



Current DECEMBER
Astronomy 2005

RIVER BEND ASTRONOMY CLUB NEWSLETTER



Journey to
Mount Wilson
Observatory

Solar observation at Mount Wilson dates back to the early 20th century. Sunlight travels from the mirrors and lenses located at the top of the telescopes to the instrumentation below. PHOTO BY MARK BROWN

Take a spin on Mount Wilson

The Earth moves during a visit to the 100-inch telescope

BY MARK BROWN

MAY 15, 2005 Once again we awoke early and spent the first half of the day at JPL, exploring exhibits we missed on Saturday. We also had the opportunity to speak with Michael Greene, head of PlanetQuest Public Engagement, Michelle Thaller, SIM Project Scientist/Manager, Ray Newburn (semi-retired), Stardust Project Engineer, and Dave Spencer, Deep Impact Mission project manager. In addition to our already overwhelming trip, the highlight of our afternoon was yet to come: An unforgettable trip to Mount Wilson.

Upon arrival we walked to the office building and met the curator, Gale Gant, and Don Nicholson, docent and tour guide. Nicholson is well into his 80s and has ample enthusiasm and energy. The mountain certainly doesn't tire him down. He told us that he is 99 percent sure he is the oldest person alive that has operated the 100-inch telescope. That in itself is impressive. But this is a man who recalls either meeting or being in the presence of George Ellery Hale, Edwin Hubble, Albert Michelson, Albert Einstein, and Harlow Shapley, just to name a few.

Nicholson walked us back down the path to the Astronomical Museum where he showed us a scale model of the mountain and observatories. He told us in great detail the history of the Mount Wilson Observatory

Nicholson unlocked the door at the base of the observatory and invited us inside. Looking up the long stairwell, he welcomed us to retrace the steps that Edwin Hubble and others had climbed on several occasions. Indeed we did.

Due to our participation in NASA Night Sky Network events, RBAC won a free trip to the JPL open house on May 13–15, and Mark Brown was chosen to attend. See the November issue for Mark's first report from the trip.

and how everything was inspired through the leadership of George Ellery Hale. Hale was also the founder of the Yerkes Observatory and largely responsible for Caltech, Palomar Observatory, the Huntington Library, and the Pasadena Civic Center. Nicholson called Hale a great pioneer in the field of astrophysics.

Atop the mountain we heard about the Hooker 100-inch telescope. But in addition to that great spectacle there is also the Snow Solar Telescope, the 60-foot Solar Tower, a 150-foot Solar Tower, the Michelson 20-foot stellar interferometer, the 60-inch telescope, a 16-inch telescope, the Berkeley Infrared Spatial Interferometer, and the CHARA Array — a six-telescope interferometer. Its six telescopes (40-inch mirrors) are arranged in a "Y" configuration spread out over 1100 feet. When fully operational it will be the largest device operating at visible wavelengths — not only on the mountain, but also in the world.

Our next visit was to the 150-foot Solar Tower, the workhorse of the mountain during the day. Built in 1910, this solar telescope is used for long-term studies in such areas as sunspot magnetic fields, solar rotation rates, solar radius, luminosity values, velocity fields and flares. We saw the telescope going through a computer-controlled sequence of measuring the size and magnetic field of sunspots 759 and 763. Sunspot 759 was responsible for several M-class flares that produced the auroras. It was then we all learned Nicholson's relationship with the mountain. His father, Seth Nicholson, discovered the 11th, 13th, 14th, and 16th moons of Jupiter by using the 100-inch telescope. Several pictures of his father graced the inside of the solar observatory.

