

ASTRONOMY

Stars and Planets Brighten Sky

While the Earth is Most Distant From the Sun, Six Bright Stars and Two Planets Give Interest to the July Heavens

By JAMES STOKLEY

SIX first magnitude stars, among them the largest that is known, and two planets, one the rarely seen Mercury, are making their appearance in the evening skies, which now wear a typically summer aspect. This evening, about nine or ten o'clock look overhead, a little to the east of the zenith. There you will see a brilliant star, the brightest of those now visible, Vega, marking the constellation of Lyra, the lyre. This star, in fact, is the fourth in order of brightness of all the stars in the heavens. Of those that can be seen from the latitude of most of the United States, only Sirius, the dog-star, visible in the winter sky, exceeds it in brilliance.

And now look below Vega, and a little to the north. There you will see a row of stars, crossed by another and shorter row, now vertical, that forms a cross on its side. At the northern end of the cross is another brilliant star. This is Deneb, and it is the lucida, that is, the brightest star, in the constellation of Cygnus, the swan. The vertical row of stars forms the wings, outstretched in flight, Deneb forms the bird's tail, and the long row of stars to the south the long neck. Another name frequently used for this group is "the Northern Cross." Though it does not contain as brilliant stars as the more renowned Southern Cross, which is occasionally seen from the southernmost parts of the United States, it is a more perfect cross. The southern one does not, like its northern counterpart, have any star at the intersection, but consists of four bright stars marking the extremities.

From Cygnus, look more to the south and a little below, and you come to another bright star even more brilliant than Deneb. This is in the constellation of the eagle, Aquila, and Altair is the name of the star. Now look directly south, and there you see a brilliant red star. To the right of it is a group of three rather bright stars, and extending from it to the left is a row which finally curves around into a hook, like the long tail of some animal. And an animal it is, for this is the constellation

of Scorpius, the scorpion, and the curved row of stars does represent the tail. In very few instances does an actual group of stars so closely resemble the object after which it is named. Antares is the name of the bright star, a name ("anti-Ares") which means the "rival of Mars." Like the star, the planet Mars has a ruddy color.

Sagittarius, the Archer

Follow along the line of the scorpion's tail to the east, and you come to another interesting group of stars, though it contains none of the first magnitude. This is Sagittarius, the archer, which, like Scorpius, is one of the zodiacal constellations, through which passes the ecliptic, the path of the sun, the moon and the planets, and which is really the part of the sky where the plane of the earth's orbit intersects it. Incidentally, though Scorpius is one of these constellations, of which there are twelve, it marks considerably less than a twelfth of this imaginary line. The constellation of Ophiuchus, the serpent-bearer, above, though not officially a zodiacal constellation, includes more of the ecliptic than does Scorpius.

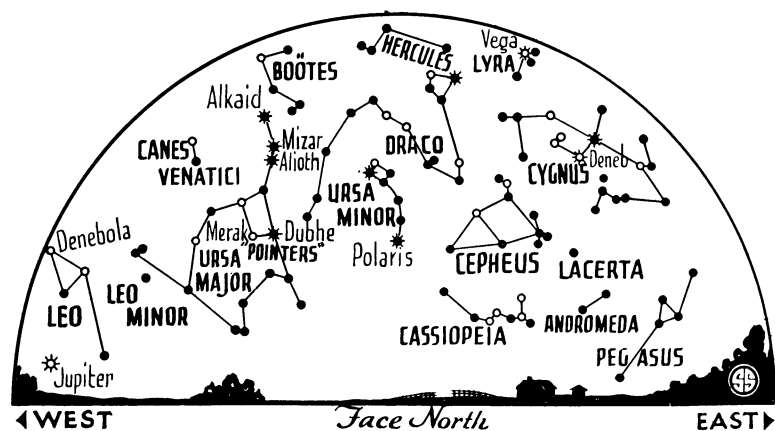
Familiar to everyone is the Great Dipper, in the great bear, Ursa Major, and many people know the little dipper, in Ursa Minor. But in Sagittarius is a third specimen of this implement, often called the "milk dipper." It is the part of the constellation farthest from Scorpius, and the handle now points almost directly upwards, while the bowl of the

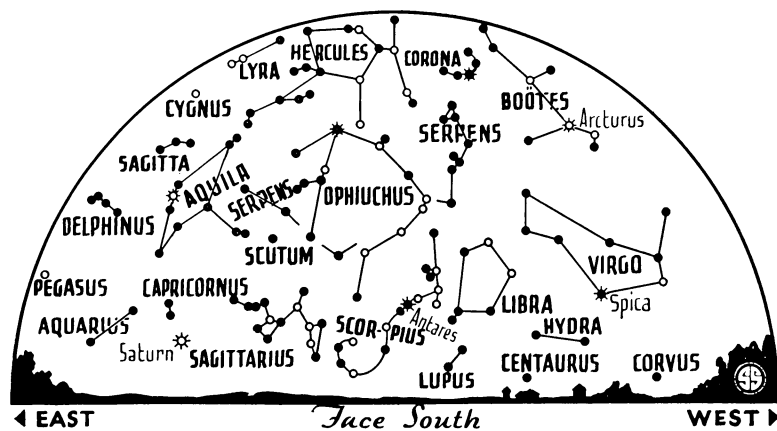
dipper is turned downwards, as if it were in the act of emptying its contents. Another imaginary figure that is sometimes seen in Sagittarius is the "tea pot." For this, the handle of the milk dipper forms one side of the lid, and the bowl of the dipper forms the handle of the pot. The four stars nearest Scorpius form the spout, so that as we see the figure in the summer evening sky, the tea pot is pouring hot tea upon the tail of the scorpion!

