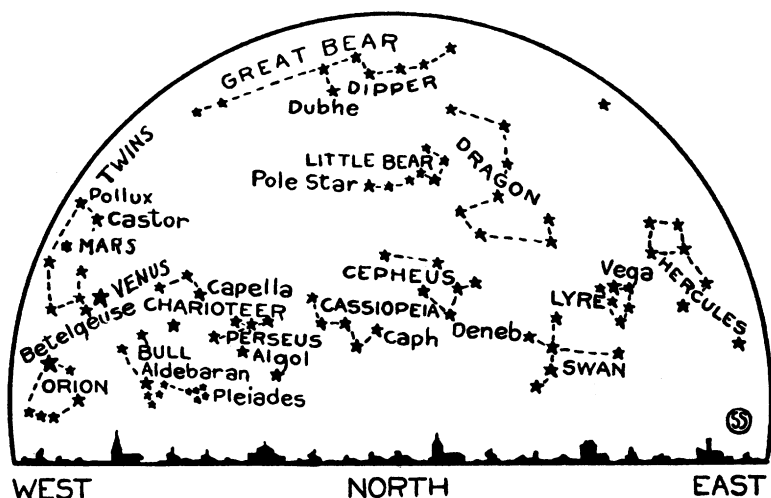


# Venus Brilliant in May Evening Skies



By JAMES STOKLEY,

Look to the western sky this evening after sunset. Even while twilight is still very bright, you will be able to see the planet Venus, which is now the brightest of any of the visible stars or planets. A few months ago this interesting orb was too near the sun to be visible; then, as it drew eastward from the sun, it became brighter, until it will be at the maximum brightness in August. Then it will become fainter, at the same time drawing towards the sun until it is no longer visible in the evening, but becomes a morning star.

The cause of all this is found in the position of the path of Venus. It is a planet, like the earth, and so revolves around the sun. The orbit of Venus, however, unlike that of Mars, is within the orbit of the earth. Once in every revolution it comes between the earth and the sun, and also the sun comes between the earth and Venus as often.

As a result of these relative motions of the earth and Venus around the sun, that planet shows phases like the moon. When it and the earth are on opposite sides of the sun, Venus is full, just as the moon is full when the sun and the earth are on the same side of it. Then, as Venus moves in its orbit until it is to one side of the sun, as seen from the earth, a position that the astronomer calls "quadrature," the planet appears like a half moon, when viewed through a telescope. As the planet is not transparent, only the half towards the sun is illuminated, and when it is in quadrature, we only see half of the illuminated portion.

## Venus Shows Crescent Phase

Then, when the planet begins to come between the sun and the earth, we see even less than half of the illuminated portion, and the planet appears as a crescent. But when Venus undergoes the change in phases, unlike the moon, it changes in apparent size as well. The orbit in which it revolves is 134 million miles in diameter. When it is between the sun and the earth it is only 26 million miles from us, but when it is on the opposite side of the sun, there is a gap of 160 million miles separating us from our neighbor planet. The result is that the full Venus is very much smaller, and fainter, as well, than the crescent phase.

All these changes, of course, are not visible to the unaided eye, but Venus itself is a most conspicuous

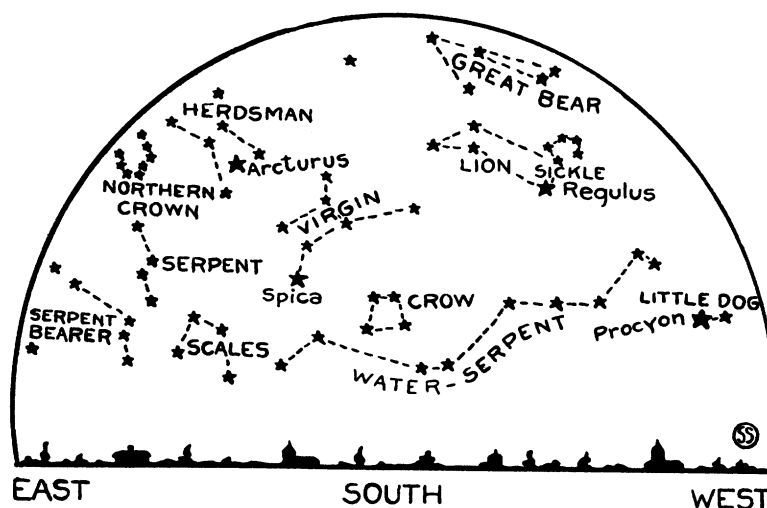
object, and so people saw it for thousands of years before they were aware of the changes that it was undergoing, literally before their eyes.

