ASTRONOMY

# Venus Still Brightening

**Easily seen during May evenings are all of the planets that are ever visible to the naked eye, with the exception of Mercury. Partial eclipse visible in South Pacific.**

By JAMES STOKLEY

➤ THE BRILLIANT display of planets is still with us, for during May evenings every one that is ever visible to the naked eye, with the exception of elusive Mercury, is easily seen. All four are shown on the accompanying maps, in which is depicted the sky at 10:00 p.m. on May 1, and 9:00 p.m. in the middle of the month.

Venus, brightest of the quartet, barely gets on the map, and is shown on the horizon in the west, in the constellation of Taurus, the bull. Most of this figure, by the time for which the maps are drawn, is out of sight. At sunset, however, Venus is about 20 degrees above the horizon, so it is easily seen as the sky darkens. Its magnitude, on the astronomer's scale, is minus 3.3.

The second most brilliant planet at present (which Venus exceeds about three and two-thirds times) is Jupiter, high in the south in the constellation of Virgo, the Virgin, close to the star Spica. Jupiter's magnitude is minus 1.9.

### Saturn Is Third

Saturn, most distant naked-eye planet, is toward the west, in Gemini, the twins, where it has been for recent months. Ranking third in order of present brightness, it is of magnitude 0.4, or about an eighth as bright as Jupiter. This is about two and a quarter times as bright as the fourth and faintest of our planets, which is Mars. It has now moved from the figure of Gemini, where it stood during the winter and early spring, and is sojourning in the next-door constellation of Cancer, the crab.

Of the stars (which, unlike the planets, are distant suns, shining with their own light) now visible, the brightest is Vega, in lyra, the lyre, seen in the northeast. It is a little brighter than Saturn. Then comes Capella, in Auriga, the charioteer, in the northwest and rather low, Arcturus, in Bootes, the bear driver, is high in the south. Next comes Procyon, in Canis Minor, low in the west, and then Spica, in Virgo, the virgin, already mentioned because of the proximity of Jupiter.

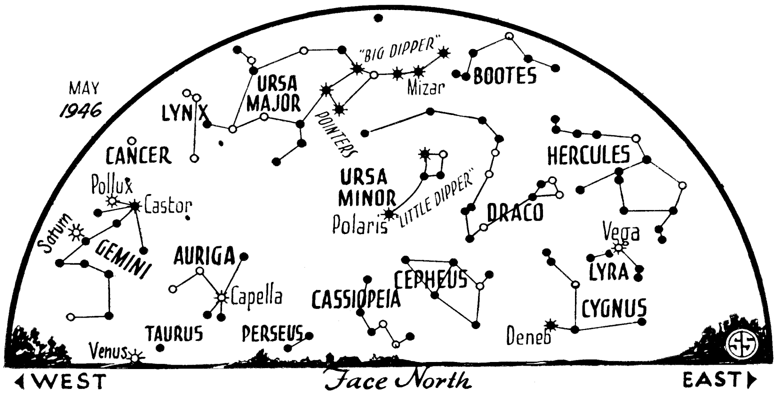
Low in the northeast, Scorpius, the scorpion, can be seen partly visible above the horizon, and in it is Antares, very red in color. Later in the night, as in the evenings of summer, it is in a better position, and its brilliance can better be appreciated. The same thing is true of Cygnus, the swan, just appearing in the northeast, and in which Deneb shines.

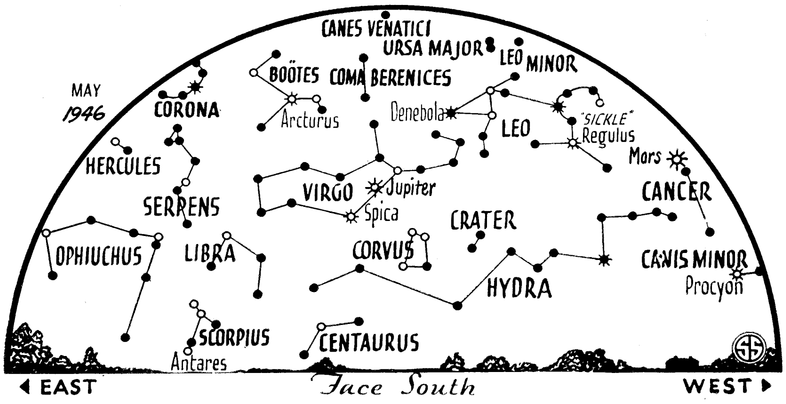
Regulus, in Leo, the lion, is in a good position, high in the southwestern sky. Directly west, one of the few typical constellations of the winter evening still visible, is the group of stars marking Gemini, the twins. Pollux is the brightest star.

Though it contains no stars of the first magnitude, the Great Dipper, in Ursa Major, the great bear, is perhaps the best known of all star groups. At this time of year, even though it is upside down, it is in its best evening position, high in the north. The two stars toward the west, forming part of the dipper's bowl, are the pointers, which indicate the direction of Polaris, the pole star, below. Polaris, in turn, is at the end of the handle of the little dipper. Winding around it is the long and snaky Draco, the dragon.

During May, the sun continues to move farther and farther north, approaching its maximum in June, at the beginning of summer. On May 30, the moon will come partially between the sun and earth, producing a partial solar eclipse, but few people will see it, as the region of visibility is in the South Pacific, between New Zealand and the southern part of South America. Except for a few Pacific islands, the only land where it will be visible is Chile, and there it will begin just before the sun sets, partially eclipsed. In mid-Pacific, where it is at a maximum, about 89% of the sun's diameter will be hidden.

