

# Mountaineer Skies

Volume 14, Issue 1

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

January - March, 2014

On the night of January 2/3, the **Quadrantids meteor shower** will be at its maximum with an expected 40 incidences per hour. The sky should be very dark making seeing excellent.

The **Earth** will be at **perihelion** on **January 4**. This is when the Earth is closest to the Sun at 0.983 AU or about 91,376,000 miles. On Independence Day, July 4, the Earth will be at aphelion when Earth-Sun distance is at its greatest, 1.02 AU's or about 94,815,000 miles. An AU (astronomical unit) is equal to about 92,955,000 miles and is the average distance between the Earth and Sun.

**Daylight Saving Time (DST)** will begin on Sunday, March 9. Set your clocks ahead one hour. This is also a good time to change the batteries in your smoke detectors. DST will end this year on Sunday, November 2.

On Thursday, March 20, the **Vernal Equinox**, or the first day of spring, will occur. **The Summer Solstice**, or the first day of summer, happens on Saturday, June 21.

## In The Sky This Quarter

### Visible Planets in the Night Sky

#### Beginning of January, 2014

	Const	Rise	Transit	Set	Mag
Sun		07:41	12:23	17:06	-26.8
Mercury	Sgr	08:01	12:33	17:08	-1.2
Venus	Sgr	08:21	13:27	18:26	-4.3
Mars	Vir	00:27	06:20	12:16	0.8
Jupiter	Gem	17:19	00:42	08:05	-2.7
Saturn	Lib	03:38	08:46	13:58	0.6

#### Beginning of February, 2014

	Const	Rise	Transit	Set	Mag
Sun		07:27	12:33	17:40	-26.8
Mercury	Aqr	08:14	13:44	19:12	-0.4
Venus	Sgr	05:17	10:25	15:37	-4.6
Mars	Vir	23:21	05:01	10:40	0.2
Jupiter	Gem	14:59	22:24	05:48	-2.6
Saturn	Lib	01:46	06:53	11:59	0.5

#### Beginning of March, 2014

	Const	Rise	Transit	Set	Mag
Sun		06:51	12:32	18:12	-26.8
Mercury	Aqr	05:45	11:00	16:18	0.7
Venus	Sgr	04:27	09:33	14:39	-4.6
Mars	Vir	21:50	03:26	09:01	-0.5
Jupiter	Gem	13:01	20:26	03:52	-2.5
Saturn	Lib	23:59	05:05	10:12	0.4

Sgr	Sagittarius, The Archer
Lib	Libra, The Scales
Vir	Virgo, The Maid
Gem	Gemini, The Twins
Aqr	Aquarius, The Water Bearer

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**About: Are all stars white?**

Looking up at the stars on a fine clear evening, at first glance we might think that all the stars are white, but on closer inspection we can see that is really not so. As an example, in the constellation **Orion, the Hunter**, the star that marks his upper left hand shoulder is called **Betelgeuse** (most usually pronounced “**Beetlejuice**” in English like the movie of some years ago) and is clearly not white, but somewhat reddish. Okay, so what? Does the color mean anything? It does indeed.

The color of a star is an indication of its surface temperature. **Betelgeuse** is reddish so its color code is **M**. (See Yerkes Spectral Classification Table below.) Hence we know that its temperature is less than **3,700 \*K** (Kelvin) or **6,200 °F** (Fahrenheit). For the ambitious, there is a simple way to convert Kelvin to Fahrenheit using this formula:

$$°F = 9/5(K - 273°) + 32°.$$

For example, what would **6000 K** be in °F?

$$\begin{aligned} °F &= 9/5(K - 273°) + 32° \\ &= 9/5(6000° - 273°) + 32° \\ &= 9/5(5727°) + 32° \\ &= 10,340.6° \end{aligned}$$

**\*\*Yerkes Spectral (MKK) Classification Table**

Color Code	Color	Temp (K)	Temp (°F)
<b>O</b>	Blue	≥ 30,000	≥ 53,540
<b>B</b>	Blue-white	10,000-30,000	17,540 – 53,540
<b>A</b>	White	7,500-10,000	13,040 - 17,540
<b>F</b>	Yellow-white	6,000-7,500	10,340 -13,040
<b>G</b>	Yellow	5,200-6,000	8,900 – 10,340
<b>K</b>	Orange	3,700 – 5,200	6,200 – 8,900
<b>M</b>	Red	≤ 3,700	≤ 6,200

\*Since 1967 Kelvin is written without a degree (°) symbol.

