Sky WAAtch

Farewell to the Space Shuttle

Courtesy of David Parmet, the above photo shows the July 8th launch of the space shuttle Atlantis. This was the final shuttle mission (STS-135). Atlantis carried the Raffaello multipurpose logistics module to deliver supplies, logistics and spare parts to the International Space Station. The mission also flew a system to investigate the potential for robotically refueling existing spacecraft and returned a failed ammonia pump module to help NASA better understand the failure mechanism and improve pump designs for future systems.

Events for August 2011

WAA Lectures

Upcoming Lectures
Miller Lecture Hall, Pace University
Pleasantville, NY

There will be no Lecture in August. Lectures will resume on September 9th.

Starway to Heaven

Saturday August 6th, 9:00pm
Meadow Picnic Area, Ward Pound Ridge Reservation, Cross River

We have a special guest for our August 6th Starway to Heaven observing date. Rob Teeter, owner of Teeter's Telescopes will be joining us. Rob will be bringing the new "flagship" scope for his company, a 20" F/3.5 which is fully GoTo with ServoCat and Sky-Commander systems. He'll be towing the scope to Ward Pound Ridge with the official Teeter's Telescopes trailer. Free and open to the public.

The scheduled rain/cloud date is August 27th. Rob has a previous commitment for the 27th. So in the event of a rain/cloud cancellation, his appearance will be rescheduled for later in the year. Participants and guests should read our General Observing Guidelines and Directions.

Call: 1-877-456-5778 (toll free) for announcements, weather cancellations, or questions. Also, don't forget to periodically visit the WAA website at:
http://www.westchesterastronomers.org/.

New Members. . .

Donald Whitfield - Patterson
Deidre Raver - Wappingers Falls
Barry Feinberg - Croton on Hudson

Renewing Members. . .

Patricia Mahon - Yonkers
Kevin Doherty - White Plains
Deborah Bernstein - North Salem
Tim & Cindy Dunne - Scarsdale
Michael & Angela Virsinger - Area 51/Seaford

Members Classified

As a service to members, the WAA newsletter will publish advertisements for equipment sales and other astronomy-related purposes. Ads will only be accepted from WAA members and must relate to amateur astronomy. Please keep to 100 words, include contact info and provide by the 20th of the month for inclusion in the next issue. The newsletter is subject to space limits; so ads may be held to subsequent issues. The WAA may refuse an ad at its sole discretion. In particular, price information will not be accepted. Members and parties use this classified service at their own risk. The Westchester Amateur Astronomers (WAA) and its officers accept no responsibility for the contents of any ad or for any related transaction.

Send classified ad requests to: Newsletter.

Rob Teeter and his 20" F/3.5 Dob

Westchester Amateur Astronomers, Inc., a 501(c)(3) organization, is open to people of all ages with the desire to learn more about astronomy. The Mailing address is: P.O. Box 44, Valhalla, New York 10595. Phone: 1-877-456-5778. Observing at Ward Pound Ridge Reservation, Routes 35 and 121 South, Cross River. Annual membership is $25 per family, and includes discounts on *Sky & Telescope* and *Astronomy* magazine subscriptions. Officers: President: Doug Baum; Senior Vice President: Larry Faltz; Vice President Public Relations: David Parmet; Vice President Educational Programs: Pat Mahon; Treasurer: Rob Baker; Secretary/Vice President Membership: Paul Alimena; Vice President Field Events: Bob Kelly; Newsletter: Tom Boustead.

Articles and Photos

An Astronomy Vacation in Arizona: Part 3: The Smithsonian Trip Day 1

The Smithsonian Institution's travel company, Smithsonian Journeys, offers a wide variety of tours, many to exotic international locales, all led by experienced, often academically accomplished tour guides. Our 3½-day trip, "Astronomy in Arizona", was led by David Aguilar, Director of Public Affairs of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Massachusetts, and Dan Brocius, Director of Public Affairs at the Fred Lawrence Whipple Observatory in Tucson. There were two dozen of us on the tour, many of whom were, surprisingly, relative astronomy neophytes. There were only two youngsters, a 7th grade boy from Illinois and an 8th grade girl from Connecticut. Both students were intelligent, poised and inquisitive. The young lady seemed to have already decided to study astrobiology and we had a detailed chat about the recent experiments with arsenic-laden bacteria (see the February SkyWAAtch newsletter).

