

ASTRONOMY

Three Planets

Venus, Mars and Jupiter, All Visible in Evening Skies, Rouse Speculation on Life on These Neighbors

By JAMES STOKLEY

THE brightest object in the April evening sky can be observed near the horizon, a little north of the west point, for about three hours after sunset. This is the planet Venus, which is drawing away from the sun and during the next few months will become more and more prominent. Farther south, higher than Venus, is the star Aldebaran, considerably fainter, which marks the eye of Taurus, the bull. Still farther south, and higher, is Betelgeuse, the uppermost star in Orion. The three stars forming the belt of this heavenly warrior are below. Still lower, where it sets at just about the time for which the maps are drawn, is Rigel.

The maps show the skies as seen at 10 p. m., April 1; 9 p. m., April 15; and 8 p. m., April 30.

Low in the southwest is Sirius, less brilliant than the planet Venus, but brightest of the stars. This star is in Canis Major, the greater dog. Above is Procyon, part of Canis Minor. About half way from the horizon to the zenith, in the west, is the constellation of Gemini, the twins, with the two stars Castor and Pollux. The latter, the brighter, is to the south. In the northwest Capella, in Auriga, the charioteer, shines brilliantly.

Steady Red Light

Directly south is Leo, the lion, which can be recognized from the familiar sickle, which has the bright Regulus at the end of its handle, hanging downwards. Towards the southeast, in the constellation of Virgo, is a red object, with a steady light that betrays it as a planet, Mars. Spica, the brightest star in the same constellation, is below and to the left. Low in the southeast, in the next-door constellation of Libra, the scales, is the planet Jupiter, even brighter than Mars, though not as brilliant as Venus.

Thus, three of the five naked eye planets are now visible in the evening sky at once. Saturn is in the constella-

tion of Aquarius, and rises in the east about 4:00 a. m., an hour and a half before sunrise. This is just about the time of the beginning of morning twilight, and so by the time the planet would be high enough the sky will be too bright to permit it to be seen. Mercury is still close to the sun and quite invisible this month.

High in the north is the familiar great dipper, part of Ursa Major, the great bear. If you follow the direction of the curve of the dipper's handle to the east, you will come to the bright star Arcturus, in Bootes. Low in the northeast is Vega, in the lyre, Lyra.

Are They Inhabited?

With Venus, Mars and Jupiter all visible in the evening sky together, our attention again turns to these members of the earth's family of bodies revolving around the sun, forming the solar system, and especially to the perennial problem of whether the earth is the only one inhabited. Without an atmosphere similar to ours and without temperatures such as those on the earth, life as we know it could not exist. The phrase, "as we know it," should be emphasized, however, for it is conceivable, perhaps, that some other sort of life

might exist under radically different conditions that would be fatal for earth-dwellers.

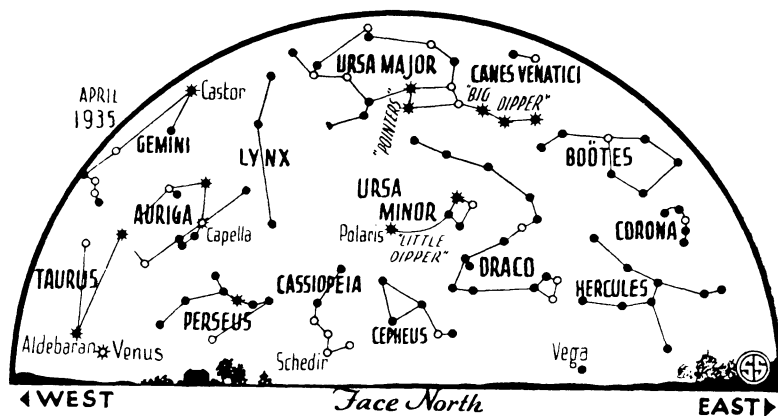
In recent years the study of the atmospheres of the planets has made great advances, which were summarized in an address by Prof. Henry Norris Russell of Princeton University at the last meeting of the American Association for the Advancement of Science. The spectroscope is responsible for these advances because different gases in the atmospheres of the planets absorb different colors, or wavelengths.

Lines Show the Elements

When light from an incandescent source passes through the prisms of a spectroscope, a continuous band of color is formed, red at one end, violet at the other. The spectrum of the sun's light is crossed by innumerable dark narrow lines, each due to the presence of some element in the sun's outer layers, which removes certain colors from the light shining through them.

