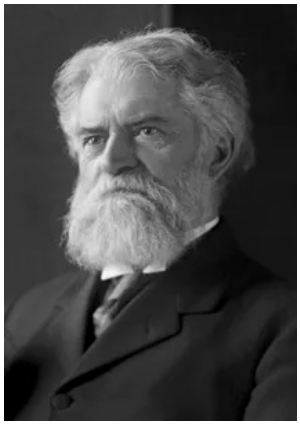
January Skies over the Pinnacles

January 2023

January's Four Principal Phases of the Moon

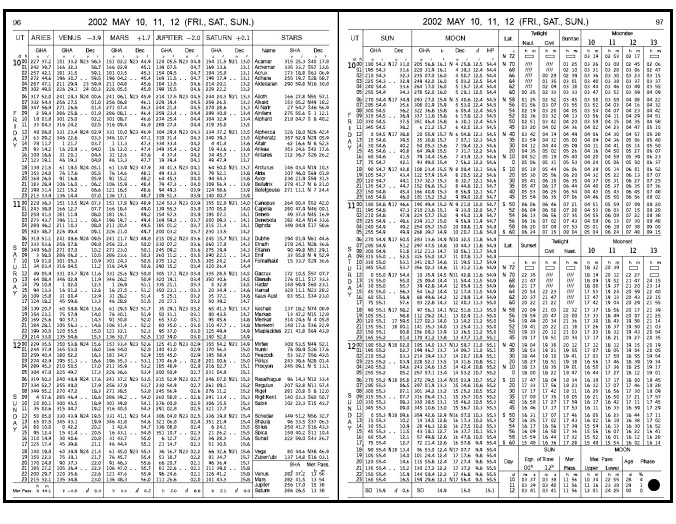
January 6	Full Moon	
January 15	Last Quarter	
January 21	New Moon	
January 28	First Quarter	

Have you checked your

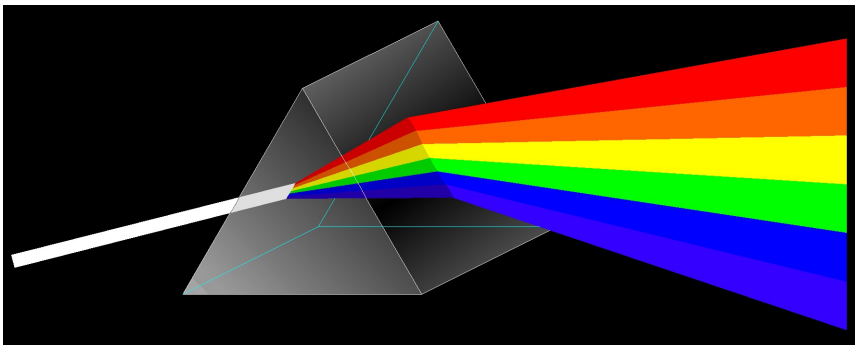


ephemeris lately?

No, I'm not urging you to go through a health screening. An **ephemeris** isn't a medical term for some internal organ that might suddenly go 'pop'. An **ephemeris** is a sort of diary to keep track, or mathematically predict something that science predicts will occur. During the American Civil War, Simon Newcomb (pictured above) was the chief astronomer for the U.S. government. Newcomb was obsessed with tables and charts and was an expert at using Newton's laws to accurately predict future celestial events such as solar and lunar eclipses, as well as the sky positions of the planets. In his day, The American Ephemeris and Nautical Almanac was established as a document that was mostly used by sea captains to help them navigate the open ocean. That's where the word 'nautical' comes in. For instance, the precise location in the sky of certain bright stars for any date and time was vital to find a ship's position on the sea. A couple of pages of the 2002 American Ephemeris and Nautical Almanac are shown below.



In Newcomb's day these tables were created by pencil and paper and he once famously declared that all that we could learn about astronomy had been learned. No further study of the stars was possible. Today, calculations for the American Ephemeris and Nautical Almanac are quickly done by computer to calculate the exact location in the sky for almost any celestial object. In a way, he was right. Newcomb, and almost all astronomers up to his time believed that predicting where "everything" in the sky was thought that was all that mattered. At about this time another way to observe the night sky was starting to be used. It was called **spectroscopy**. If you've ever seen a rainbow in the sky or a pretty spectrum projected by a crystal, you've seen how ordinary "white" light can be separated into a rainbow of colors from violet to red.