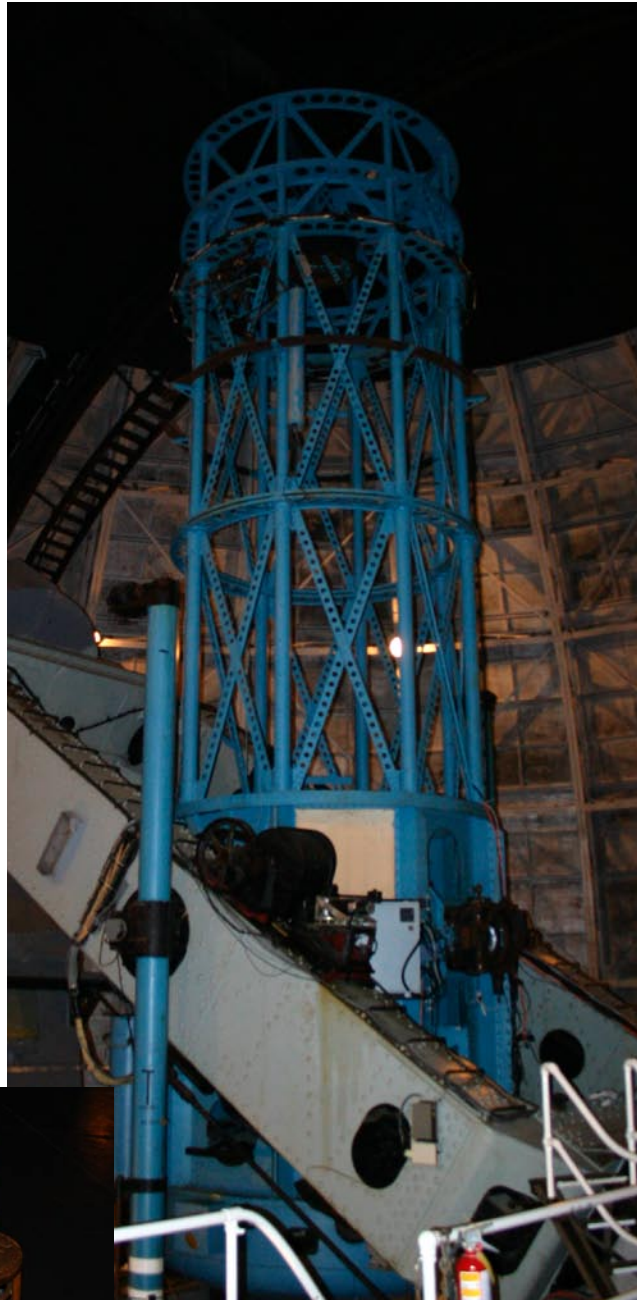
We traveled down the path past the 60-inch telescope which is currently used by astronomy clubs and college research programs. Full nights or half nights for use of this telescope can be reserved through the Mount Wilson Institute for \$900 per night. Because of an ongoing research project we were not permitted to see the telescope. However, our attention now turned to the 100-inch.

At a distance, the telescope clearly stands out along with the two solar towers seen in the foreground. But after crossing the footbridge we started to realize the enormity and history of the facility. The telescope was completed in 1917 and has been used in every kind of nighttime astronomical research, including stars, nebulae, galaxies, planets and their satellites, and much more. This telescope is best known for its discoveries in the 1920s by Edwin Hubble, proving that spiral nebulae are distant galaxies outside the Milky Way, and that the universe is expanding.

Nicholson unlocked the door at the base of the observatory and invited us inside. Looking up the long stairwell, he welcomed us to retrace the steps that Edwin Hubble and others had climbed on several occasions. Indeed we did. The public tours are able to walk the same steps up to the telescope, but once at the top are led through a separate door to view the telescope — through a series of glass windows. However, our group climbed a few more steps through a narrow entryway, which brought us to the base of the telescope. It was incredibly massive and the dome was much larger than I had envisioned.

For the next two hours, Nicholson told the history of the observatory, its operation, the structure of the dome, and the workings of the telescope itself. Words cannot describe the experience of being there.

Nicholson recalls an evening on the mountain with his father. He was 14 years old and his father was to conduct imaging of “this, that, and the other.” Whenever the boy was on the mountain, he would ask to use the telescope and/or to help with the imaging, and every time he asked for permission, his father gave him a stern “No.” He knew what his father was



Wide-angle view of the 100-inch telescope and dome. At left, a chair that Edwin Hubble probably sat in, although this is not the chair as seen in the famous photograph with him seated at the telescope. The location of that chair is unknown. There were several chairs located in the observatory during his day and this is one that he probably sat in on many occasions.

His father positioned the telescope and readied his son. The roar of the motors oriented the dome and the sliding doors opened to the night sky.

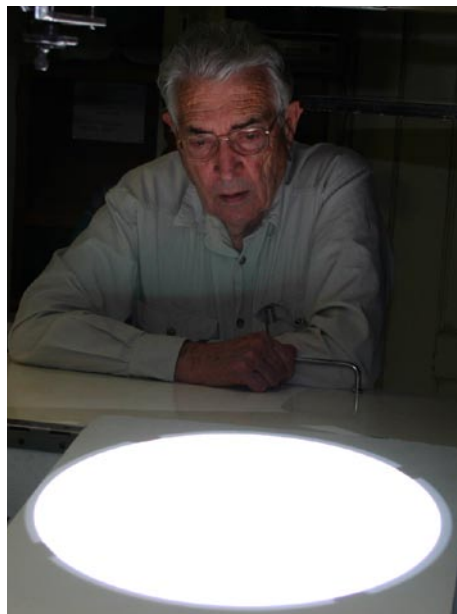
thinking — “I have at my hands the most powerful telescope in the world. There’s no way in hell I’m going to let a kid operate it.”

