

S.C.R.A.P.S.

Society's Chronological Astronomical PaperS



The Night That The Sky Fell into My Dreams By John Sparks

Strange how I have spent 24 years in astronomy and 8 years in SMAS and never took a full night lying on my back to see a meteor shower. I have spent a few hours with the Perseids and the Geminids, but this was nothing like my recent experience. On the night of the 17th and morning of the 18th of November, this changed. When I arrived, the telescopes were already out at Gary Nolan's, but I didn't even bother to bring mine. I came for the Leonids and after completing the ARP list, I needed a break from telescope observing. I bought a sleeping bag with a new form of observing in mind just hours before. The sleeping bag was advertised to keep one warm at +25° and it kept me cozy all night long. Now if this form of observing isn't relaxing enough, give it up!

Around 12:30 I started laying out the sleeping bag as nice meteors were already streaming from west to east. The night was filled with astronomers saying "Oooo", "Aaaah" and "Did you see that?" whenever a bright meteor flashed across the sky. About an hour later, one meteor came across that was worth my entire night to see. I have heard meteors hiss and explode like a flash bulb and I have seen them change color. This meteor was very bright-enough to cast a shadow! When it ended, it left a bright glowing trail at least 20 degrees long. We watched the trail change into an "S" but it could still be seen for well over 15 minutes. I don't know how long the trail was up because I was too busy watching the sky fall all through the night. I fell asleep around 2:30am and the alarm on my watch woke me up at 4:00am. I was in a dream-like state and the rest of the night was "visionary". Two non-SMAS members stopped by just 15 minutes earlier. Leo

was high in the sky by now and it was as if the entire constellation stood out above all others. For the next two and a half hours, Leo created its own halo of meteor trails that radiated across the sky. There would be periods when nothing would cross the sky at all. Suddenly, falling stars would shoot out of Leo faster than one could keep up with. As the sun was coming up, I fell asleep again contemplating what I had seen. I woke up alone in Gary's field at 9:30 and felt as though I had experienced a wonderful dream. The Leonid meteor shower/storm was one of the greatest experiences I have had in astronomy. It was a reminder to me that sometimes the best observing can be done when one leaves the optics at home. I don't know when we will get a chance to see another meteor storm, but I sure know what I will be doing if I'm not cussing under clouds.



"Counting Falling Stardust"

Astronomy Picture of the Day November 23, 2001,
<http://antwrp.gsfc.nasa.gov/apod/ap011123.html>

Clear falling skies:
"Sparky!"

100-METER TELESCOPE (PART 1)

Is it feasible and if so, is it needed?

By Michael Littleton

The twin telescopes, Keck I and Keck II, of the Mauna Kea Observatories in Hawaii currently hold the record for the largest ground-based optical telescopes. They have primary apertures of 10 meters, which was deemed impossible not so many years in the past. For years the Russian 6-meter Boishoi and 5-meter Hale Telescopes were considered the largest feasible designs. New telescope mirror materials and designs along with computer-controlled altitude/azimuth mounts permitted the size jump in the last decade.

In 1955, science fiction author and visionary, Arthur C. Clarke, wrote of a 100-m segmented-mirror telescope on the Moon. A number of astronomers believe such an Earth-based telescope is feasible and necessary to continue the type of quantum leaps in astronomy made possible by the current generation of large terrestrial telescopes and the Hubble Space Telescope (HST). One proponent believes a 100 m telescope, the Overwhelmingly Large Telescope (OWL), is the next logical step of light-gathering power from the steady increase in telescope aperture versus time since Galileo's first telescope.

The construction of a 100-m telescope presents enormous engineering, political and financial challenges. The OWL is estimated to cost approximately \$1 billion. Any successful justification for such a large expenditure must include that the telescope will answer fundamental questions in astronomy that cannot be obtained using cheaper methods. Some of the potential arguments against the OWL are the following:

- The HST has allowed resolution of the structure of celestial objects unprecedented in the history of astronomy. For example, resolution of the structure of active galactic nuclei has confirmed the existence of black holes. What is the advantage of an earth-based telescope with its inherent limitations imposed by looking through a thick atmosphere? The atmosphere filters out many wavelengths of interest to astronomers and atmospheric turbulence degrades the image. The HST's successor, the Next Generation Space Telescope (NGST), is funded and is expected to improve on the work of the HST.
- Are not interferometers a cheaper solution to improve resolution?
- Will the OWL look so far in distance and time that it will hit the confusion limit where the number of galaxies or their predecessors per unit area is so high that their images merge?

