

(eleven minutes) distant, yet a powerful telescope shows a bluish companion star of the eighth magnitude within 14" (fourteen seconds) of Mizar, which is therefore an interesting "telescopic double."

*Epsilon*, or Alioth, is the third star.

*Delta*, or Megrez, of the third magnitude, marks where the handle joins the Dipper.

*Gamma*, or Phecda, of the second magnitude, comes first at the bottom of the Dipper.

*Beta*, or Merak, next at the bottom.

*Alpha*, or Dubhe, next at the top. These last two are called the "pointers," because a straight line through them points nearly to the Pole Star.

The lower pair of stars, of the fourth magnitude, marking the hind paw of the Bear, are called respectively *Nu* and *Xi*. The last of these is a remarkable telescopic double.

The companion star is only 2" (two seconds) distant, nearly as brilliant as its fellow, and they move around each other apparently in about sixty years. This appears to be a strong evidence that here we have two vast suns nearly of equal size revolving in a tremendous orbit around each other. Very many other doubles give indications of a similar connection. Sir Wm. Herschell observed 2,400 double stars, while Struve, of Dorpat, catalogues 3,063 of them.

But this constellation has another double star. Join *Delta Ursæ Majoris* with *Alpha*, and produce the line as far again. This points out "h 23" of the Great Bear, a star of about the fourth magnitude, with a companion of about the fifth magnitude, 23" (twenty-three seconds) apart. It will require a telescope to separate them.

The extreme star of the third magnitude, in the direction of the nose of the Bear in our map, is *Omicron*. The pair in the highest paw are respectively *Iota* and *Kappa*. The pair in the intermediate paw are *Lambda* and *Mu*. The lower pair, as already said, are *Nu* and *Xi*.

#### STAR DRIFT.

The wonderful accuracy of astronomical measurement of the position of stars show us that the stars are drifting in various directions. In a hundred thousand years the constellations which Abraham and Moses studied, under nearly the identical forms of today, will become unrecognizable. Eta and Alpha of the Great Bear are drifting easterly, as seen in the early evening of January. Zeta, Epsilon, Delta, Gamma and Beta are drifting westerly at different rates and in different directions. The motion is slow, so slow that thousands of years will be required to make it perceptible to the ordinary human sense—so slow do they cross athwart our vision, only from ten

to forty miles per second. Swifter than the fieriest bolt from earth's most tremendous artillery do these Titan sun-worlds fly across the calm blue northern vault. The Chaldean astrologers watched their flight in the far distance, but died before they became conscious of their change of position. Generations after generations have since grown up to watch and have passed away, but the flying orbs appear yet nearly in the same position as they did to the eyes of Job. What a speck in the duration of human life, when considered in relation to the dynamics of the skies!

But the spectroscope in the hands of Huggins shows that these motions are not all athwart our line of vision. Some of these stars are approaching us with these tremendous velocities, while others are receding from us. Beta, Gamma, Delta, Epsilon and Zeta of the Great Bear are receding from us at the rate of about seventeen miles per second, as well as drifting westerly. Stars larger than ten thousand worlds, throbbing with liquid lava, shrouded in whirlpools of flame and circled with rabbles of satellites, have been flying towards us from before the time of Adam with a velocity to which that of a cannon ball is but the motion of a snow-flake. And they are yet coming on with unslacked speed. We need hardly fear them. Human life is fleetier still.

Where shall we be  
Long before the Dipper's dined  
Or the Great Bear coils its tail?

When it is the astronomer who looks up into the calm blue abysses of the sky—the very emblem of silence—how overpowering the sensation must be of the magnificence of heaven's flaming and dark-orbed artillery! Man lives a life-time ere the distant balls are even seen to change their places, and the awful depths of space swallow up the continued roar of nebular tornados and the thunder of storm-wrapped worlds.

#### ASTRONOMICAL NOTES.

Venus and Mars were in conjunction on the 2nd inst., and with the moon on the 4th; they presented a brilliant sight to star-gazers. They are in the constellation Capricornus, and will set from 8 to 9 p.m., towards the end of the month.

Saturn is in Leo, and rises shortly after seven in the evening about the middle of January. Half an hour later, Regulus, a star of the first magnitude, in the handle of the Sickle, rises. Saturn is now about the point of the Sickle, while Regulus is in the end of the handle, in which positions they may readily be found with a little search.

Jupiter is morning star, rising two hours in advance of the sun, in Sagittarius.

January 18th, Saturn will be in conjunction with the moon. January 26th, occultation of Theta Libræ. January 28th, moon in conjunction with Jupiter. Moon in conjunction with Mercury, February 1; with Mars, February 2; with Venus, February 3; with Saturn, February 15.