However, this night he again asked his father for permission to control the telescope for the photographs he was to capture. His father looked at him, thought long and hard and said, “Okay.” After years of watching his father, he knew what he had to do and how to operate the controls. His task was to take a 3-hour exposure of some target and guide on the guide-star. His father positioned the telescope and readied his son. The roar of the motors oriented the dome and the sliding doors opened to the night sky. It was at that exact moment he knew why his father placed him at the controls on that evening. Temperatures on the mountain were in the 30s and the cold biting wind howled through the dome, chilling him to the bone. Nicholson did not see his father for the next three hours until the exposure was completed.

The dome and telescope are so incredible, it’s hard to imagine something so massive able to move and to be controlled. We were given a demonstration that tested our frames of reference. Nicholson placed the observatory into motion and asked, “What is moving? You or the telescope?” From our point of view it certainly looked as if the telescope was moving, which most of us incorrectly answered. Actually the dome and the floor structure we were riding were in motion. Common sense later told us that the telescope is really part of the mountain supported by piers of concrete extending several hundred feet into the mountain.

Many of us continued to explore and take pictures of the observatory and telescope. One question led to another, with more stories being told by Nicholson. I continued my investigation of the telescope, trying to get that perfect shot with the camera. I found a spot where I thought I could get the right shot with good lighting. As I framed and focused my shot, I took one step backward. I heard a loud bang and the motors we heard several minutes earlier started to roar. The observatory was coming to life once again and we were moving.

“That was me!” I yelled. My camera bag had been draped over my shoulder and back and had inadvertently hit one of the control switches to the dome as I stepped backward. We were once again taking a ride on floor revolving around the telescope. Nicholson laughed and told me which buttons to push to stop the rotation and then to bring it back to the home position.



Don Nicholson at the work table of the 150-foot solar telescope.


I will never live that moment down and will be known to those in my group as the guy who put Mount Wilson in motion and gave us another free ride on the mountain.

As a final part of our visit on the mountain, we were led to the catwalk on the outside of the dome and allowed to walk around to get the full 360-degree view of the area. It was beautiful!

It was bittersweet to leave Pasadena, but we all left with a better appreciation for JPL and the Mount Wilson observatories.

There was a feeling of enthusiasm; excitement and a sense of accomplishment in doing something few people get to do in

their lifetime. Marni Berendsen of the NASA Night Sky Network congratulated us all and praised our clubs for the outreach we were conducting and urged us to carry on.

This pretty much sums up my trip... Purchasing a t-shirt at the JPL open house...\$20. Enjoying dinner with like-minded amateur astronomers and JPL scientists...\$300. Causing the world to (accidentally) turn beneath the 100-inch Hooker Telescope... *Priceless!* 

BY TRUDY E. BELL AND DR. TONY PHILLIPS

Voices from the cacophony

Around 2015, NASA and the European Space Agency plan to launch one of the biggest and most exacting space experiments ever flown: LISA, the Laser Interferometer Space Antenna.

LISA will consist of three spacecraft flying in a triangular formation behind Earth. Each spacecraft will beam a laser at the other two, continuously measuring their mutual separation. The spacecraft will be a mind-boggling 5 million kilometers apart (12 times the Earth-Moon distance) yet they will monitor their mutual separation to one billionth of a centimeter, smaller than an atom's diameter.

LISA's mission is to detect gravitational waves — ripples in space-time caused by the Universe's most violent events: galaxies colliding with other galaxies, supermassive black holes gobbling each other, and even echoes still ricocheting from the Big Bang that created the Universe. By studying the shape, frequency, and timing of gravitational waves, astronomers believe they can learn what's happening deep inside these acts of celestial violence.

The problem is, no one has ever directly detected gravitational waves: they're still a theoretical prediction. So no one truly knows what they "sound" like.

Furthermore, theorists expect the Universe to be booming with thousands of sources of gravitational waves. Unlike a regular telescope that can point to one part of the sky at a time, LISA receives gravitational waves from many directions at once. It's a cacophony. Astronomers must figure how to distinguish one signal from another. An outburst is detected! Was it caused by two neutron stars colliding over here or a


LISA will be able to detect gravitational waves from as far back as 10-36 second after the Big Bang, far earlier than any telescope can detect.

pair of supermassive black holes tearing each other apart in colliding galaxies over there?

"It's a profound data-analysis problem that ground-based astronomers don't encounter," says E. Sterl Phinney, professor of theoretical physics at the California Institute of Technology in Pasadena.

