

ASTRONOMY

# Cygnus Flies Overhead

The autumnal equinox, when the sun reaches the half-way mark in its southern journey, will be at 2:42 p.m. EST on Sept. 23. Sagittarius is visible in the southern evening sky.

By JAMES STOKLEY

► **HIGH OVERHEAD** on September evenings shines the constellation of Cygnus, the swan, a group also known as the Northern Cross.

At the times for which the accompanying maps are drawn (10:00 p.m., your own kind of standard time, at the beginning of September, an hour earlier at the middle of the month and two hours earlier at the end), the group stands directly at the zenith. Its bright star Deneb is toward the north, and marks the head of the cross which extends in a southwesterly direction.

But this is not the only bird to be seen among the stars, for nearby is Aquila, the eagle. This constellation is southwest of Cygnus. It contains the first magnitude star Altair, shown on the map high in the south.

A third bright star—Vega, in Lyra, the lyre—is a little to the west of Cygnus. Since Vega is the brightest star now seen in the evening sky, it is not hard to locate.

Standing high in the eastern sky, just below Cygnus, we find Pegasus, the winged horse, which contains no stars of the first magnitude although it does have a characteristic figure called the "great square," so designated on the map. The square is now seen resting on one corner.

### Princess and Monster

Actually, only three of the great square's four stars are in Pegasus, for the one to the upper left as you view it in the sky is in the next-door group of Andromeda. This represents the Ethiopian princess whose story has come down to us in mythology. The hero who rescued her from the rocks to which she had been chained, left to be devoured by a sea monster, is also seen, as the constellation of Perseus, low in the northeast.

Just below and to the left of this group stands Capella, in Auriga, the charioteer, which will shine overhead during the winter months, where Cygnus is now.

Also near the horizon, over to the northwest, we find Arcturus, in Bootes, the bear-driver. It is right next to the familiar great dipper, which is part of Ursa Major, the larger bear. Winding upward above this group is the snaky constellation of Draco, the dragon, part of which winds around Ursa Minor, the smaller bear. This group contains the little dipper, with Polaris, the pole star, at the end of the handle.

ern twilight. When, as now, it occurs in the fall, the planet is difficult to locate, since it is quite low in the sky.

However, Saturn can be seen in the southwest at dusk, setting about two hours after the sun. It is in the constellation of Libra, the scales, which is not shown on our maps since it has gone below the horizon by the times for which they are drawn.

Jupiter, so brilliant in the evening a few months ago, has now shifted to the western side of the sun and has become a morning star, visible low in the east just before sunrise.

Ever since the beginning of summer, on June 21, the sun has been moving southward in the sky. This month it reaches the halfway mark at 2:42 p.m., EST, on Sept. 23, an event termed the autumnal equinox, which marks the beginning of autumn in the Northern Hemisphere. In regions south of the equator, spring begins at the same time.

The capital of a nation is always a place of interest to its inhabitants. Likewise, the constellation of Sagittarius, now visible in the southern evening sky, ought to be of interest to us since that is the direction

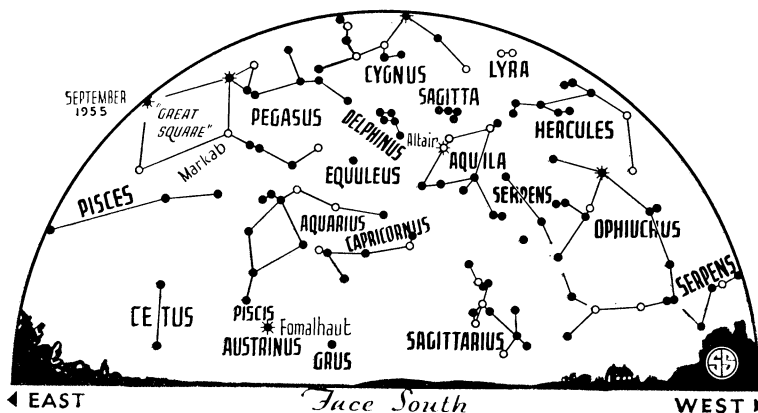
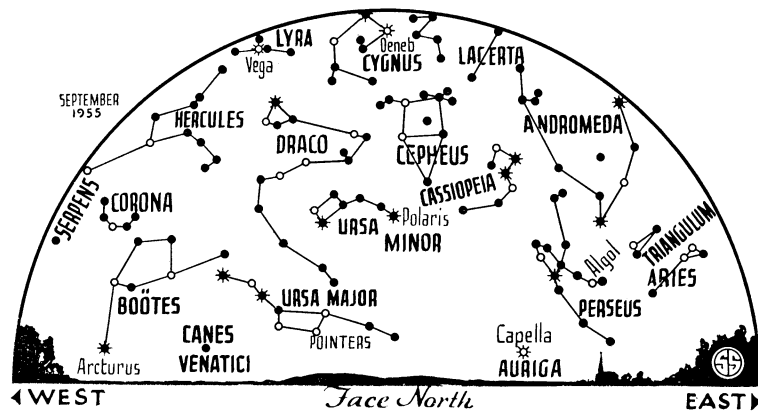
Cassiopeia, the queen, shaped like a letter W on one side, is to the right, between Polaris and Andromeda who, by the way, was the queen's daughter.

Low in the south is the star called Fomalhaut, in Piscis Austrinus, the southern fish. It is now seen about as well as it ever is in our northern latitudes. From more southerly countries, particularly those south of the equator, it rises high in the sky.

### Planets Obscured

This is not a good month for planets. Venus and Mars are both too nearly in line with the sun to be seen easily. Mercury is farthest east of the sun on Sept. 18 and, therefore, remains above the horizon following sunset.

