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## "Teach Them Young"

By Joe Arcaro

"Teach them young" was the thought of the evening as AAI hosted fifty-one Kindergarten teachers from Union County and beyond. On Tuesday, November 11, 2008, AAI held a seminar on Astronomy for members of the Union County Association of Kindergarten Educators (UCAKE). The evening was a joint project between UCAKE and AAI, and was hosted by Union County College as a Continuing Education course.

The evening began with the participants being greeted at the door outside the South Lecture Hall by a member of UCAKE carrying balloons. The festive atmosphere continued inside where each teacher was registered and was given a goodie bag consisting of a CD, pencil, tote bag, and other items.

The group was welcomed by AAI president, Joe Arcaro. Al Witzgall then delivered a riveting lecture on all aspects of astronomy from 13 billion years ago to today. The follow-up questions showed that Al had the teachers' attention. Al was immediately followed by Irene Greenstein who brought the assemblage back to Earth by providing demonstrations on ways to present astronomy to the participant's students. The teachers took part in the demonstrations, and all agreed that valuable information was shared.

Meanwhile, back at the Observatory, Bonnie Witzgall was organizing other AAI members in preparing door prizes (donated by AAI and UCAKE) along with coffee and cake. Following the lecture at the College, all the teachers were invited to return to the observatory for telescope viewing and further discussion of astronomy.

Everyone believed that the evening was a success. It could not have been successful without the support of over fifteen AAI members who, again, volunteered their time and knowledge.



UCAKE Members in South Lecture Hall  
 Photo by Lynn Bilman

# Stewart's Skybox

by Stewart Meyers

**N**ovember is when we celebrate Thanksgiving, which commemorates the harvest celebration of the Plymouth colonists. It also honors how Tsquantum (aka Squanto) helped the settlers, though Charles Mann, in his book "1491", has found that Tsquantum may have been motivated more by tribal politics than altruism. In honor of the holiday, this column will look at astronomy in colonial and early America.

## A Vague Beginning

Observations of celestial objects from the New World began as soon as European sailors started their exploration. However, these observations were solely for the purposes of navigation (remember, they didn't have GPS in those days). That includes Columbus' infamous lunar eclipse observation of 1506 during which he tricked the natives in Jamaica into giving food to his stranded crew. Columbus was attempting to determine the location of the island, though he appears to have fudged the results to put it closer to Asia. Non-navigational observations would eventually appear.

English astronomer and mathematician Thomas Hariot made the first known observation from what is now the United States in 1585. Hariot was hired as a cartographer by Sir Walter Raleigh to map the territory explored by Raleigh's expedition that year. The maps were then used by Raleigh to decide on a site for his colony of Roanoke, which vanished in 1588 under unknown circumstances. While on the trip, he sighted a comet from what is now North Carolina. But all he noted was that he saw a comet. After the expedition, Hariot returned to England and made more significant observations. He was one of the first people in England to use a telescope, and he observed the sky around the same time Galileo and Kepler made their marks on astronomy. Hariot was the first to study the refraction of light. It would be more than fifty years before another American astronomical observation was recorded.

## Puritanical Astronomers

The Puritans who settled in New England in the early 1600s would not seem likely people to dabble in astronomy. Yet, the first meaningful astronomical observation in colonial America was made on June 16, 1638 from what is now Rhode Island. It was of a lunar eclipse. An unnamed amateur took the trouble to time how long the entire eclipse took. According to Dr. P. Clay Sherrod, this marked the beginning of amateur astronomy in America.

Later, John Winthrop, colonial governor of Connecticut, brought two small telescopes over from Europe. By 1672, Winthrop donated the instruments to a small college by the name of Harvard. At the time, Harvard had no professional astronomers, so an amateur used the telescopes. Although the instruments were small, they were used to observe the comet of 1680, and one of the telescopes was later used to observe a transit of Venus. This was fortunate, as there was a major fire at Harvard while the expedition took place, so that telescope survived.

## Surveyor Says...

Skilled surveyors were in high demand in colonial America and, in those days, the only way a surveyor could find his coordinates was by sighting on stars, the Moon, and the Sun. In order to accomplish this, a surveyor had to know what star he was sighting. To find longitude, knowledge of the position of the Moon (or the Galilean moons of Jupiter - depending on which method of longitude finding was being used) was vital.

As a result, many historic notables would have had some astronomical knowledge. For example, George Washington was a surveyor before becoming a plantation owner, though he was never known to have discussed astronomy.

Getting back to colonial times, two famous surveyors of that era were also reputable astronomers. Charles Mason and Jeremiah Dixon are best known for their surveying work which ended a boundary dispute between Pennsylvania and Maryland (hence the Mason-Dixon line), but they were also respected astronomers. In 1761, they went on an expedition to observe the transit of Venus. After being unable to get to Indonesia, they observed it from South Africa instead.



