



Starscan

Johnson Space Center Astronomical Society

*JSCAS is an association of amateur astronomers
dedicated to the study and enjoyment of astronomy. Membership is
open to anyone wishing to learn about astronomy.*

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A Day in the Life of an Amateur Astronomer

Les Blalock

6:45 Alarm goes off awhile before the brain is capable of understanding it's time to get up. With clear skies last night the temptation at the eyepiece was just too great so I didn't get to bed until after 1 AM.

7:19 With a shower and fresh clothes I begin to wake up just as I enter the garage. While picking up the newspaper in the driveway, I make a quick look around to see if I left anything outside. Check the back bumper of my car to make sure I didn't leave any eyepieces on it

7:45 Arrive at work, turn on the computer and check email. Although email correspondence is a big part of my daily work, 16 of the 21 new emails are from astronomy egroups. I'll have to ignore these non-work-related emails until break time.

9:00 Read job-related emails and respond and/or begin necessary research to respond.

9:15 Check Astromart by mistake when I accidentally clicked that link instead of the work-related link in my bookmarks.

9:45 Click work-related link and read appropriate information.

10:00 Email observing buddy to see if he's available for lunch.

10:05 Pick up Orion catalog by mistake when reaching for job-related trade publication.

10:45 Quickly put down Orion catalog and begin scanning index of trade publication.

10:50 Leave office to meet observing buddy for lunch.

11:00 Arrive in parking lot of restaurant. I'm a little early so pull out my PDA to check weekly meetings schedule.

11:01 Turn on PDA and am greeted with extremely dim display. Peel off red Rubylith colored filter to reveal Planetarium application running.

11:10 Standing in restaurant parking lot trying to find Venus as its location is indicated by Planetarium.

11:20 Locate Venus just as two other cars arrive in parking lot. Neither car is my observing buddy's. Occupants walk slowly toward restaurant looking back at me then looking up at the sky in the direction I'm looking. I think about asking if they want to see Venus but, considering the looks they're giving me, decide to keep quiet and just get back in my car.

11:45 Awakened by on-time observing buddy rapping on car window.

Noon: Go inside barbeque place for lunch.

2:00 Finish lunch and astronomy-related conversation.

2:10 Arrive in parking lot at work and step out of car to see if I can still spot Venus. Building occupants pay no attention to me scanning the sky they know me.

2:30 Back at the ole desk and check email. 15 new emails. 12 are astro egroup posts. I'll get to them as soon as I finish with that stack of paperwork.

2:45 Start on that paperwork.

2:33 Find copy of last month's observing list in financial report. Scan list to note SEEN or NOT SEEN as best I can recall. Oh yea, NGC2158. Can't believe I was not previously aware of it in the field of view with M35. Let me take a quick look in Burnham's Celestial Handbook to see what's said there about it.

2:42 Find copy of Burnham's in office bookshelf between computer user manuals and personnel notebooks.

3:15 Check Dark Sky Clock. Hmmm clear skies tonight.

3:17 Email observing buddy.

3:20 Back to stack of paperwork on my desk. Gotta update that spreadsheet

3:33 Accidentally click on Astromart link again.

3:50 Close browser and open spreadsheet.

3:51 Spreadsheet reminds me of the eyepiece calculator spreadsheet I found on the Internet. Open eyepiece calculator spreadsheet. Man, that 16mm Nagler would give me a great field of view at higher magnification than my 18mm Ultima.

4:00 Open browser, surf to Astronomics to check price of 16mm Nagler.

4:10 Surf to Visa credit card account info to check balance.

4:12 The 18mm Ultima is a great eyepiece.

4:13 Update spreadsheet, compose email and attach spreadsheet. Send (and check) email.

4:14 Break-time! Better read these new egroup posts.

4:55 Where has time gone? Why all this work piling up? Oh well, I'll get it knocked down tomorrow.

5:00 Out of office and headed home. Check out the license plate of that car ahead... "M31OTA".

5:15 Arrive at home. Find new issue of Sky & Telescope in the mail. Yippee No need to put up the scope and accessory case I left out in the living room I'll be using it later.

5:45 Fire up computer and open Sky Map Pro. Print up some charts for those neat targets in S&T.

6:00 Wife calls me to dinner. "Just a minute. I want to check Astromart"

6:30 Set down to cold fish sticks and icy stare. Impish, knowing smile of familiarity from offspring who is eating his dessert.

