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the Skyscraper

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AMATEUR ASTRONOMICAL SOCIETY OF RHODE ISLAND ⋆ 47 PEEPTOAD ROAD ⋆ NORTH SCITUATE, RHODE ISLAND 02857 ⋆ WWW.THESKYSCRAPERS.ORG

June Meeting & Potluck Dinner

Saturday, June 8, 6:00pm

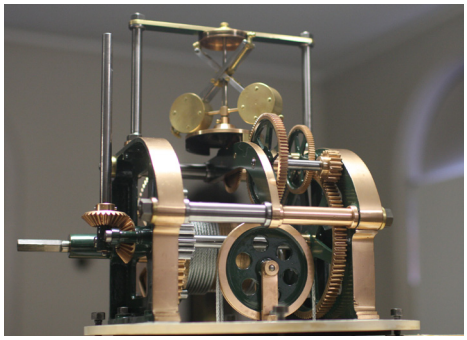
Seagrave Memorial Observatory

6:00pm **Skyscrapers annual summer potluck**

We return to our Saturday meeting schedule for the summer and the June meeting is our annual potluck dinner. Make your signature delicacy and come out for socialization, and bring your telescope too.

7:30pm **Restoration of the George N. Saegmuller Telescope Clock Drive at The Ladd Observatory** by David Gow

David Gow will present all aspects of the conservation: assessment, working with the Curatorial staff, treatment plan, restoration versus conservation, documentation, and maintenance schedule will be discussed and illustrated.



David was born in Aberdeenshire, Scotland. He followed his father and brother by serving a five-year apprenticeship in traditional woodworking. After getting married and some interesting diversions, a persistent desire to become involved in clocks and watches was finally realized.

The first few years were a learning curve, which culminated in specializing in 18th and 19th century clock restoration. David owns a nicely-equipped workshop in Shrewsbury, MA. For the past seventeen years he has been the Conservator at the Willard House and Clock Museum in Grafton, MA. Recent restoration work has included two historic clocks in the Capitol Building in Washington D.C., a London tall-case marquetry clock by John Sweeby, circa 1690, an astronomical clock having two pendulums, made by Hezekiah Conant, for a college in New England, and finally, the restoration of the telescope clock drive at the Ladd Observatory in Providence, RI.

He has two adult sons. Along with his wife Barbara, they have just completed a six month trip to the Bahamas, surviving Hurricane Sandy aboard their thirty-seven foot sailboat, Podjo.

9:00pm **Observing at Seagrave Observatory**

In this issue

President's Message

Ed Haskell

Your feedback last year about changing the meeting day during the summer months was very strongly in favor, so we are going to do it again. Since you may have missed the announcement of the summer meeting dates and programs I will recap that information for you:

June 8 (Saturday) at Seagrave Memorial Observatory. The meeting will commence with a pot luck supper at 6:00pm. Our June speaker will be David Gow, who did the restoration work on Ladd Observatory's clock drive system. All aspects of the conservation will be presented: assessment, working with the Curatorial staff, treatment plan, restoration versus conservation, documentation, and maintenance schedule will be discussed and illustrated.

July 13 (Saturday) at Seagrave Memorial Observatory. Coffee and refreshments at 7pm, presentation at 7:30pm. Prof. Greg Tucker, Dept of Physics, Brown University: "Astronomy Above the Antarctic". Flying telescopes on high altitude balloons from the Antarctic provides relatively low-cost access to a space-like environment. This talk will describe two experiments which have been developed to answer questions about what happened during the first fraction of a second after the Big Bang to how stars form.

August 3 (Saturday) at Seagrave Memorial Observatory. Coffee and refreshments at 7pm, Talks at 7:30pm. The program for the August meeting will consist of short presentations by members of Skyscrapers. If anyone would like to give a talk, please contact Kathy Siok or Bob Horton.

An important element of the rationale for these changes during summer is to encourage a more relaxed environment for member socialization and to promote more use of the instruments after the meetings. This seemed to work very well last summer and I was encouraged to see that as soon as we returned to Seagrave for the April and May meetings there was a resumption of the collegial atmosphere and lingering for observing late into the night.

Remember that the June meeting starts with a pot luck dinner. Make your signature delicacy and come out for socialization, and bring your telescope too.

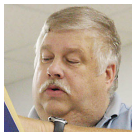
Thanks for all you do for Skyscrapers.

The Skyscraper is published monthly by Skyscrapers, Inc. Meetings are held monthly, usually on the first or second Friday or Saturday of the month. Seagrave Memorial Observatory is open every Saturday night, weather permitting.

Directions
Directions to Seagrave Memorial Observatory are located on the back page of this newsletter.

Submissions
Submissions to The Skyscraper are always welcome. Please submit items for the newsletter no later than **June 21** to Jim Hendrickson, 1 Sunflower Circle, North Providence, RI 02911 or e-mail to jim@distantgalaxy.com.

E-mail subscriptions
To receive The Skyscraper by e-mail, send e-mail with your name and address to jim@distantgalaxy.com. Note that you will no longer receive the newsletter by postal mail.



Previewing June's Evening Skies

Dave Huestis

Though the month of June does provide much more reasonable temperatures for amateur astronomers to enjoy their hobby, most of us do not welcome the summer months. Why? The sky doesn't get sufficiently dark for deep sky objects (galaxies and nebulae) until close to 10:00 pm as we near the summer solstice on June 21 at 1:04 am. And morning twilight begins between 3:30 and 4:00 am! These circumstances definitely limit a serious stargazer's observing session.

Still, dedicated sky enthusiasts find time to scan the heavens no matter what time of the year it is. While many stargazers will be concentrating on observing beautiful Saturn (see last month's column), this summer many other astronomical events will be observable with and without telescopes. Here are a few highlights that will be visible during June.

More than likely you will hear about another *supermoon* during June. Even though this term is not an astronomical one, back in 1979 an astrologer coined the phrase, and it has become more widely used in the media lately. The term is used to describe a time when a Full or New Moon coincides with the Moon's closest approach to the Earth. The Moon's elliptical orbit brings it as close as 221,824 miles and as far away as 252,581 miles. On June 23 at 7:32 am EDT the Moon will be full, just 32 minutes after reaching perigee (close approach). At that time the Moon will be approximately 221,853 miles from the Earth.

While this scenario will make the Full Moon the closest one until August 10, 2014, it is not the closest it can be, and I seriously doubt whether anyone could truthfully say that it looks any larger than any other recent Full Moon or even any brighter than usual. While it is true that a Moon at the extreme perigee (farthest distance from Earth) appears about 14% larger and 30% brighter than the extreme apogee, making an observation from one Full Moon to the next would not be as noticeable. However, imaging successive full moons using the same camera and lens would definitely allow for an accurate comparison.

Also, so-called supermoons are not at all as rare as they are made out to be. There are four to six such events yearly. So while a rising Full Moon may appear larger than normal when foreground objects allow a comparison, June's full strawberry moon would hardly receive any attention if not for the hype. At least it may have folks looking at the sky and marveling at our desolate neighbor.

During the last week of May through the first week of June, stargazers will be able to observe three planets above the western horizon after sunset. While this column is primarily prepared for June, it often is published before the new month begins. Start observing this triple planetary conjunction on May 24. You will see brilliant Venus, bright Jupiter and much dimmer Mercury above and to the left of the sunset horizon point. You will need an unobstructed horizon in order to view this conjunction of planets. Once evening twilight has deepened, all three heavenly bodies will be within twelve degrees or less (about a fist held at arm's length provides this measurement) of the horizon. (See the May issue of The Skyscraper, the monthly newsletter of Skyscrapers, for diagrams showing sky charts for May 24-31 at www.theskyscrapers.org.)

Watch the positions of theses planets change with each successive night. On the night of May 28 Jupiter and Venus will be only one degree (two Full Moon diameters) apart. On June 1 the planetary trio will form a straight line from and above the sunset point on the horizon in order of Jupiter, Venus and Mercury. (This scene will look practically identical to the sky diagram for May 31 in The Skyscraper newsletter.) It will be quite a beautiful sight to behold. Jupiter will soon be lost in the solar glare, so bid farewell until later this year. On June 10, Mercury and Venus will be joined by a thin waxing crescent Moon passing nearby. This sky scene would make an excellent opportunity to snap a few images.

Mercury will reach its highest elevation from the horizon on June 12 and will then begin to sink lower each night. Meanwhile, Venus will continue to rise up past Mercury as the month progresses. On the 18th they will be a mere two degrees apart (that's four Full Moon diameters). Venus keeps on its upward swing into a darker sky, while Mercury will quickly draw closer towards the Sun and will soon be lost in the solar glare.

