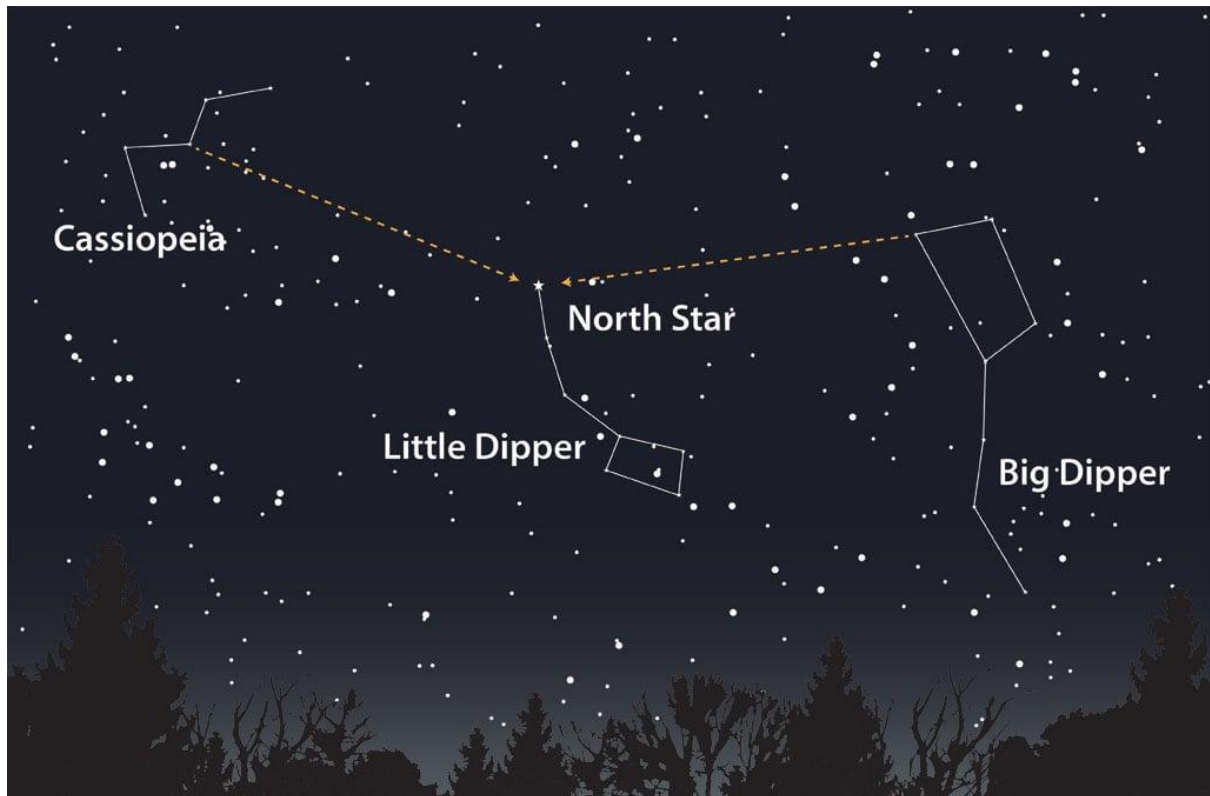


POLARIS - NORTH STAR, PART TIME

"But I am as constant as the Northern Star", says Julius Caesar in the play Shakespeare named after him. He was making a strong statement that he was reliable and unchanging in his opinions. Shakespeare regarded the North Star as a permanent feature of the heavens. He was wrong. He should have picked something else.



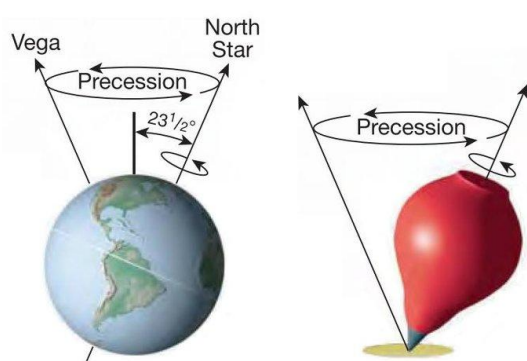
All of us have seen at some time or another one of those time exposures of the northern sky, where all the stars leave circular tracks, and in the centre of this circling lies a star that is hardly moving. This is because those circular tracks are due to the rotation of our planet. If we were at the North Pole, there would be one star, overhead, that is not moving, because that is where the Earth's axis of rotation meets the sky. We call that star the "North Star". That star, named Polaris, is the brightest in the constellation of Ursa Minor, "The Little Bear".



For millennia Polaris has been used for navigation. If you are sailing the ocean, out of sight of land, the North Star always lies due north, and the angle between the North Star and the northern horizon is equal to your latitude. Therefore, if you are sailing across the Pacific or the Atlantic, you can keep Polaris at the right angle above the horizon and be sure you will reach your destination. Warning though, that star won't tell you your longitude, so you have to be careful not to arrive at your destination's offshore reefs during the night.

At the moment, our neighbours in the Southern Hemisphere do not have a good, bright "South Star", sitting over the southern end of Earth's rotation axis. The current candidate is an insignificant star named Sigma Octantis. This meant that when ancient sailors crossed the equator, heading south, their navigation aid, the North Star, vanished below the northern horizon, but no usable South star appeared in the south.

In 3000 BCE, well before those classical and mediaeval sailors, the North Star was another star entirely: Thuban, in the constellation of Draco, "The Dragon". Around 1000 BCE, the North Star was Kochab, a red star in the same constellation as Polaris. In 11,250 CE the North Star will be Delta Cygni, in the constellation of Cygnus, "The Swan". Then, in 14,500 CE the bright star Vega, in the constellation of Lyra, will be near the Pole. In 27,800 CE, the North Star will be Polaris again. The end of the Earth's rotation axis describes a circle in the sky, taking about 26,000 years to complete one circuit. What is going on?



Any of us who have played with spinning tops will have seen the answer. If we managed to put the spinning top down completely vertically, it would just sit there spinning until it finally fell over. However, most of the time we would have set it down not quite vertical. When this happens, gravity interacts with the spin to make the top lean over, wobbling in little circles. This circular wobble is called precession. Why does the Earth do that?

Although images taken from space suggest our Earth is spherical, it isn't. It is a bit squashed from the poles and bulges at the equator. The gravitational pulls of the Moon and Sun work on that bulge, causing the precession: the 26,000-year parade of North Stars, and intervening periods where there isn't one.

All the major bodies in the Solar System move in the same plane, so we see them moving along a strip of sky that passes through twelve constellations, called "The Zodiac". The first sign coincides with the position of the Sun at the spring equinox and is usually assumed to be Aries. However, due to precession, the first sign is now Pisces. Check your Horoscopes!

Venus and Saturn lie close together low in the southeast before dawn. In the evening, Mars lies high in the southwest. The Moon will reach Last Quarter on the 20th, and be New on the 26th.

Ken Tapping, 20th May, 2025

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