David Aguilar lecturing

After breakfast on April 28th, we introduced ourselves and talked a little about why we joined the trip (I said "I'm VP of our local astronomy club, I'm an astronomy gearhead and I came to see the Big Ones"), David gave two excellent lectures, one on the current state of astronomy science, addressing recent progress and current problems in astrophysics and cosmology, and another on exoplanets. These were pitched at a semi-beginner level but were so well done, with wonderful graphic and multimedia content, that they firmly held my interest. David is one of the best general astronomy presenters I've ever heard.

After lunch, we boarded a bus and headed off to the University of Arizona, in central Tucson just a few minutes from the hotel. We were supposed to go to Roger Angel's U of A Steward Observatory Mirror Laboratory, which is housed at the bottom of a large tower (used for interferometry testing) behind the football stadium grandstand, but their schedule couldn't accommodate us because they were testing one of the 8.4-meter off-axis component mirrors of the Giant Magellan Telescope, and the whole place was sealed, evacuated and in total darkness. Instead, we went across the street to the Mars HiRISE project headquarters, to hear an informative talk given by several staff members. HiRISE (High Resolution Imaging Science Experiment) uses a 0.5m f/24 camera on the Mars Reconnaissance Orbiter spacecraft fitted with a sensor that is 20,000 pixels across. It records swaths of data in 3 spectral ranges (blue-green, red and near-infrared), which are combined into super high-resolution images at a ground resolution of 30 centimeters a pixel, just over one foot. Lose your hat on Mars and they'll find it for you! Images from adjacent satellite passes can be made into 3-D anaglyphs, some of which we viewed with official Mars HiRISE 3D glasses. We wanted to see "mission control", but the MRO spacecraft is operated by JPL in Pasadena. Data comes down to the U of A over the Internet, to be processed there by folks sitting at computer workstations. Although they may be astronomers and computer techies, they're artists too. The images are amazing. Check them out on the HiRISE web site. Make sure you have some 3-D glasses handy for the anaglyphs.

We left the U of A in the late afternoon for the drive to Kitt Peak National Observatory, 56 miles southwest of Tucson on the Tohono O'odham Nation reservation. KPNO sits on a mountaintop 6,875 feet above the Sonoran desert at the end of a twisty but well-paved 7-mile long access road that our large bus had no trouble climbing. It houses the greatest number of optical telescopes (26, plus 2 radio telescopes) at any site in the world. The largest,

diameter-wise, is the 4-meter Mayall telescope, the last multi-meter diameter research telescope to be built (1968-70) with a polar mounting (all are now made with alt-az mounts and field derotators). The world's largest solar instrument, the 1.6 meter McMath-Pierce telescope, is also housed on the site. Prime focus of this scope is at the end of a tunnel several hundred feet below ground. Although most of the telescopes are run by university research consortia, there is an amateur-owned, remotely operated telescope on the site.

Elyse at the Visitor's Center. The dome houses a 20" Cassegrain used for outreach.

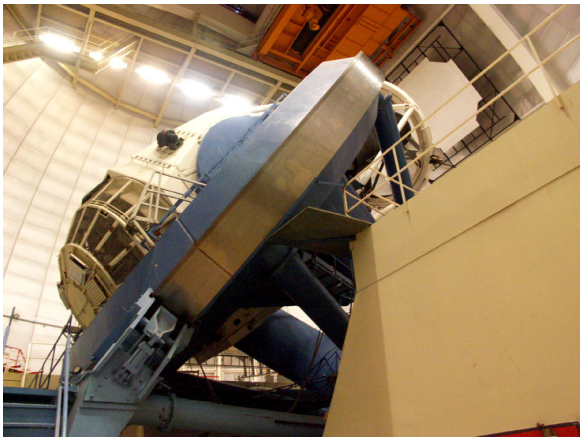
After being greeted by the Kitt Peak staff, we went over to the Mayall telescope, perched on a knoll at the northern end of the property.

The Mayall 4-meter telescope (right), a 2.3 meter telescope on the left.

We took an elevator up to the observation gallery atop the support structure, just under the dome, where panoramic windows permit views in all directions.

Many (but not all) of the telescopes at Kitt Peak, from the Mayall observer's gallery

The Mayall building itself is 187 feet high and dwarfs a nearby 2.3 meter telescope. The dome was built on a tall pedestal building to get it high off the ground on the theory that air flow would be more stable than if it were lower, but apparently that turned out not to be the case. Nevertheless, the structure can withstand 120 mile per hour winds.