Though most people probably picture an astronomer at work as a man looking




☼ ✱ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

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through a telescope, a visit to a great observatory will reveal relatively few persons at such a task. One is more apt to find the astronomer examining a photographic plate, for most of modern astronomy is done by photography. This has two advantages. First of all, the plate is a permanent record that can be studied at leisure. But even more important is the fact that it will soak up light with long exposures. It is therefore possible to photograph objects like faint nebulae, that cannot be seen even when looking through the biggest instruments. Again, with properly sensitized plates, exposures may be made with ultraviolet or infra-red rays, which cannot be detected by the human eye.

### Electronic Techniques

Now, as a result of wartime electronic developments, it is likely that electron tubes, oscilloscopes and other instruments that one expects to find in an electrical laboratory will more and more invade the observatory. As a matter of fact, even before the war astronomers had begun to use several electronic techniques. To measure brightness of stars they used the electric eye, or photocell, attached to a telescope. This is an electronic tube in which the electrons are knocked out of a sensitive surface by light. The more light, the greater the number of electrons. Thus, by measuring the resultant electrical current, which is a flow of electrons, the amount of light from the star could be determined. Sometimes photocells are also used to study photographic plates, particularly those of the spectra of stars, where dark lines indicate certain elements, under various conditions. Important to know are such data as the relative intensity of different lines, or whether a line is sharply defined or gradually fades out on each side.

With the microphotometer, a spectrum plate is moved past a narrow slit, parallel to the lines. A light shines through the slit, to a photocell beyond, and as the dark lines go by the current from it is reduced. This varying current may be made to write its own record, a curve with valleys and peaks which show clearly the characteristics of the lines in the spectrum plate.

Television, too, may become an adjunct of astronomy. Just before the war experiments showed that the sun's corona or outermost layer, formerly visible only at the time of a total eclipse, could be observed at other times with a television method. Perhaps television camera tubes may be made which are even more sensitive to light than the best photographic plate, and these may be employed in telescopes in their place. With other electronic tubes to amplify the faint currents, stars and nebulae far fainter than we can photograph today with the biggest instruments may be studied. If this is done, it may be possible that a telescope of only moderate size will do what the 100-inch reflector at Mt. Wilson, or the new 200-inch at Mt. Palomar, will do by methods which are conventional today. But the same improvements should also make those telescopes even more potent—able to equal the work of ones far bigger than any that have yet been proposed.

Then there is the possibility of using radar in astronomy, as suggested by the success of the Signal Corps in getting reflections of radio waves from the moon. This would give immediately the moon's distance. To obtain it otherwise requires photographs made at different parts of the world, and their careful measurement and comparison. The same method might also be used for the measurement of distances of the planets, but the problem in that case is much more severe. While the moon's average distance is of the order of 240,000 miles, Venus, which comes nearer than any other planet, reaches a minimum distance of 26,000,000 miles. The strength of a radar echo varies not with the distance of the object which sends back the reflection, but with its fourth power. (This is the distance times the distance, times the distance, times the distance.) Thus, while Venus, at her closest, is only 108 times as far as the moon, the echo would be reduced by a factor of the fourth power of 108, which is more than 136,000,000!

Still more unlikely is the possibility of charting the heights of lunar and planetary features by radar. The radar beam used in the army experiments was several times the diameter of the moon at the distance of our satellite. To be useful in measuring height of lunar mountains (which can, by the way, be measured accurately now by other methods) the beam would have to be of the order of a mile or less in diameter at that distance. In the case of Venus, which is continually covered with clouds, such height-finding methods would be very useful, but the problem of getting a beam a mile in diameter at 26,000,000 miles or more is far more difficult—indeed, with present-day knowledge it seems to be well beyond the bounds of practicability.

### Celestial Time Table for May

| May | EST | |
|---|---|---|
| 1 | 8:16 a.m. | New moon |
| 2 | 1:00 a.m. | Moon nearest, distance 222,500 miles |
| | 9:30 p.m. | Moon passes Venus |
| 4 | early a.m. | Meteors of eta Aquarid shower visible |
| 6 | 12:02 a.m. | Moon passes Saturn |
| 7 | 5.04 a.m. | Moon passes Mars |
| 8 | 12:13 a.m. | Moon in first quarter |
| 12 | 7:40 p.m. | Moon passes Jupiter |
| 15 | 9:52 p.m. | Full moon |
| 16 | 2:00 p.m. | Moon farthest, distance 252,400 miles |
| 23 | 11:02 p.m. | Moon in last quarter |
| 30 | 11:00 a.m. | Moon nearest, distance 222,100 miles |
| | 4:00 p.m. | New moon, partial eclipse of sun visible in South Pacific |

Subtract one hour for CST, two hours for MST, and three for PST.

*Science News Letter, April 27, 1946*

GENERAL SCIENCE

## 80-Year-Old Soviet Scientist Honored

➤ SOVIET agricultural scientists are honoring Academician Dmitri Pryanishnikov, now 80, who has spent 60 years in agricultural chemical researches, publishing over 400 scientific papers. His plan for crop rotation and use of industrial fertilizers, such as saltpeter and ammonium nitrate, combined with peat, industrial and farm wastes are credited with increasing crop yields and fertility of fields.

*Science News Letter, April 27, 1946*

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