\*\*The **MKK** stands for the last name of its originators, William Morgan, Philip Keenan, and Edith Kellerman and is often shortened to **MK**.

If you were to look in the contents of the Royal Astronomical Society of Canada’s excellent annual publication “Observer’s Handbook” for their **Table of the Brightest Stars**, you would find **Rigel’s** (the second brightest star in Orion after Betelgeuse) MK type as **B8 Ia**. Looking at the Spectral Type Table we see that **B** is blue-white with a surface temperature of between **10,000 – 30,000 K (17,540 – 53, 540 °F)**. The **8** is a subdivision from 0 to 9 where 0 is hotter and 9 is cooler, so an **8** indicates a cooler temperature closer to 10,000 rather than 30,000 **K**. Finally there is the **Ia**. Looking at the table below, we see that **Ia** is a type of a very bright supergiant. So decoding the shorthand of Rigel, we have a blue-white star whose surface temperature is toward the cooler part of **10,000 – 30,000 K**, and is a very bright supergiant.

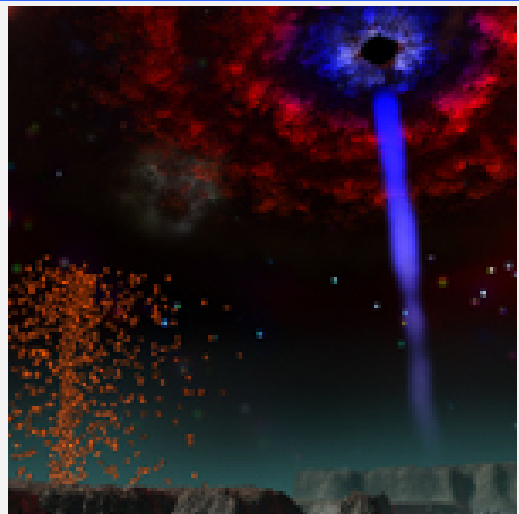
**Other Examples:**

- 1. Sun G2 V:** Yellow dwarf star with a surface temperature of about 6,000 **K**
- 2. Aldebaran K5 III:** Orange giant star with a surface temperature of about 4,000 **K**
- 3. Betelgeuse M2 Iab:** Red intermediately bright supergiant star with a surface temperature of about 3,500 **K**

Although beyond the scope of this article, there is a classification know as **Spectral peculiarities** which can be looked up on the Internet if you would like to delve more deeply into this subject.

Class	Type
<b>Ia-O</b>	<b>Supergiant of extreme brightness</b>
<b>Ia</b>	<b>Very bright supergiant</b>
<b>Iab</b>	<b>Intermediate bright supergiant</b>
<b>Ib</b>	<b>Less bright supergiant</b>
<b>II</b>	<b>Bright giants</b>
<b>III</b>	<b>Normal or typical giants</b>
<b>IV</b>	<b>Subgiants</b>
<b>V</b>	<b>Dwarfs</b>
<b>VI or sd</b>	<b>Subdwarfs</b>
<b>D</b>	<b>White dwarfs</b>

## 2014 Planetarium Shows



**Black Holes**

Jan 10 & 24 7:00 P.M. <b>Dawn of the Space Age</b> 8:00 P.M. <b>Black Holes</b>	Feb 14 & 28 7:00 P.M. <b>Dawn of the Space Age</b> 8:00 P.M. <b>Black Holes</b>	Mar 14 & 28 8:00 P.M. <b>Dawn of the Space Age</b> 9:00 P.M. <b>Black Holes</b>
Apr 11 & 25 8:00 P.M. <b>Dawn of the Space Age</b> 9:00 P.M. <b>Black Holes</b>	May 9 & 23 8:00 P.M. <b>Dawn of the Space Age</b> 9:00 P.M. <b>Black Holes</b>	June 13 8:00 P.M. <b>Dawn of the Space Age</b> 9:00 P.M. <b>Black Holes</b>