I must add a word of caution here to beginner stargazers. Do not attempt to locate these planets when the Sun is still in the sky. While it would be futile to try anyway, you don't want to risk losing your eyesight should you wander too close to the Sun, either with your eyes, binoculars or a telescope. Many more astronomical wonders await your gaze throughout the coming year.

In conclusion, while the initial June conjunction of planets just above the western horizon will be difficult or impossible to observe from the local observatories, Saturn will still be the focus of attention throughout the summer. Afterwards the summer constellations along with the Milky Way will provide access to a multitude of clusters and nebulae at which to marvel. While it won't get dark enough to recognize adequately many of the familiar star patterns until after 9:45 pm or so, the sky vault will certainly reward a patient stargazer with splendid views of the heavens once twilight has faded.

Don't forget that the local observatories provide open nights for telescopic viewing of the heavens throughout the summer. Seagrave Memorial Observatory in North Scituate (http://www.theskyscrapers.org/) is open every clear Saturday night for observing. Ladd Observatory (http://www.brown.edu/Departments/Physics/Ladd/) in Providence will be closed during the month of June for annual maintenance. Frosty Drew Observatory (http://www.frostydrew.org/) in Charlestown is open on every clear Friday night. Please visit the respective websites for details about opening times and closures.

Turn off the lights and turn on to astronomy. Good observing.

Phases of the Moon

New Moon
June 8 15:56

First Quarter Moon
June 16 17:24

Full Moon
June 23 11:32

Last Quarter Moon
June 30 04:54

Full Circle

An Amateur Astronomer's Journey Home

by Matthew T. White

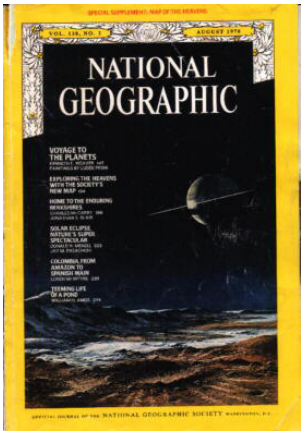
It was late March when I decided to visit the Seagrave Memorial Observatory, having already decided to apply for membership in the organization. I pulled into the parking lot around ten of eight and made my way to the main building, which I knew from my research on the web, housed the Society's centerpiece instrument. I climbed the stairway and joined the group of people who had gathered to view the heavens that evening. It was there that I met Dave Huestis and his very capable assistant, a young man by the name of Alex Bergemann. As I got to know this young man, I soon realized I was looking in the mirror, a mirror that added a temporal distortion of about forty years.

December 24, 1968

It was Christmas Eve and I was sitting in my second grade classroom at St. Joseph School in Pascoag, Rhode Island. Every member of my class, along with the first and third graders, was glued to the television set. Three American astronauts, Frank Borman, Jim Lovell, and Bill Anders, were orbiting the moon in the Apollo 8 spacecraft. I remember thinking; we've actually put men in orbit around the moon. This wasn't science fiction, it was real. That morning, I think every child in the classroom wanted to be an astronaut.

The Space Race was well underway and it looked as if the United States was finally taking the lead from the Soviet Union. The dream of stars seemed to fill our culture as many popular TV shows would indicate. Three years prior, in 1965, the introduction of Irwin Allen's *Lost in Space* teased our imaginations, and a year later, Gene Roddenberry followed with *Star Trek,* one of the finest science fictions shows to grace the TV screen. In February of 1968, Stanley Kubrick released what was to be called the proverbial good science fiction movie; *2001: A Space Odyssey*. But all of this utterly paled in comparison to the real life drama which was played out on the classroom television that morning.

The following summer, my family drove down to Wilmington, North Carolina to visit with relatives. Most of my mother's family lived down there, as well as my father's parents. (They moved back to Rhode Island the following year.) While we were visiting, I met my older cousin Keith, who was an avid amateur astronomer. One night, the sky was clear and Keith set his telescope up in the backyard. We spent the next few hours looking at the stars. I don't remember seeing any planets, but this was over forty years ago. It did not matter, I was hooked. When we came in, I told Mon and Dad that I wanted a telescope for Christmas.



Unfortunately, it would be another couple of years before my parents could afford to grant my request. I didn't know it at the time, but they were having trouble making ends meet. It didn't help that Dad was still going to night school, at Bryant College, in an effort to finish his business degree.

But, my interest in astronomy never wavered, in fact, my grandfather helped keep it alive when he presented me with the August 1970 *National Geographic Magazine*, Volume 138, Number 2. The magazine contained an article titled *Voyage to the Plan-*

ets written by Kenneth Weaver as well as a map titled, *The Heavens*. That map hung in my bedroom for the next several years. There was also an article about the March 7, 1970 solar eclipse contained within that issue. I wore the magazine out by reading it over and over again, dreaming of the planets, stars, galaxies, and the thought of exploring the cosmos.

On Christmas Day, 1970, I received my first telescope, a Sears and Roebuck 100 power refractor with a sun projection screen and an erecting lens which increased the power to 150x. I was elated to say the least. A few nights later we had clear skies and I was able to take the scope out for first light. I vividly remember the night being bitterly cold but I knew Saturn was going to be up in the constellation of Taurus. Using my planisphere, I located the target constellation and started searching for the ringed planet. When I moved to the third object, I found my quarry! I had seen Saturn in magazines, including images from some of the world's largest telescopes, but seeing the ringed wonder, with all its glory, with one's own eyes was an experience I will never forget. I soon forgot about the cold and would have stayed there all night if it wasn't for my mother worrying about me catching a cold.

I spent the next several nights outside; unencumbered by the temperature, in order to take in the magnificent beauty that is Saturn. I eventually turned to the stars, but, at the time, I considered them just boring points of light. (I would change my mind about that later.)

Looking at the moon was another favorite pastime as I could often observe from the comfort of my bedroom window. I soon learned that the best views were obtained with a crescent moon rather than when it was full.

Around late spring or early summer, I spotted what I thought was a bright star in the southern sky. I carted my scope onto the neighbor's deck (with their permission of course) and trained the scope on the "star". It turned out that this wasn't a star at all; it was the King of the Planets, Jupiter. Even at 100x power, the four Galilean moons were plainly visible as well as the atmospheric bands. Also visible, much to my delight was the Great Red Spot, the hurricane which has raged for over four hundred years. I was just as excited, about Jupiter, as I was the first time I saw Saturn through the scope.

In addition to my observations, I continued to study everything, and anything I could get my hands, on that related to astronomy, planets, space, or space travel. I was reading, and much to my parents delight, understanding my father's college science textbooks. I memorized the facts about the solar system, including distances from the sun, number of moons, relative sizes, and so on. My fourth grade science project was titled *The Nine Planets* and I won 1st place in my grade in the school science fair. Truth be told, I never expected to even show, much less come in first. I found out later that my knowledge of the material is what impressed the judges.

I spent quite a bit of time using my scope for solar observing. With the simple but effective solar projection setup, I was able to watch as sunspots traversed the solar surface. On July 10, 1972, a partial solar eclipse was to occur in the greater Rhode Island area. I set my scope up and watched as the moon, ever so slowly, covered the solar disk. Alas, the clouds rolled in ten minutes before the point of maximum coverage and rain began shortly thereafter. Ah, the trials of an amateur astronomer.

It was around this time that I became interested in a TV show (that would later reignite my waning interest in astronomy) called UFO. It was a somewhat obscure British offering, but, in my opinion one of the best speculative science fictions shows of the twentieth century.

Sometime in late 1972, I learned that my cousin Keith had been diagnosed with leukemia. The prognosis was not good and he would succumb to the disease before our next visit to North Carolina. It was the first time I had come face to face with my own mortality. (When you are a kid, you think that you will live forever.)

December 7, 1972 marked another milestone in the space race with the launch of Apollo 17, the last manned mission to the moon. My Uncle David, who worked for NASA, had told me the prior year that 17 would be the last lunar mission, but NASA had plans for a new space station called Skylab, and a re-useable spacecraft known as the STS (Shuttle Transportation System).

While astronomy still remained near the top of my list of interests, it gave ground to other pastimes as I progressed into junior high school. I didn't know it at the time, as I still wanted to be a pilot, but my interest in electronics would someday evolve into my livelihood.

By the time I became a freshman in high school, I knew my dream of flying was destined to be only a dream, due to my eyesight. To keep my options open, I took college prep classes including accelerated sciences. In the advanced group, doing a science project was mandatory and I turned back to astronomy for my project. This would be my first exposure to the world of astrophotography. Remember, this is back in the day where digital cameras didn't exist, and motorized RA drives were well beyond the budget of most middle class families. Still, I was able to get a few decent shots of Venus, Jupiter, and the moon. The project also gave me some experience with black and white developing and printing.

