 BC in Rhodes, which was the capital of astronomy at the time. It was discovered in the 1970s in a shipwreck at the bottom of the Mediterranean, where it had laid for 2000 years. The Antikythera Mechanism contained at least 30 gear wheels, the most complex geared mechanism known to civilization until clocks appeared in the Late Middle Ages. This shoebox-sized contraption was the culmination of Roman and Greek technology, and it was built to demonstrate the laws of astronomy.

Celebration of the solstice is one event that cuts across all cultures worldwide. The Incas and Mayas celebrated it, as did the Egyptian Pharaohs. So in addition to being thankful that the days will get longer again, I enjoy the Solstices as a reminder that all cultures everywhere have been interested in this astronomical event.

Banquet
Just a reminder: the annual SAS Awards Banquet is January 14th (Sunday), at the Rock Salt. Our speaker is Dr. Don Brownlee, UW Astronomer and Principal Investigator for NASA’s Stardust mission. You can find details in this newsletter, or on the website at http://www.seattleastro.org/banquet.shtml.
And remember: you can sign up and pay for the Banquet online! Just follow the link above, and click on the links to fill out the online form. Paul Rodman, the SAS webmaster extraordinaire, has made the process very quick and easy!

Happy Observing-
-Thomas

SAS November 2006 Club Meeting Minutes

Announcements:
Banquet speaker and finalized date were announced; Don Brownlee will be the speaker and the date is set for Jan 14.

A new astronomy store has been opened in Everett and is offering a 10% discount to SAS members on their first purchase. “Aurora Astro Products” is operated by Jim Bielega.

Elections
Nominations and elections were held for club officer positions. There were no nominations for president and treasurer. Anita Eclissi was approved and welcomed as the new VP of Programs, replacing Bruce Kelley in this position. The remaining slate of current officers was also approved by the general membership.

Meeting Topic
Al McFarland, member since 1951, provided a presentation on his use of video recording equipment for astrophotography.

Meeting was adjourned around 9:00PM.
SAS BANQUET 2007

Online sign up is available this year!

**Speaker**  Dr. Don Brownlee, Professor of Astronomy at University of Washington and Principal Investigator for Stardust, NASA’s comet sample return mission. Co-author with last year's speaker (Dr. Peter Ward) of "Rare Earth" and "The Life and Death of Planet Earth".

**Location**  Rock Salt on Latitude 47° Restaurant & Catering
1232 Westlake Ave N
Seattle WA 98109

**Date/Time**  Sunday, 14th January, 2007
4:00-5:00pm: No Host Bar
5:00pm: Dinner served promptly

**Menu**  Pepper Steak or Fresh King Salmon or Portabella Mushroom Steak (vegetarian)
Entree will be served with: green salad, garlic mashed potatoes, bread and butter, coffee or tea, dessert.

**Cost**  $33.00 per person

**Payment**  Pay on-line with your credit card using PayPal, or fill in and print a payment form to pay by check at:
http://www.seattleastro.org/banquetform.shtml
Please submit the form or call the Banquet Chair by 10th January, 2007.

Questions? Contact Banquet Chair: Andrea Torland at (206) 669-4283
If you’ve ever watched the lazy summer Sun redden as it settles with a stalling sigh into the welcoming bosom of Earth’s horizon, you might have thought it grew a little fat around the mid-section. Time seems to suspend itself as the fading star spreads out, gripping the evening stage like a performer reluctant to allow the next act, twilight, to begin.

Strange things happen in the gathering dusk.

A few people claim they’ve seen a brilliant and instantaneous green flash as the top of the fiery blob dipped out of sight. More common are reports of light pillars shooting straight into heaven just before the day’s goodbye.

Wrapped up in these strange phenomena are a curious combination of fact and myth -- quite possibly not in the combination you imagine. The commonly held belief that the green flash is a myth, for example, is itself a myth. We’ve got a picture to prove it.

And the idea that the Sun gets fatter and larger as it sets is flat wrong. Oh, it seems to. But what really happens involves some relatively simple atmospheric science and, to keep things interesting, a strong dose of illusion and a dash of mystery.

The flat Sun (and Moon)

Let’s imagine you’re not at your computer today. Instead, you’re wiggling your toes in the sand at Malibu.

