

ASTRONOMY

# Look Overhead

## Attractions of Evening Skies Center at the Zenith In Cygnus, Constellation Full of "Holes in the Sky"

By JAMES STOKLEY

**L**OOK OVERHEAD these September evenings, and you will see some of the most conspicuous astronomical objects now visible. At about ten o'clock, local standard time, at the beginning of the month, an hour earlier on the fifteenth, and at eight o'clock at the end of the month (which are the times for which the accompanying maps show the skies) the constellation of Cygnus is at the zenith. The name means "swan," but the group is frequently called the "northern cross," on account of its shape. The top of the cross points to the northeast, at the head is the bright star Deneb.

In addition to Deneb, there are five other first magnitude stars shown on the maps for this month. Directly west of it is another, and even more brilliant star, Vega, in the constellation of Lyra, the lyre. To the south of this pair, forming with them a pretty good isosceles triangle, is Altair, which marks Aquila, the eagle. Low in the northeast can be seen the group of Auriga, the charioteer, with the brilliant Capella.

The constellation of Bootes shines low in the western sky, with the first magnitude Arcturus still visible, though no longer as conspicuous as it has been during the summer months. The sixth of the bright stars now to be seen is near the southeastern horizon. It is Fomalhaut, and is included in the southern fish, Piscis Austrinus.

Directly south can now be seen another body looking like a first magnitude star, but distinctly different because of its steady leaden light. This is the planet Saturn, which now is in the constellation of Capricornus. Saturn, most distant member of the sun's family that can be seen without the aid of a telescope, is famous for its system of rings, which can be seen with a modest sized telescope.

Two other planets can be seen in the early evening this month, but are not shown on the maps because by the time for which they are adjusted, the planets have descended behind the western

horizon. Both can be seen low in the southwest just after sunset.

Most conspicuous is Venus, of magnitude minus 3.5 on the fifteenth, far more brilliant than any other star or planet. In the middle of the month it sets about an hour after the sun. A short distance to the left of Venus, and much inferior in brilliance, is Mars, which will soon disappear from the evening sky for several months. Venus will remain with us for a while, though it will not rise much higher in the sky. It is still moving away from the sun, but when it is the evening star at this time of year, its motion is along a path so nearly parallel to the horizon that actually it sets a little earlier at the end of the month than at the beginning.

### Behind the Sun

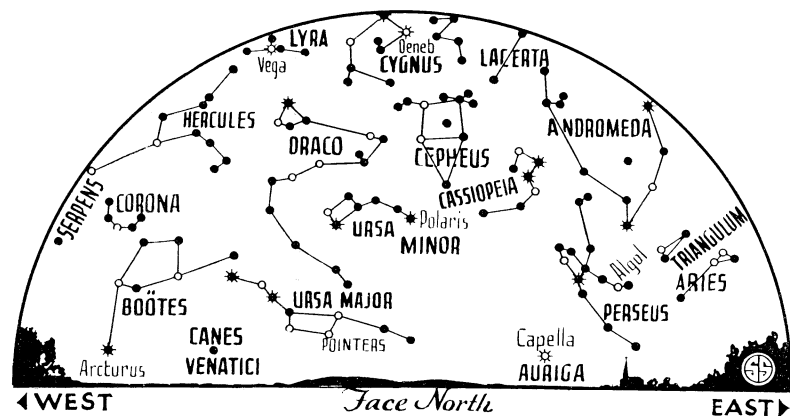
Jupiter, which was so prominent in the spring and summer months, is now so close to the sun as to be completely invisible. On the 27th it is directly behind the sun, and after several weeks it will reappear in the morning sky just before sunrise. Mercury will also be directly behind the sun, and invisible, on the 12th.

Let us return to Cygnus, which is interesting enough to deserve further consideration. First of all, this group lies right in the Milky Way, which, as a matter of fact, here divides into two branches. To a person who lives con-

stantly in a larger city, the Milky Way is an unfamiliar object. Such a person will be well repaid for a visit on a clear evening this month to the country, far away from the city lights, where this luminous band stretching across the sky can now be seen at its best.

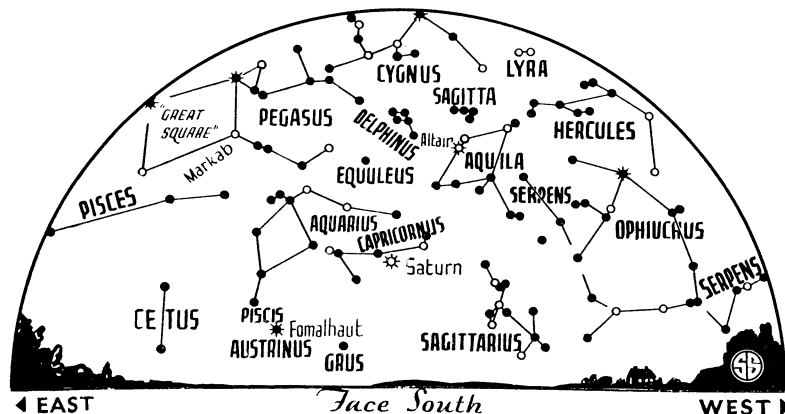
A pair of field glasses, or even opera glasses, will reveal, as did Galileo's primitive telescope when he first turned it on the stars in 1610, the true nature of this Milky Way. With such slight optical aid it is resolved into a cloud of stars. It is especially glorious along the line forming the bottom portion of the cross, where one can see swarms of stars, each a sun like our own but vastly farther away. Occasional dark gaps also appear.