By the summer of 1976, I was unsure about what I wanted to do with my life, and I knew that I was running out of time to decide on a career path. I didn't want to make the same mistake my father did, but as a sixteen year old kid, I wasn't sure what to do about it. When I was unable to find a summer job, my parents sent me to the Project Horizons program at the William M. Davies Vocational Technical School in Lincoln Rhode Island. I had been to the program in the summer of 1974 and enjoyed exploring the different trades, taught by the school, so I agreed to go. It would prove to be a turning point in my life. I knew I had an aptitude for electricity/electronics, as well as the data processing program, so I needed to decide if any of these career paths were right for me. In the pro-

cess, I discovered amateur radio, a pursuit which still competes with astronomy for my attention.

By the end of the eight week program, I knew what I was going to do. The one career path that encompassed all of my interests was the electronics field. In September of 1976, I transferred to Davies Voc-Tech and dove headlong into my studies. Contrary to popular belief, the academic program at the school sported a college prep program for those students in the technical fields, such as, electronics, drafting, data processing, and health occupations. I worked my tail off to maintain an "A" average and my telescope was relegated to the closet, only brought out on a rare occasion of a lunar eclipse or when Jupiter happened to be up.

When the Space Shuttle Columbia was first launched on April 12, 1981, my interest in the space program was revived for a time, but other concerns would soon occupy my thoughts and my passion for observing the night sky with my telescope was all but forgotten. I still tried to catch the shuttle launches and, as fate would have it, I was watching when seven Americans, in the words of Ronald Reagan, "slipped the surly bonds of Earth, and touched the face of God." Like many Americans, the Challenger disaster was a kick in the gut for me.

As the next fifteen years passed I would sometimes find myself looking up at the stars with nothing but my own eyes. The siren song of the heavens provided some solace for a rather turbulent time in my life.

In 2002, I married the lady I had been dating since 1993. We closed on our first home a few days later. Susanne knew of my interest in the stars and bought me a new telescope for Christmas, that year. It was a Bushnell 6" reflector with a motorized equatorial mount. While the optics seemed to be okay, the mount was unstable, and having gone through the same frustration with my first scope, I didn't want her to waste good money on something that would end up collecting dust. When I told her how much we would have to spend to do what I wanted to, we both decided to wait until we were a bit more financially secure before we would make that kind of investment.

On May 15, 2003, a partial lunar eclipse occurred while I was at work. Not wanting me to miss it, my wife tried her hand at astrophotography. Using our little 2 megapixel point and shoot, she clicked off about twenty shots of the moon in various phases of eclipse.

Well, she got an "A" for effort. After all, it's the thought that counts.

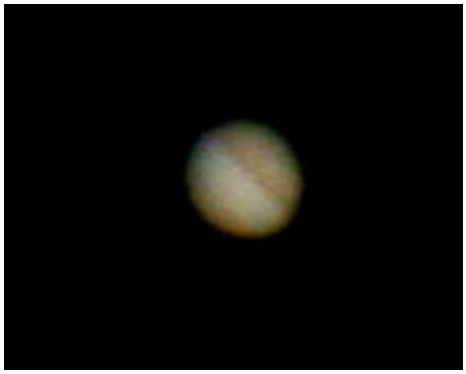
In late 2005, my employer was laying people off, and I suddenly found myself beating the pavement looking for a new job. The sudden loss of income resulted in us having to drain our savings account (including my telescope fund) to keep the mortgage and bills paid. I was out of work for almost six months. I expanded my job search into central Connecticut and found a two-way radio company looking for an experienced and licensed technician. I started with WPCS on May 6, 2006. It took me a couple of years, pulling down overtime, and negotiating pay raises to re-establish some financial security. I did manage to procure a decent pair of Nikon 10x50 binoculars. I use them to check the antenna feed lines on radio towers, but they also can be used for star gazing. It was a win-win. Using my binoculars, I often would gaze up at the night sky not looking for anything particular. I stumbled on a few star clusters by accident. The passion for astronomy was reawakening.

It was in late 2009, when I discovered Fan-Fiction.net, a repository of stories written by the fans of both past and current TV shows. Remember that British TV show I mentioned earlier? One of the first sections a stumbled on was a collection of stories which had been written for that show.

Science fiction has always been one of my favorite reading genres so I decided that I would try my hand at writing a UFO story of my own. My first story was long, over eighty thousand words and I spent four months writing it. When I finished the first story, I added companion short stories to supplement the saga and some of my work mentioned astronomy. Suddenly, I found myself longing to delve back into my boyhood hobby.

After doing some research, I ordered the Meade LS-6 in November of 2010. The scope arrived a few days before Christmas and saw first light on December 24. In addition to the telescope, I had ordered a T-ring and T-mount for my 35mm Digital Rebel. I took my first images of Jupiter and the Great Orion Nebula on January 3, 2013.

As one can see, I still have a ways to go on the astrophotography learning curve. I

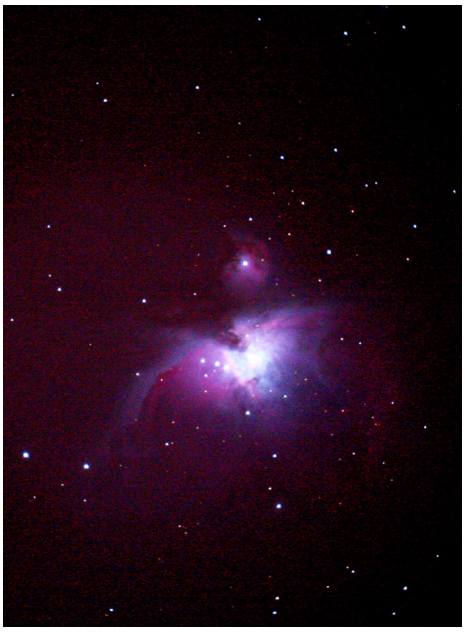


soon realized that I hadn't purchased a suitable platform for serious astrophotography work. Fortunately one of my co-workers was in the market for a portable scope and the LS-6 fit his needs perfectly. I parted with the LS-6 and ordered the 8" LX-200.

The new scope arrived a couple weeks later. Compared to what I was used to, this telescope was a monster. I'm sure glad

I didn't order the 10" model. I spent several sessions just getting used to the scope before I tried it out with the camera. On March 19, 2012, the moon was due to make a close approach during its full phase. The weather looked as if it was going to cooperate so I set up to take some astrophotos. I had just received a 6.3 focal reducer and the moon would be a good target to try it out. I also wanted to take another crack at M42.

I have to admit, I was very pleased with the way this one came out. I took several photos that night, most of them of the moon, but I also managed to capture the Pleiades, the Double Cluster (Caldwell 14),



Sirius, and Betelgeuse.

Of course the moon was the star of the show that evening. I started at 1/125 of a second exposure and continued to lower the value until I was at 1/4000 of a second. I suppose I could have dropped the ISO setting down but 1/4000 seemed to be just right.

My interest now revived, I started looking on the internet for star parties and dark skies. It was then that I came across the Skyscraper website. Having learned the hard way to look before you leap, I spent a great deal of time on the website to ascertain what the organization was all about. I decided to submit my application for membership at the April, 2013 meeting.

Present Day

As I gazed at the rings of Saturn, through the Alvan Clark refractor, I felt as if I had finally come home. And while it is true that astronomy shares the top spot with my radio interest, the two are uniquely compatible. I'm working on a way to display the voice of Jupiter on the computer using a program I use for precise frequency measurement. If things work out the way I hope, I may be able to give a radio astronomy presentation to the group.

As I listened to the oohs and aahs from the people gathered in the dome I fondly remember my own reaction four decades ago. I still hear the siren sound of the stars.

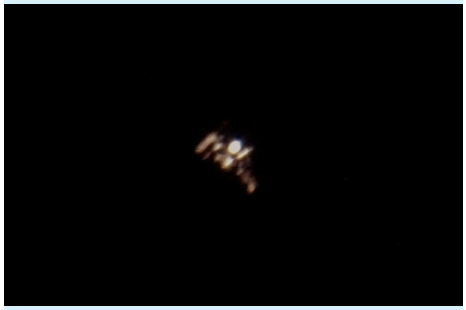
For Sale

C5 (orange tube)
Vixen mount
Hard carrying case
Diagonal
Motor driven equatorial mount.
(camera not included)

All for $275

CONRAD CARDANO

This might not look like much at first glance, but this the **X-37B**, an unmanned mini-shuttle that orbits the earth for months at a time. I got this shot through my telescope early in the morning on June 5. I can make out a basic structure, enough that I think I see the wings, and a color difference between the white top of the spacecraft, and the gray heatshield. Also note some kind of structure sticking out that is orange in color. Photo by Bob Horton.

