ASTRONOMY

Autumn Stars Now Shine

The first planets of October nights, Mars and Saturn, arise late. The stars of the Great Square and Northern Cross are visible.

By JAMES STOKLEY

➤ WITH NAKED-EYE planets absent from the evening sky in October, this is a good time to concentrate on getting acquainted with the stars of autumn, and the constellations into which they are formed. Some of these go back into the dim mists of antiquity, while a few have been added in more modern times. Often there is slight resemblance between the object after which it is named and the grouping of the stars. But perhaps we should not expect to find these things accurately pictured, any more than we would feel that the State of Washington ought to form a picture of George. The constellations are really areas of the sky, just as the states are areas of the United States, and the arrangement of the stars in them is as fortuitous as is the arrangement of the cities in the states.

Looking at the stars we are apt to see geometrical figures. High in the south, for example, there are four stars of similar brightness that form a square, indicated on the map as "Great Square." But this is not a true constellation. Three of the stars in it are in the group of Pegasus, the winged horse, and on the old star maps, which showed the actual figures around the stars, the horse was placed upside down for some unknown reason. The angular row of stars extending westward from the lower right-hand star of the square formed the animal's head, and the group of stars just above the word "Pegasus" on the map formed his forelegs. Only the front half of the horse was shown.

Many Stars

Alpheratz, the star in the upper left corner of the square, is in the constellation of Andromeda, the princess who, in mythology, was chained to a rock, to be rescued by Perseus, who is himself represented in another constellation nearby. He is to the northeast, just above the bright star Capella, in the figure of Auriga, the charioteer. To the left of Perseus is Andromeda's mother, the queen Cassiopeia, and still farther to the left is Cepheus, the king.

High in the west, next to Cepheus, we see Cygnus, the swan, in which there is a group of stars forming the Northern Cross, a much more perfect cross than its more famed southern counterpart, which is now invisible from most of the United States. Deneb is the bright star in Cygnus, at the top of the cross, which stands vertically at this time of year.

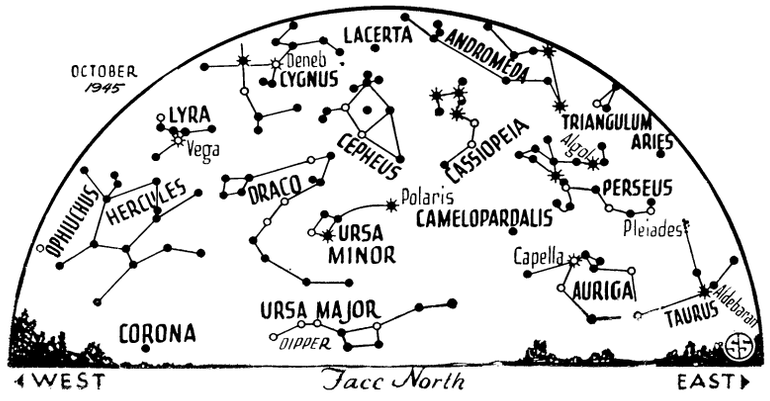
Below Cygnus is Lyra, the lyre, said to have been the one used by the mythological Orpheus, and in it is the bright star Vega. To the left of Vega is Aquila, the eagle, in which the first magnitude star Altair is found. Below Lyra is Herclues, the strong man, and next to him, to the right, is Draco, the dragon, which winds around Ursa Minor, the little bear, in which the pole star is located. Below Draco, now in its poorest position of the year, is the great dipper, in Ursa Major, the great bear.