The polar axis horseshoe of the Mayall 4-meter telescope.

The scope chamber, reached by a stairwell from the observation level, is kept cooled, so that when the dome is opened after dark, thermal equilibration will occur as rapidly as possible. We encountered this feature in every research scope we visited for the rest of the trip except the MEARTH array at Whipple, even scopes less than one meter in diameter. The scope operators spent nearly 45 minutes explaining

the scope's design, operation and research, with David and Dan giving additional educational commentary, which they did throughout the trip. The engineers rotated the dome for us, and although the telescope moves quietly on oil bearings, driven by just a pair of one-half horsepower motors, the dome made a squeaky racket.

We then visited a nearby 0.9 meter telescope belonging to the Steward Observatory. Like the Mayall, the dome was cooled to night-time temperatures by air conditioners. This scope was operated by remote control as were just about all of the smaller (<2 meters) telescopes we saw at the three observatories we visited. The guidescopes on the telescope tube are reminders of an earlier era of film astrophotography and manual guiding, but those days are long gone. Technicians make sure that it is in working order every evening, but they don't operate the scope in the traditional sense

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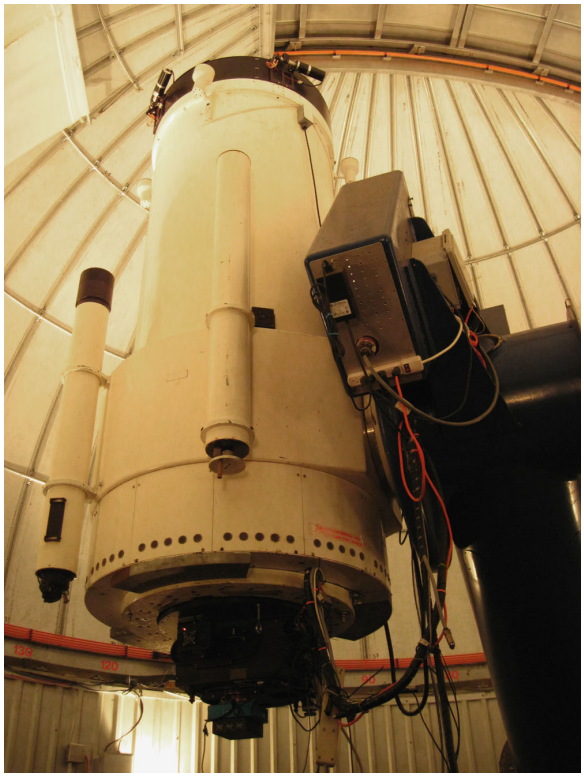


0.9 meter Cassegrain

Inside the 0.9 meter dome. The fellow with the scarf is the Kitt Peak technician responsible for preparing the scope that evening.

My idea of a good time: the business end of the 0.9-meter scope with Apogee camera and lots of wires.

We emerged from the 0.9 meter at sunset and watched the sun drop below distant mountains to the west. As we walked back to the Visitor's Center, our guide asked us to look to the east, pointing out the very visible "Belt of Venus". This is a reddish band about 10° above the horizon, tapering downwards to the north and south, which sits between the darker shadow of the earth and the still-illuminated blue atmosphere. It is caused by backscattering of reddened light from the sun, and can be seen before sunrise and after sunset (particularly from an airplane), and at the edge of the umbral shadow during solar eclipses. As the sky darkened, we could easily make out the lights of Tucson, lighting ordinance or no, and even the light dome of Phoenix 100 miles to the north, but the sky overhead was quite dark and clear.

The Belt of Venus, above the McMath-Pierce Solar Telescope (left) and a 2.1 meter telescope (right)