7:00 Offer to clean off table in hopes of reclaiming human status.

7:15 Sit down on sofa with wifey and make small talk to finish defrosting the room.

7:30 Announce that I think I'll step outside for a breath of fresh air. Announcement receives cordial reply. Good sign.

7:45 Sun setting. Must decide how to gather up telescope gear and justify absence from the family for a few minutes.

8:00 Walk back inside and ask wifey, "Wanna take a look at Saturn?" Wife sucker for Saturn (and ONLY Saturn) so get positive response.

8:03 Scope stuff in driveway.

8:09 All set up and scope on Saturn. Call wifey out.

8:15 Wife goes back inside after looking at Saturn and making appropriate remarks about how beautiful the planet is. Rest of night mine.

12:45 A.M. Bang tripod legs on wall while trying to sneak equipment back inside. Wakes wife. "What time is it?" I reply, "around 12, I just got up to go to the bathroom".

6:45 Alarm goes off...

NASA SOLVES HALF-CENTURY OLD MOON MYSTERY

In the early morning hours of Nov. 15, 1953, an amateur astronomer in Oklahoma photographed what he believed to be a massive, white-hot fireball of vaporized rock rising from the center of the moon's face. If his theory were right, Dr. Leon Stuart would be the first and only human in history to witness and document the impact of an asteroid-sized body impacting the moon's scarred exterior.

Almost a half-century, numerous space probes and six manned lunar landings later, what had become known in astronomy circles, as "Stuart's Event" was still an unproven, controversial theory. Skeptics dismissed Stuart's data as inconclusive and claimed the flash was a result of a meteorite entering Earth's atmosphere. That is, until Dr. Bonnie J. Buratti, a scientist at NASA's Jet Propulsion Laboratory (JPL) in Pasadena, and Lane Johnson of Pomona College, Claremont, Calif., took a fresh look at the 50-year-old lunar mystery. "Stuart's remarkable photograph of the collision gave us an excellent starting point in our search," said Buratti. "We were able to estimate the energy produced by the collision. But we calculated that any crater resulting from the collision would have been too small to be seen by even the best Earth-based telescopes, so we looked elsewhere for proof."

Buratti and Lane's reconnaissance of the 35-kilometer (21.75-mile) wide region where the impact likely occurred led them to observations made by spacecraft orbiting the moon. First, they dusted off photographs taken from the Lunar Orbiter spacecraft back in 1967, but none of the craters appeared a likely candidate. Then they consulted the more detailed imagery taken from the Clementine spacecraft in 1994. "Using Stuart's photograph of the lunar flash, we estimated the object that hit the moon was approximately 20 meters (65.6 feet) across, and the resulting crater would be in the range of one to two kilometers (.62 to 1.24 miles) across. "We were looking for fresh craters with a non-eroded appearance," Buratti said.

Part of what makes a moon crater look "fresh" is the appearance of a bluish tinge to the surface. This bluish tinge indicates lunar soil that is relatively untouched by a process called "space weathering," which reddens the soil. Another indicator of a fresh crater is that it reflects distinctly more light than the surrounding area. Buratti and Lane's search of images from the Clementine mission revealed a 1.5-kilometer (0.93 mile) wide crater. It had a bright blue, fresh-appearing layer of material surrounding the impact site, and it was located in the middle of Stuart's photograph of the 1953 flash. The crater's size is consistent with the energy produced by the observed flash; it has the right color and reflectance, and it is the right shape.

Having the vital statistics of Stuart's crater, Buratti and Lane calculated the energy released at impact was about .5megatons (35 times more powerful than the Hiroshima atomic bomb). They estimate such events occur on the lunar surface once every half-century. "To me this is the celestial equivalent of observing a once-in-a-century hurricane," observed Buratti. "We're taught the moon is geologically dead, but this proves that it is not. Here we can actually see weather on the moon," she said. While Dr. Stuart passed on in 1968, his son Jerry Stuart offered some thoughts about Buratti and Lane's findings. "Astronomy is all about investigation and discovery. It was my father's passion, and I know he would be quite pleased," he said.