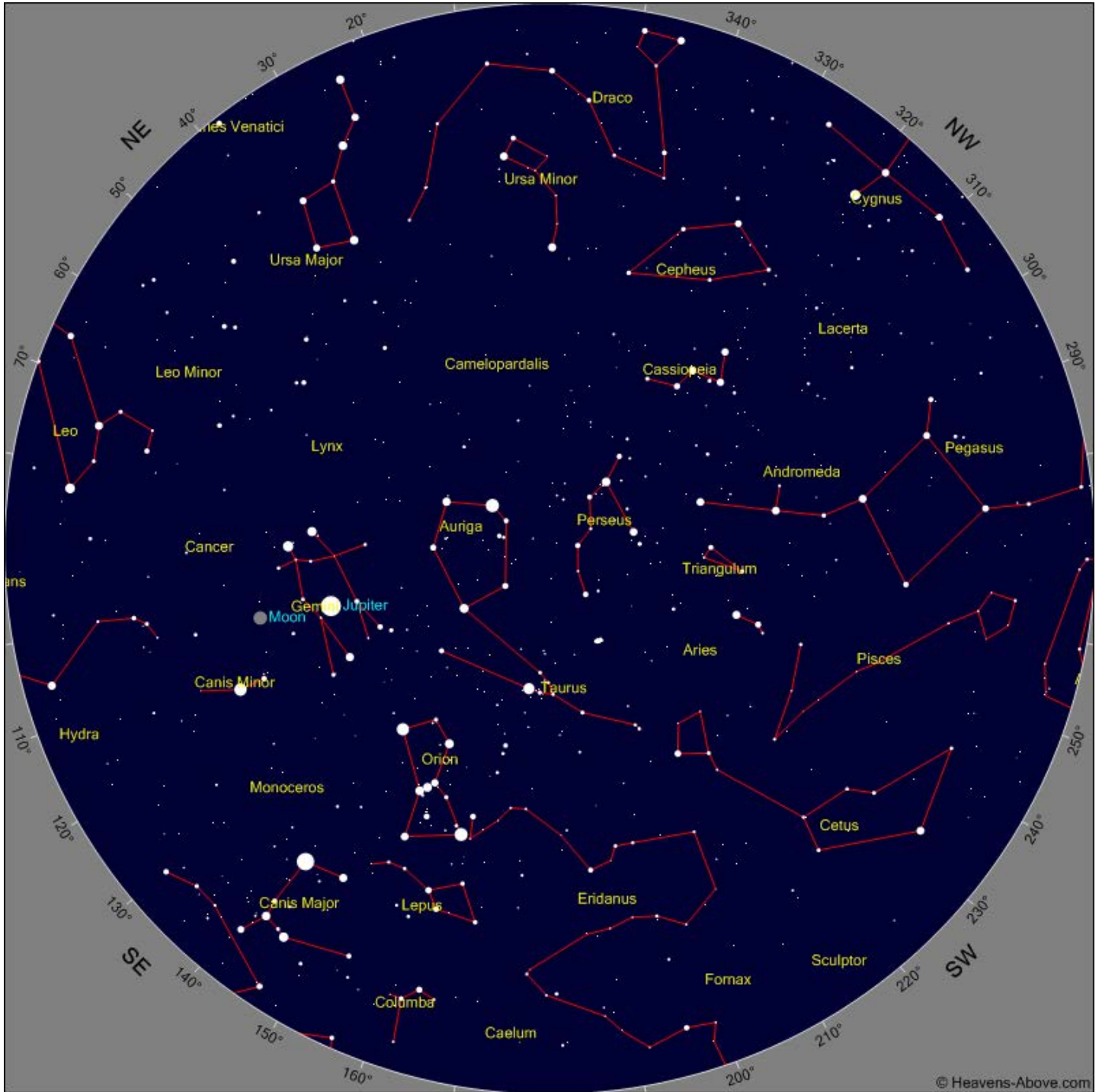
For those who are interested in bringing a group, such as schools or scouts, during the day, please call for more information. These shows are usually given on Tuesday or Thursday mornings.

For further information or reservations, please call John Hopkins at (304)293-4961, or by email at: [jhopkins@mail.wvu.edu](mailto:jhopkins@mail.wvu.edu)