Scientists learned that the colors, or **spectrum** could tell you what that thing which was making the light was made of. It didn't matter if that thing was a candle across the room or a star all the way across the galaxy! So **spectroscopy** is the science of splitting up the light from anything that glows to find out what it is made of. Not only that, a star's **spectrum** can also tell you if it is rotating and if it is moving toward or away from you. Mostly because of the **spectroscope**, a new kind of science that combined astronomy and physics was born. It is called **astrophysics**.

But astrophysicists still have to know where in the sky to point their tools of research, so an **ephemeris** is still necessary. Now the exact positions of celestial objects is in the memory of advanced telescopes. You can even buy a telescope with an "object database" loaded and it can find objects on its own!

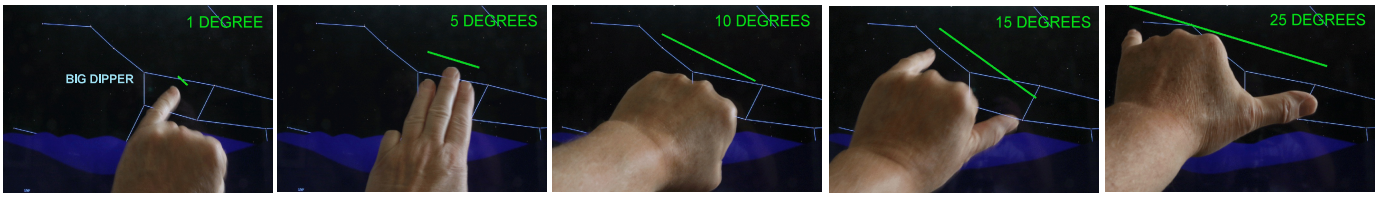
There are other people who carefully consult the pages of The American Ephemeris and Nautical Almanac. These are the folks who believe that the positions of certain stars and planets can affect peoples' daily lives. I'm talking about the astrologers. These folks believe that our lives are directed by a set of "traffic lights in the sky". Today, after being proved to be no more accurate in predicting the trajectory of our lives than random chance, most astrologers, at least the newspaper variety, never offer predictions. Pick up a daily astrology page, say, in the Lexington Herald-Leader. Carefully read advice offered for any 'zodiacal sign' (it doesn't matter which one). You'll find that predictions are not offered. Instead a sort of soft 'advice' is offered for each sign. Examples might be " to ask more of yourself" or "today might be a good day to make a new friend". No arguing with that!

In its more harmful form, astrophysicist, Carl Sagan once described the practice of astrology as a combination of, "careful observation and pious fraud".

"I see meetings. Lots of meetings."

Attractions in January

Astronomers use a measuring scale of **angular distance** to show the apparent distance that separates two objects in the sky. A trip all the way around the sky would take 360 degrees. Here's a handy guide to estimate **angular distance** that you can use when you're out under the stars.