The Rittenhouse Orrery in Peyton Hall, Princeton University  
Photo by Stewart Meyers

Oddly enough, the biggest name in science in colonial and Revolutionary America, Benjamin Franklin, seems to have had little interest in astronomy beyond what he published in Poor Richard's Almanac. His only known attempt at an astronomical observation, watching a lunar eclipse on October 21st, 1743, was rained out. However, the ever-resourceful Franklin turned this astronomical lemon into lemonade. By comparing reports from other observers who got clouded out and rained on as well, he was able to deduce the spiral pattern of winds in low-pressure weather systems. But, as often happened with Franklin, he narrowly missed out on discovering why this was the case. It would not be until 1856 when William Ferrel, using the rules of motion described some years earlier by Gustave Coriolis, correctly explained that the spiral patterns were the result of the winds trying to go straight on the rotating Earth.

Another scientifically advanced individual in those days, and probably the most scientifically literate president in American history was Thomas Jefferson. But, like Franklin, he had little interest in

astronomy beyond that needed for surveying work. However, that did not mean he was uninformed. When two Yale professors published their report concerning the fall of a meteorite in 1807, Jefferson commented about it. He said that the scientists had made up the story about rocks falling from the sky. Although his initial opinion was wrong, this shows that Jefferson did read astronomical papers.

A contemporary of Franklin, David Rittenhouse of Philadelphia, was interested in the planets. He built two elaborate mechanical models known as orreries that simulated the motion of the solar system. One of these is on display at Peyton Hall, the location of the regular meetings of the Amateur Astronomical Association of Princeton's (AAAP) (<http://www.princetonastronomy.org>). Rittenhouse also studied the diffraction of light, and he invented the diffraction grating in 1785. It was not until the science of spectroscopy emerged in the 19th century that the grating proved useful.

### Happy Thanksgiving

As you enjoy your dinner this Thanksgiving, remember that astronomy in America is almost as old as the time of the Pilgrims.

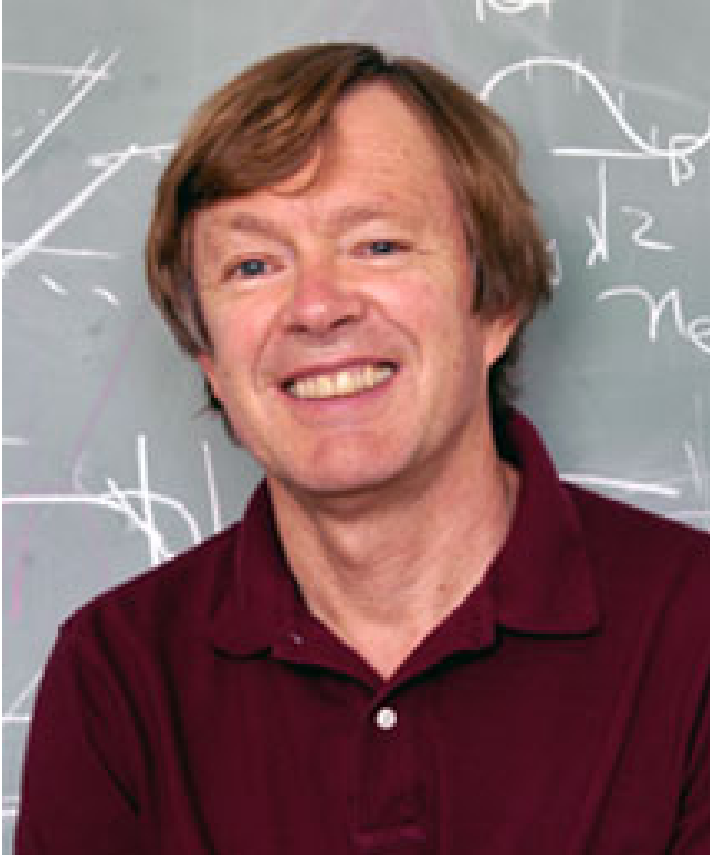
### References

Mann, Charles C. 2005. 1491: New Revelations of the Americas Before Columbus, Knopf, 465 pages.

Sherrod, P. Clay, Koed, Thomas L. and Aleichem, Sholem 2003. A Complete Manual of Amateur Astronomy: Tools and Techniques for Astronomical Observations, Courier Dover Publications, ISBN 0486428206, 335 pages.



## GENERAL MEMBERSHIP MEETING NOVEMBER 21, 2008



### “The 1.6 meter New Solar Telescope at Big Bear”

Philip R. Goode, PhD, a distinguished professor of physics at NJIT and director of the Center for Solar-Terrestrial Research, has led the project to build the world's most capable solar telescope at Big Bear Solar Observatory (BBSO), Big Bear Lake, California. For nearly three decades, BBSO has used one of the world's most powerful solar telescopes to advance knowledge of our star. This old telescope is being replaced by one with three times the resolution to enable scientists to probe the fundamental scale of the Sun's dynamic magnetic fields, which can cause storms that destroy satellites, disrupt the power grids, and interrupt telecommunications. Dr. Goode will discuss how the new telescope is made possible by pushing the envelope of current technologies.

