WEST VIRGINIA UNIVERSITY
EBERLY COLLEGE OF ARTS AND SCIENCES
THE DEPARTMENT OF PHYSICS
TOMCHIN PLANETARIUM AND OBSERVATORY

Mountaineer Skies

Volume 10, Issue 3 http://planetarium.wvu.edu/ July – September 2010

Some Events This Quarter

July 6 - the Earth is farthest from the Sun at 1.017 astronomical units (*AU). This is called **aphelion**. When the Sun is nearest the Earth it is called **perihelion** and occurs about six months later, in this case on **January 3, 2011**.

August 12 - the **Perseids Meteor** shower peaks and will appear to come from the constellation **Perseus, the Hero**, located in the northeastern sky. Viewing will be better later in the evening as Perseus gets higher and higher as the night goes on.

September 22 – This is the **first day of Autumn.** It is also known as the **Autumnal Equinox**. This is one of the two days a year when the Sun spends approximately as much time above the horizon as it does below. The other equinox is called the **Vernal Equinox**, or the first day of Spring.

*** AU = 149,598,000 kilometers or 92,960,000 miles**

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In The Sky This Quarter

Visible Planets in the Night Sky

Beginning of July, 2010

	Const	Rise	Transit	Set	Mag
Sun		05:53	13:23	20:53	-26.8
Mercury	Gem	06:11	13:41	21:16	- 1.8
Venus	Leo	09:13	16:13	23:15	- 4.1
Mars	Leo	11:10	17:40	00:09	1.4
Jupiter	Psc	00:46	06:50	12:57	- 2.5
Saturn	Vir	12:26	18:39	00:51	1.1

Beginning of August, 2010

	Const	Rise	Transit	Set	Mag
Sun		06:17	13:26	20:34	-26.8
Mercury	Leo	08:37	15:09	21:43	0.2
Venus	Vir	10:06	16:18	22:30	- 4.2
Mars	Vir	10:40	16:45	22:48	1.5
Jupiter	Psc	22:46	04:50	10:54	- 2.8
Saturn	Vir	10:32	16:45	22:54	1.1

Beginning of September, 2010

	Const	Rise	Transit	Set	Mag
Sun		06:46	13:19	19:52	-26.8
Mercury	Sex	07:04	13:26	19:39	4.4
Venus	Vir	10:39	16:02	21:24	- 4.4
Mars	Vir	10:17	15:55	21:32	1.5
Jupiter	Psc	20:39	02:40	08:40	- 2.9
Saturn	Vir	08:46	14:55	21:00	1.0

Gem	Gemini, the Twins
Leo	Leo, the Lion
Psc	Pisces, the Fishes
Vir	Virgo, the Maid
Sex	Sextans, the Sextant

About: Potentially Hazardous Object (PHO)

As revealed in our planetarium show ***Impact Earth***, comets and asteroids of large size do impact our planet with enough force to cause catastrophic damage. It is believed that this is what caused the death of the majority of dinosaurs some 65 million years ago and also the Tunguska event of 1908, when what is thought to be a comet hit the Earth with a force of hundreds of atomic bombs of the type dropped on Hiroshima, Japan, during the concluding days of World War II. Fortunately, the Tunguska area of Russia is very remote so that human fatalities were minimal.

Today we recognize the real danger that these objects pose to our blue world, and we have become more watchful of the skies. Comets and asteroids that come somewhat near the Earth are generally known as Near Earth Objects (NEO's) but the really close, potentially dangerous ones are called **Potentially Hazardous Object** (**PHO**'s). To be counted as a PHO, a body must be at least 400 feet in diameter, have an optical magnitude of 22.0, and come within 0.05 astronomical units **(1 AU = 149,598,000 kilometers or 92,960,000 miles)** or less to the orbit of the Earth. This means within about 7,479,893.55 km (4,648,000 miles.) There are currently (as of May 24, 2010) **1127** identified PHO's. One of the closest is an asteroid named **Apophis** discovered in 2004 and fitting the definition of a PHO. In fact, it was at first thought that **Apophis** had a 2.7 % chance of impacting the Earth, specifically on April 13, 2029. That, coincidently, is on a Friday, Friday the 13th. Closer observation has indicated that it will come no closer than 18,000 miles. This is within the 22,000 mile orbit of geostationary satellites. **Apophis** will again approach the Earth in 2036, but how close it will come to us has yet to be determined.