Everyone around you is half-naked, of course, and when the reason for that soared directly overhead at Noon, its waves of radiation fried a lot of the exposed flesh. But now it’s evening, the Sun is preparing to depart, and the harshness has gone out of the rays. You know intuitively that some of the energy isn't getting through.

The electromagnetic waves -- light -- are muddling through more atmosphere en route to your spot on the beach.

To envision why, you can draw two circles, one to represent the atmosphere and another one inside the first and slightly smaller. This is Earth. Now draw a vertical line that connects the 12 o’clock positions of both circles. From the same point atop the Earth circle, draw a horizontal line to the left until it intersects the outer circle of atmosphere; this line will be longer, and it points toward your imaginary setting Sun. Back in the real atmosphere, molecules of water, oxygen and other things get in light’s
way, refracting some of it, sending it off in new directions. With more atmosphere comes more refraction.

Here's the important part: When the Sun is at the horizon, light from its bottom travels through just a bit more air than light from the top. This lower batch of light gets refracted upward, and so the Sun appears squashed, as though it's being drawn up like a set of mini-blinds. Yet light from the left and right sides of the Sun travel through the same amount of atmosphere, so the Sun does not spread out -- it's horizontal dimension remains the same.

The squashed Sun effect happens to the Moon, too, when it is near the horizon.

The extent of the squashing changes with altitude and temperature, both of which alter air density. In a study this spring, Romanian scientist Zoltan Neda and colleague Sandor Volkan worked out the math on all this. They found that on a normal day in a place like Malibu, the Sun can appear 1.2 times wider than it is tall. But in the Arctic, the Sun can appear twice as wide as its height.

And from an airplane or a space shuttle, the width can appear 2.5 times greater than the height, Neda said in an e-mail interview.

This refraction causes another effect you might have noticed. Because the bottom of the Sun is visually drawing up, the Sun really does appear to slow down just before it sets, explained Neda, who is a professor of theoretical physics at Babes-Bolyai University.

Now as you ponder all of this from the beach in Malibu, you would probably not be alone if you argued, "Hey, you said the Sun does not get wider, but I can see with my own eyes that it is much larger overall at sunset than at midday."

I wouldn't argue with you, but I would ask Philip Plait about your perplexing observation.

**Debunking a myth**

In his new book, "Bad Astronomy" (Wiley & Sons, 2002), Plait argues across 10 pages against a long-held myth that the Moon is larger when near the horizon. You've no doubt noticed this when a full Moon rises and looms ridiculously huge, only to shrink an hour later. Scientists don't know exactly what's going on, but they do know that the whole thing is an illusion. If you don't believe them, Plait suggests you conduct your own test.

Hold a pencil eraser at arm's length, he writes, and you'll see that the Moon measures the same size when it rises as when it's high in the sky.

Read more at: http://www.space.com/scienceastronomy/sun_mysteries_020716.html
Seattle Astronomical Society

Stellafane New Member Orientation Meeting
Green Lake Star Party
Paramount Park Star Party

January 2007

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SAS Banquet
Admit it. Whenever you see a new picture of Mars beamed back by Spirit or Opportunity, you scan the rocks to check for things peeking out of the shadows. A pair of quivering green antennas, perhaps, or a little furry creature crouched on five legs…? Looking for Martians is such a guilty pleasure.

Well, you can imagine the thrill in 2004 when scientists were checking some of those pictures and they did see something leap out. It skittered across the rocky floor of Gusev Crater and quickly disappeared. But it wasn’t a Martian; Spirit had photographed a dust devil!

Dust devils are tornadoes of dust. On a planet like Mars which is literally covered with dust, and where it never rains, dust devils are an important form of weather. Some Martian dust devils grow almost as tall as Mt. Everest, and researchers suspect they’re crackling with static electricity—a form of “Martian lightning.”

NASA is keen to learn more. How strong are the winds? Do dust devils carry a charge? When does “devil season” begin—and end? Astronauts are going to want to know the answers before they set foot on the red planet.

The problem is, these dusty twisters can be devilishly difficult to catch. Most images of Martian dust devils have been taken by accident, while the rovers were looking for other things. This catch-as-catch-can approach limits what researchers can learn.

