

# Mountaineer Skies

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<http://planetarium.wvu.edu/>

July – September 2011

On **July 4, Independence Day**, the Earth is at **aphelion**. Aphelion is when the Earth is farthest from the Sun.

On **July 18, John Glenn**, a veteran combat pilot (59 combat missions during WWII and 63 combat missions during the Korean War) and one of the original Mercury Seven astronauts, will celebrate his 90<sup>th</sup> birthday. Although not America's first man into space, that honor went to Alan Shepard, he was the first American to orbit the Earth and at the age of 77 was the oldest person yet to fly in space as a crew member of Space Shuttle Discovery's mission STS-95 launched on October 29, 1998.

The **Perseids Meteor Shower** will peak on the night of **August 12/13** with up to 60 meteors per hour possible. Radiating from the constellation **Perseus**, this is one of the best showers all year.

On **September 23**, the **Autumn Equinox** will occur. This is the first day of autumn and one of the two days each year when the Sun rises due east and sets due west. The other day is the **Spring Equinox** which happens around **March 20** yearly.

## In The Sky This Quarter

### Visible Planets in the Night Sky

#### Beginning of July, 2011

	Const	Rise	Transit	Set	Mag
Sun		05:56	13:24	20:51	-26.8
Mercury	Cnc	07:31	14:49	22:11	-0.4
Venus	Tau	05:03	12:29	19:56	-3.9
Mars	Tau	03:45	11:04	18:24	1.4
Jupiter	Ari	02:09	08:52	15:38	-2.3
Saturn	Vir	13:29	19:25	01:20	0.9

#### Beginning of August, 2011

	Const	Rise	Transit	Set	Mag
Sun		06:20	13:26	20:33	-26.8
Mercury	Leo	08:16	14:47	21:15	1.4
Venus	Cnc	05:59	13:10	20:24	-3.9
Mars	Tau	03:06	10:34	18:04	1.4
Jupiter	Ari	00:18	07:05	13:56	-2.5
Saturn	Vir	11:32	17:29	23:22	0.9

#### Beginning of September, 2011

	Const	Rise	Transit	Set	Mag
Sun		06:49	13:20	19:51	-26.8
Mercury	Leo	05:19	12:10	19:01	0.1
Venus	Leo	07:11	13:39	20:08	-3.9
Mars	Gem	02:36	10:00	17:26	1.4
Jupiter	Ari	22:20	05:09	11:57	-2.7
Saturn	Vir	09:45	15:37	21:26	0.9

Cnc	Cancer, The Crab
Tau	Taurus, The Bull
Ari	Aries, The Ram
Vir	Virgo, The Maid
Leo	Leo, The Lion
Gem	Gemini, The Twins

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## A Short Biography of Edwin Hubble

"Equipped with his five senses, man explores the universe around him and calls the adventure Science."

This is a quote from Edwin Hubble (1889-1953), the brilliant twentieth century astronomer for whom the Hubble Space Telescope (HST) was named. He led a very interesting and varied life. Edwin was born in the small Missouri town of Marshfield in 1889. His birth was just 5 years after and a hundred miles from another famous son of Missouri, Harry S. Truman. As it is with most accomplished men, including Truman, he was an avid reader at an early age, especially enjoying science fiction and adventure novels. Early on he moved to Kentucky and shortly thereafter to Chicago in 1898 with his family where he quickly demonstrated excellence in academics, especially science and mathematics. Interestingly enough, his first real competitive successes came not in the classroom but in the arena. In 1906 while still in high school, he broke the Illinois State high jump record and won seven first places and a third at one particular track meet in the same year. Other athletic interests included boxing, basketball, and fly fishing. After matriculating to the University of Chicago, where he concentrated primarily on astronomy, mathematics, and philosophy, he became an excellent collegiate basketball player as well as continuing his participation in boxing. Always a gifted student, he won one of the earlier Rhodes Scholarships to Oxford (England) where he studied, surprisingly, law and then Spanish, rather than astronomy.

After completing his studies at Oxford University, he returned to Louisville, Kentucky, where he passed the bar and then opened a small law office in 1913. This pursuit did not hold his attention for long. He soon returned to the University of Chicago where he finished his doctorate in astronomy in 1917. This was a field that suited his talents much better than law. At this time World War I was raging in Europe, so he enlisted as an officer in the 343rd Infantry, 86th Division and deployed to France where he quickly rose to the rank of major.