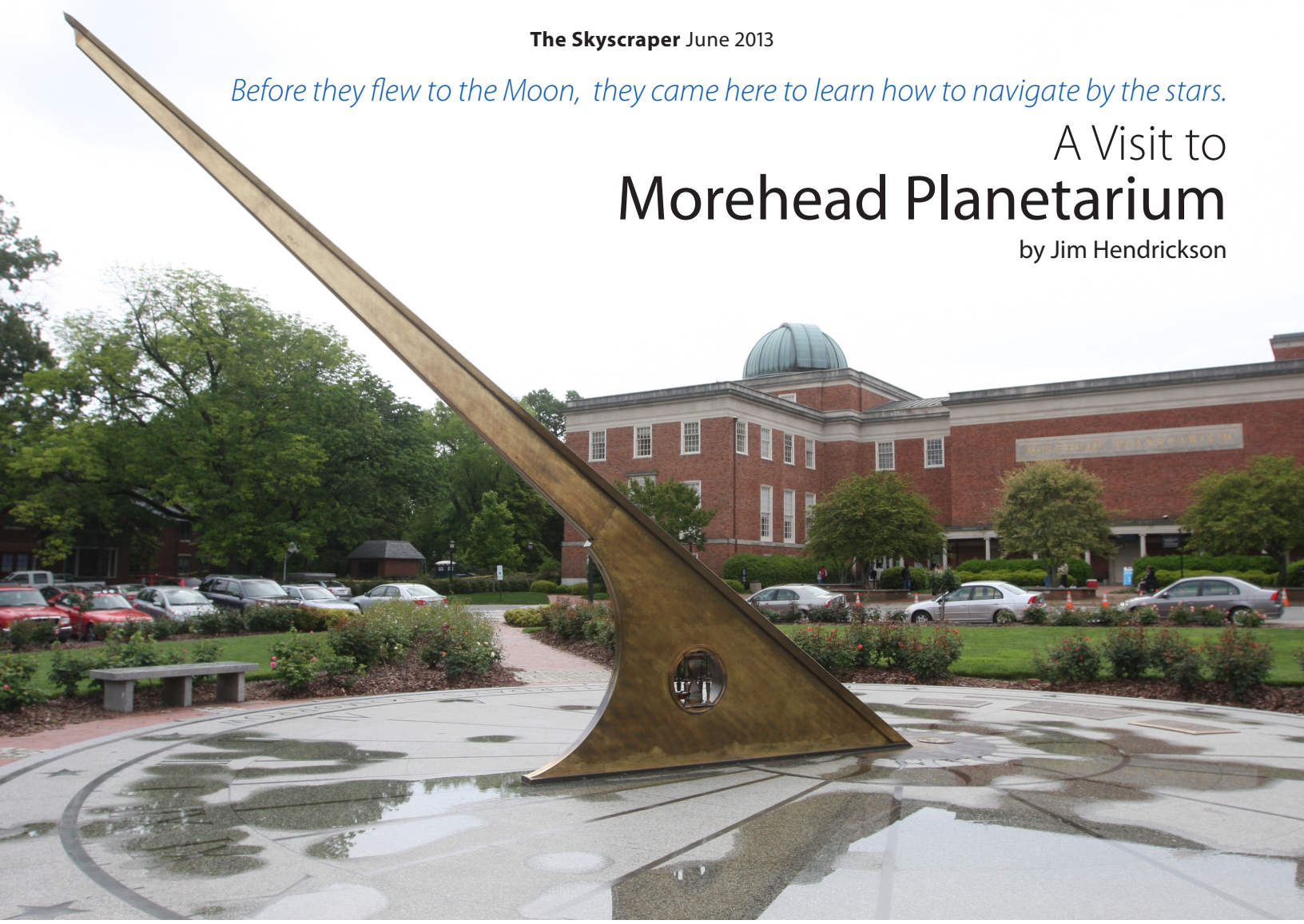


Here's the shot I got of the **ISS** about 5 minutes after the X-37B.

Before they flew to the Moon, they came here to learn how to navigate by the stars.

A Visit to Morehead Planetarium

by Jim Hendrickson



It is natural for us to give credit to astronauts for knowing much more about the sky than us amateurs. After all, we're not guiding our spacecraft with precision while flying through space at eight kilometers per second, but rather pointing our simple telescopes at our favorite planets and seasonal objects or showing others how to use the Big Dipper to find the North Star. But the fact of the matter is, those astronauts had to learn the same sky we did, and given the time constraints of the Space Race and all the other aspects of astronaut training they had to attend to, the men of the Mercury, Gemini, and Apollo programs didn't have the luxury of meeting with their local astronomical society once per week in the hopes of clear enough skies for at least a year to adequately learn their way around, not to mention that a good portion of the sky simply isn't visible from a fixed point on Earth.

What was needed was a planetarium. A high-tech piece of science wizardry that could simulate the sky in any direction at any time of year regardless of weather. Between 1959 and 1975, NASA astronauts were trained in the art of celestial navigation at the Morehead Planetarium on the campus of the University of North Carolina Chapel Hill.

Many of us have had fond memories of visiting planetariums when we were younger, on school field trips or on summer vacation. Some of us still aspire to travel far and wide to visit notable observatories and planetariums around the country. In recent years I have had the pleasure of visiting the Hayden Planetarium in New York, Adler in Chicago (including the original Atwood Sphere), and Griffith in Los Angeles. This is in addition to the numerous visits to the Charles Hayden in Boston over the years, and locally the Cormack Planetarium (named after one of Skyscrapers ten original Incorporators Maribelle Cormack), the planetarium at URI, and the home-built planetarium that was set up at Ladd Observatory a few years back, the projector for which Skyscrapers used for its 1975 Midland Mall portable planetarium.

Located just over a mile from Newfangled company headquarters in Chapel Hill, North Carolina, Morehead Planetarium has been on my short list of places to visit for several years. In 2010 I asked our local planetarian Francine Jackson if she knew a point of contact at Morehead and she connected me with Richard McColman, Fulldome Theater Director at the planetarium. While I always consider my trips to North Carolina to be business as well as pleasure, I hadn't been able to find the time during these busy week-long trips to pay the visit.

I would finally get that chance in the days before our annual spring retreat at the beginning of May 2013. I contacted Richard to let him know my travel schedule and availability and we worked out an appointment on Tuesday morning, May 7.

Upon arriving at the planetarium the most prominent feature you will notice is the very large sundial in the courtyard to the north of the building. A native Rhode Islander will notice the difference in latitude of the gnomon, which points the north celestial pole. Chapel Hill is about six degrees farther south than North Scituate.

Unlike traditional planetarium arrangements of the past, the seats are arranged in a semi-circular orientation facing one quadrant of the dome. This allows for live presentations to be given in addition to or in conjunction with fulldome shows. Notably missing is the large Zeiss Model VI star projector that once dominated the center of the dome. Unfortunately, the planetarium was not able to preserve the historic Zeiss star projector because they have neither the storage space nor a suitable place to put it on display. They do plan to display a section of it, however, and are offering the lenses as collectibles.

It was still mostly cloudy from overnight rain so I wasn't able to get a good read on the sundial.

When I approached the building, Richard was waiting to greet me, and after introductions he ushered me into the planetarium through a service entrance. Upon entering the dome I was impressed not only by its size, but also how sparse it appeared. This was the first time I had been inside a planetarium dome that did not have a large projection system in the center. I had known before my visit that the Zeiss Model VI projection system had been removed, but what I didn't realize was that the new fulldome projection system was so cleverly concealed in the perimeter of the dome.