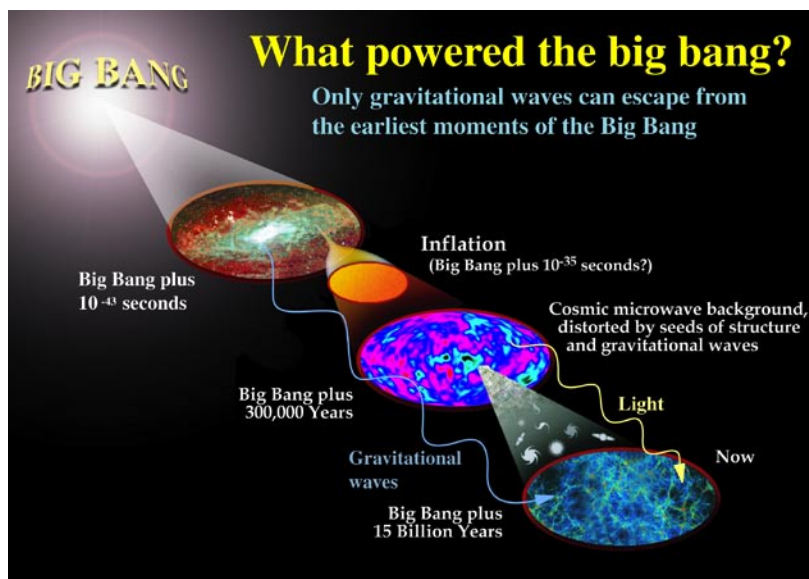
Profound, but not hopeless: "We have lots of good ideas and plans that work — in theory," he says. "The goal now is to prove that they actually work under real conditions, and to make sure we haven't forgotten something."

To that end, theorists and instrument-designers have been spending time together brainstorming, testing ideas, scrutinizing plans, figuring out how they'll pluck individual voices from the cacophony. And they're making progress on computer codes to do the job.

Says Bonny Schumaker, a member of the LISA team at the Jet Propulsion Laboratory: "It's a challenge more than a problem, and in fact, when overcome, a gift of information from the universe." 

For more info about LISA, see lisa.nasa.gov.

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



The River's Edge

BY ERIC YOUNG

Gather at the watering hole

NOVEMBER 5, 2005 Mother Nature cursed us once again. We were stuck in the Kronk's garage during a mostly cloudy evening when a storm threatened to the west. With our optics safely stowed away we talked and talked.

WILDLIFE Catch goings-on at Pete's Pond with WildCam Africa. (Several members are addicted, but who can blame them for wanting to keep an eye on their family trees?) Watch wildebeests at www9.nationalgeographic.com/ngm/wildcamafrika/wildcam.html

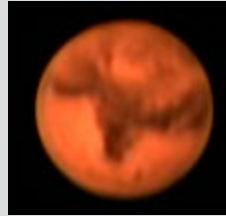
NEW KID Lee Paul got his first little refractor when he was 11 years old — the instrument cost \$35. Now he's all grown up and has joined RBAC, this time with a bit pricier 8-inch Celestron in tow. He's ordered an illuminated reticle finder to help get him headed in the right direction. Welcome, Lee.

WAYBACK MACHINE Speaking of kid's scopes, we laughed at how many of us survived using cheap, unsafe solar filters on our eyepieces. (Filtering the telescope's aperture is a much safer way to block light and heat.) Even so, we didn't go blind and some of us even managed to sketch sunspots.

LETTER-PERFECT If you want to give talks to schools, we now have a letter about the club that you can send to teachers. Thanks to Terry Menz for writing the letter. Hope she checked her ABCs!

AROUND THE SON Gary Kronk has spent more time sneaking around at night than most raccoons. Anyhow, Gary recalled the early morning in 1976 when he was out studying the gossamer tail of Comet West, one of the most fabulous comets of all time. Gary's dad, a trucker, had watched the spectacle as he drove, it's scimitar tail arcing over the horizon. When he got home, with an understanding grin he said to Gary, "So this is what your astronomy is all about."


CLOSE APPROACH TO MARS



From Gary Kronk: I set up the 8-inch SCT on Friday and Saturday nights (October 28 and 29) for the sole purpose of imaging Mars. The first night was an excellent night and I shot nine movies in the course of two hours. The last movies shot after 11 p.m. were the best as Mars was very high in the sky. These were my best images of Mars ever, not including the nights at Meyer-Womble Observatory with Mark Brown back in 2003.

NOVEMBER 11, 2005 (Reported by Bill Breeden.) RBAC presented a Mars viewing session at St. Jacob Park. A steady and rather cold wind came along with clear skies, but it was well worth it. Mars put on a spectacular show, and many visitors stopped by to have a look at Mars, the waxing gibbous Moon, and various deep sky objects.

