

ASTRONOMY

September Evening Skies

By JAMES STOKLEY

MOST CONSPICUOUS of the stellar decorations of the September evening skies is the "Northern Cross," also known as Cygnus, the swan, which shines high overhead. Brightest star in the group is Deneb, which the astronomers call alpha Cygni, at the head of the cross. Deneb is close to the zenith. Running from it to the southwest is a row of stars which outlines the upright piece of the cross and terminates in the star called Albireo, or beta Cygni.

The use of the Greek letters, "alpha" and "beta," is in accord with the astronomical practice universally adopted since its introduction in a famous set of star maps published in 1603, Johann Bayer's "Uranometria." "Cygni" is the genitive case of the Latin name "Cygnus," which means "swan," and is used with the Greek letters in order of brightness. Thus "alpha Cygni" indicates to those familiar with this system that it is the brightest star in the constellation, while beta Cygni is the second brightest.

There are a few exceptions to this rule. In the case of Ursa Major, the great bear, which now appears low in the northwest, alpha and beta are the two pointers, and then the other Greek letters follow the stars of the great dipper. This is done because the dipper is such a well-known figure.

Deneb and Albireo, then, are the brightest stars in Cygnus, and when the group is considered as a bird, rather than the northern cross, they mark respectively its tail and its head. The lower part of the upright piece of the cross is the swan's long neck, outstretched as he flies to the southwest. Two fainter stars on opposite sides of the long row represent both the cross piece or the bird's wings.

South of Cygnus is another bird—an eagle. Aquila is marked by the brilliant star Altair. Directly west of Deneb and forming with Altair a large isosceles triangle, is Vega in the constellation of Lyra, the lyre. Vega is the fourth brightest star in the heavens, and of the stars seen in the winter from the latitude of most of the United States, it is only exceeded in brightness by Sirius.

Another characteristic star figure now visible is the "Great Square of Pegasus." High in the east just below Cygnus is

Pegasus, the flying horse. Three stars in Pegasus, with one in the neighboring constellation of Andromeda, form the square, which can easily be identified. As it appears these September evenings with the square standing on one corner, the star in Andromeda, called Alpheratz, is to the left. Andromeda represents the famous chained lady of mythology.

Next to Andromeda to the left is Perseus, and next to him low in the northeast is the constellation Auriga, just coming into view, with the brilliant Capella to mark it. Later in the night at this season, and in the early evening a few months hence, Auriga will be a prominent group in the northern sky.

Fomalhaut Diminishing

Another first magnitude star is seen low in the south. This is Fomalhaut in Piscis Austrinus, the southern fish, but unlike Auriga, this group will not become much more conspicuous than it is now—at least not for a far longer time. Piscis Austrinus is a constellation of the southern skies, that can best be seen from countries to the south of the United States.

However, once in a period of nearly 26,000 years, the entire heavens make a turn around a point in the northern constellation of Draco, the dragon. This is called the precessional cycle. One of its effects is successively to bring different stars to the north pole, so that our present pole star, Polaris, in Ursa Minor, the little bear, has not always occupied that post, nor will it continue to do so. Another effect of the precessional cycle is to raise stars that now

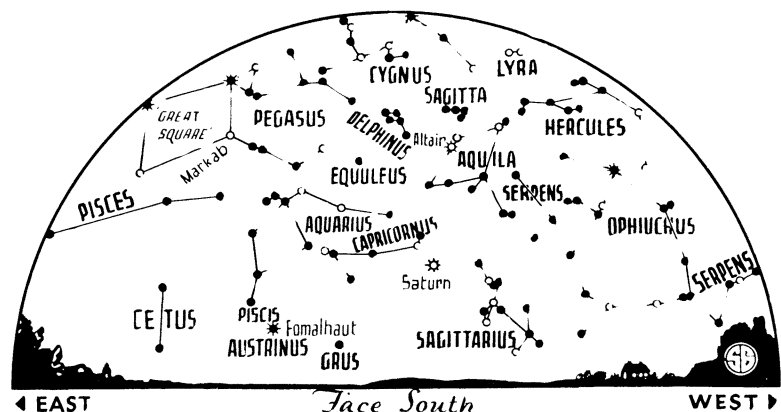
never appear in our skies, high into view. Thus in about ten thousand years the famous southern cross will be seen from the present position of Washington, while Piscis Austrinus and other groups that now only appear briefly at certain times of year low in the south will be as conspicuous as Cygnus or Pegasus.

Another bright star of the September evening sky is seen to the west in the constellation of Bootes. This star is Arcturus, which has been conspicuous during the summer months but is now about to disappear from evening view until next year.

In the southern sky a little to the west of the south point can be seen another brilliant object, which is not a star at all but the planet Saturn. This most extraordinary member of the sun's family of planets is now in the constellation of Sagittarius, the Archer. Of all the planets that can be seen with the unaided eye Saturn is the most distant and was thought to represent the limits of the solar system until 1781 when the English astronomer, Sir William Herschel, discovered Uranus. After that came discoveries of Neptune in 1846 and of Pluto in 1930 to push back still farther the boundaries of the system. And even now, in the opinion of many astronomers, the limit has not been reached. Few students of the stars would be surprised if tomorrow it were announced that photographs made at some great observatory had revealed the presence of a planet beyond Pluto, or even of another beyond that.