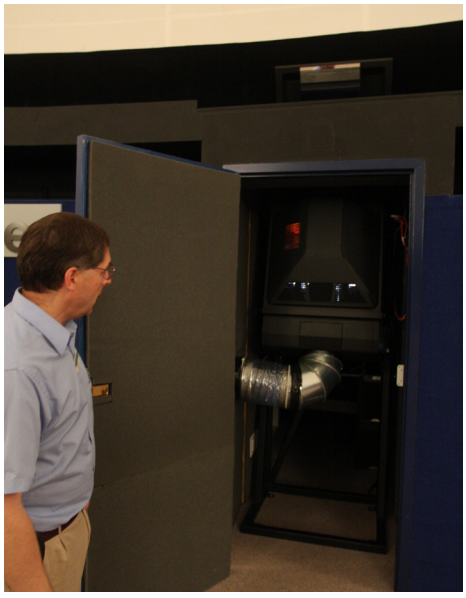
Richard give me a brief history of the planetarium, which opened in 1949 and originally utilized a Zeiss Model II star projector. He talked about the 2011 replacement of the Zeiss Model VI star projector and efforts to preserve parts of it (unfortunately a new home could not be found and the planetarium does not have the space to preserve it in complete form) and also talked about planned renovations to the building

When we began talking about the projection system he showed me to a nondescript closet door at the front of the planetarium behind which was one of a pair of projectors that comprised the digital fulldome projection system. The projector was rather diminutive compared to the large mechanical projectors which once adorned planetariums, but boasted rather impressive specifications, considering that it illuminates half of the 68-foot diameter dome (nearly 1,200 square feet of area). The dual projectors each have two lamps and precisely calibrated optics which project onto the opposite side of the dome via diagonal flat mirrors mounted just above the projectors. They weigh 300 pounds each and produce over 30,000 BTUs of heat, which must be dissipated using their own ventilation system.

After we talked about the history and technical details, I was treated to something I wasn't expecting--a full demonstration of the planetarium. Richard dimmed the lights and showed me the capabilities of the planetarium as I stood beside the operator's booth. We first toured the night sky on the dome. We talked about how the digital projection systems do not display stars quite as sharp as the old mechanical projectors and he showed how there are adjustments that can be made to display stars as brighter, condensed points or larger discs, something that helps to enhance the colors of stars such as Betelgeuse and Antares.

We then went "off-world" and began to simulate what traditional planetarium projectors cannot produce. Through the magic of the Digital Sky software, the planetarium is capable of taking the viewer on a journey through the solar system and out into the galaxy. I had seen this demonstrated in programs at the Griffith Observatory in Los Angeles and at the Charles Hayden planetarium in Boston, but it wasn't until I was given this personal tour at the Morehead Planetarium that I knew what it was capable of.

The tour continued through the solar system as we explored Jupiter and Saturn and the motions of their moons. Zooming out a bit further reveals the size of the solar system and how far the Voyager spacecraft have traveled. Beyond the solar system the simulation moves out among the stars, showing the position of the Sun relative to the nearest stars and still further out shows the stars which have confirmed exoplanets. The journey outward continues to a point which reveals the radio sphere, representing the expanding bubble of radio transmissions from planet Earth, the beginning of which was defined as the television broadcast of the opening ceremonies of the 1936 Olympics. Traveling even farther, the limit of our naked-eye constellations is shown in comparison to the size of the galaxy as the



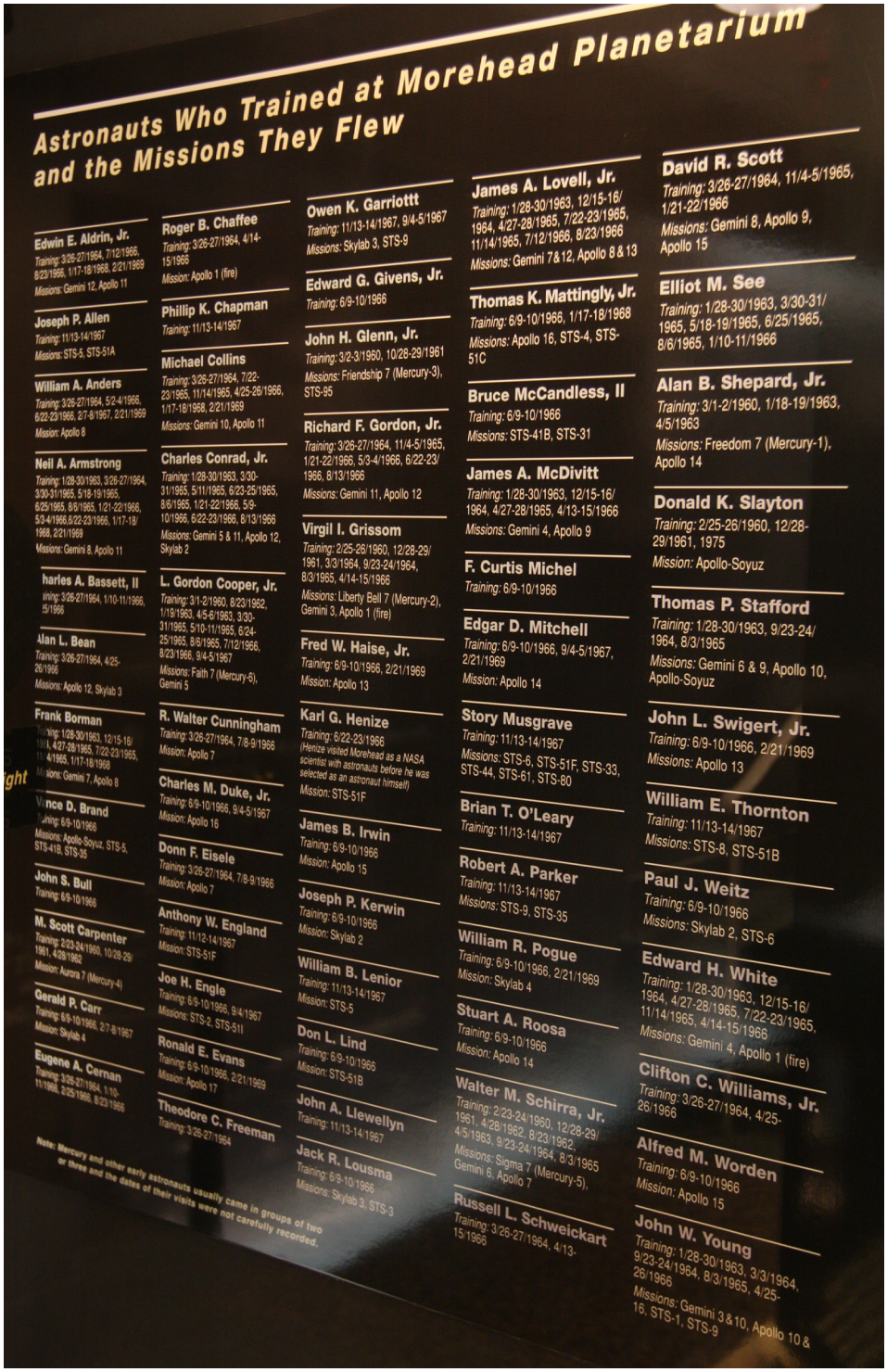
One of the two Sky-Skan Definiti fulldome projection systems in the 68-foot dome. Each projector uses two lamps and projects upward onto a diagonal flat mirror and against the opposite half of the dome. The projectors weigh 300 pounds each and have a custom ventilation system to dissipate the 30,000 BTUs of heat they generate while in use.

simulation transitions to the Digital Universe databases. This simulation contains data that extends from the local group all the way out to the cosmic background radiation and shows the large-scale structure of the Universe.