Ft. McKavett Spring Star Party

Ken Lester

Its almost here! JSCAS has been invited back to historic Ft. McKavett where we will have the opportunity to observe under some of the darkest skies in Texas. The dates are March 27th ~ 30th. So mark your calendars now because this is one star party you won't want to miss! There is private viewing on Thursday and Friday nights. Saturday night the fort will be open for a public star party. With a gloomy



economy and the dark cloud of war looming over our heads, its time for us all to take a break and come on out to this unique event. You will have fun!

Situated at latitude 30-49-46.5, longitude 100-06-24.1 (elevation is ~ 2000 FT. AMSL), Ft. McKavett is northwest of Junction, Texas. It's about a 6.5 hr drive from the greater Houston area. The fort lies at the headwaters of the San Saba River. This Army post dates back to 1852 and consists of beautifully restored buildings and displays. You can even sleep on authentic straw mattresses in the barracks!

Once again, Lisa Lester, our star party chairperson, is taking on the job of coordinating this exciting star party. Contact Lisa if you think you might attend (e-mail: lesteln@swbell.net or home phone: 281-479-1102). She needs a count of attendees to let our host, Buddy Garza, know how much food to buy for the BBQ on Saturday. In addition to tracking the attendance, Lisa will be coordinating the sleeping arrangements. There is plenty of room in the barracks for singles. The barracks are furnished with wood slat cots with straw mattresses. It is advisable to bring your own air mattress (single size) and a sleeping bag. There is limited space for couples and families in the Headquarters Building and some of the Officer Quarters. Contact Lisa to reserve a spot. There are usually some canvas style army cots available for use in the family areas. But be sure to bring your own air mattress and sleeping bag. Want to tent camp? There is plenty of room just outside (or within) the walls of the ruins on the north side of the parade grounds (our observing field), for pitching a tent. There is limited RV space available and since the fort is not really set up for RV camping only limited water and electric hookups will be available. There is no dump station at the fort. Check with Lisa to see if there is room for your RV or pop-up.

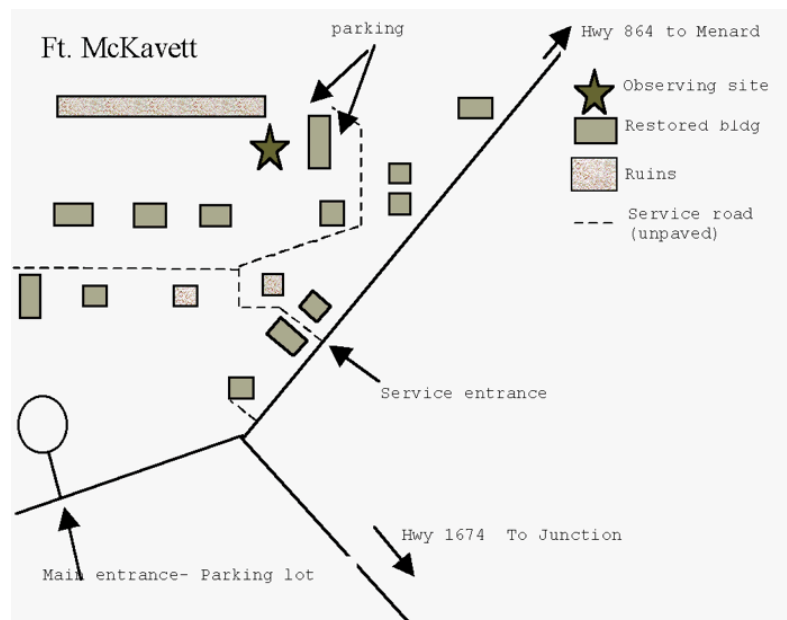
Buddy and the Friends of Ft. McKavett will serve up a BBQ feast on Saturday around noon. A donation of \$10.00 is requested to cover the cost of the food. There are grocery stores and restaurants in Menard and Junction. Closer to the fort, there is a restaurant on the road to Eldorado (turn left on Hwy 190).

Our club has what I would call "favored" status. Buddy has always had high praise for the way our members have observed the rules, helped keep the park clean, and respected the park staff. Remember, that this is an active state historical site. Doors open at 8:00 am and close at 5:00 pm, 7 days a week. While you're sleeping after a long night of observing, there may be visitors, both adults and children, touring the facilities. Unfortunately, we can't ask these visitors to be quiet. Please help Buddy out by keeping our equipment, camps and living spaces neat and clean. Here are a few things to remember:

- No tents on the field, unless they are reproduction army tents from the mid 1800s. This includes equipment tents
- Keep your living area neat and don't erect any structures like sun or windbreaks, which detract from the ambiance of the park.
- Don't leave cooking fires unattended, ever!
- Dispose of smoking materials properly
- No alcohol should ever be displayed during park hours
- Pick up all trash before going to bed, not when you wake up
- Park behind the barracks never on the parade grounds

These trips are the highlight of the year for most who attend. The dark skies, friendship, and relaxed atmosphere rejuvenate the astronomer and non-astronomer alike. I have posted much more information on my web site about Ft. McKavett and how to get there. Please take a look at <http://home.swbell.net/lesteko/StarParties.html>.