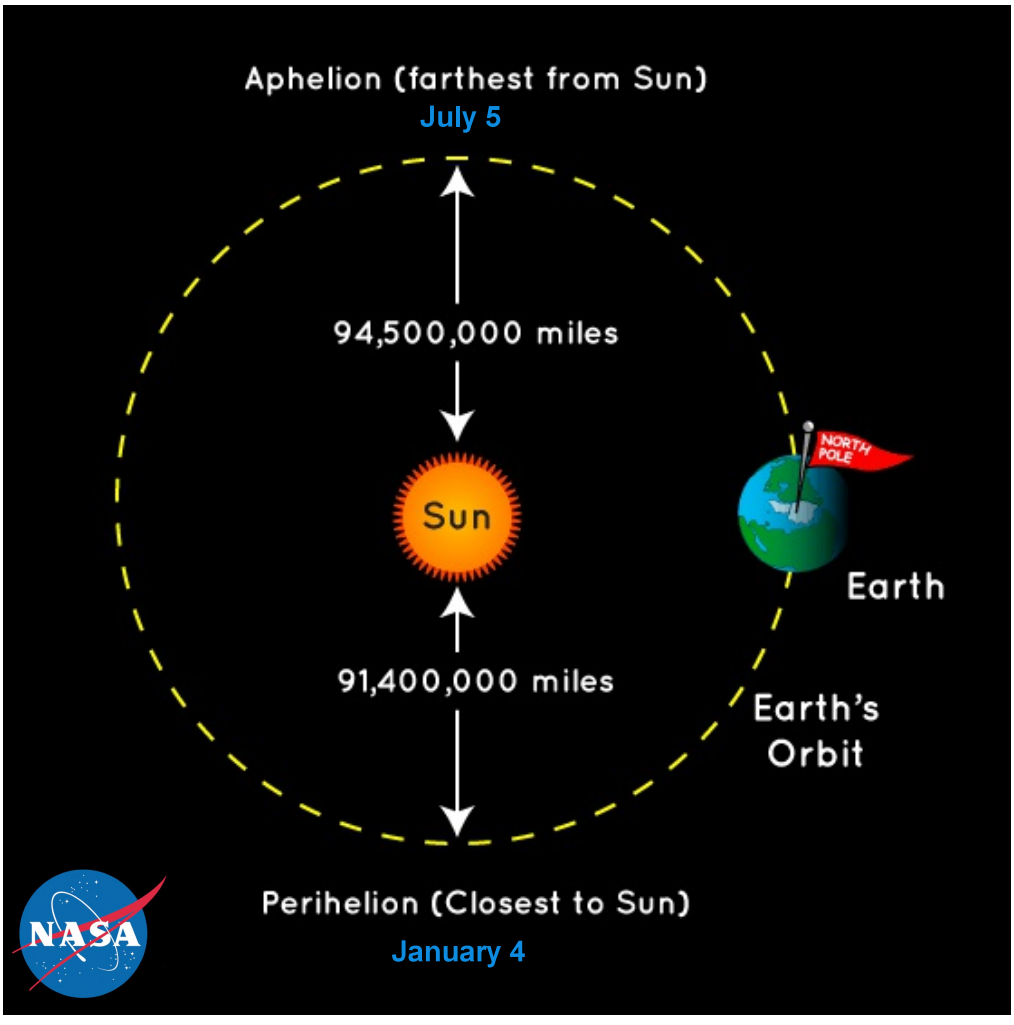


When you hold your hand all the way out and hold three fingers out, like the scout's salute, your fingers create an **angular distance** of 5 degrees**,** about the width of the bowl of the Big Dipper. When I talk about the distance between, say, the Moon and a star or planet, I'll say that they are separated by a certain number of degrees.

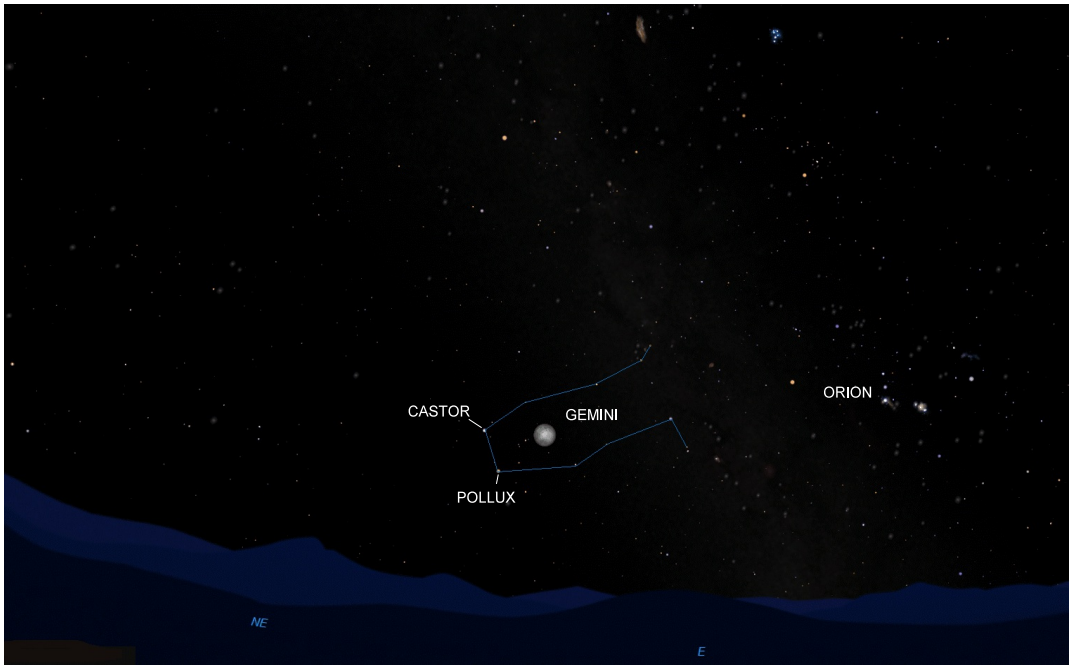
Well, we were clouded-out in December for the spectacular apparent super close joining up of Mars and the Moon. Sometimes we get a second chance! At the end of January the Moon and Mars will appear almost as close. See January 31.