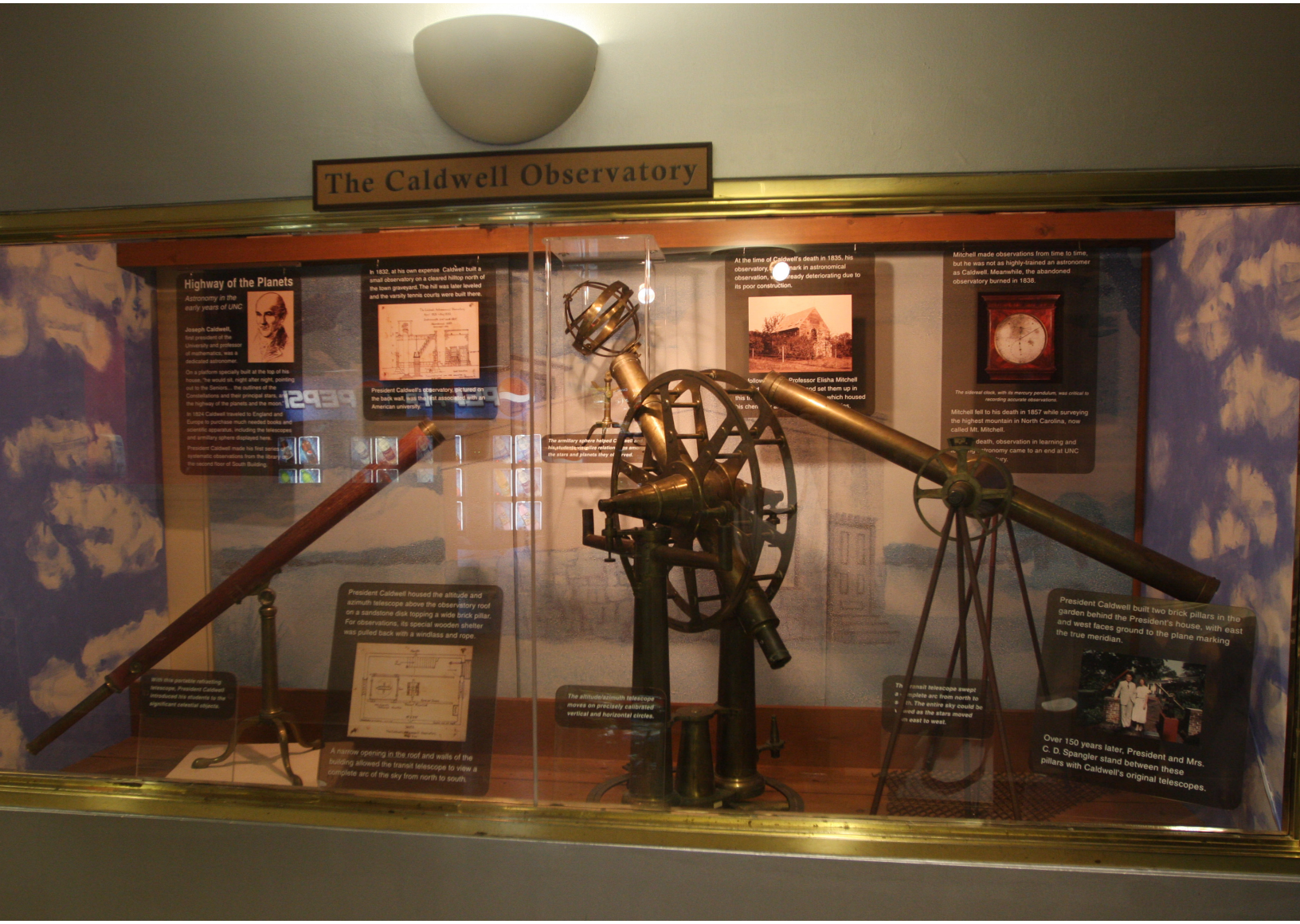
Richard then brought the demonstration back to the inner solar system and demonstrated some custom programming that can be done with the planetarium software by showing a simple and intuitive animation of the seasons.

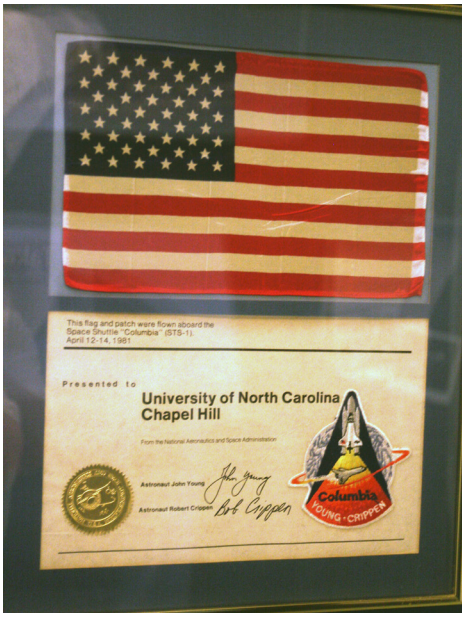
After the nearly hour-long presentation he showed me downstairs to the exhibits containing artifacts from the astronaut training programs and invited me to his first official presentation. Unfortunately I needed to get back to work and only had time to view the exhibits gallery, but I felt privileged to have gotten a personal showing in the planetarium dome which was used by all of the astronauts of the Mercury, Gemini, and Apollo programs.

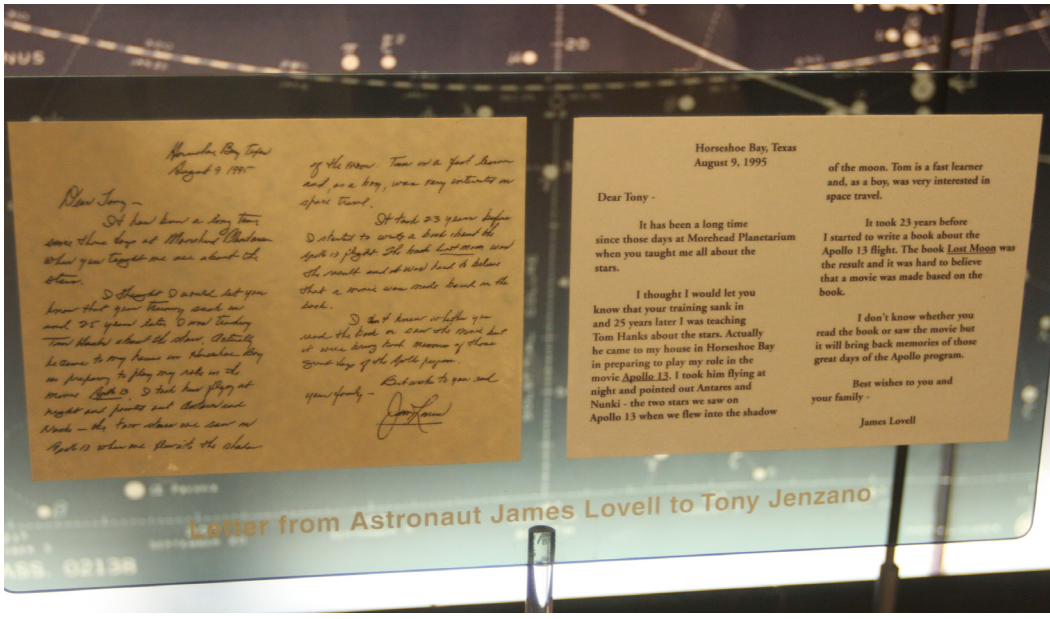
Richard McColman, Fulldome Theater Director at Morehead Planetarium.



The roster of astronauts from Mercury, Gemini, Apollo and even the early STS missions who trained at Morehead Planetarium.







Top: A display of instruments, photographs, and drawings from Joseph Caldwell, first president of UNC, professor of mathematics and devoted astronomer. Bottom left: This flag was flown aboard STS-1 Columbia in April 1981. Bottom right: a letter from Jim Lovell to then planetarium director Tony Jenzano.

Binary Star: Xi Boötes

Scott MacNeill

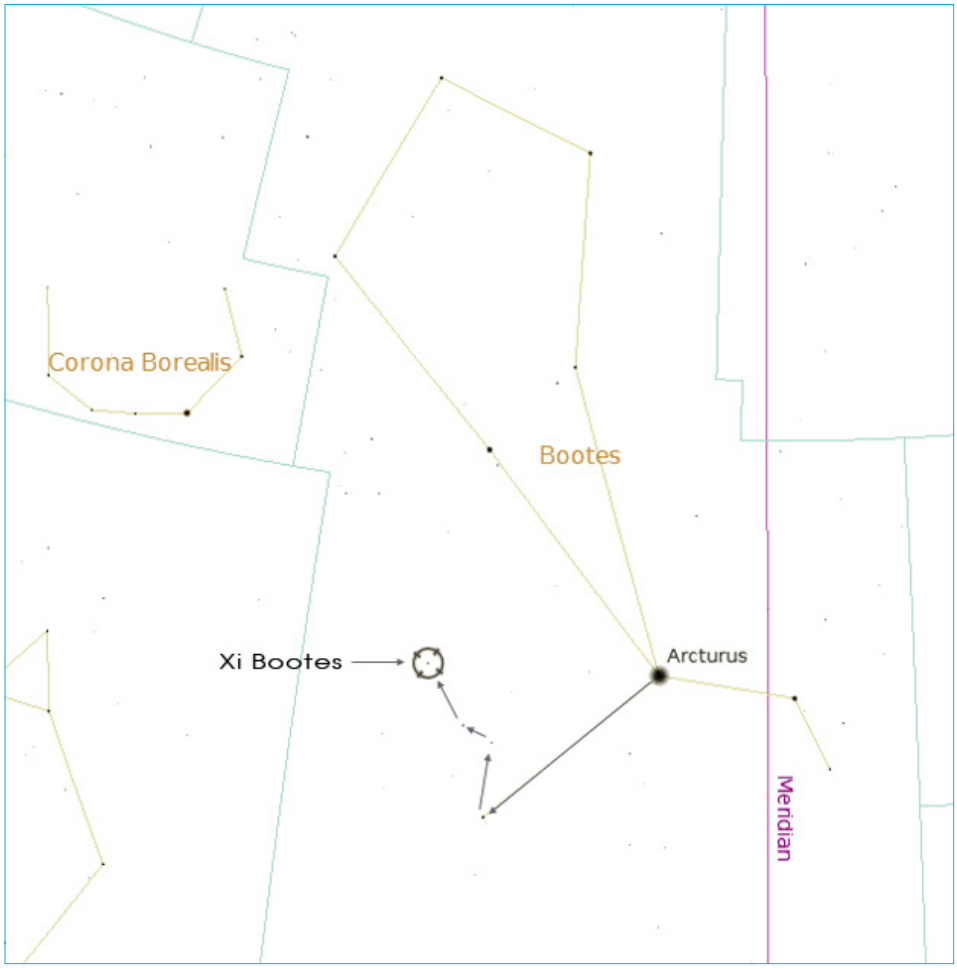
June is a fantastic time of the year to observe the night sky. The bright Sagittarius arm and galactic center of the Milky Way Galaxy rise early like an approaching storm from the southeast. The starscape at this point has switched to summer mode feature rich awesomeness. This month we will turn our aperture towards the constellation Boötes (The Bear Herder) where we find the rather dim yet colorful star Xi Boötes.