Next to Scorpius towards the west is Libra, another of the zodiacal constellations, but which contains no first magnitude stars. But next to Libra is Virgo, the virgin, in which shines brilliant Spica. Above Virgo is the sixth first magnitude star now to be seen in the evening sky—Arcturus, in Bootes, the herdsman. Of the stars now visible, only Vega exceeds it in brilliance. With Antares and Spica, it forms a large right angled triangle, Spica being at the right angle. Vega, Deneb and Altair form an isosceles triangle, so that if you become familiar with these two trios of stars, you will know the most important ones in the summer evening skies.

Largest Star

And now let us return a moment to Antares, which surely deserves more than passing attention, for it is the largest of all the stars whose diameter has so far been measured. The earth revolves around the sun at an average distance of 92,900,000 miles, and Mars at an average distance of 141,500,000 miles. Yet Antares is so huge that, if it were a hollow shell, there would be room within it for the earth and Mars, as well as the sun itself and the inner





planets, to move in their accustomed orbits without any crowding. Even Mars would be some 53,000,000 miles from the surface, for the diameter of Antares is 390,000,000 miles, or 450 times the diameter of the sun.

The diameter of Antares was measured a few years ago at the Mt. Wilson Observatory, in California, by F. G. Pease, using the stellar interferometer, an instrument invented by the late Prof. A. A. Michelson, famous physicist of the University of Chicago. This instrument was used in conjunction with the 100-inch telescope, the largest in the world, and consists of a beam twenty feet long, fastened to the end of the telescope. Upon this beam slide two mirrors, which reflect the star light to the center of the beam. Here two more mirrors reflect the light down into the telescope. Under these conditions, most stars appear as discs, crossed by dark bands. This is due to interference, when the waves in the two beams of light come together at certain places so as to reinforce each other, and at other places so as to cancel each other.

New Interferometer

As the two sliding mirrors are moved apart, the dark bands begin to disappear, and at a certain point they vanish completely, only to reappear if the mirrors are moved still farther apart. From the distance of the mirrors, the astronomer can calculate the star's diameter. For most stars, the critical distance of the mirrors is far greater than twenty feet, so that only a few are within the reach of the twenty-foot interferometer, practically all of which have been measured, with Antares coming out with first honors. But there has now been completed at Mt. Wilson a new interferometer, with a beam fifty feet long, and with this, it is believed, perhaps a dozen or so additional stars can be measured.

Possibly one of these may turn out to be even larger than Antares.

Two planets will appear in the evening sky during July, though one will be visible for only a few days. This is Mercury, which will be seen low in the western sky about July 20. Mercury is so close to the sun that it is never seen far away from that body, and it moves so rapidly that it never stays in the same part of the sky very long. Very different, however, is the other planetary attraction for this month. This is the planet Saturn, most distant from the sun of all the naked eye planets. It is in the constellation of Capricornus, in the southeast, below Aquila. Its steady light helps one to distinguish it from a star, which is continually in scintillation. It is of the 0.3 magnitude, not quite as bright as Vega, but brighter than any of the other

stars now visible. Saturn is one of the most interesting of all the planets, for it is the one provided with the remarkable system of rings. During the coming months it will come into better position for viewing in the evening, and will be considered in detail a little later in this series of articles.

The earth during July reaches aphelion, that is the position farthest from the sun. This happens on July third, when we are about three million miles farther from that body than we were last January. The phases of the moon during this month are as follows. On July 3 it is new, on the 10th it is at first quarter, directly south at sunset, on the 17th it is full, and visible all night, while on the 26th it is at last quarter, when it rises at midnight. Thus, from about the 7th to the 20th, will be moonlight evenings.

Though it will not happen until the 31st of next month, August, astronomers have now begun to get ready for the total eclipse of the sun which will be seen on that date along a path crossing parts of Quebec and the states of Vermont, New Hampshire, Maine and Massachusetts. It will happen about 3:30 p. m., eastern standard time, so it should be a good opportunity to see this rare and magnificent natural spectacle. Not until 1970 will another be seen from the United States. Details of this important event will be given in next month's article.

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ARCHAEOLOGY

Indians Ate Red Peppers Nearly a Thousand Years Ago

RED PEPPERS, such as the housewife uses in making salads and pickles, were part of the bill-of-fare of Southwestern Indians nearly a thousand years ago. That these hot dainties tickled Pueblo tongues centuries ago has been proved for the first time by the discovery of a lot of pepper seeds, buried four feet beneath the present ground level in the ruins of Mattocks pueblo, thirty miles east of Silver City, N. M., on the Mimbres river. The find was made by Paul H. Nesbitt, curator of the Logan Museum of Beloit College.

The seeds were identified by Dr. Melvin R. Gilmore of the University of Michigan Museum, a specialist on the

botany of ancient Indian food plants. Dr. Gilmore said of the present find:

"This is so far the first specimen of this species of plant to come to hand. Although an American plant it is scarcely known in the wild state. It is much used in Yucatan as well as Mexico for flavoring food. This is the first example to come from the Southwest."

The position and arrangement of the seeds as found indicated that they had been in a bunch of peppers hung up on a rafter to dry. The bunch had fallen to the floor, and the pods disintegrated.

The find belongs to the Indian archaeological period known as Early Pueblo III, dated at about 1000 A. D.

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