If we found an asteroid or comet that was going to hit the Earth, is there anything we could do about it? Most natural disasters are unstoppable.

We cannot stop volcanoes from erupting or hurricanes or tornadoes from blowing, or earth-quakes from shaking or most forest fires from burning, but there is a chance that we can stop a large asteroid or comet from hitting the earth. If that happens, that would be the first time in the history of our planet that man has actually stopped a natural disaster from happening instead of just cleaning up after the tragedy.

What are some of the ways we could do this? We either have to move the Earth out of the way or move the asteroid out of the way. Probably the most realistic is to force the asteroid to move rather than the Earth. Because we are not likely to have a lot of time, say a couple of years if we are lucky, we have to depend on technology we have right now. All of these methods require that we get close to or on the asteroid. This would of course take some time.

Blast the offending body with a nuclear weapon. Care would have to be taken to ensure that the explosion would not just make one large problem into many smaller, but significant, ones. Better to use not so large a warhead, but one that would just push the asteroid off course.

Attach a rocket to the PHO. Although technically difficult, it is a good way because you simply attach a rocket to the asteroid and blast the rock off course using known technology.

Mount a sail on the rock. Then you just sail it away using the solar wind much as a sailboat uses the wind on a lake or ocean on Earth.

I am sure that there are other novel, as well as practical, ways to move the colliding object away from the Earth. As a mater of fact, this is being worked on even as you read this.

Currently there is no immediate need, but the future is uncertain and it is best to be prepared.

PHO's are being taken very seriously.

2010 Planetarium Shows

August 27 8:00 P.M. - **Origins of Life** 9:00 P.M. – **Amazing Astronomers of Antiquity**	**September 10 & 24** 7:00 P.M. - **Origins of Life** 8:00 P.M. – **Amazing Astronomers of Antiquity**	**October 8 & 22** 7:00 P.M. - **Origins of Life** 8:00 P.M. - **Amazing Astronomers of Antiquity**
November 12 & 19 7:00 P.M. - **Origins of Life** 8:00 P.M. – **Amazing Astronomers of Antiquity**	**December 3, 10, & 17** 7:00 P.M. - **'tis the Season** 8:00 P.M. - **'tis the Season** 9:00 P.M. - **'tis the Season**	

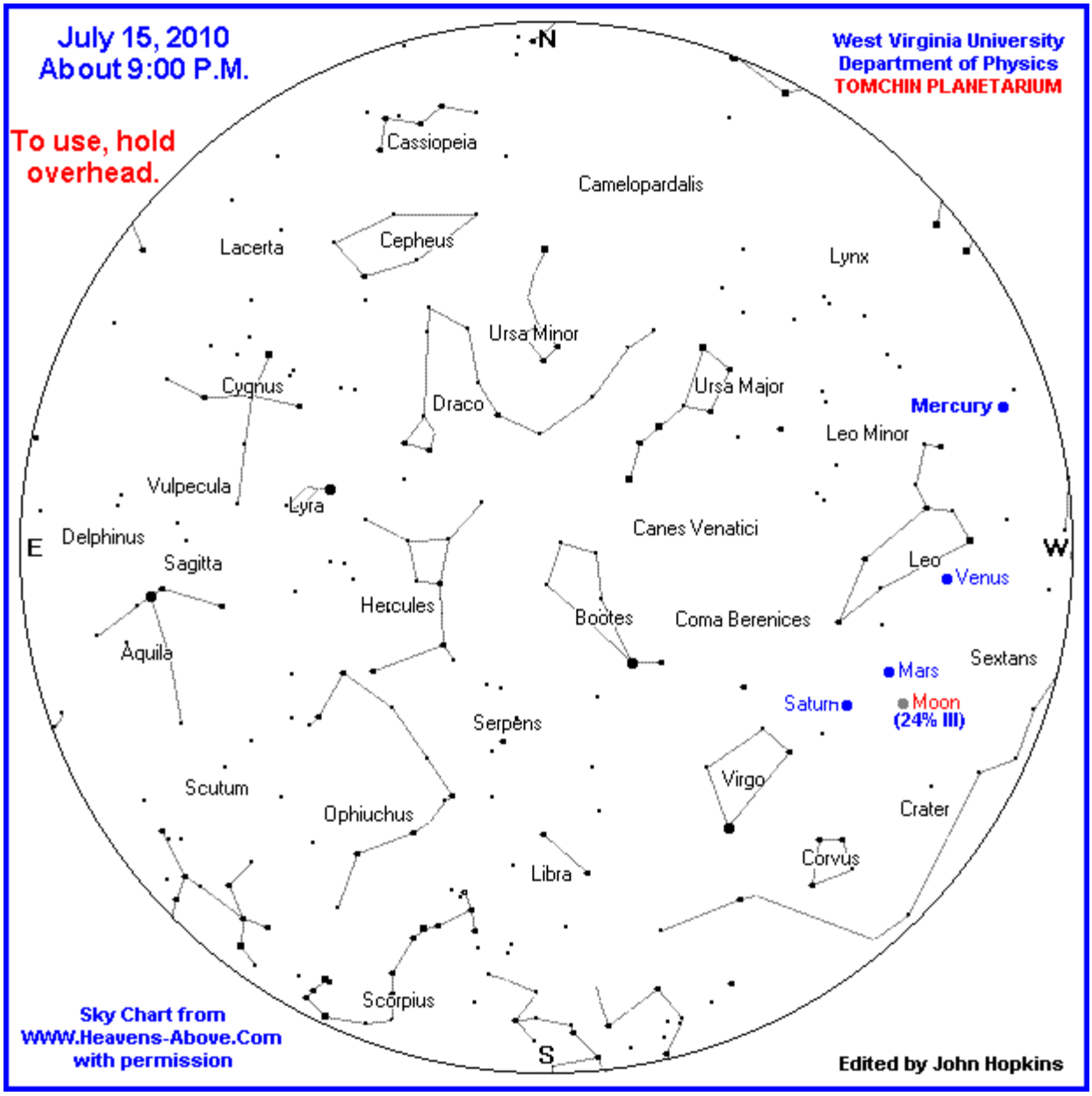
For those who are interested in bringing a group, such as schools or scouts, during the day, please call for more information. These shows are usually given on Tuesday or Thursday mornings.