A sometimes overlooked star, Xi Bootes, lies a mere 21.9 light years away from Earth with a visible magnitude of 4.6 making this star quite dim even under slightly light polluted skies. Xi Bootes is made up of two stars with a clearly visible degree of separation at 7 arcseconds. Xi Bootes A, the primary star, has a spectral classification of G8, is 10% smaller in diameter than the Sun, and displays bright yellow characteristics. The companion star, Xi Bootes B, has a spectral classification of K4, presenting a distinctly visible red-orange hue, and is slightly smaller than Xi Bootes A at 29% smaller than the Sun.

Finding Xi Bootes in the sky can be somewhat challenging, especially if observing under light polluted skies. At magnitude 4.6 this star will surely be overpowered by local light pollution. Fret not, as the super bright star Arcturus is in the same neighborhood as Xi Bootes and will serve as a suitable guide. Shortly after sunset, while facing South, the bright yellow star Arcturus will be shining dominantly overhead. Once identified, Xi Boötes can be found 20 degrees to the left of Arcturus, the north-most star in a small group of four faint stars. When hunting for Xi Boötes be sure not to mistaken the binary star Mu Boötes for Xi Boötes. Mu Boötes is two stars south of Xi Boötes and not nearly as colorful.

Observations of Xi Boötes will easily reveal distinction between both stars with even modest backyard telescopes due to its relatively wide 7 arcseconds of separation. A noticeable yellow with hints of purple will emit from the luminous primary star with a rudy-red present in the smaller companion star. If the colorful differences in these stars do not present themselves, adjust your focus to slightly blur the view and colors should become apparent.

Don't hurry away from the eyepiece when taking in the view of binary awesomeness with this target. The easy separation and vivid colors make this star hard to leave behind and I am sure it will earn a special note on your list of killer binary stars.



Kim Arcand book signing & solar star party

May 18 at Greenville Public Library

Left to right: Kim Arcand, Tom Gilson, Bob Forgiel, Dave Huestis

A "Double-Double" Challenge

Nu (ν) Scorpii

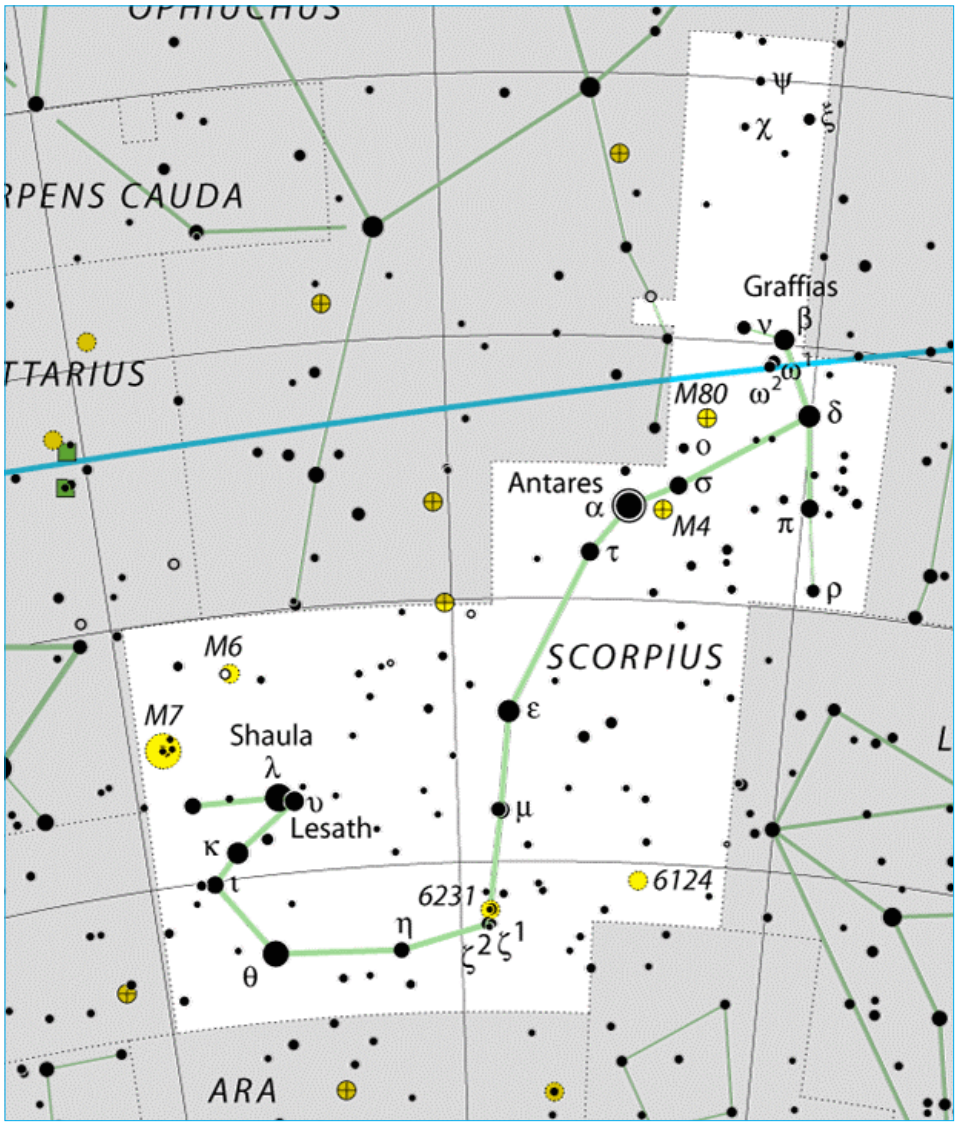
Glenn Chaple

I first met nu (ν) Scorpii in the summer of 1971. Using a 3-inch f/10 reflector and magnifying power of 60x, I saw the same wide (41 arc-second) magnitude 4.2 and 6.6 double star that the German astronomer Christian Mayer had discovered nearly two centuries earlier. At the time, I had no idea there was more to be seen.

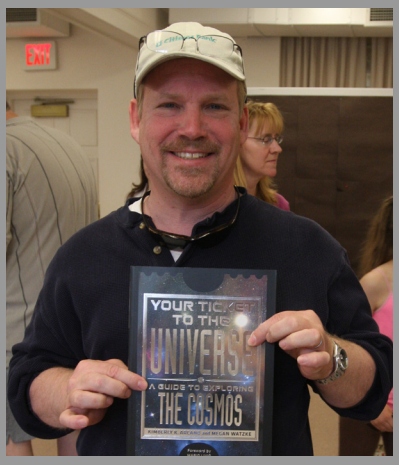
Neither did the American astronomer Ormsby M. Mitchel (who would later become a decorated Civil War general) when, in 1846, he eyed nu Scorpii with the 11-inch refractor at the Cincinnati Observatory. He was able to split the fainter star into its magnitude 6.6 and 7.2 components, which were 1.1 arc-seconds apart at the time. In 1873, the eagle-eyed double star observer S. W. Burnham outdid Mitchel by detecting the duplicity of the brighter star when its magnitude 4.4 and 5.3 components were a mere 0.3 arc-seconds apart. This was an amazing visual accomplishment, as Burnham made the discovery using a 6-inch refractor!

In the ensuing decades, these two pairs (designated Mitchel 2 and Burnham 120) widened and, by the early 1900s, were within reach of medium aperture scopes. In 1905, Agnes Clerke wrote that nu Scorpii is "perhaps the most beautiful quadruple group in the heavens." Other astronomers likened it to the better-known "Double-double" epsilon (ε) Lyrae.