To reach Ft. McKavett, take I-10 just past Junction (other side of San Antonio) until you come to Hwy 1674. Take 1674 north until you reach Ft. McKavett. Once at the fort, turn right onto Hwy 864 then take the second gate into the fort. Drive slow, don't kick up dust. Follow the map below to the parking area behind the barracks. Find Lisa Lester to check in. **CAUTION:** There are a lot of deer in the last twenty something miles. Be very careful especially at night and at dusk.



Moon Lore

Bob Taylor

I tend to put the moon in the same category as taking out the trash and doing yard work; I don't have to like it, but do have to deal with it. While I can tolerate the trash and yard work, the moon is just too big of a problem for me to deal with so, in goes the towel. In an attempt to apply tolerance to this orbiting streetlight, I will just "try to like the moon", and get to know it better. Others have embraced this concept before me, and have compiled lists of names for the moon that give it a touchy-feely appeal. Harvest Moon rings a bell in most heads, some of the other monthly lunar names are nowhere near as well known. Think pink. And worm, and strawberries and wolves. Or how about Sturgeon? Full Moon names in the United States date back primarily to Native Americans who lived in what is now the northern and eastern United States. Those tribes of a few hundred years ago kept track of the seasons by giving distinctive names to each recurring full Moon. Their names were applied to the entire month in which each occurred. There were some variations in the Moon names, but in general the same ones were current throughout the Algonquin tribes from New England and westward to Lake Superior. European settlers followed their own customs and created some of their own names. Since the lunar ("synodic") month is roughly 29.5 days in length on average, the dates of the full Moon shift from year to year. Inside is a listing of all the Full Moon names, used primarily in the United States, as well as the dates and times (for the Eastern time zone) for the next twelve months.

Snow Moon

February 16, 2003, 6:51 p.m. EST

Usually the heaviest snows fall in this month. Hunting becomes very difficult, and hence to some Native American tribes this was *the Full Hunger Moon*.

Worm Moon

March 18, 2003, 5:34 a.m. EST

In this month the ground softens and earthworm casts reappear, inviting the return of robins. More northern tribes knew this as the *Full Crow Moon*, when the cawing of crows signals winter's end, or the *Full Crust Moon* because snow becomes crusted from thawing by day and freezing at night. *The Full Sap Moon*, marking the time of tapping maple trees, is another variation.

Pink Moon

April 16, 2003, 3:36 p.m. EDT

The grass pink or wild ground phlox is one of the earliest widespread flowers of spring. Other names were *the Full Sprouting Grass Moon*, *the Egg Moon*, and -- among coastal tribes -- the *Full Fish Moon*, when the shad came upstream to spawn. In 2003, this will be the first full Moon of spring; hence it is also the Paschal Full Moon. The feast of Passover begins at sundown on this night and the first Sunday following the first full Moon of spring (April 20) is designated as Easter Sunday. Lastly, the Moon will arrive at perigee at 1:00 a.m. on April 17, at a distance of 221,937 miles (355,987) kilometers from Earth. Very high tides can be expected from the near-coincidence of perigee with Full Moon (referred to as an astronomical spring tide).

Flower Moon

May 15, 2003, 11:36 p.m. EDT

Flowers are abundant everywhere at this time of year. It was also known as the *Full Corn Planting Moon* or the *Milk Moon*. A total lunar eclipse also occurs on this night, the first of two such spectacular events that will be visible to most Americans in 2003 (the other coming in November). The umbral phase of the eclipse, involving a partial shadow, will run from 10:03 p.m. into 1:18 a.m. EDT (on May 16). Totality will last 53 minutes beginning at 11:14 p.m.

Strawberry Moon

June 14, 2003, 7:16 a.m. EDT

Known to every Algonquin tribe. Europeans called it the *Rose Moon*.