For further information or reservations, please call John Hopkins at (304)293-3422, extension 1443 or by email at: jhopkins@mail.wvu.edu

Selected Sunrise/Sunset and Moon Rise/Moon Set Times

Date	Sunrise	Sunset	Moon Rise	Moon Set	Moon Phase
Jul 4	5:57 A.M.	8:50 P.M.	12:24 A.M.	1:47 P.M.	Last Qtr
Jul 11	6:01 A.M.	8:48 P.M.	5:41 A.M.	8:49 P.M.	New Moon
Jul 18	6:06 A.M.	8:45 P.M.	2:17 P.M.	12:04 A.M.	First Qtr
Jul 25	6:12 A.M.	8:39 P.M.	8:25 P.M.	5:44 A.M.	Full Moon
Aug 2	6:19 A.M.	8:32 P.M.	11:52 P.M.	1:39 P.M.	Last Qtr
Aug 9	6:25 A.M.	8:24 P.M.	5:46 A.M.	7:59 P.M.	New Moon
Aug 16	6:32 A.M.	8:15 P.M.	2:22 P.M.	11:58 P.M.	First Qtr
Aug 24	6:39 A.M.	8:04 P.M.	7:47 P.M.	6:36 A.M.	Full Moon
Sep 1	6:47 A.M.	7:52 P.M.	12:00 P.M.	2:36 P.M.	Last Qtr
Sep 8	6:53 A.M.	7:41 P.M.	7:07 A.M.	7:30 P.M.	New Moon
Sep 15	7:00 A.M.	7:29 P.M.	3:07 P.M.	NA	First Qtr
Sep 23	7:07 A.M.	7:16 P.M.	7:03 P.M.	7:23 A.M.	Full Moon
Sep 30	7:14 A.M.	7:05 P.M.	11:53 P.M.	2:18 P.M.	Last Qtr

July 2010 Sky Chart* for:
10:00 P.M. at the beginning of the month
9:00 P.M. in the middle of the month
8:00 P.M. at the end of the month



***Sky Chart used with the kind permission of Heavens-Above at http://www.heavens-above.com/**

The TOMCHIN PLANETARIUM is named in honor of the late Harold Tomchin, of Princeton, W.Va., who made a generous donation to ensure its continuing operation, and whose family continues to support the planetarium for the educational benefit of WVU students, staff, and faculty members, as well as the local community. Contributions can be made in support of the planetarium through the WVU Planetarium Project at the WVU Foundation, Inc., phone (304)284-4000. Thank You.

Edited by John Hopkins
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