Today, the two binary stars that comprise the nu Scorpii system are wider than ever – 2.4 arc-seconds for Mitchel 2 and 1.3 arc-seconds for Burnham 120. Splitting them will still require planning and patience. Because of its southerly declination, you'll have to wait until nu Scorpii is as high above the horizon as possible (around 10pm on a mid-June evening). Optimum seeing conditions are a must, and you'll need an optically sound telescope of at least 6-inch aperture and a 200x-plus magnifying power.



Was Agnes Clerke's assessment of nu Scorpii accurate? Does it actually outrank the celebrated epsilon Lyrae in visual splendor? You won't know unless you give each a telescopic examination.



MAY REPORTS

Secretary

Tom Thibault

Skyscrapers Annual Meeting Minutes – May 3, 2013

President Ed Haskell called the Skyscrapers May Members Meeting to Order at 7:32PM.

President Ed Haskell: Ed opened the meeting and the floor for updates from the Trustees and B.O.D.

Trustee Steve Siok: Informed the membership the restroom facilities has been delivered and is opened for business, so to speak.

1st Vice President Kathy Siok: Informed the membership the June, July, and August Members Meeting will be held on Saturdays. • June and July speakers have been confirmed and August will feature Member Presentations. Those interested with sharing their current and past projects or activities, please contact Kathy. • The June Members Meeting will be held on June 8th and will be a Pot Luck event beginning with refreshments at 5:30. Kathy encouraged all to bring one of their favorite summer dishes to share.

2nd Vice President Bob Horton: Noted the enjoyable time had after last month's meeting with the Double Star Challenge with Glenn Chaple. • AstroAssembly is scheduled for October 4th and 5th this year. Volunteers will be needed to assist in our organizations premier event. More to come and please consider in lending a hand.

Treasurer Linda Bergemann:

Introduced for future membership consideration was Mark Bruck. • Matthew White was voted into Skyscrapers by the membership. • Matthew and Lauren Ouellette were voted into Skyscrapers by the membership.

Good of the Organization: Member Observations • Scott Tracy noted StarConn is being held on June 1st at Wesleyan College in Middletown, Ct.

Speaker Will Vaughan provided the membership with a wealth of information about Mercury and updated all on the current findings concerning the closest planet to our sun. • Ed Haskell closed the meeting at 8:45PM and invited the membership to stay and enjoy the views through the organizations telescopes which are open for rest of the evening. Our speaker Will Vaughan joined us and was treated to views of M3, M51, M65, M66, M81, M82, M104, and Saturn before closing.

Submitted by Tom Thibault - Secretary

William Vaughan

Treasurer

Linda Bergemann

Cash Flow YTD May 21, 2013
(4/1/2013 through 5/21/13)

INFLOWS	
Donation	
Misc Donation	$132.00
Refreshment Donation	$7.20
Star Party Donations	$54.00
TOTAL Donation	**$193.20**
Dues	
Contributing	$59.05
Family	$240.00
Regular	$640.00
Senior	$150.00
TOTAL Dues	**$1,089.05**
Subscription Income	
Astronomy	$196.00
Sky & Telescope	$131.80
TOTAL Subscription Income	**$327.80**
TOTAL INFLOWS	**$1,610.05**
OUTFLOWS	
Facilities Expense	
Electric	$14.98
Trustee Exp	$179.09
TOTAL Facilities Expense	**$194.07**
Misc Expenses	
Postage and Delivery	$9.20
Refreshment Expense	$26.37
TOTAL Misc Expenses	**$35.57**
Subscription Payments	
Astronomy	$196.00
Sky & Telescope	$131.80
TOTAL Subscription Payments	**$327.80**
TOTAL OUTFLOWS	**$557.44**
OVERALL TOTAL	**$1,052.61**

Cash and Bank Accounts	**5/21/2013 Balance**
Capital One Bank	$12,304.53
Checking	$11,814.00
PayPal Account	$0.00
TOTAL ASSETS	**$24,118.53**

The Art of the Crescent Moon

Francine Jackson

I think I've found the answer to a long-standing pet peeve of mine.

For many years, whenever I've seen drawings of a crescent Moon in a night sky – especially in the daily comics – the horns of the Moon have invariably faced toward the right, like so:  As a lover of astronomy, I shudder every time I see the poor Moon exposed in such a fashion.

The sky, from our view, seems to travel from east to west. When the Moon is visible, it also appears to move with the stars. Actually, the Moon is moving independent of the rest of the sky – travelling about 2,000 mph west to east, or counterclockwise against the stars. However, it is far enough away, about a quarter million miles, that for our swift looks, it appears to be moving with the rest of the sky.

In thinking what this has to do with the shape of the Moon: Let's start with the Moon at "zero," that is, when it is in the same part of the sky as the Sun. The only reason we see the Moon is because it reflects sunlight, with one half of the Moon lit at any time. When the Sun and the Moon are on the same side of the sky, the side of the Moon away from the Earth is lit, and the side facing us is dark, making a "new" Moon.

The next night, the Moon will be about 14 degrees east of the Sun, and will set just about an hour after sunset. If you could see the Moon before it leaves the sky, it would show just a little sliver of itself. And, because the Moon is located to the left of the Sun, the right side of the Moon will be lit, like so: 

Every night, the Moon will continue to be around 14 degrees farther to the left of the Sun, and we see more of it lit. Finally, two weeks after "new," the Moon will be opposite the Sun, and we see its entire lit side, the "Full Moon," rising just as the Sun sets.

The next night, the Moon will seem to start its trek toward the Sun. Each night, we will see a little less of the Moon than the day before. And, because the Moon is now to the right (west) of the Sun, the sunlit side is now the left:  Each day, the Moon will appear smaller and smaller until it is again "new," and the process starts all over again.

Now, on to the art of the Moon. Invariably, when a person draws a crescent Moon in the nighttime sky, he will represent it like so:  For the Moon to be seen like this in the sky, the viewer would either have to be up very late (or get up just before dawn), or look up at the Moon when it is in the early daylight hours, generally before noontime. The proper crescent for a normal night sky should be this:

But, then, why does almost everybody draw the Moon backwards? After trying to answer this question for several years, I believe I've found the answer – courtesy the February, 1981 Omni magazine (living proof – never throw anything away). The reason is that most artists are right-handed, and drawing the Moon that way is more comfortable for them. For myself, a left-hander, it feels more natural to draw it the other (actual) way – try it yourself.

My main reason for writing this is that artists should try for truth in art, even though something doesn't "feel" right. Of course, sometimes it does appear there are other points that must be considered: I recently spoke with an artist who had done this reversal of the Moon for a concert series poster. Her defense – artistic license. All right, I can concede: Perhaps artistic license is a viable rationale. But, so, too, is good science.

Scott MacNeill and Francine Jackson present an award received by Frosty Drew Observatory from Yankee Magazine for **Best Stargazing in New England**

Mercury, Venus & Jupiter Conjunction

May 26

Steve Hubbard

May 27

Mercury, Venus & Jupiter Conjunction

May 31

Jim Hendrickson

Directions to Seagrave Memorial Observatory

www.theSkyscrapers.org

From the Providence area:
Take Rt. 6 West to Interstate 295 in Johnston and proceed west on Rt. 6 to Scituate. In Scituate bear right off Rt. 6 onto Rt. 101. Turn right onto Rt. 116 North. Peeptoad Road is the first left off Rt. 116.

From Coventry/West Warwick area:
Take Rt. 116 North. Peeptoad Road is the first left after crossing Rt. 101.

From Southern Rhode Island:
Take Interstate 95 North. Exit onto Interstate 295 North in Warwick (left exit.) Exit to Rt. 6 West in Johnston. Bear right off Rt. 6 onto Rt. 101. Turn right on Rt. 116. Peeptoad Road is the first left off Rt. 116.

From Northern Rhode Island:
Take Rt. 116 South. Follow Rt. 116 thru Greenville. Turn left at Knight's Farm intersection (Rt. 116 turns left) and follow Rt. 116. Watch for Peeptoad Road on the right.

From Connecticut:
• Take Rt. 44 East to Greenville and turn right on Rt. 116 South. Turn left at Knight's Farm intersection (Rt. 116 turn left) and follow Rt. 116. Watch for Peeptoad Road on the right.
• or • Take Rt. 6 East toward Rhode Island; bear left on Rt. 101 East and continue to intersection with Rt. 116. Turn left; Peeptoad Road is the first left off Rt. 116.

From Massachusetts:
Take Interstate 295 South (off Interstate 95 in Attleboro). Exit onto Rt. 6 West in Johnston. Bear right off Rt. 6 onto Rt. 101. Turn right on Rt. 116. Peeptoad Road is the first left off Rt. 116.

SKYSCRAPERS INC.

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