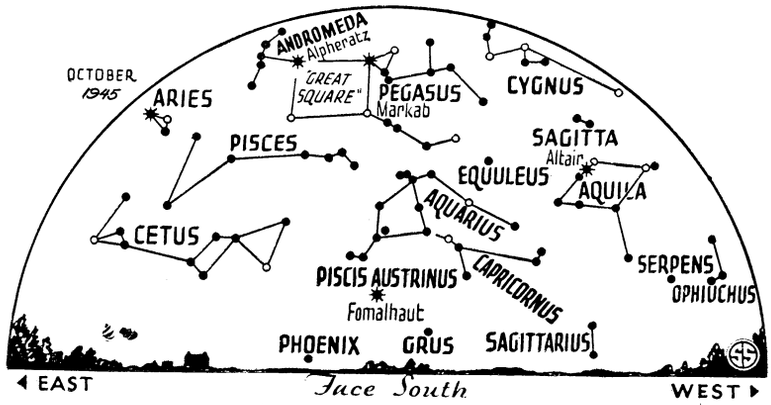
Going back to the square, we find a sort of V-shaped group of stars below and to its left. These form Pisces, the fishes, one of the "zodiacal" constellations, through which the sun and moon and planets move. Aquarius, the water carrier, just below the head of Pegasus, is another, and so is the rather faint constellation of Capricornus, half fish and half goat, which is next to the right. To the left of Pisces is still another, Aries the ram, and then after that we have Taurus, the bull, with brilliant Aldebaran, just appearing in the east, a group which will become more and more prominent as winter comes.

"Water" Stars

For some unknown reason this part of the sky contains a number of constellations having some connection with water. We have already mentioned Pisces, Aquarius, Capricornus. Just below Aquarius is the bright star Fomalhaut, in Piscis Austrinus, the southern fish, and to the left, below Pisces, is Cetus, a sea monster, supposed to be the one that would have devoured Andromeda had Perseus not rescued her.

All these constellations are represented on the accompanying maps, which de-





☼ ✷ ∘ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

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pict the sky as at 10:00 p.m., standard time, Oct. 1, and an hour earlier at the middle of the month. It is still later that the first planets arise. These are Mars and Saturn, both of which are in the constellation of Gemini, the twins, which is next to Taurus in the zodiac. Saturn is slightly the brighter of the two, but Mars is red in color and can easily be identified. Much brighter are two other planets which come up later—about two hours before sunrise—in the constellation of Virgo, the virgin. These are Jupiter, which will be seen at the end of the month, and Venus, with Venus considerably brighter. It is moving to the east, and will pass Jupiter on Oct. 30, so on that morning they will be very close together.

Hazy Light

In the constellation of Andromeda, if the night is dark and the sky is clear, it is possible to see a hazy spot of light. If you find this, you are probably seeing the oldest light that ever entered your eye, for the light waves that now fall on your retina, and excite the optic centers of your brain, have been on the way for the past three quarters of a million years. This hazy spot is the nearest of the other galaxies, great clusters of stars of which the whole Milky Way system, of which we are part, is another example. No other galaxy can be seen with the naked eye, though thousands are visible with large telescopes.

Before its nature was understood, this galaxy was often referred to as the Andromeda nebula, and it was considered to be similar to the other nebulae, such as one in the constellation of Orion which we see in the winter sky; that is, a huge cloud of gas, made to glow by the radiation of stars within it. It had been found that the Andromeda object, and others like it, had a characteristic spiral structure, and they were called spiral nebulae, but still they were believed to be part of the grind-stone-shaped galaxy, making up the Milky Way, and most of the stars that we see.

Separate Stars

Twenty years ago, with photographs made at Mt. Wilson Observatory, the Andromeda "nebula" was resolved into separate stars. Some of these were of a kind that permitted astronomers to tell their candlepower. Then, knowing how bright they looked, it was possible to figure their distance, and thus it became apparent that this "nebula" was beyond the limits of our system. There are a few others that are close enough to reveal separate stars, when observed with the biggest telescopes, but most of them are farther away. With the present world's largest telescope—the 100-inch at Mt. Wilson—galaxies can be recorded that are so far that their light, traveling 186,000 miles every second, takes 500,000,000 years to reach us. The new 200-inch, which will be completed at Mt. Palomar in southern California perhaps a year after work upon it is resumed, will reach out to twice this distance.

Celestial Time Table for October

Oct.	EST	
1	5:00 a. m.	Jupiter in line with sun
3	6:39 a. m.	Moon passes Venus
6	12:22 a. m.	New moon
8	8:00 a. m.	Moon farthest, distance 252,500 miles
14	4.38 a. m.	Moon in first quarter
21	12:32 a. m.	Full moon
	9:00 a. m.	Moon nearest, distance 221,700 miles
26	2:00 a. m.	Mars passes Saturn
26	11:48 p. m.	Moon passes Saturn
	12:25 a. m.	Moon passes Mars
	5:30 p. m.	Moon in last quarter
30	3:00 a. m.	Venus passes Jupiter

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