

ASTRONOMY

In March Comes Spring

Stars Bring Forecast of Warmer Days as Winter Constellations Move Toward the Southwest Skies

By JAMES STOKLEY

ORION has now moved over to the southwest in the evening skies and along with it the retinue of brilliant stars that made glorious the winter heavens. As usual, it may be recognized by the three stars in a row that form the warrior's belt—these are now horizontal. Directly above them is Betelgeuse, and below Rigel, part of the same constellation.

About as high, and farther south, is Sirius, brightest star of the night time sky, marking Canis Major, the greater dog. Above is Procyon, in Canis Minor, the lesser dog. A little to the west of the zenith are the twins, Gemini,—Pollux to the south and Castor to the north. Lower, and a little farther north, is Capella, in Auriga, the charioteer, and below is Taurus, the bull. Aldebaran, the star marking the bull's eye, is part of the Hyades, the V-shaped group that outline the face.

In the eastern sky, the place where these were a few months ago, now appear several constellations that at that time were not to be seen until late at night. The Great Dipper, then low in the north, is swinging around, into the northeast, the bowl uppermost. It is well known how the pointers, the two stars of the bowl farthest from the handle, indicate the direction of Polaris, the pole star. The handle of the dipper, too, can be used to find other groups. If, in imagination, its curve is extended around to the south, it brings one to Arcturus, in Boötes, and still farther south to Spica, in Virgo.

Lion and Crab

Directly above Virgo is the lion, Leo, of which the principal parts are the sickle, a hook-shaped group of stars, with Regulus at the end of the handle, to the south, and a triangle of stars below. Between Leo and Gemini is a rather faint constellation, Cancer, the crab, which is chiefly of interest because, like its neighbors, and Virgo and Taurus as well, it forms part of the zodiac, the

path of the sun, moon and planets in their wanderings through the sky.

If one has a clear horizon to the south, it is possible to see there part of the great constellation of Argo, the ship, in mythology representing the one that carried Jason and the Argonauts on their famous quest in search of the golden fleece. At latitude 40 degrees, for which these maps are prepared, the brightest star in the group does not rise, but from points south of latitude 38 degrees, that of Richmond, it can be seen at this time. Its name is Canopus, and it is the second brightest star in the heavens, only Sirius surpassing it. Argo is such a large constellation that it is subdivided into four parts. Canopus marks Carina, the keel. Puppis, the bow, is just left of Canis Major. Farther to the left are Pyxis, the compass, and Vela, the sail.

Only One Planet

Mars is the only planet that can be seen in the evening sky, but it sets about two hours after the sun, before the times of the maps, 10 p. m. on the first, 9 on the 15th and 8 on the 31st. Two other planets are in the sky, only they require telescopic aid to see them. In the constellation of Leo, a little below Regulus, is Neptune, which before 1930 was considered the outermost member of the

solar system, the family of planets revolving around the sun, and of which the earth is for us the most important. It was just 90 years ago that this planet was added to our knowledge, for before that Uranus, which the English astronomer, Sir William Herschel, had discovered in 1781, was supposed to have that distinction.

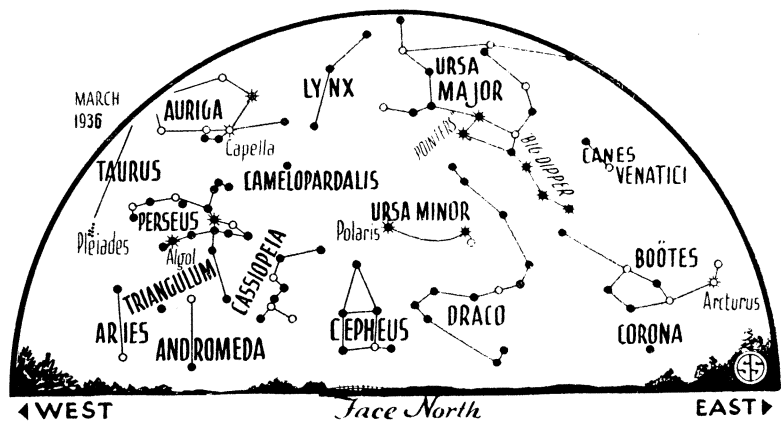
After Uranus had been discovered, astronomers calculated the orbit in which it should move, and predicted its future motion. For a time it followed the forecasts, but early in the nineteenth century it was found to have deviated slightly from its expected path, even though the gravitational pull of all the other known members of the solar system had been considered and allowed for.

Intolerable

By 1845 the difference had become, astronomically, intolerable—it was nearly two minutes of arc, about a fifteenth the apparent diameter of the moon, and almost enough to be noticed with the naked eye.

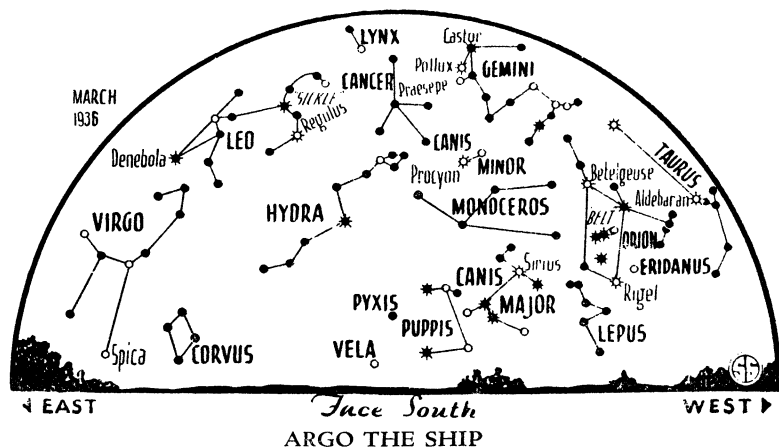
"But suppose there were another planet, so far undiscovered, out beyond. Might not its attraction sometimes pull Uranus one way, sometimes the other, and so account for the deviations?" This thought came to several astronomers, but to them remained only an idea. Two, however, proceeded to work upon it. One was a young Englishman, John Couch Adams. By laborious ef-

◊ * ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



STARS OF THE SPRING

Now in the east you may be able to find the spring stars coming into view. Follow the handle of the Great Dipper around its curve and you will locate Arcturus.



