



NEWSLETTER

RITTENHOUSE ASTRONOMICAL SOCIETY

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April 2009

OPEN TO PUBLIC AND STUDENTS
Upcoming Meeting on April 8th at
7:30 PM
The Franklin
20th Street and Benjamin Franklin Parkway

April's Meeting:

"This Art of Arts"

A Voyage to Virginia in 1611:

Robert D. Hicks, Ph. D.

*Director, Mutter Museum/Historical Medical Library
College of Physicians of Philadelphia*

The International Year of Astronomy will highlight Galileo's use of an astronomical telescope and achievements in cosmology, but the utility of the celestial sphere in creating a global economy may be overlooked. In an illustrated talk, historian Robert D. Hicks creates a voyage from England to Virginia to illustrate techniques of navigation at key moments during the ship's voyage. Techniques range from sampling mud underneath the ship to determining latitude by observation of the sun's altitude at noon. Dr. Hicks describes and explains the methods and tools that enabled Europeans to achieve a global economy by sea ... four centuries ago.

Navigation—reaching a destination by the most direct method in the shortest time—involved a keen sensitivity to the environment. Navigators sharpened their perception of the seascape by noting the shape of a coastline, the nature of the seabed underneath the ship, the changing pattern of stars at night, the apparent motions of the sun and moon, the smell and texture of the sea. Navigation as an art required more than taught knowledge: it embraced apprenticeship, experience, and skill in application. Dr. Hicks will also



display replica and original early instruments of navigation including an astrolabe, cross-staff, back-staff, and octant.

Brief biography

Robert D. Hicks is the director of the Mutter Museum and Historical Library at the College of Physicians of Philadelphia. He also directs the F. C. Wood Institute and holds the William Maul Measey Chair for the History of Medicine. Before coming to the College of Physicians of Philadelphia, Robert supervised exhibits, collections, and educational outreach as the Director of the Roy Eddleman Institute for Education and Interpretation at the Chemical Heritage Foundation in Philadelphia. He has worked with museum-based education and exhibits for over two decades, primarily as a consultant to historic sites in Virginia. The Virginia work led him to obtain a doctorate in maritime history from the University of Exeter, United Kingdom. Much of his museum work has involved the history of maritime navigation. He has written essays on navigation for several publications, most recently on the navigation of the Mary Rose, a 16th-century English warship, and he wrote the essay on the history of celestial navigation for The Oxford Encyclopedia of Maritime History.

Meeting Agenda

7:20 - Prelude
7:30 - Astronomy Lesson
President's Message
Sky This Month
Guest Speaker
Rooftop Observing - Weather Permitting

Visible Planets 04/08/2009

	Rises	Transit	Sets
Mercury	06:55 am	01:36 pm	08:19 pm
Venus	05:23 am	11:45 am	06:07 pm
Mars	05:30 am	11:14 am	04:59 pm
Jupiter	04:12 am	09:21 am	02:31 pm
Saturn	04:35 pm	11:02 pm	05:30 am

Secretary's Address

Ted Williams

I want to thank Ken Kremer for his idea and assistance inviting and promoting our March guest speaker Max Mutchler. Max gave us all a look into the discovery of Pluto's new satellites, and the image processing utilized to bring them into view.

Ivin William's talk engaged the audience with the Navajo creation story which was a treat to the ear and the eye. The artistry he shared of Navajo constellations was quite beautiful. Authentic Navaho music and Ivin's delivery helped us to find the constellations on the Fels sky.

Thanks also to Dave Walker, Mike Mountjoy, Ruth List, Daniel McCormick, Fern Culhane, Alan Daroff and Derrick Pitts who assisted to ensure the evening was a success. The large number of members and guests made it all worth while. The success is in gathering interested people together to discover and learn about the Universe around us.