With an extra powerful field glass, if held steadily, as in a tripod, or better yet, with a small telescope, magnifying perhaps fifty times, the star at the bottom of the cross, known as Albireo, is seen as a most fascinating object. With such assistance, it is no longer the single star that it seems to the naked eye, but is revealed as a member of the large family of double stars, pairs of suns, with each member revolving around their common center. The telescope reveals many such doubles, but none more beautiful than Albireo, for the two stars that compose it, though of similar brilliance, have contrasting colors. One is yellow, the other blue. If Albireo, like the sun, should happen to be surrounded by a family of planets, life on one of them would be most interesting, with these brilliantly colored orbs lighting the daytime sky.



The North Map contains four of the six first magnitude stars this month—Vega and Deneb near the zenith, and Arcturus and Capella close to the horizon.

☼ \* ○ ● SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



In addition to Saturn, two other planets can be seen this month, low in the southwest just after sunset. They are not given on this map, however, because by the time for which the map is adjusted, the planets, Venus and Mars, will have descended below the horizon.

The huge telescopes of modern observatories, especially the 100-inch reflector at Mount Wilson, greatest in the world, have shown previously unsuspected glories of the constellation of Cygnus. A little to the east of Deneb is the largest of these, a cloud of nebulosity that covers an area in the sky many times that of the full moon, though it is so faint that a time exposure photograph of many hours is required with a great telescope to bring out its details. This is called the North America nebula, because it corresponds closely in shape to our own continent. Two clouds of dark nebulae, that may once have been luminous themselves, but are now apparent only because they are silhouetted against a bright background, form the "Gulf of Mexico," and "Hudson Bay." Around it are lanes of similar dark nebulosity, which sharply outline its edges.

#### The Pelican Nebula

Just to the west of the North America nebula is another that has been christened the Pelican nebula, also from its shape. The bird is shown in considerable detail even to its huge beak which can hold more than its—stomach can! A very beautiful photograph of this object, made with the 100-inch Mount Wilson telescope by Prof. J. C. Duncan, reveals that it is crossed by curious dark lines, which are also, without doubt, dark nebulae. In fact the whole constellation of Cygnus is famous for these dark nebulae, many of which look, as Sir William Herschel, the great English astronomer, exclaimed when he saw one, like "holes in the sky."

With some it is hard to believe that we are not looking down a tube devoid of stars, but with the stars of the sky continually in motion it is hard to imagine that there would be so many of these starless tubes pointed to the earth. The late Prof. Edward Emerson Barnard, of the Yerkes Observatory, and one of the greatest of modern observers, catalogued a number of these dark markings, and showed that they are undoubtedly clouds of dark matter. Perhaps they are scattered all over the sky, but we can only observe them when in front of a background of bright stars. Consequently, it is not surprising that they should be conspicuous in Cygnus, where there are plenty of bright stars to serve as a background.

Still another beautiful nebula is found in Cygnus, surrounding the star Sadr, at the intersection of the cross. This is so faint that even through the largest telescope it is not apparent to the eye, but a photograph with an exposure of six or seven hours, perhaps made on two successive nights, portrays its delicate form. It is called the network, or veil, nebula, and is in two parts, which are connected to form a wreath. A few years ago Dr. Edwin P. Hubble at the Mount Wilson Observatory compared some photographs that he had just made with others made many years previously by Prof. George W. Ritchey, and found that the nebula is moving outwards from the center of the wreath.

Dr. Hubble has offered a reasonable explanation of this movement. He suggests that the wreath is the result of a celestial explosion many thousands of years ago, when something happened

to a previously inconspicuous star, causing it suddenly to flare up and shoot out a cloud of stellar material which ever since has been travelling away in a widening circle.

One of the astronomical events that we use to divide our calendar into seasons occurs on September 23. On that date, at 7:01 a. m., eastern standard time, the sun, which has been moving southward in the sky since last June, crosses the Equator, and this is taken as the beginning of autumn. On that date the sun is above the horizon just as long as it is below, the night and day are therefore equal, and so this event is called the autumnal equinox. After that, the nights will continue to lengthen until the beginning of winter, next December.

The moon is full on September 4, at last quarter on the 11th, new on the 19th and at first quarter on the 26th. This means that the evenings will be moonlit for the first week of September, and again during the last week. On the 22nd the crescent moon passes close to the planet Venus. During the night of the 29th, it passes within a little more than its own diameter of the planet Saturn. Both of these events will make interesting spectacles.

*Science News Letter, September 2, 1933*

#### CHEMISTRY

### Tastiest Liquids Come Out of Green Bottles

**E**XPOSURE to light is bad for all liquids from beer to kraut juice, but green light has been found to be the least harmful.

Experiments on apple and kraut juices made by D. C. Carpenter at the New York Agricultural Experimental Station and reported to the American Chemical Society show that blue bottles will ruin the taste of these juices and fade their color to a marked extent. Storage in red bottles may enhance the color of the liquid but it will make kraut juice taste like decaying cabbage.

The best treatment is to keep the juice in the dark until it is necessary to open it. If it has to be exposed for advertising, green bottles will afford the best protection. Manufacturers object to the use of green containers because they mask the clarity and the color of the product, but this might be overcome by wrapping the bottle in green cellophane until it is necessary to demonstrate it to the customer.

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