We returned to the Visitor's Center for a dinner of sandwiches and soft drinks. Then we were split up, half of us going to observe and the other half getting a lecture on using binoculars and a planisphere. We were in the first group, and so we climbed up stairs to a spacious dome housing a 20-inch Cassegrain. An astronomer showed us 4 objects in the dark sky (SQM 21.37 at 10 pm): a planet (Saturn), a double star (Castor), a globular cluster (M3) and a galaxy (M51). With each person going up to the scope in the dark for each object, that was about all that the hour could accommodate, somewhat disappointing, but the quality of the images was superb. Saturn, as it always does, got most of the oohs and aahs. Many beginners had trouble seeing M51, but I guess the old adage that telescopic observing improves with experience is true, and Elyse and I had no trouble as the bright and detailed double galaxy jumped out at us. We held back for a few minutes at the end to talk shop with the astronomer, and then our group switched places for the binocular talk (humorously given but fairly straightforward: get 10x50s) and the planisphere talk. We were each given decent 10x50 binoculars and a planisphere to use at a docent-led basic orientation to the spring sky. I was fiddling with the planisphere, which was a model set for 30 degrees north latitude (Kitt Peak is at 32°) when I noticed that the great star cluster Omega Centauri, which being a life-long northerner I had never seen, was just above the southern horizon. So I turned my back on the rest of the group and looked for it. In a few seconds, I found it hanging over distant mountains, an enormous ball of stars impressively bright in the binos. Once observed, I could spot it easily with the naked eye. For comparison, I found M13, rising in the east. Omega Centauri simply dwarfs M13 in size and brightness. Telescopic observation would have to wait for the following night at the Whipple Observatory, but I was pretty stoked.

As the evening came to a close, it was explained to us that all the public visitors had to leave Kitt Peak at the same time and they had to drive down the first mile of the access road without headlights. Cars with unquenchable lights had manila file folders taped over the offending beams, and our caravan of vehicles slowly descended until we were far enough along that lights could be turned on and manila folders removed. The trip back to Tucson took an hour, charmingly interrupted at a brightly lit Border Patrol checkpoint about halfway between Kitt Peak and Tucson (and only 40 miles north of the Mexican border). Two uniformed officers boarded our bus and surveyed the sleepy astronomer-wannabes. Convinced we were not illegals, they let us pass. We returned to the Arizona Inn around midnight, excited for the next day's agenda, a visit to the Fred Lawrence Whipple Observatory and some serious observing, the subject of next month's article.

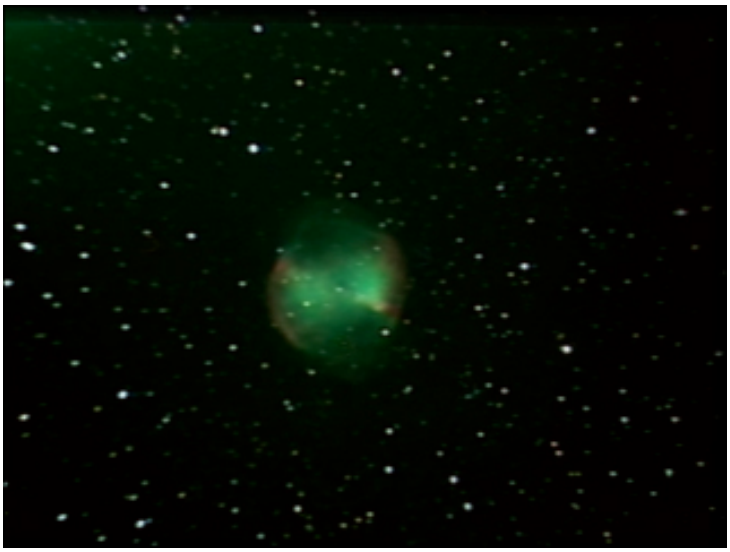
Elyse & me in front of the WIYN 3.5 meter telescope (photo by David Aguilar)

Read Part 1 and Part 2

Safely Home

On July 21st, the Space Shuttle Atlantis and its 4-person crew safely return to the Kennedy Space Center.

Credit NASA.



The Dumbbell Nebula

Courtesy of Larry Faltz, a picture of M27 (a planetary nebula in Vulpecula). It was taken on July 1st from the light-polluted Quaker Ridge School. Notes Larry: It only came out 320x240 for some peculiar reason, I think because I was fiddling with the capture software and inadvertently changed the display setting, but I think it's a nice image of the Dumbbell. Anyway, the usual technology: CPC800 at f/4 with focal reducers, Mallincam, IDAS-P2 filter, stack of 24 28-second captures using Deep Sky Stacker.

Star Formation

The spiral galaxy NGC 2403 lies within the boundaries of the constellation Camelopardalis. Some 10 million light-years distant and about 50,000 light-years across, the spiral galaxy has an abundance of giant star forming HII regions, marked by the telltale reddish glow of atomic hydrogen gas. In fact, NGC 2403 closely resembles another galaxy with an abundance of star forming regions that lies within our own local galaxy group, M33 the Triangulum Galaxy.

Credit: Image Data - Subaru Telescope (NAOJ), Hubble Legacy Archive; Processing - Robert Gendler.