Proponents of the OWL argue that the superior light gathering power of a 100-m aperture compared to the NGST's aperture (currently set at 6-m) will make the OWL's performance better than NGST's at wavelengths < 2.5 microns. Conversely, the NGST would have more sensitivity in the thermal infrared (IR), but the OWL would have much higher resolution. Therefore, the two systems are complementary.

Moreover, the diffraction limit of the NGST is about 0.006 arc seconds and the OWL's is 0.0005 arc seconds. The OWL will perform close to its diffraction limit even though earth-based through the use of adaptive optics. It would therefore allow an order of magnitude better resolution. Interferometers (multiple telescopes tied together to form a single image) can achieve milliarcsecond resolution, but at the cost of poor sensitivity making them poor choices for resolution of dim objects. Finally, past experience has shown the confusion limit, if it exists, has never yet been reached when resolution improves. For example, the Hubble Deep Field showed more empty space than a smear of overlapping objects.

The OWL should be able to image point sources down to 38th magnitude in 10 hours. This would permit the study of Cepheid variable stars out to $z=0.8$ (z is a measure of redshift) allowing measurement of the recessional velocity of galaxies to distances outside the influences of the Local Group of Galaxies, which will increase the accuracy of estimates of the Hubble Constant. It could resolve H regions and type O stars out to $z>2$ providing information on the star formation of the early Universe. In our own galaxy, the OWL would allow the imaging of stellar surfaces and extrasolar planetary systems.

In the next installment, I will explore the engineering feasibility of the telescope.

CALENDAR

- **12/07/01** SMAS Christmas Dinner at the Great American Steakhouse at 7:00 PM
- **12/07/01** Last Quarter Moon
- **12/14/01** New Moon
- **12/15/01** Venus rises at 7:06 AM. Jupiter rises at 6:38 PM. Saturn rises at 4:28 PM. Mars sets at 10:58 PM
- **12/15/01** SMAS Star Party at Gary Nolan's place
- **12/22/01** First Quarter Moon
- **12/30/01** Full Moon
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2001 Ends in Style by John "Sparky" Sparks

On December third, Saturn is in opposition. From the 12th to the 14th, the Geminids meteor shower hits with little moon to get in the way. On December 14th, we will see a partial solar eclipse around sunset. There will be a penumbral lunar eclipse on the 30th. On New Years Eve, Jupiter is in opposition. 2001 ends with a bang for astronomy. Don't let colder temperatures keep you from observing!

SMAS will be holding a Starparty at Gary Nolan's house after 00:Dark: 30 on December 15th and there will be plenty to see. Our Starparty falls almost directly between the oppositions of Jupiter and Saturn and one day after the new moon. M31, the Andromeda Galaxy is almost directly overhead at sunset and M33, the Pinwheel is nearby. M42, the great Orion Nebula, is rising from the east. Cassiopeia offers as many open clusters as one can observe in a single night.

Ever see NGC 7662 in Andromeda? It's a planetary nebula nicknamed the "Blue Snowball" and is one of my favorite objects. Show it to me in your telescope and don't be afraid to use high magnification. I know it's off the beaten path but so are many of the best objects in the sky. Ever hear of NGC 1750, the "Little Dumbbell Nebula" in Perseus or NGC 2392, the Eskimo in Gemini? None of these objects are Messiers but you will learn that Charles Messier didn't get "all the good ones" and some of the best objects aren't even NGC's. I caught a lot of people's interest at the Tennessee Star Party using only binoculars by showing them Stock 2, "The Strongman" near the Double Cluster in Perseus. No, the Messiers are but a small sample of the best objects in the sky. The Starparty on the 15th is good for planets and deep sky. Join me at Gary's house and we will learn the glories of the universe together.