Returning from the tragic fields of France in 1919, Hubble immediately went to work for the Mount Wilson Observatory in California near Los Angeles. Up to this time it was generally assumed that the Milky Way Galaxy contained all there was in the universe.

He changed that view significantly. During the 1920's his research into Cepheid variables led him to conclude that some of the objects that he was observing, which looked like smudgy clouds, were, in actuality, other galaxies, proving that the universe was much larger than it was previously thought. This was a giant move forward in understanding the cosmos.

After realizing that there were many more galaxies than our own, he developed a system of galaxy classification based on how far they were from us, how bright they were, and their shape. His classification included **elliptical**, **spiral**, and **barred spirals** galaxy. Those galaxies that did not fit in with these were relegated into another category, **irregular shaped** galaxies.

Using these observations he developed a concept called Hubble's Law that showed that the universe was expanding in all directions. This law was used to determine the age of the universe. Early estimates put the age of the universe at 9-12 billion years old. Using current data from the WMAP satellite, it is currently estimated that the age of the universe is about 13.7 billion years. However, work continues to improve the accuracy of this estimate.

An important and interesting concept came from his discovery that the universe is expanding. If this is true, and it appears to be, then at some time in the remote past there must be a point (a singularity) from where everything began expanding. The initial explosion (assumed) became known as the Big Bang.

When Albert Einstein developed his justly famous general relativity theory, he recognized that his equations predicted that the universe is dynamic. However his intuition, for once failing him, told him that the cosmos was really unmoving, static, so he added a fictional "cosmological constant" to his equations to make them reflect this belief. Hubble's work clearly showed that this was not true. The universe was indeed expanding. So he became one of the few people ever to correct Albert Einstein in a scientific matter. In 1931 the famous physicist paid a visit to Hubble at the Mount Wilson Observatory to thank him for correcting his "cosmological constant" error, "the greatest mistake of my life," Einstein said.

A true scientific giant of the last century, Edwin Hubble died in 1953, leaving behind a remarkable

## 2011 Planetarium Shows



July 2011 Closed	August 26, 2011 8:00 P.M. Ultimate Universe 9:00 P.M. It's About Time	September 9 and 23, 2011 8:00 P.M. Ultimate Universe 9:00 P.M. It's About Time
October 14 and 28, 2011 7:00 P.M. Ultimate Universe 8:00 P.M. It's About Time	Nov 11 and 18, 2011 7:00 P.M. Ultimate Universe 8:00 P.M. It's About Time	December 2, 9, and 16 7:00 P.M. 'tis the Season 8:00 P.M. 'tis the Season 9:00 P.M. 'tis the Season