January 3 Look high in the east after dark and see a pretty grouping of our Moon, the planet Mars nestled close to the star cluster, called the Hyades with bright orange star, Aldebaran tipping one wide of this 'V' shaped star grouping. The Hyades forms the face of the mythical bull called Taurus. Later this month, the Moon is due for another close rendezvous with Mars. Don't forget to admire one of the brightest constellations, Orion, as it rises just below.

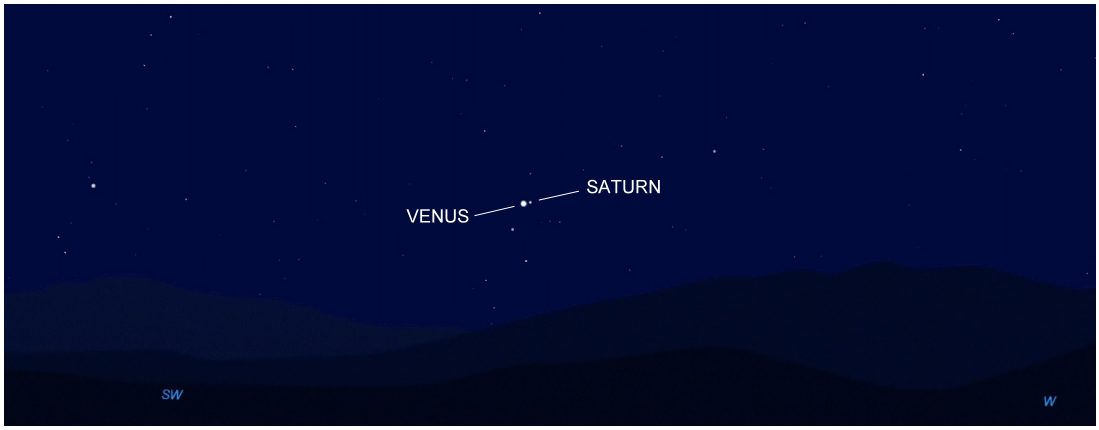
January 4 If you think the seasons are caused by changes in Earth's distance to the Sun: that summers are hot because Earth is close to the Sun and winters are cold because we are farthest from the Sun, think about this. On this date in chilly January, our elliptical orbit carries the Earth closest to the sun.



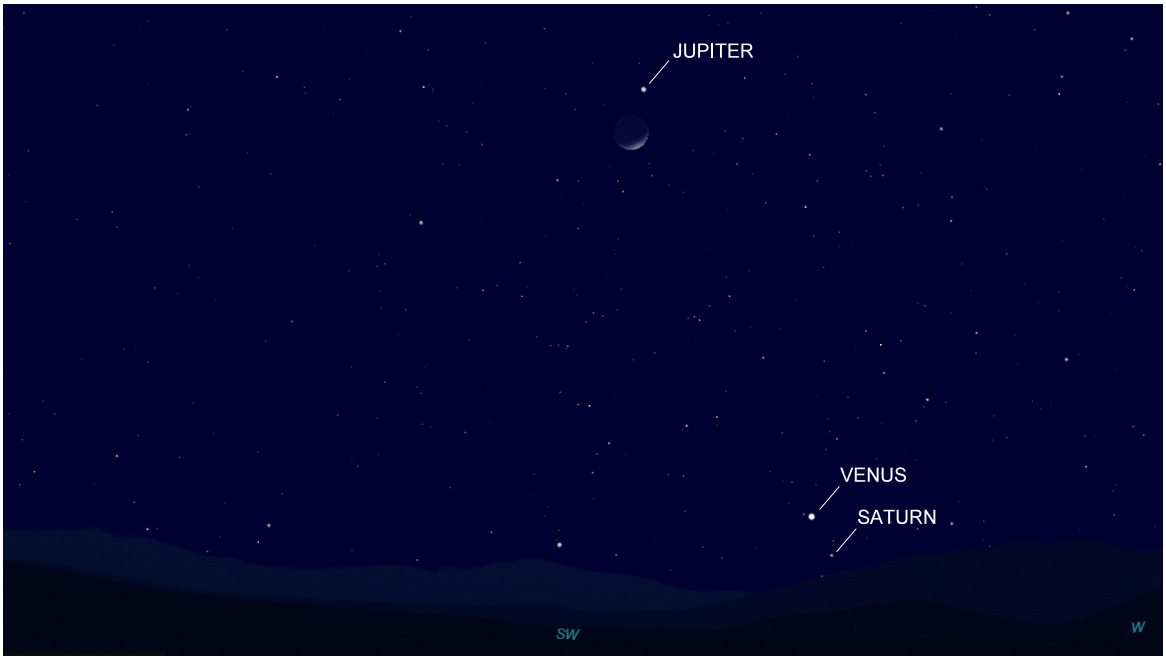
January 6 The full Moon sits neatly in the heart of the constellation Gemini, making a neat triangle with its two brightest stars, Castor and Pollux.