I remembered to bring many things to the observing session: My 8-inch LX-90 Schmidt-Cassegrain telescope, eyepieces, battery pack, star charts, etc. But alas, I only brought a jacket without a hood — big mistake! Within minutes my ears and hands were freezing! This is November — what was I thinking? True, the Summer Triangle was still well-placed in the sky, but it sure wasn't summer anymore! Others advised me to dress for weather 20 degrees colder than the actual temperature. It's all coming back to me now: The frigid nights at the eyepiece last winter were made bearable simply by dressing very warm.

I had several visitors to my telescope, and Mars was quite a hit. The wind did make the image bounce around noticeably, even at a relatively low power of 77x. Still, people could detect a little hint of surface markings on the Red Planet. 

December 2005



November 2005

S	M	T	W	T	F	S
30	31	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	1	2	3

January 2006

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	1	2	3	4

■ Holidays
 ■ Moon Phases
 ■ RBAC
 ■ Space Mission
 ■ Observing
 ■ Trivia

Sun	Mon	Tue	Wed	Thu	Fri	Sat
27	28	29	30	1 ■ New Moon 9:01 a.m. ■ 45th ann. of Sputnik 6	2 ■ 10th ann. of SOHO launch	3 ■ RBAC meeting 7 p.m.
4 ■ 40th ann. of Gemini 7	5	6	7 ■ Pearl Harbor Day ■ Gerard Kuiper's 100th B.D.	8 ■ First quarter 3:36 a.m. ■ Venus at greatest extent	9 ■ Mercury at greatest elongation	10 ■ Mercury at greatest extent
11	12	13	14 ■ Geminids peak 02:24 UT	15 ■ Full Moon 10:15 a.m. ■ 40th ann. of Gemini 6A	16 ■ 40th ann. Pioneer 6	17
18	19	20	21 ■ Winter Solstice	22 ■ Ursids peak 10:53 UT	23 ■ Last quarter 1:36 p.m.	24
25 ■ Christmas Day ■ Hanukkah begins at sunset	26 ■ Hanukkah ■ Cassini: Titan flyby	27	28	29	30 ■ New Moon 9:12 p.m.	31

RIVER BEND ASTRONOMY CLUB

River Bend Astronomy Club serves astronomy enthusiasts of the American Bottom region, the Mississippi River bluffs and beyond, fostering observation, education and a spirit of camaraderie.

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Affiliated with the Astronomical League, dedicated to fostering astronomical education, providing incentives for astronomical observation and research, and assisting communication among amateur astronomical societies.
www.astroleague.org



Affiliated with the NASA Night Sky Network, a nationwide coalition of amateur astronomy clubs bringing the science, technology and inspiration of NASA's missions to the general public.
nightsky.jpl.nasa.gov

Current Astronomy CLUB NEWSLETTER

EDITOR Eric Young
younger@wustl.edu

Monthly Meeting

Holiday Party – Bring a dish or dessert
Saturday, December 3, 2005 • 7:00 p.m.

132 Jessica Drive, St. Jacob, IL 62281 Phone 618/644-2308

Upcoming meetings: January 7, February 4

Looked up lately?

Join River Bend Astronomy Club

Want to learn more about astronomy? The members of River Bend Astronomy Club invite you to join. You won't need expensive tools or special skills — just a passion for observing the natural world.

- Meetings offer learning, peeks through great telescopes and fun under the stars.
- You will receive the club newsletter, *Current Astronomy*, packed with news and photos.
- Get connected with our member-only web site and discussion group.
- Borrow from the club's multimedia library.
- And that's not all! Through club membership you also join the Astronomical League, with its special programs and a colorful quarterly newsletter to enrich your hobby.

We meet monthly, observe regularly, e-mail news and quips constantly, and generally have a good time. Won't you join us?

Name(s) _____

Address _____

City _____ State _____ Zip _____

Phone (Day) _____ (Evening) _____

Email address (to receive club news and information): _____

Where did you hear of our club?

How long have you been interested in astronomy? _____

Do you have optical equipment? ___ Telescope ___ Binoculars

Are you afraid of the dark? ___ Yes ___ No (just kidding)

I am submitting my application for:

_____ Adult membership(s) _____ Youth membership(s)
@ \$20.00/year @ \$15.00/year
(18 years or older) (under 18)

I enclose a check for a total of \$ _____
made out to "Mike Veith, Treasurer, RBAC."

Signature _____

Date _____



River Bend Astronomy Club

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AUGUST 05