The famous craft that carried Jason and the Argonauts on their famous quest in search of the golden fleece is represented in the heavens by a constellation that may be seen low in the south in March.

forts he calculated where a planet would have to be to produce such an effect. Due partly to the fact that British astronomers did not have the proper star charts, and partly to the disinclination of those in official position to recognize this young and unknown man, his communications were pigeon-holed.

In the meantime, Urbain Joseph Leverrier, in France, knowing nothing of Adams' work, had set himself to the same problem, and had also solved it, in 1846. He was more fortunate in his choice of a correspondent, for he sent his results to J. G. Galle, in Berlin. The German, fortunately, had a new map of the stars in the part of the sky where Leverrier had said the new planet would be. Immediately after receiving his letter, Galle looked in the place mentioned, and there he found a strange object that did not appear on the charts. This was the planet Neptune, as it was later named.

Of course, when news of the discovery reached England, the importance of the work of Adams, who had placed his planet in just about the same position, was recognized at once, but too late to secure the honor of the discovery for England entirely. But the verdict of history has been to share the honor equally with Adams and Leverrier. Both attained outstanding rank in the astronomical circles of their respective countries, and also of the world.

In Opposition

On the fifth of this month Neptune is in opposition with the sun. This means that the two bodies are in directly opposite directions from the earth, so it rises just as the sun sets. At this time also, Neptune is closest to the earth, but is still at a distance of 2,714,210,000

miles. Large as this seems, it is about ten thousand times farther to the nearest star. Like all the planets, its sole source of illumination is the sun, and with it so far away, this light is very feeble. Its brightness in the sky is therefore that of an eighth magnitude star, two steps fainter than the dimmest visible to the naked eye. It can be seen, however, with small telescopes.

The other planet in the evening sky this month is still fainter. This is Pluto, which was discovered in 1930, and took away from Neptune the honor of being the most distant from the sun. It is now in the constellation of Gemini, but is of the fifteenth magnitude so that only very large telescopes reveal it.

Romantic Story

The discovery of Pluto, at the Lowell Observatory, Flagstaff, Arizona, is also a romantic story. This observatory was founded by the late Percival Lowell, of a prominent Boston family, who died in 1916. Even after the discovery of Neptune there had remained some very slight irregularities in the motion of Uranus, and Lowell calculated from these where a still more distant planet might be. A search was made for the planet, with photographic telescopes, before his death, but was unsuccessful. But in 1929 a new instrument had been presented to the observatory by the founder's brother and biographer, A. Lawrence Lowell, then president of Harvard University. A young amateur astronomer, Clyde Tombaugh, was employed to use it, and soon after he began his work the new planet was found, in almost the same part of the sky that Lowell had predicted. Since then several very famous astronomers have stated that Pluto could not possibly have

produced an effect great enough to have been detected in this way. The fact remains, however, that as a result of Lowell's prediction, and from the observatory he founded and directed, the planet was discovered. Undoubtedly future generations will remember him, like Herschel, Adams and Leverrier, as one who was responsible for the adding of a new planet to the solar system.

Spring at Last

The most important event in the astronomical calendar for March is scheduled for the 20th. On that date, at 1:58 p. m., eastern standard time, the sun, which has been moving northwards through the sky since last December, crosses the equator, and this, according to our convention, marks the beginning of spring. This is the point of the sun's path through the sky called the vernal equinox, because then the day and the night are supposedly of equal length. Actually, there is the effect of refraction, by which the sun's light is bent as it passes through the earth's atmosphere. This makes it appear higher than it really is, and makes it seem to rise a little early, and set a little late. So, on the twentieth, the sun will be above the horizon several minutes longer than it is below.

The evenings will be moonlit during the first week of the month, and again at the end. Apogee, the point at which the moon is farthest from earth, occurs on the 9th, at 11 p. m., E.S.T., with it 252,450 miles away. On the 23rd, at 4 a. m. it will be in perigee, nearest earth, only 221,900 miles distant. The moon is full on March 8 at 12:14 a. m., E.S.T.; at last quarter on the 16th at 3:35 a. m., new on the 22d at 11:14 p. m., and at first quarter on the 29th at 4:22 p. m.

Science News Letter, February 29, 1936

Weather predictions play an important part in modern warfare in laying plans for airplane maneuvers, gas attacks, and long-range gunfire.

RADIO

March 3, 3:15 p. m., E.S.T.
PLANT GROWTH SECRETS—Dr. P. W. Zimmerman of the Boyce Thompson Institute for Plant Research, Yonkers, N. Y.

March 10, 3:15 p. m., E.S.T.
ADVENTURES IN COLOR—Charles Bittinger, artist-physicist of Washington, D. C.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.