No more! The two rovers have just gotten a boost of artificial intelligence to help them recognize and photograph dust devils. It comes in the form of new software, uploaded in July and activated in September 2006.
“This software is based on techniques developed and tested as part of the NASA New Millennium Program’s Space Technology 6 project. Testing was done in Earth orbit onboard the EO-1 (Earth Observing-1) satellite,” says Steve Chien, supervisor of JPL’s Artificial Intelligence Group. Scientists using EO-1 data were especially interested in dynamic events such as volcanoes erupting or sea ice breaking apart. So Chien and colleagues programmed the satellite to notice change. It worked beautifully: “We measured a 100-fold increase in science results for transient events.”

Now that the techniques have been tested in Earth orbit, they are ready to help Spirit and Opportunity catch dust devils—or anything else that moves—on Mars.

“If we saw Martians, that would be great,” laughs Chien. Even scientists have their guilty pleasures.

Find out more about the Space Technology 6 “Autonomous Sciencecraft” technology experiment at nmp.nasa.gov/st6/TECHNOLOGY/sciencecraft_tech.html, and the use of the technology on the Mars Rovers at nmp.nasa.gov/TECHNOLOGY/infusion.html. Kids can visit spaceplace.nasa.gov/en/kids/nmp_action.shtml and do a New Millennium Program-like test at home to see if a familiar material would work well in space.
Large and Small, Black Holes Feed the Same Way

Whether you’re dealing with a stellar mass black hole, or a supermassive black hole at the heart of a galaxy, it appears they consume matter in much the same way. It’s all just an issue of scale. Researchers have studied the accretion disks around both stellar and supermassive black holes, and found they seem to emit the same pattern of X-rays. Because of their size, the supermassive variety consume matter over long periods. By studying the smaller variety, researchers can model what will happen on larger scales.

Link: http://www.universetoday.com/2006/12/06/large-and-small-black-holes-feed-the-same-way/

What Makes the Biggest Impact on Galactic Evolution?

Astronomers assume that the galaxies we see today are the result of billions of years of evolution. Collision after collision turned small, irregular galaxies into majestic spirals like our Milky Way. But does the evolution depend on starting conditions, or is it all about the galactic collisions? A recent survey of more than 6,500 galaxies at various distances shows the environment of the early Universe made a significant impact on the evolution of the galaxies we see today. So both the early environment and ongoing collisions played a part.

New Spurts of Water Discovered on Mars
Just when you thought Mars was dead, it goes and surprises you. New images released from the Mars Global Surveyor shows new gullies on the surface of Mars that formed within the last 7 years. The shape and path taken down the slope suggests that they were carved by rushing liquid water. It’s possible that there are quantities of liquid water underneath the surface, which can escape to the surface from time to time. Even though Mars can get cold, researchers think that water spurting out of the ground could last long enough to carry debris down the slope of a hill before freezing solid.

Link: http://www.universetoday.com/2006/12/06/new-spurts-of-water-discovered-on-mars/

Supermassive Black Hole Mashes Up and Consumes a Star
A supermassive black hole in a distant galaxy has been caught in the act of consuming a star. In fact, NASA’s Galaxy Evolution Explorer was able to watch the entire process, from the beginning to the end. A some point in the recent past, a star got too close to the supermassive black hole, and was torn apart. The shreds swirled around the black hole, and the Galaxy Evolution Explorer spotted the bright blast of ultraviolet light.

Link: http://www.universetoday.com/2006/12/05/supermassive-black-hole-mashes-up-and-consumes-a-star/
We promise you the sun, moon and stars and we deliver...

The Seattle Astronomical Society is an organization created and sustained by people who share a common interest in the observational, educational, and social aspects of amateur astronomy. Established in 1948, the SAS is a diverse collection of over 200 individuals. A variety of programs and activities is presented by the SAS throughout the year. Monthly meetings feature speakers on a wide range of topics, from the Hubble Space Telescope to electronic imaging to personal observing experiences. The club holds public observing "star parties" at Green Lake every month, dark sky observing parties outside Seattle, plus such activities as meteor watches, public telescope and astronomy displays, National Astronomy Day, and an annual Awards Banquet.

The Seattle Astronomical Society

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