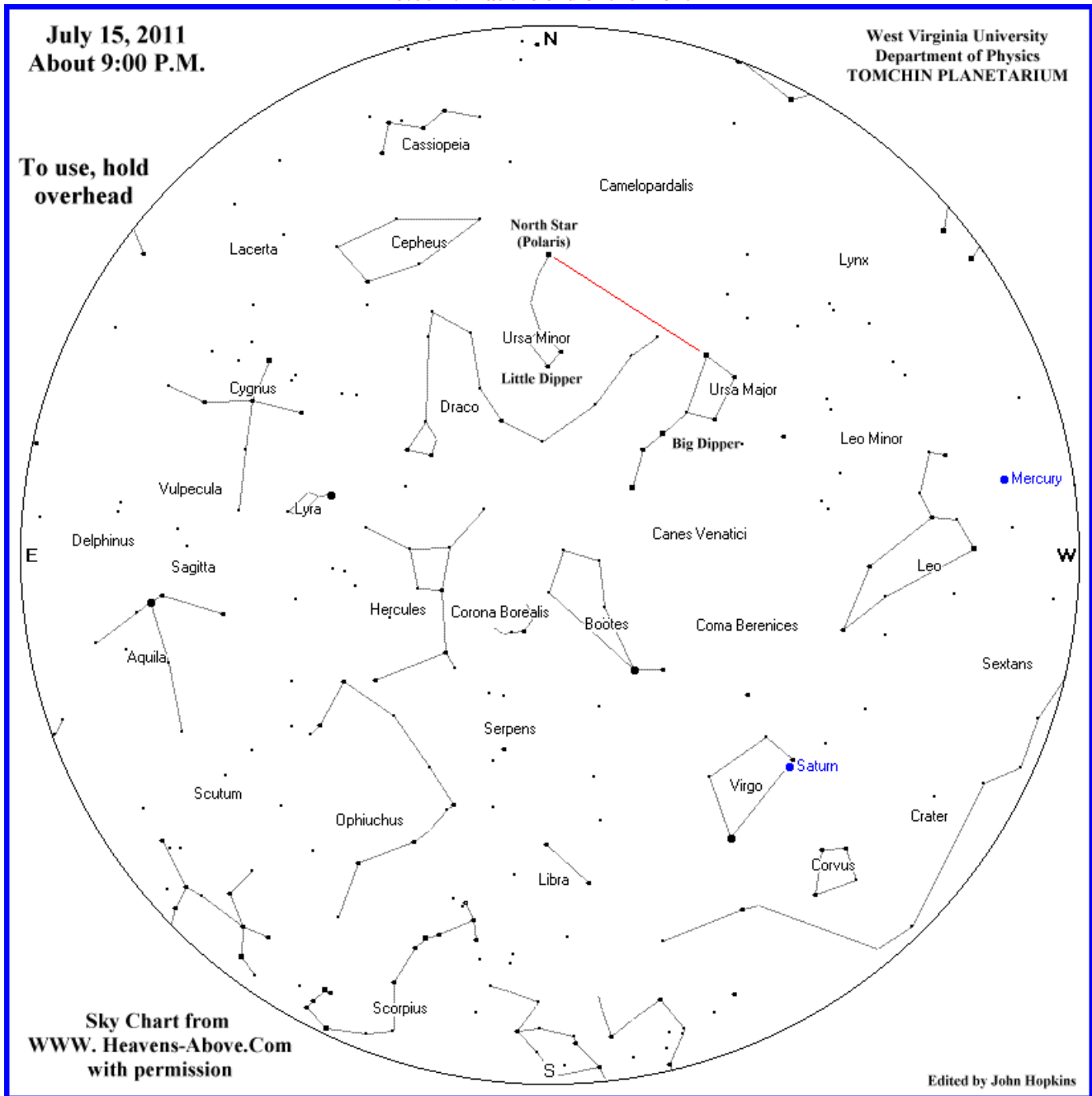
For those who are interested in bringing a group, such as schools or scouts, during the day, please call for more information. These shows are usually given on Tuesday or Thursday mornings.

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

### Selected Sunrise/Sunset and Moon Rise/Moon Set Times

Date	Sunrise	Sunset	Moon Rise	Moon Set	Moon Phase
Jul 1	5:56 A.M.	8:52 P.M.	6:10 A.M.	9:09 P.M.	New Moon
Jul 8	5:59 A.M.	8:50 P.M.	2:18 P.M.	12:29 A.M.	First Qtr
Jul 15	6:04 A.M.	8:47 P.M.	8:59 P.M.	6:27 A.M.	Full Moon
Jul 23	6:11 A.M.	8:42 P.M.	12:11 A.M.	2:27 P.M.	Last Qtr
Jul 30	6:17 A.M.	8:36 P.M.	6:08 A.M.	8:22 P.M.	New Moon
Aug 6	6:23 A.M.	8:29 P.M.	2:30 P.M.	NA	First Qtr
Aug 13	6:30 A.M.	8:20 P.M.	8:01 P.M.	6:22 A.M.	Full Moon
Aug 21	6:37 A.M.	8:09 P.M.	11:58 P.M.	2:12 P.M.	Last Qtr
Aug 28	6:44 A.M.	7:59 P.M.	6:09 A.M.	7:26 P.M.	New Moon
Sep 4	6:50 A.M.	7:48 P.M.	2:32 P.M.	NA	First Qtr
Sep 12	6:57 A.M.	7:35 P.M.	7:22 P.M.	7:13 A.M.	Full Moon
Sep 20	7:05 A.M.	7:22 P.M.	NA	2:42 P.M.	Last Qtr
Sep 27	7:11 A.M.	7:11 P.M.	7:24 A.M.	7:00 P.M.	New Moon

**July 2011 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.



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