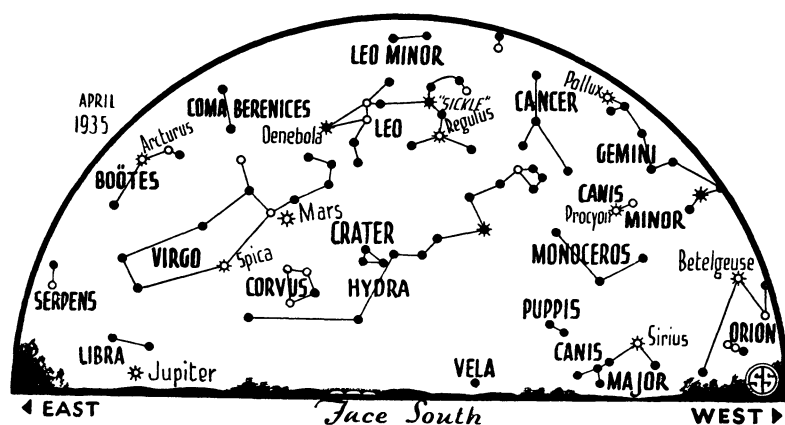
In addition other dark markings cross the spectrum of the sun. These are wider bands, which vary from time to time depending on weather conditions or on the sun's height in the sky, which determines the thickness of our atmosphere through which its light has to pass. These bands, therefore, are ascribed with certainty to some of the gases in the earth's atmosphere, particularly oxygen and water vapor.

☼ * • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



BRIGHTEST IN THE SKY

For about three hours after sunset you may watch the beautiful planet Venus in the western sky of April.



MARS AND JUPITER

With a steady red light shines the planet named for the god of war. Below it and farther east is the brighter Jupiter.

When we look at Mars, for instance, the light that reaches us has passed through both the atmosphere of the earth and that of the planet. Some of the bands that appear in the spectrum of its light are therefore caused by our own atmosphere, and some by that of Mars.

The problem is to sort them out. This can be done by comparing the spectrum of the planet with that of the moon which is known, on entirely independent evidence, to be completely devoid of any layer of air.

At Same Height

In taking such spectra for comparison purposes, the planet and the moon must be at the same height in the sky, in order that the light of each will pass through the same thickness of terrestrial air. If the bands are then found to be stronger in the planetary spectrum than in that from the moon, it would indicate the presence of that particular gas in the planet's atmosphere. Forty years ago Dr. W. W. Campbell, of the Lick Observatory, used this method, and found no appreciable difference between the strength of the lines in the spectra of Venus and Mars, and that of the moon. This experiment indicated that the atmospheres of these planets certainly did not contain a quarter as much oxygen and water vapor as are in the earth's.

In recent years a more delicate method of sorting the two groups of bands has been used. This depends on the Doppler effect, the same thing that makes the pitch of a fire engine bell sound higher when approaching you than when going away. When the bell comes towards you the sound waves are

squeezed together, they enter the ear at small intervals and give the effect of a higher pitched sound. But when leaving, the waves are spread out, the pitch is lower.

Exactly the same effect is observed with light. When light reaches the earth from a star or planet that is approaching us, the light waves are squeezed together and the wavelength, corresponding to pitch, is reduced. This produces a shift of the lines in the spectrum towards the violet end. If the star is receding, the shift is towards the red.

If the speed with which the earth and Mars are separating, or coming together, were great enough, the two sets of bands would be entirely separated, and then it would be easy to distinguish one from the other. With less speed, the bands would merely be widened. At the Mt. Wilson Observatory in California, several astronomers have been working on this problem with the world's largest telescope and a very powerful spectroscope used with it.

No Oxygen

No oxygen has been detected in the light of Venus and Mars, though it is estimated that one thousandth as much as is on the earth would have produced a noticeable effect. The test for water vapor is not so delicate, but it is certain that there is very little on either planet.

In his address Dr. Russell pointed out, however, that certainly some water vapor must be present in the atmosphere of Mars, because observations of the heat show that every day at noon on the Martian equator the temperature rises above freezing, and even at the poles it reaches that point in midsum-

mer. Consequently, the white areas that we can see around the pole of Mars, which form during the winter and disappear in their summer, must be snow, and must evaporate when they disappear. They are probably very thin, perhaps not more than a few inches deep, and they would account for only a minute amount of water vapor, too small to be detected.

But the case for life on Mars is not entirely hopeless. There are green areas on Mars which appear and disappear with the coming of spring, summer and autumn, and these seem very likely to be vegetation. Vegetable life might well adapt itself to the conditions on the planet. Dr. Russell points out that a race with no more intelligence than our own could probably have worked out means of living on oxygen obtained electrically from water. Whether this has been done on Mars, however, is pure speculation, and the astronomer does not concern himself with a problem of this kind.

The moon is new on the third, at first quarter on the tenth, full on the eighteenth and at last quarter on the twenty-fifth, so that it will be seen during the evening from about the sixth to the twentieth. At 3:12 p. m., E. S. T., on the first, it will be at perigee, or closest to the earth, 224,400 miles away. On the thirteenth, at 7:48 p. m., it is farthest, at apogee, at a distance of 251,700 miles, but on the twenty-ninth, at 11:00 a. m., it is again at perigee with 227,550 miles separating us.

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PSYCHIATRY

Conscience, Immortality Disputed in England

THE English are having their own Battle of Dayton.

Instead, however, of fighting over whether man is descended from monkeys, the compatriots of evolutionist Darwin are waging a religious controversy over such matters as the voice of conscience, belief in the soul and hope of immortality.

Instead of being fought in a court of law as was the famous Tennessee battle, the English version of the Battle of Dayton is being fought in that truly English court of public opinion, the London Times.

The shot that started the London battle was fired by Dr. David Forsyth, president of the section of psychiatry of the Royal Society of Medicine, when he