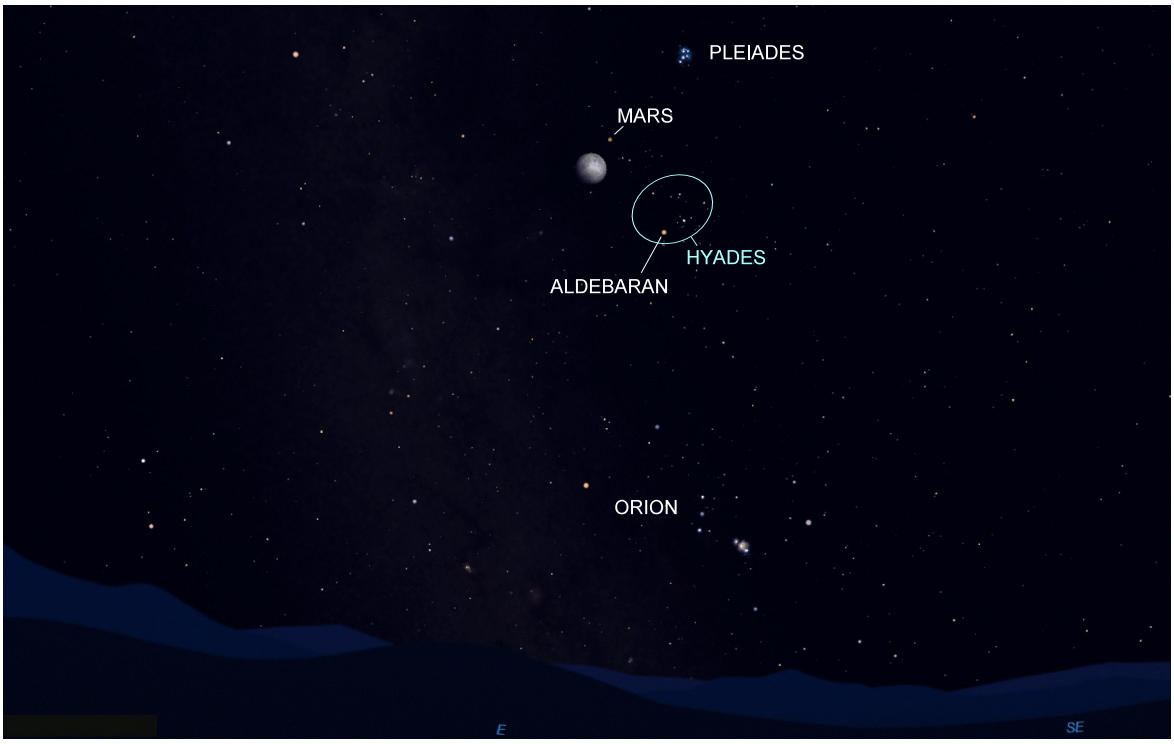
January 22 Binocular Alert! Check out the western as the is just getting dark. You'll find the planets, Venus and Saturn only ½ degree apart. Venus is much brighter because it is closer to us and the Sun than Saturn, even though Saturn is 10 times bigger than Venus.



January 25 Go out early this evening to spy the planet Jupiter just 2 degrees above the crescent Moon. That's bright Venus close to the western horizon and Saturn even further down..



January 31 Binocular Alert! Tonight at about 12:45 we'll be treated to another apparent close approach of our Moon and the planet Mars. Below is a comparison with January's event (left) to December's. Mars will be a bit dimmer and it won't be quite as close to the moon's edge (curved white line) but it will be interesting!



Compare the two pictures below. On the left is the closest Mars will get to the moon tonight. The curved line shows where the Moon's limb, or edge, will be. To the right is last month's event. Clouds kept us from seeing that one.