President's Message

Dr. Milton Friedman

A rare event occurs every 28 years and it is happening again on April 8, 2009. According to the Jewish religion, every 28 years the sun returns to the same location in the heavens that it was in at Creation. Although that original concept is not accepted by the modern astronomical community, it provides insight into calendars and their shortcomings.

Dr. Friedman will discuss this prior to our guest speaker on Wednesday, April 8 at our RAS meeting.

To help members gather background for this rare happening, we have an article submitted by Steve Berr who can give us the Jewish perspective on "The Birthday of the Sun." Thanks to Steve for helping us with one of our International Year of Astronomy objectives which is to seek out different cultural perspectives and interpretations of the sky and subsequently the universe we live in.

Birchat Hachamah

The Birthday of the Sun

By Stephen Berr – sberr@bee.net

According to Genesis 1, v16-19, "God made the two great lights...to give light upon the earth...to rule over day and over night...and it was good. And it was evening and there was morning, a fourth day". Since Day One is Sunday, it is clear that according to the bible, the sun was created on Wednesday. But in what month did creation occur?



Talmudic scholars consider the 8th month, Tishrei, (when Jews celebrate Rosh Hashanah) as when God conceived of the world, but believe that the actual creation took place in Nissan, first month of the Jewish calendar in the spring.

Each day ends at sunset, so Jewish people count days this way: "It was evening and it was morning, Day Four." The Jewish Sabbath on Saturday begins on Friday night at sunset. Jewish commentators in the Talmud (the commentary on the Bible) believe that the sun was created on the first day of spring, at 6 PM Tuesday evening, when the fourth day of creation (Wednesday) began.

Every year we have a first day of spring, but only rarely does the first day of spring fall on Tuesday evening (start of Wednesday). That occurs every 28 years. Why only every 28 years? Take a deep breath and slowly look over the next paragraph!

The calendar is complicated by the fact that the world completes one orbit around the sun arriving back at the starting place in 365 days, 5 hours, 48 minutes and 46 seconds. This is 365.2422 days, almost 365 and a quarter days. At the time the Talmud was written between the years 200 CE and 500 CE the year was rounded to 365 days and 6 hours. (365.25 days) As a result, if we start counting the creation of the sun at occurring at sunset the evening before Day Four, 365.25 days later when we arrive at the first day of spring, the time will 1/4 day later, midnight. The following year it will be 6 AM on Day Four. The next year it will be noon on Day Four, and then finally, the following year it will be 6 PM (sunset) again, but this will now be the beginning of Day Five (Thursday). The first day of spring has thus moved from occurring on a Wednesday to occurring on a Thursday.

It takes 28 years for first day of spring to repeat on Tuesday eve, the start of Day Four.

Every 28 years when the Sun rises on a day when the first day of spring falls on Wednesday, the Talmud says we are witnessing the exact lineup of sun and earth that took place on creation. This is the time to celebrate the rare holiday of Birchat Hachamah, the blessing of the sun. Birchat Hachamah has occurred in 1925, 1953 and 1981 in

the 20th century, and will occur in 2009, 2037, 2065 and 2093 in the 21st century.

If your eyes glazed over, don't feel badly. Just understand that because the earth does not make an even number of turns on its axis for one trip around the sun, the first day of spring only falls on a Wednesday every 28 years.

Compound that with the fact that calendar changed from the Julian calendar to the Gregorian calendar in 1582 to correct for the cumulative error introduced by rounding .2422 to .25, and the result is that the holiday falls on April 8th in the 21st century.

Here is yet another piece of technical information to glaze your eyes further.

Over history, there have been many different kinds of calendars. In 1582 Pope Gregory changed the calendar to correct errors in the existing Julian calendar that had accumulated over the centuries. These cumulative errors were causing Easter to fall at inappropriate times. The last day of the Julian calendar for the Catholic world was Thursday, October 4 in 1582. The next day was the first day of the new Gregorian calendar, Friday, October 15. The first day of spring was moved from March 25th to March 21st, more in keeping with the sun's true position, and also from then on, the year had 365 days. Leap year added 1 day every 4 years, except special cases on the century mark. Only one century in four would be a leap year. 2000 was, 2100, 2200, and 2300 won't be. This creates a year that is 365.2425 days long. The error between it and the accepted value of 365.24219 days produces an error of only one day in 3,300 years. This is much more accurate than the Julian year of 365.25 days which produced an error of one day every 128 years.