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

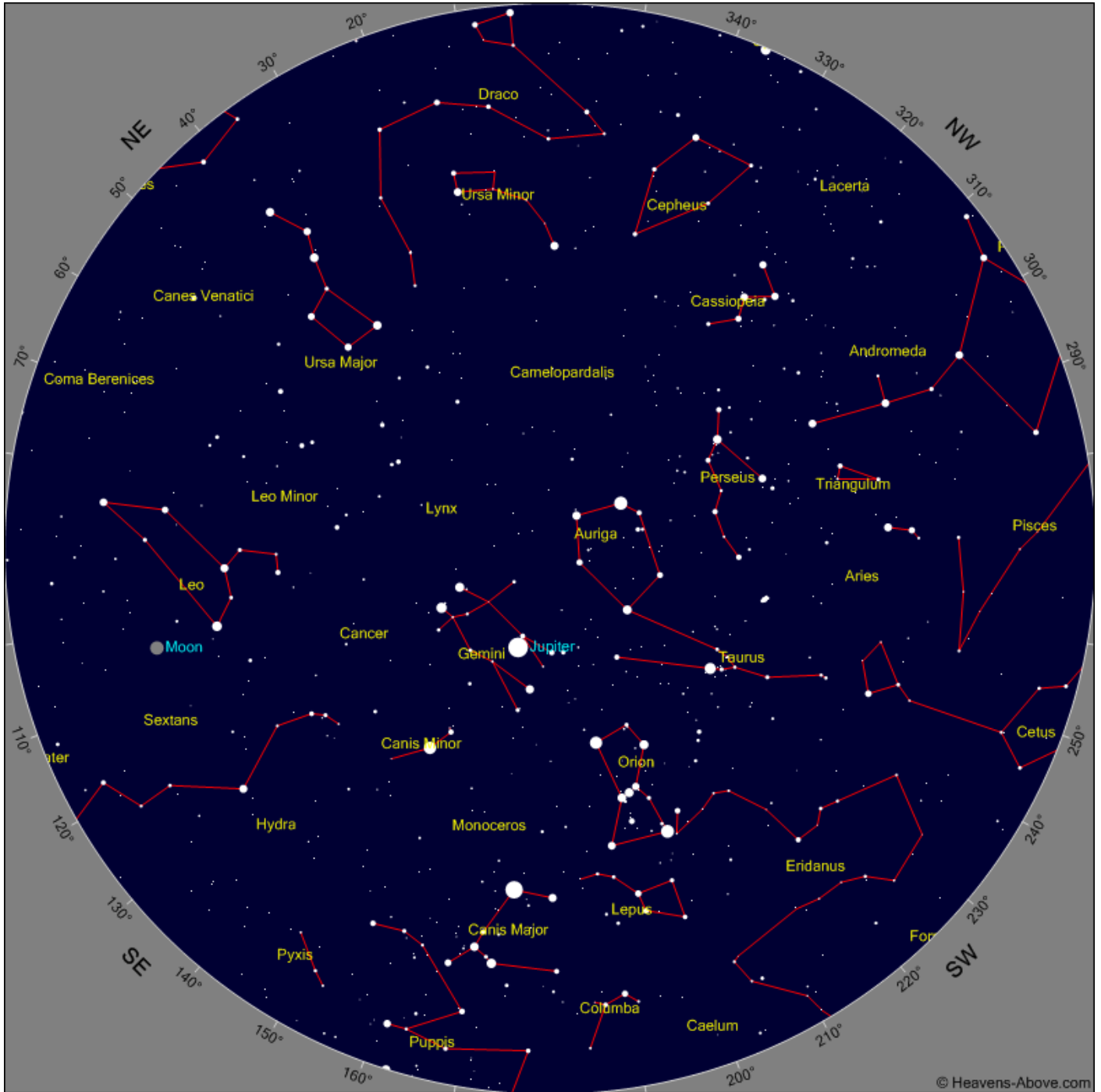
Date	Sunrise	Sunset	Moon Rise	Moon Set	Moon Phase
Jan 1	7:41 A.M.	5:06 P.M.	7:30 A.M.	5:50 P.M.	New
Jan 7	7:41 A.M.	5:11 P.M.	11:30 A.M.	NA	First Qtr
Jan 15	7:39 A.M.	5:19 P.M.	5:17 P.M.	6:54 A.M.	Full
Jan 24	7:34 A.M.	5:29 P.M.	1:00 A.M.	11:48 A.M.	Last Qtr
Jan 30	7:30 A.M.	5:36 P.M.	6:55 A.M.	5:48 P.M.	New
Feb 6	7:23 A.M.	5:45 P.M.	11:17 A.M.	12:37 A.M.	First Qtr
Feb 14	7:14 A.M.	5:54 P.M.	5:58 P.M.	6:40 A.M.	Full
Feb 22	7:04 A.M.	6:03 P.M.	12:56 A.M.	11:15 A.M.	Last Qtr
Mar 1	6:54 A.M.	6:11 P.M.	6:46 A.M.	6:58 P.M.	New
Mar 8	6:43 A.M.	6:18 P.M.	11:24 A.M.	1:15 A.M.	First Qtr
Mar 16	7:30 A.M.	7:27 P.M.	7:44 P.M.	7:13 A.M.	Full
Mar 23	7:19 A.M.	7:34 P.M.	1:50 A.M.	12:00 P.M.	Last Qtr
Mar 30	7:08 A.M.	7:41 P.M.	6:53 A.M.	7:53 P.M.	New