Buck Moon

July 13, 2003, 3:21 p.m. EDT

This Moon coincides with the time when new antlers of buck deer push out from their foreheads in coatings of velvety fur. It was also often called the *Full Thunder Moon*, thunderstorms being now most frequent. Sometimes also called the *Full Hay Moon*.

Sturgeon Moon

August 12, 2003, 12:48 a.m. EDT

A time when this large fish of the Great Lakes and other major bodies of water like Lake Champlain is most readily caught. A few tribes knew it as the Full Red Moon, because the moon rises looking reddish through sultry haze, or the *Green Corn Moon* or *Grain Moon*

Harvest Moon

September 10, 2003, 12:36 p.m. EDT

Traditionally, this designation goes to the Full Moon that occurs closest to the Autumnal (Fall) Equinox. In two years out of three, the Harvest Moon comes in September, but every third year it occurs in October. At the peak of the harvest, farmers can work into the night by the light of this Moon. Usually the Full Moon rises an average of 50 minutes later each night, but for the few nights around the Harvest Moon, the Moon seems to rise at nearly the same time each night: just 25 to 30 minutes later across the United States, and only 10 to 20 minutes later for much of Canada and Europe. Corn, pumpkins, squash, beans, and wild rice -- the chief Native American staples -- are now ready for gathering.

Question: What happens when the Harvest Full Moon comes late? The names Fruit or Barley Moon are reserved only for those years when the Harvest Moon comes very late in September or in early October. In such situations, the full Moon occurring immediately prior to the Harvest Moon (in late August or early September) is bestowed with the title of Fruit or Barley. This will be the case in 2004, with the Full Moon of August 29.

Hunter's Moon

October 10, 2003, 3:27 a.m. EDT

With the leaves falling and the deer fattened, it is time to hunt. Since the fields have been reaped, hunters can ride over the stubble, and can more easily see the fox, as well as other animals that have come out to glean and can be caught for a thanksgiving banquet after the harvest.

Beaver Moon

November 8, 2003, 8:13 p.m. EST

Time to set beaver traps before the swamps freeze to ensure a supply of warm winter furs. Another interpretation suggests that the name Beaver Moon comes from the fact that the beavers are now active in their preparation for winter. Also called the *Frosty Moon*. The second total lunar eclipse of 2003 also occurs on this night. The umbral phase of the eclipse, involving a partial shadow, will run from 6:32 p.m. to 10:05 p.m. EST. Totality will last only 24 minutes, beginning at 8:07 p.m.

Cold Moon

December 8, 2003, 3:37 p.m. EST

Among some tribes, this is called the Long Nights Moon. In this month the winter cold fastens its grip, and the nights are at their longest and darkest. Also sometimes called the *Moon before Yule* (Yule is Christmas, and this time the full Moon comes before it). The term *Long Night Moon* is a doubly appropriate name because the midwinter night is indeed long and the Moon is above the horizon a long time. The midwinter full Moon takes a high trajectory across the sky because it is opposite to the low Sun.

Wolf Moon

January 7, 2004 10:40 a.m. EST

Amid the zero cold and deep snows of midwinter, wolf packs howled hungrily outside Native American villages. It was also known as the *Old Moon* or the *Moon After Yule*. For some tribes this was the *Full Snow Moon*; as already noted, a name more often applied to the February moon.

A Memory of a Sad Morning

Ed Malewitz

February 1 is my wedding anniversary. This year, my wife and I were planning on celebrating 25 years together. We began by walking to the Middlebrook Park to watch the Shuttle re-entry. Our Johnson Space Center Astronomical Society friend, Dave Brown was coming home. As we watched to the north in the thickening fog, we felt the Sun rising to the east. Through a break in the fog, I caught a glimpse of a bright object (obviously the Shuttle—we've viewed several re-entries).

But below it were two bright smaller objects. I pointed the shuttle to my wife, but the fog obscured it before she saw it. It was a beautiful morning. We walked back home and, as we walked up our driveway, we stopped to admire the roses in our garden. They were in full bloom. The fog had left them covered with dew. We went inside and logged on to Space.com and found out the Columbia was missing.

The film from WFAA confirmed my horror. I had seen the breakup. The rest of the day was as bad for us as for all of the JSC family.

I took a few pictures before we went inside. I offer this one to the memory of Columbia.