This change was not accepted universally, and the Julian calendar stayed in use in Great Britain and the colonies until 1752. George Washington was born under the Julian calendar, and contemporary records give his date of birth as Feb 11. We however celebrate his birthday on Feb 22 because of the 11 day difference when we adopted the Gregorian calendar in 1752. Russia stayed with the Julian calendar until 1917, and Greece stayed with it until 1923.

While the Jewish calendar is generally lunar, there is a component used for determining the seasons that follows the sun. According to Jewish tradition, the Gregorian modification was unjustified and remains to this day unrecognized by halacha (Jewish law). The Jewish solar calendar follows the Julian calendar (JD), and sets the first day of spring as March 25th. In 1582 JD, March 25th corresponded to Gregorian April 4, 1582. Since then, because of the tiny difference caused by the new calendar skipping 3 leap years every 400 years, the halachic first day

of spring has been shifting slightly forward in the Gregorian year ever since 1582.

Here are the Gregorian dates for the Julian start of spring of March 25th JD.

- * In 1609, spring began sunset April 4
- * In 1709, spring began sunset April 5
- * In 1809, spring began sunset April 6
- * In 1909, spring began sunset April 7
- * In 2009, spring will begin sunset April 7

Again, in summation, because the Jewish calendar kept the Julian calendar and did not change to the Gregorian calendar in 1582, and because the Jewish calendar never accepted March 21st as the first day of spring, the Jewish first day of spring begins at sunset on April 7th in the 21st century modern western calendar.

This year we have a very special birthday for the sun. Although the Jewish first day of spring (April 7-8) occurs on Day Four (Wednesday) only every 28 years, it is even rarer for that day to fall on Nissan 14, the eve of Passover. This has happened about 4 times in the last 1,400 years. The last time was in 1925. The time before that was 1309, then before that, 693 and before that 609. This year Birchat Hachamah occurs on Nissan 14, the eve of Passover. I don't know when the next date is since my calculations for Birchat Hachamah only go to 2121. Here are the dates for the next those reoccurrences of Birchat Hachama, and their dates on the Jewish calendar

- * Wednesday, April 8, 2037 (23 Nisan 5797)
- * Wednesday, April 8, 2065 (2 Nisan 5825)
- * Wednesday, April 8, 2093 (12 Nisan 5853)
- * Wednesday, April 9, 2121 (21 Nisan 5881)

There are many in the evangelical Christian world who believe that this congruence of Birchat Hachamah and the eve of Passover will produce the rapture, when Christians are suddenly taken from the earth to participate in the second coming of Christ. Many are prophesying special events in 2009 because of this rare confluence of Birchat Hachamah and Passover.

So here we are, getting ready for the rarest holiday in the Jewish calendar. No child in our schools has ever experienced a Birchat Hachamah. Many of us adults have already experienced one, some two, some even 3, and if you were born before 1925, you can look forward to your 4th Birchat this year.

When the sun sets on Wednesday evening April 8, realize that according to the Talmud, on the new day that is now starting, the sun has aligned itself in the same place it was when it was created on the 4th day of creation. Special prayers can be said upon seeing the sun on the morning of April 9th. In addition to reading of certain psalms,

the special blessing that should be said (the same one that should be said on seeing lightening or shooting stars) is: "Blessed are You, Lord our God, ruler of the universe, who does the work of creation".

Happy birthday sun!

