

Saturn visible on September evenings

by James Stokley

With the coming of September the planet Saturn appears in the east. Autumn begins on the 22nd, and the same day brings a total eclipse of the sun. Unfortunately, you'll have to go to Siberia if you want to see it.

The accompanying maps show the sky as it looks about 11:00 p.m., local daylight saving time, on Sept. 1. It has a similar appearance in the middle of the month at 10:00 p.m., and at 9:00 p.m., as October begins.

Brightest star is Vega, in Lyra, the lyre, high in the west. Above it is Cygnus, the swan, whose brightest star is Deneb at the top of the Northern Cross.

Aquila, the eagle, is in the south. Here there's another first magnitude star, named Altair. Vega, Altair and Deneb form the "summer triangle."

Low in the southeast stands Piscis Austrinus, the southern fish, marked by Fomalhaut. This is one of the bright stars dimmed by low altitude. Now nearly as high as we ever see it from these latitudes, Fomalhaut is overhead in southern Brazil.

Low in the north is Ursa Major, the great bear, of which the Big Dipper is part. To the left is Bootes, the herdsman, with Arcturus, which was near the

zenith on summer evenings. Just appearing above the northeastern horizon is Auriga, the charioteer, with bright Capella.

Our evening planet, Saturn, stands in the east, in Pisces, the fishes. It's between Vega and Altair in brightness but the steady planetary light is quite different from the twinkling of stars.

Autumn begins in the Northern Hemisphere (and spring in the Southern) on Sept. 22, at 7:26 p.m. EDT. Then the sun will be directly over the equator at a point in the Pacific Ocean.

Our maps show stars as faint as the fourth magnitude, but under good conditions, especially directly overhead, you can see others even fainter. One interesting fifth magnitude star stands near the zenith these evenings, in Cygnus. This is 61 Cygni: the first to have its distance measured and the first, except for the sun, to show a much smaller dark body—perhaps a large planet—revolving around it.

The small map shows the Northern Cross, formed by seven stars in Cygnus. Deneb is at the top of the cross, toward northeast. Just east of the upper part are four stars in a quadrilateral, with another between the bottom pair. This is 61 Cygni, marked with an X.

Even in the early 19th century, astronomers had found that it had the highest speed across the sky then known. It moves fast enough to take it a distance equal to the moon's diameter in 380 years, suggesting that it is relatively close.

In 1838 F. W. Bessel, in Germany, measured the shift that 61 Cygni seems to make every year, as viewed from opposite sides of the earth's orbit. Half

CELESTIAL TIMETABLE FOR SEPTEMBER

September EDT

- 6 6:08 p.m. Full moon
- 8 8:00 p.m. Jupiter behind sun
- 10 1:00 a.m. Moon passes north of Saturn
- 13 6:00 p.m. Moon farthest, distance 251,300 miles
- 14 4:32 p.m. Moon in last quarter
- 20 noon Mercury farthest east of sun
- 22 7:09 a.m. New moon, total eclipse of sun not visible in U.S.
- 7:26 p.m. Sun crosses equator, autumn begins in Northern Hemisphere
- 24 7:00 a.m. Moon passes south of Venus
- 25 4:00 p.m. Moon nearest, distance 227,800 miles
- 29 1:07 a.m. Moon in first quarter



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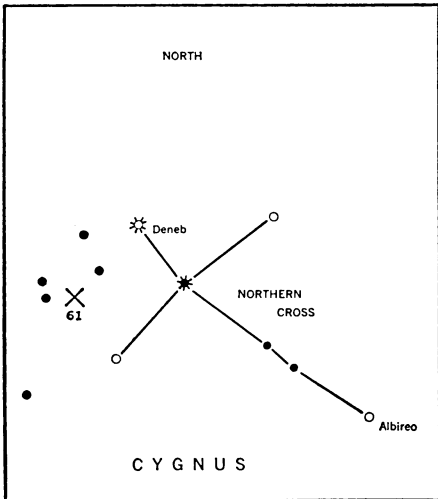


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this shift is the star's parallax. Even for the closest it's very small, measured in fractions of a second of arc. One second is the apparent diameter of a penny two and a half miles away.

Bessel found that the star was nearly 66 trillion miles way. Its light, traveling 186,000 miles per second, takes 11 years to reach us. Since 1838, parallax has been measured for hundreds of stars, of which 11 are even closer, not counting the sun.

Actually, it's not a single star but a binary—two stars revolving every 700 years around a point between them. When the path of one component relative to the other was plotted, it showed a wavy line. It too is double, but its



companion is invisible. Dr. K. Aa. Strand of the U.S. Naval Observatory concluded from this that it goes around the visible star every 4.8 years. It is far smaller, probably less than a hundredth the mass of the sun, or about 16 times as massive as Jupiter. Similar small dark companions have been found for a few other stars, and they may represent other planetary systems. However, some astronomers believe that such objects are small, faint stars.

When the moon is new, on Sept. 22, its shadow will sweep across the earth, producing a total eclipse of the sun. The shadow first touches down in the Arctic Ocean north of Siberia. It goes southward along the Ural Mountains and curves eastward into China. This marks the "path of totality," where the moon will hide the sun's disk and the solar corona will flash into view.

The path crosses the Trans-Siberian RR near Kurgan, with the sun hiding for 40 seconds. Many astronomers from the U.S.S.R. and other nations will go there to make important observations possible only during such an eclipse.

Over much of Asia, most of Europe and Greenland a partial eclipse will be visible, with the moon hiding only a portion of the solar disk.

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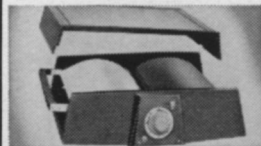


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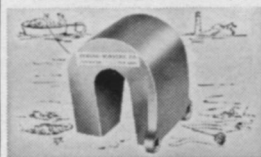
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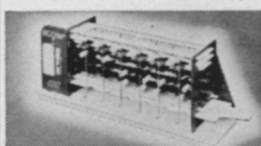
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