Clear skies and Merry Christmas:
"Sparky"!

FROM THE CHAIR BY TOM RIMMELL

The year 2001 is coming to a close, and it is time to start planning club activities for the club in 2002. Let me express my appreciation for those of you who regularly participated in the club and its activities this past year. As many of you know, I started this year as your co-chair. When I became Chairperson I did not know what to expect. However, I can say that it has been a wonderful experience. Our main objective for the January meeting we will be taking nominations for club officers. I would like to encourage each of you to consider running for one of the office position in the club. Believe me, you will not regret the experience.

Finally, would like to wish everyone a Merry Christmas and a Happy New Year.

NOVEMBER MEETING BY LEE ERICKSON

The SMAS November 9, 2001 meeting began at 8:05 at the Discovery Center. Chair Tom Rimmell presided. There were 19 persons and four guests in attendance.

Old Business:

Tammy Burgess has arranged for our Christmas dinner on December 7th at 7:00 at the Great American Steak & Buffet (900 Merchants Dr., Phone: (865) 687-8773). Several members reported on their very good experience at the Tennessee Star Party. The lodgings were nice, there were good lectures and even a couple of meals were provided. There were dark skies and electricity available. They suggested everyone should consider attending next year.

New Business:

Tom Rimmell discussed the visibility of comet LINEAR and provided a few handouts showing the path of LINEAR through the November sky. Shawn Grant announced the occultation of Saturn by the moon on Friday the 30th of November and agreed to provide a follow up email with the occultation's details.

Ken Ferguson announced that the Discovery Center will have a program "How to buy a telescope." at 2:00 to 4:00 PM on December 1. He requested volunteers and telescopes to show to the public. Robb Feldhege and Lee Erickson volunteered to help and to bring their telescopes.

Sparky reminded us of the observing calendar. There was an Astrofreaks observing session on November 10th at Look Rock. The monthly dark sky observing night was on November 17th at Gary Nolan's house. (See Sparky's description on Page 1.) November 24th was supposedly Lunar Wars with December 1st as the back up date. The first night was weathered out. The backup date was a success with Lee Erickson's ETX 90 mm winning Lunar Wars. In appreciation of the event, moon pies and monolith candy bars (remember 2001 The Movie) were served.

Vanessa Pelham reported missing the aurora Monday night but seeing a nice fire ball Tuesday night the 6th. She was inside and saw it through the window, just to prove that you do not always have to be outside to observe interesting celestial events.

November Program:

Tom Rimmell brought some star charts to show what is available for beginners up to advanced observers. For beginners, Tom suggested a planisphere and "Norton's Star Atlas and Reference Handbook" (ISBN: 0582356555, Price: \$25.50). Norton's charts display stars down to magnitude 6, which are about the limit of visual observing. Wil Tirion's "SkyAtlas 2000" (ISBN: 0933346336 Publisher: Sky Publishing Corporation) shows stars to magnitude 8 and is a smaller scale than Norton's Atlas. Another good book is Nightwatch (ISBN: 1552093026, Price: \$29.95), which usually comes with a planisphere. One of our guests brought a book he recommended, "The Backyard Astronomer's Guide" (ISBN 0921820119, Price: \$31.96).

December Program:

Consumption of massive quantities of food.

January Program:

The January 2002 program will be "Active and Adaptive Optics" presented by Mike Littleton.

WANTED: AUTHORS FOR SCRAPS-NO EXPERIENCE NECESSARY!

Have you made a modification to your telescope that you are proud of? Find a piece of sky that is overlooked in *Burnham's Celestial Handbook*? Have you just attended the Cleveland Star Stare? Share your experience with the rest of SMAS and potentially anyone with access to the Internet by writing an article for SCRAPS. It doesn't have to be Shakespeare and the SCRAPS editor will clean up the grammar if needed. Contact Mike Littleton at (865) 671-1022 or email little@ix.netcom.com.