A Talk By Dr. Neil deGrasse Tyson

By Ivin Williams

On Tuesday evening March 3, 2009, I attended a talk at the Free Library of Philadelphia given by Dr. Neil DeGrasse Tyson the astrophysicist and director of the Hayden Planetarium in New York City's Museum of Natural History. Dr. Tyson was in town to promote his new book "The Pluto Files: The Rise and Fall of America's Favorite Planet" but due to the area still digging out from a snowstorm that blew in a day earlier, I had my doubts about how many people would brave the elements to come and listen to an astrophysicist talk. I was dead wrong and it was a good thing that I arrived early because the seats quickly filled up.

After Dr. Tyson was introduced, he proceeded to get comfortable by emptying his pockets and removing his boots which drew laughter from the audience. After giving a brief overview of Pluto, Dr. Tyson explained how as planetarium director he was responsible for a solar system exhibit and after some thought decided to exhibit the models not in the traditional way of lining them up according to their distance from the sun, but instead chose to group them by their actual composition and physical features. This meant that the terrestrial planets were given their own space and the gas giants were grouped together in another space while smaller icy Kuiper Belt like objects that orbit beyond Neptune were given yet another space. Dr. Tyson included Pluto in this last group due to it's size and composition and did not give it much thought beyond that.

Dr. Tyson then discussed how his decision to group Pluto along with other icy objects was largely overlooked by outsiders of the planetarium until a front page article in the January 22, 2001 New York Times read "Pluto's Not a Planet? Only in New York". The prior day was President George W. Bush's first day in office but by many accounts, the real headline story was the nerve of Dr. Tyson to not include Pluto alongside the other eight solar system planets. This led to Dr. Tyson being the recipient of lots of dreaded hate mail and surprisingly much of it coming from school aged children who bombarded him with their bad thoughts about him and their hurt feelings. Further abuse of Dr. Tyson occurred a few years later when the International Astronomical Union (IAU) officially demoted

Pluto to "dwarf planet" status after it failed to meet one of the criteria for being a planet namely that it had not cleared out the neighborhood around it's orbit.

Dr. Tyson was both amused and perplexed by all of this hostility directed towards him and he knew that he had struck a raw nerve somewhere and went on to explain with a real sense of humor how he felt that American popular culture was primarily responsible for Pluto being elevated to pop icon status and not anything of any real significance that the previous ninth planet had actually brought to the table. Dr. Tyson also took a playful stab at one culprit in particular, Mickey Mouse's pet dog Pluto.

Dr. Tyson also recalled the touching story of when he was still Neil the student at the Bronx High School of Science. While there, he applied to several universities including Cornell in upstate New York. In time he received a letter from Dr. Carl Sagan the famous astrophysicist who not only invited him to visit the campus but greeted him when he arrived and gave Neil a personal tour. Back at his office, Dr. Sagan reached behind his desk and pulled out a copy of his latest book, signed it and handed it to a stunned Neil. Dr. Sagan extended even more hospitality towards Neil when he wrote his number on his business card and told Neil to call him in case he missed his return bus to New York City and needed to spend the night. Dr. Tyson said that he has always remembered the kindness that Dr. Sagan extended towards him because as famous as he was, he did not have to pay any attention to some science student named Neil. Dr. Tyson continues to this day to thank Dr. Sagan even though he is no longer with us by always dropping what he is doing to immediately answer a student's question even if it means putting someone important on hold.

Afterwards, Dr. Tyson answered several questions and then invited everyone upstairs so he could answer yet more questions while signing books for those who purchased it because the proceeds were going to stay right there at the Free Library of Philadelphia.

It was very obvious to me and I am sure to everyone else in the audience that Dr. Tyson not only has a real love, passion and extreme knowledge for the science of astronomy but that he also holds no ill will or hard feelings towards all those school children who called him names and accused him for being heartless towards their beloved Pluto.

Our **NEW** Mailing Address:

Rittenhouse Astronomical Society
P.O. box 283
Feasterville, PA 19053-0283