The earth is about 92,900,000 miles

☼ * c • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



RINGED PLANET, SATURN, SHINES IN THE SOUTH



THE SWAN, CYGNUS, FLIES OVERHEAD

from the sun and Saturn revolves around it at an average distance of 885,900,000 miles. However, its orbit is not truly round but rather eccentric and its distance from the sun varies by about 100,000,000 miles. When closest to the earth it is only 745,000,000 miles from us but it can recede to a distance of more than a billion miles.

Saturn is far larger than the earth, having a diameter of 71,500 miles, a little more than nine times that of our own planet. But the remarkable thing about Saturn is revealed by a small telescope. This is its system of rings which surround the planet.

Three Rings

There are really three of them. The outer one is 171,000 miles in diameter and about 10,000 miles wide. Then comes a gap about 8,000 miles wide known as "Cassini's division" after the famous French astronomer who discovered it in 1675. Next is the ring B, about 16,000 miles wide, and much brighter than the other two. After that comes a narrow gap, probably not more than a thousand miles wide, and finally the inner ring, which is very faint and difficult to observe, except with a large telescope. This is sometimes called the "crepe ring" and is about 11,500 miles wide. This makes the entire system about 41,500 miles in width and leaves a space of some 7,000 miles between them and the surface of the planet. In other words, their size is such that four balls each the size of the earth might be rolled around on the rings, one each on the outer and inner rings, and two, side by side on the second one.

However, this is an experiment that could not be made, even if it were possible to get the earth-size marbles. The rings are not the solid flat structures they appear when viewed in the tele-

scope. Instead, they are swarms of tiny moons, so small and close together that even the most powerful optical aid fails to reveal the individual particles. And in addition, Saturn has nine other moons, of a more conventional size, so that this planet is entitled to rate as one of the most remarkable of celestial bodies.

Returning to the stars, let us give our attention again to Cygnus. With a pair of binoculars or even an opera glass the region of Cygnus is most interesting, for it is right in the heart of the Milky Way and swarms of stars, though occasional dark gaps can be seen. One of these, sometimes called the "coal sack," is just to the south of Deneb in the right triangle formed by the upper part of the cross and the arm to the southeast. At one time this and other similar objects were thought to be actual holes in the sky, regions devoid of stars. But now it is believed that they are clouds of dark matter, cosmic dust, obscuring the stars beyond.

With a more powerful aid to the vision such as a small telescope the star Albireo is most interesting. It is one of the large class of double stars, pairs of suns which revolve around each other. Its chief feature, aside from its brilliance, is that the two bodies which constitute it are not of the same color, but one is yellow and the other blue, so that it is one of the most beautiful telescopic objects in the sky. At this time of the year it is being shown in the many observatories that are regularly open to the public.

The moon during September is at first quarter on the seventh, full on the fourteenth, at last quarter on the twenty-second and new on the thirtieth. On the fourteenth when it is full it will pass partly into the shadow of the earth, and there will be an eclipse of the

moon. Unfortunately, it will not be visible from the United States because it will be at its height at 4:05 p. m., eastern standard time, and will be completely over by sunset here when the moon rises. It will be seen, however, from most of Europe and Africa and the Atlantic Ocean, while the end will be seen from Newfoundland and the easternmost part of South America.

Early in the morning of September 23, at 1:16 a. m., eastern standard time, an interesting event happens when the sun passes into the zodiacal sign of Libra. This point is called the autumnal equinox and is taken as the beginning of autumn. At this time of year, the sun rises directly east, and sets directly west, so that it is above the horizon just as long as it is below, and the days and nights are of equal length. After this the sun continues its southward motion through the sky, and the days will continue to get shorter and the nights longer until December.

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ANTHROPOLOGY

Indian Drum Religion is Thriving American Cult

A RELIGION which centers about a drum is the curious cult adopted by Menominee Indians of Wisconsin. Songs which are an important part of this modern Indian religion have just been recorded for scientists by Miss Frances Densmore, collaborator of the Smithsonian Institution.

Reporting the results of her investigation among these Indians, Miss Densmore says that the drum religion combines old Indian thought with some features of Christianity. Rites of the cult require use of a sacred drum which "has a heart inside it." The heart is the tongue of a pony bell which rings as the instrument is beaten. At a certain point in the ceremony the drum is struck, and the answer of the bell inside is said to mean that the drum has heard what is said and will answer the petition.

Among the teachings of the cult, as described by one leader in the drum religion, are: "If any one tries to quarrel with you, walk away. If any one is talking bad about any one, walk away. If a bad scheme is afloat, walk away. The drum religion is strictly against moonshine, and teaches that men must not steal."

An important feature of the ceremonies, Miss Densmore found, is the practice of contributing money to the