Almanac

For August 2011 by Bob Kelly

Aug 6 Aug 13 Aug 21 Aug 28

The last of the bright planets in the evening sky sinks into the western twilight this month and the usual highlight of August has to compete with the full moon. Saturn isn't the brightest planet, magnitude 0.9 this month, 16 arcseconds wide, but it makes up for it with its thrilling rings and moons. Look as soon as it gets dark, low in the southwest sky, for the best view. Saturn's rings are tilted open 9 degrees as the view of the rings keeps getting better. Saturn hangs 9 degrees (about a fist-width) above the crescent moon on the 3rd, together they look like a cosmic semi-colon.

The Perseid meteor shower peaks around the 12th and 13th, but a full moon will wash out viewing of all but the brightest members of this dependable, warm-weather shower. But Perseids have more bright meteors than most showers and maybe the moonlight will illuminate their persistent trails.

Planets may run, but they can't hide. This month, SOHO catches Venus and Mercury as they hide near the sun. Mercury, at inferior conjunction between us and the sun, passes almost 7 degrees south of the sun on the 17th, just 12 hours after Venus passes almost behind the sun at superior conjunction. Venus is already in the SOHO C3 field of view, but Mercury may get by unnoticed since it passes so far south of the sun and is only 1 percent lit that day. Venus is on the other side of the sun, but it's 100 percent lit, overwhelming SOHO's detectors. Check it out at: LASCO C3 camera view! Mercury comes back to the evening sky, low in the west, in late August.

The moon also points the way to Jupiter in the morning of the 19th and 20th, Mars on 25th, Saturn again on the 31st. The sighting of the new moon near the end of August marks the traditional end of Ramadan. But there are plenty of fainter members of the solar system to explore this month. It's Neptune all night as it comes to opposition on the 22nd at mag 7.8, you'll need a telescope to make out its 2.4 arcsecond-wide disk. Uranus is brighter at mag 5.8, and might be seen without optical aid, but even our telescopes won't see details on its 3.6 arcsecond-wide disk. Just a bit brighter at mag 5.6, asteroid Vesta comes to opposition on the 5th. You'll need to watch over the shoulders of the scientists tending the Dawn spacecraft to see any details. Dawn will send photos during its year in Vesta's neighborhood before moving on to Ceres.

This month, Sagittarius, looking like a teapot, is low in the south in the evening. The portion of the Milky Way above the 'spout' looks like steam from the boiling pot. This large concentration of faint stars marks the direction of the center of our galaxy. There are many clusters, star clouds and dark nebula in this area of the sky for users of all kinds of optical aid. Then the moon swings through like a cosmic wrecking ball, blinding us from the 8th though the 16th. But think about the scene: Our 'nearby' satellite, 1.5 light seconds away, is in front of a star scene that goes all the way to the galactic center some 25,000 light years away. In-between, a 14th mag object in Sagittarius, Pluto, is 4½ light hours away, at 0.1 arcseconds. But Hubble picked out another tiny moon! Pluto is becoming an even more interesting place as we get ready for the New Horizons fly-by in 2015.

The moon covers up 2.9 mag π Sagittarii on the evening of the 10th for much of the USA, about 10:15 in our area. You'll need binoculars or a small telescope to see this star next to the 92 percent illuminated moon. Start looking before 10pm to find the star to the upper left of the moon. The star will disappear behind the invisible lunar limb before the star gets to the bright part. This is a hard event to show other people, since the 'event' is the star instantly winking out due to the lack of atmosphere on the moon, so it's not possible for everyone to see the disappearance with only one telescope or set of binoculars. The waning moon is well placed for telescopic inspection more than half-way up in the sunrise sky after the 18th as the sun setting on the moon highlights the rugged lunar terrain.

August brings back fond memories of long trips in late August with pre-sunrise starts to our long drives. What made it fun was seeing Orion laying on the horizon, many months before its winter appearance in the evening sky. If you are up early on the 24th, the moon stands at the top of Orion's club, looking like the hunter is holding a torch or like he's a jai alai player returning the pelota with his cesta.

The second phase of American human spaceflight came to a close with the safe landing of Shuttle Atlantis - 42 years after the day the Apollo XI astronauts lifted off from the moon. One of the legacies of the shuttle fleet is our first human colony in space. We can see the International Space Station in the predawn sky though the 13th and from the 13th onward in the evening sky. Russian Soyuz capsules will give us access to the ISS until we develop a new American human space craft and launch system.