January 2014 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



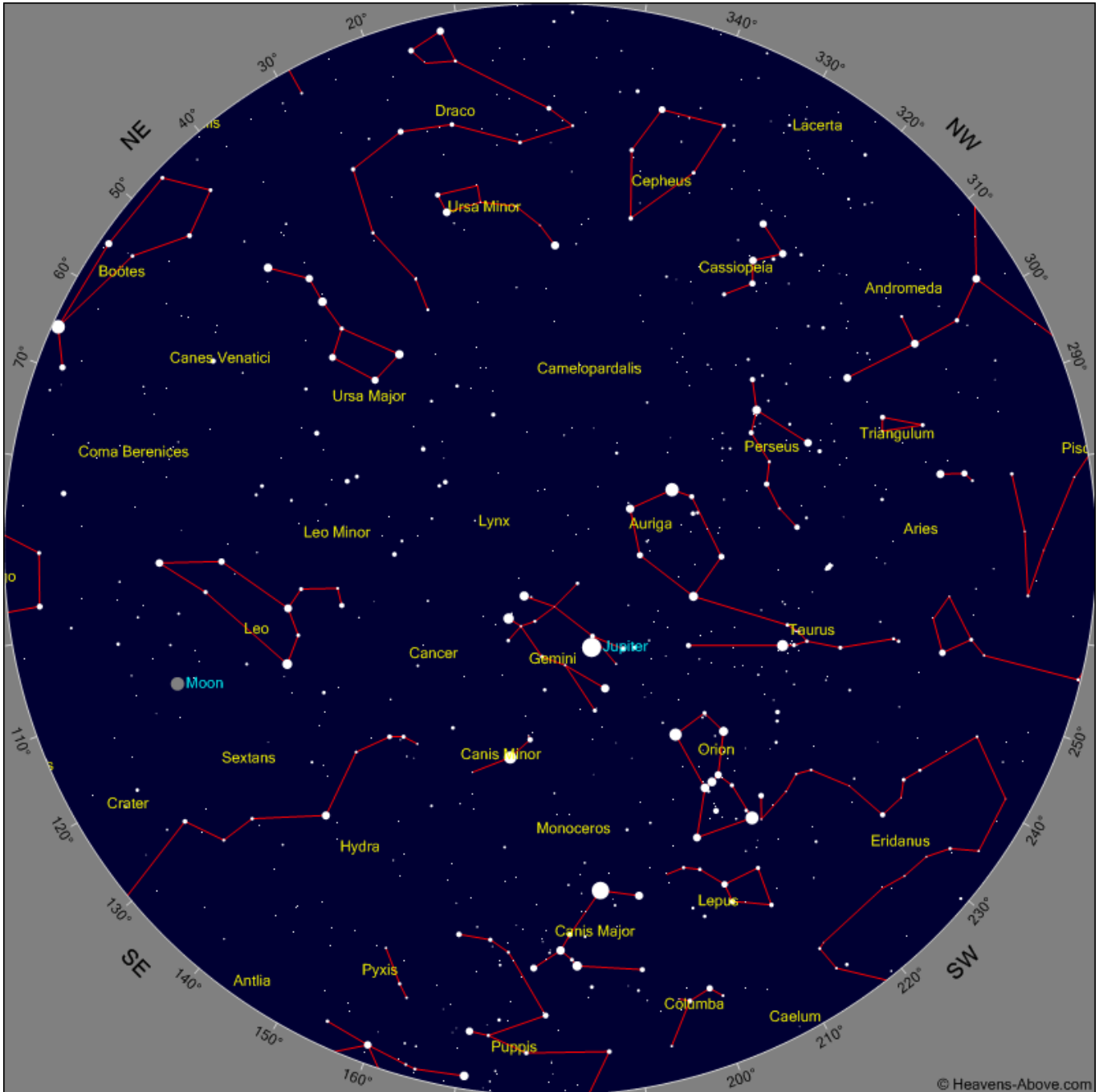
\*Sky Chart used with the kind permission of Heavens-Above at <http://www.heavens-above.com/>

February 2014 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/>

March 2014 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 WVU PLANETARIUM is for the educational benefit of WVU students, staff, and faculty members, as well as the local community. Should you wish to make a contribution to the planetarium, it can be made through the **WVU Planetarium Project** at the **WVU Foundation, Inc.**, phone **(304)284-4000**. **Thank You.**



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