When such a position, called "greatest eastern elongation," occurs in the spring, Mercury may easily be visible in the west-



☆ \* ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

of the center of the galaxy, our "nation" of stars, of which those we see in the night-time sky are a small part.

The galaxy has the shape of a thin, flat watch, and contains about a hundred thousand million stars.

In addition, between the stars, there is about as much matter as there is in the stars themselves. Interstellar space is not truly empty. It is far more so than the best vacuum we can produce on earth, but there is so much of it that it can hold a great deal of material.

We are about 150 million billion miles from the center, a distance that a beam of light, traveling 186,000 miles each second, would take about 27,000 years to cover. The total diameter of the galaxy is such that light takes about a hundred thousand years to cross it.

### Why the Milky Way

When we look at any direction in its plane, we see a great many more stars than when we look off to one of the sides. This vast swarm of stars seems to the naked eye to blend into a continuous band of light. This produces the effect we know as the Milky Way, the brightest part of which is in Sagittarius, where the concentration of stars is thickest.

Because we are inside the galaxy, it is hard to tell much about its general shape. However, outside its limits there are other disc-shaped aggregations of stars. Some of these, called "spiral nebulae," have a characteristic spiral structure, and it has been surmised that if an astronomer out there were to look back at us, he would see very much the same thing.

Very recently, partly with the aid of radio waves broadcast from clouds of interstellar hydrogen gas, some of these spiral arms in our galaxy have been identified, which seems to confirm this theory.

### Celestial Time Table for September

Sept.	EST	
1	2:00 a.m.	Sun between earth and Venus.
2	2:59 a.m.	Full moon.
9	2:59 a.m.	Moon in last quarter.
	8:00 p.m.	Moon nearest, distance, 229,800 miles.
13	6:49 p.m.	Moon passes Jupiter.
16	1:19 a.m.	New moon.
20	11:06 a.m.	Moon passes Saturn.
23	6:00 a.m.	Moon farthest, distance 251,200 miles.
	2:42 p.m.	Autumnal equinox, sun over equator, autumn begins in Northern Hemisphere.
	10:40 p.m.	Moon in first quarter.

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, August 27, 1955

Reclamation developments can be credited with adding about \$4,000,000,000 in Federal tax revenues since 1916.

Untreated hay fever can lead to asthma, serious bronchial difficulties and to chronic nasal sinus infections.

### GENERAL SCIENCE

# Radiation Danger Halved

AEC reports chemical treatment that helps mice endure large doses of radiation and a method for obtaining temperatures nearer absolute zero than previously possible.

➤ A TREATMENT that cuts the danger of death by radiation more than half, at least for bacteria and mice, has been reported by the Atomic Energy Commission.

The mice were given chemicals before exposure and bone marrow after irradiation. They were also given streptomycin to reduce infection. With this treatment, it was possible to "more than double the amount of radiation which a mouse can survive."

The findings resulted from studies at Oak Ridge National Laboratory and elsewhere in which scientists found that bone marrow, spleen, and extracts of spleen and of yeast have a protective effect against radiation in laboratory animals and bacteria.

Certain chemicals are almost as effective as the yeast and spleen extracts in producing recovery of one strain of bacteria from radiation damage, Oak Ridge scientists found.

These chemicals are glutamic acid, uracil and guanine. By combining chemical protection before irradiation and these recovery chemicals afterwards, it was possible to make a very high percentage of bacteria resist large quantities of radiation. When nutrition and temperature conditions were right, it was possible to reduce potentially lethal damage by 50% or more. These same chemicals were effective in mice.

The recovered bacterial cells, it was also found, had a lower mutation rate than expected from the amount of radiation exposure. This suggests a relation between the reduction in mutation rate and the increase in survival produced by the chemicals. Both effects may be produced by the same protective mechanism, it appears.

The low mutation rate is called "an interesting finding" because previous experiments had indicated that mutation production depended solely on the amount of radiation to which the cell is exposed.

The findings, with their hope of leading to human application, appear in the Eighteenth Semiannual Report of the Atomic Energy Commission.

### Reach Low Temperatures

➤ A UNIQUE METHOD for reaching temperatures much lower than ever before possible is also described in the report.

To learn about atoms and their hard cores, or nuclei, scientists have found it very useful to study them at temperatures as close as possible to absolute zero, 459.72 degrees below zero on the Fahrenheit scale.

At this temperature, all substances or particles reach a state of frozen immobility.

Theoretically it is impossible to reach absolute zero, but scientists have devised ways of coming within a few hundredths of a degree of it. The new method now suggested by the AEC would cool the metal indium by "temperatures perhaps one-hundredth as great as those realized previously in low temperature research."

It would be reached by placing the metal indium between the poles of a magnet at a temperature below 459 degrees Fahrenheit, then later cutting off the magnetic field. Under these conditions the neutrons and protons that make up its hard core tend to line up in one direction, that of the applied magnetic field.

When such nuclei revert to a random arrangement, they should absorb energy from the motion of the atoms. Since temperature is simply a measure of the energy state—the higher the temperature, the greater the energy—absorption of the nuclear energy would lower the metal's temperature.

What is now needed, the AEC said, are "advances in techniques to increase the degree of polarization," or alignment, of nuclei. Experiments at Oak Ridge National Laboratory are aimed in this direction.

Science News Letter, August 27, 1955

More than half of the *drugs* in use today were unknown 17 years ago.

A *tree*, shaded and protected from wind by other trees in the woods, may easily blow over or suffer from sunscald in winter when suddenly left to stand alone.

## GOLF: Your LEFT SHOULDER makes the amazing difference!

One of the most startling discoveries to emerge from wide research in the golf swing is that your game literally hinges on your left shoulder!

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