Ed Malewitz



The Age of the Universe

Ron Kunkel

Most everyone has some familiarity with the measurements being taken of the microwave background, the relic afterglow of the big bang, also known as the CMB (Cosmic Microwave Background). These measurements are detailing the geometry of the universe to a high precision and the nature of the matter and energy that fill the Universe. Now the latest measurements of the CMB by NASA's Wilkinson Microwave Anisotropy Probe (WMAP) have nailed these measurements with an uncanny accuracy. The first evidence of structure in the Cosmic Microwave Background (CMB) was found in 1991 by NASA's Cosmic Background Explorer (COBE) satellite, which mapped the entire sky with high sensitivity but coarse angular resolution. Then BOOMERANG, a balloon-mounted telescope that circum-navigated Antarctica mapped only about 2.5% of the sky but with an angular resolution 35 times that of COBE. BOOMERANG revealed hundreds of complex structures that are visible as tiny variations -- typically only 100 millionths of a degree (0.0001 C) -- in the temperature of the CMB. By observing the characteristic size of these hot and cold spots the geometry of space was determined to be very nearly flat. BOOMERANG data also provided an estimate of the matter and energy density of the universe, but only to an accuracy of about 10%. On February 11, 2003 additional CMB data was released based on measurements by Wilkinson Microwave Anisotropy Probe (WMAP). WMAP measured the CMB to 1 millionths of a degree. Based on this data the portrait of the universe can now be described with an unprecedented accuracy on the order of 1%. The values of various cosmological parameters are summarized below.

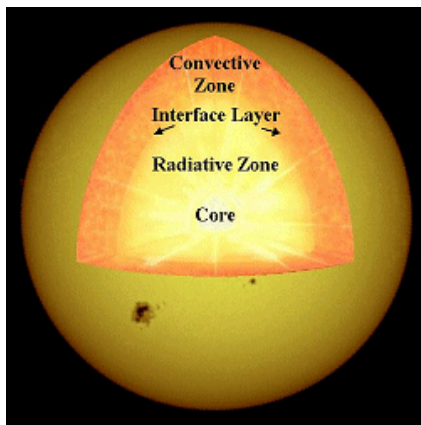
1. The patterns in the big bang afterglow were frozen in place 0.38 billion (380 million) years after the big bang.
2. The first generation of stars to shine in the universe first ignited only 0.2 billions years (200 million years) after the big bang, much earlier than most scientist's expected.
3. The precise age of the universe is pegged at 13.7 billion years, plus or minus about 0.15 billion (150 million) years.
4. WMAP data confirms the both the big bang and Inflation theories continue to ring true.

5. The total matter content of the universe is 27%, with baryon (ordinary) matter content contributing on 4% and the dark matter content at 23%. The dark matter thus comprises 85% of the matter in the universe. It is unseen, unknown.
6. The mysterious dark energy content is 73%.
7. The universe will continue to expand forever, rather than collapse.

The WMAP probe orbits at the second Lagrange Point or “L2”, about a million miles from earth. It will continue to observe the CMB for another three years, and it’s data will reveal yet more insights into the theory of Inflation and the nature of the mysterious dark matter and dark energy which so dominates our universe.

The WMAP probe was named in honor of David Wilkinson who died in September 2002. Dr. Ruth Daley, currently at PSU-Berks and our speaker at February’s meeting was a member of David Wilkinson’s team during her 10 years at Princeton University.

Fun Facts - Did You Know?



- The Sun contains almost 98% of the total mass of the solar system.
- The Sun’s period of rotation at the surface varies from 25 days at the equator to 36 days at the poles.
- Deep down, below the Convection Zone, the period of rotation appears to be 27 days.
- 109 Earth’s would fit across the Sun’s disk, and it’s interior could hold 1.3 million Earth’s.
- The Sun’s core temperature reaches 15,000,000 degrees C (27,000,000 degrees F)
- Pressure at the Sun’s core reaches 340 billion times that of Earth’s at sea level.
- Every second, the Sun fuses 700 million tons of hydrogen into helium, releasing 5 million tons of pure energy.
- Energy produced by nuclear fusion at the Sun’s core takes a million years to reach the surface.
- The Sun has been active for 4.6 billion years and has enough fuel to remain active for another 5 billion years (or so).

Want to learn more? Visit the Big Bear Solar Observatory’s web site <http://www.bbso.njit.edu/>

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