Dr. Philip R. Goode NJ Institute of Technology

8 pm In The **MAIN LECTURE HALL**



DMK21 Digital Video Camera

### Digital Video Finder For the 24-Inch Reflector

The Technical Committee, under the direction of Clif Ashcraft, is currently completing the installation and checkout of a DMK21 digital video camera which is being mounted on the 24-inch reflector to act as a finder for the big telescope.

In operation, the  $4^{\circ} \times 3^{\circ}$  field of view displayed by the camera will be matched with a sky chart drawn by planetarium software on a second computer monitor. When the two views are the same, the target object should be centered in the telescope's main eyepiece.

The use of this system is fairly intuitive, however, hands-on instruction is being conducted for all Qualified Observers.

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## MEMBERSHIP DUES

Regular Membership:	\$21
Sustaining Membership:	\$31
Sponsoring Membership:	\$46
Family Membership:	\$5
First Time Application Fee:	\$3

*Sky & Telescope:* \$32.95

*Astronomy* subscription: \$34

(Subscription renewals to *S&T* can be done directly. See "Membership-Dues" on website for details.)

*AAI Dues can be paid in person to Membership Chair or Treasurer, or by mail to: AAI, PO Box 111, Garwood, NJ 07027-0111*

## DOMESTIC DUTY

November 28 Team E

December 5 Team A

December 12 Team B

December 19 Team C

## FRIDAYS AT SPERRY

**November 28, 2008**

"Ask Dr. Lew" Dr. Lew

**December 5, 2008**

"What's Up? A Down to Earth Sky Guide" Kathy Vaccari

**December 12, 2008**

"'Tis the Season: Telescope Buyers Beware" Mark Shoengold

*All schedules above were accurate at time of publication. Please check [www.asterism.org](http://www.asterism.org) for latest information (click on "Club Activities")*

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## DR. LEW'S SEMINARS

See Dr. Lew Thomas for possible upcoming seminar topics.

*(Choice of topic at Dr. Lew's seminars is determined by participants' interest)*

Special thanks to Gordon Bond for the "Theater in the Sky" page design.

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Special thanks to Justin Shapp for the design of the masthead and other graphics.

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# Theater<sup>in</sup><sub>the</sub> Sky

by Ron Ruemmler

December 2008 is bookended by two beautiful evening triplets, each having two bright planets and the crescent Moon. The first evening of the month finds Venus, Jupiter, and the Moon in a tight, little triangle, while the last Sunday of December features Jupiter, Mercury, and the Moon in a short, vertical line.

Venus and Jupiter are actually at their closest (two degrees) at 4 AM Eastern Time on the first, and not visible from New Jersey, but the planets move apart at only one degree per day all month. Seven hours later, Africa gets to see the Moon pass between the two planets, while western Europe finds the dark edge of the crescent Moon passing directly over Venus (occultation). By the time the sunset line gets around to North America the Moon has moved to the upper left of the two planets. Find the crescent Moon before sunset and try to see all three objects in the daytime in the same binocular field of view!

All month Jupiter moves sedately down and to the right of Venus toward the setting Sun. Around Christmas, an unusually easy-to-find Mercury jumps up to meet the giant planet. After the crescent Moon passes by on the 28th, the two planets head toward a perfect rendezvous on New Year's Eve, at which time the Moon has its own conjunction with Venus. Spectacular!

Early on the 11th the almost-full Moon passes through the upper part of the Pleiades star cluster. Binoculars might let us see Taygeta being occulted by the slim, dark leading edge. A telescope may be needed to cut through the Moon's glare. The Full Moon on the 12th is the closest and highest of the entire year. Expect extreme tides, especially if a storm is near. The Moon can also be seen passing unusually close to Regulus and Spica this month.

Saturn now rises before midnight, but it is nearly as dim as it ever gets due to the very small angle its rings make with our line-of-sight. On the 27th this angle reaches 0.99 degrees, its minimum for 2008. The Earth will cross the ringplane next year. Mars passes beyond the Sun this month marking the midpoint of its half year of invisibility.

## December Sky Calendar

1 Mon 5:00 PM Easy Venus lower left of Jupiter and lower right of crescent Moon  
5 Fri 4:25 PM First Quarter Moon  
5 Fri 5:00 PM Mars passes beyond the Sun into the morning sky  
7 Sun 4:29 PM Earliest sunset of the year  
12 Fri 11:38 AM Full Moon, just five hours before...  
12 Fri 5:00 PM Perigee; closest Moon of the year (221,560 miles)  
17 Wed 3:00 AM Regulus two degrees upper left of Moon  
19 Fri 5:30 AM Last Quarter Moon  
21 Sun 6:00 AM Spica upper left of crescent Moon  
21 Sun 7:04 AM Winter Solstice; shortest day of the year  
26 Fri 1:00 PM Apogee; most distant Moon of the year (252,650 miles)  
27 Sat 7:22 AM New Moon  
28 Sun 5:00 PM Mercury lower right of Jupiter  
28 Sun 5:00 PM Very thin crescent Moon lower right of Mercury  
29 Mon 5:40 PM Crescent Moon upper left of Jupiter and Mercury  
31 Wed 5:40 PM Venus lower left of crescent Moon; Mercury left of Jupiter