It remained for the great Galileo, who, in the year 1610, first turned a telescope on the heavens, to find that Venus showed changes in phase, a discovery which had a great effect on the acceptance of the then recently proposed Copernican system. Previously, the Ptolemaic theory had been widely accepted, and men thought that the earth was at the center of the universe, with the planets revolving around it. A mere rotation of the planets around the earth, however, was not sufficient to explain some of the complicated motions, for sometimes the planets move one way among the stars, and sometimes another. To reconcile the theory with the observed motions, they introduced epicycles. That is, a planet moved in a circle around a center which itself might move in a larger circle around the earth. The smaller circle was the epicycle, and sometimes it was necessary to have half a dozen or more epicycles on top of each other to explain the motions of the planets.

## Proposed Motion of Earth

It was in 1543 that Copernicus published his famous "De Revolutionibus Orbium Coelestium," "On the Revolutions of the Celestial Orbs." In this book, the first copy of which was handed to the great Polish scientist as he lay on his death bed, the much

(Just turn the page)



THIS MAP, and the one above, show the evening skies as they appear in May. Hold this page in front of you, and face either north or south. The upper or lower map will then show the heavens as they appear to you

## May Skies

(Continued from page 291)

simpler plan was suggested for the universe of putting the sun at the center, with the earth and the other planets revolving around it. With the earth and the other planets moving as well, the apparent motions of these bodies could be explained just as well as by the Ptolemaic theory. The Ptolemaic theory did not fall because it did not fit the facts, for it did, but the Copernican idea explained them just as well, and in a much simpler way. Of two possible explanations scientists usually accept the simpler one.

But for many years after 1543, the idea that the earth was not at the center of the universe proved too radical for general acceptance, and the religious authorities, the fundamentalists of the day, fought hard against the Copernican theory. Galileo Galilei, to give him his full name, however, was more progressive than the orthodox scientists of the time, and so he soon accepted the ideas of Copernicus. In 1610, when he heard that a Dutch spectacle maker was said to have made a glass that made dis-

tant objects seem close, and with no knowledge of the Dutchman's method, he constructed a telescope. Though it was inferior to a good pair of modern binoculars, it was the first telescope to be pointed at heavenly objects, and so his discoveries were many.

### Galileo Discovered Venus Phases

For the first time, Galileo saw the four larger moons of Jupiter, revolving around their parent planet. This was one of the first scores for the Copernican theory, for here, in the heavens, was a miniature of the solar system which it proposed. But more conclusive evidence was obtained when he turned his little glass on Venus, and watched it for a while. Then he saw that it underwent phases like the moon, a phenomenon which could not possibly occur with the Ptolemaic arrangement, for it placed the path of Venus inside that of the sun. Therefore, it could never get farther away from the earth than the sun was, and could therefore never show us more than half of its illuminated surface. When Galileo, then, found that it showed a full phase, as well as the crescent, it was a powerful argument in favor of the newer ideas.

The unpopularity of the ideas of Copernicus, however, made it unsafe to be too much in favor of them, and so Galileo showed strange caution about announcing his discovery in regard to Venus. He wanted to furnish some proof that he had seen the changes in phase, but on the other hand, he wanted to keep his discovery secret for a time. So he announced it in the form of an anagram; which he sent to his friend John Kepler: "Haec immatura a me iam frustra leguntur: o. y." (These things, not ripe, by me are read in vain.) Later he announced the solution. By transposing the letters, it read "Cynthiae figuras aemulatur Mater Amorum," which means in English, "The Mother of Loves (Venus) imitates the phases of Cynthia (the moon)." A few months later he revealed the solution.

### Mars and Saturn Visible

This month Venus will be seen regularly in the western evening twilight. On the third, the moon will be with it. At 2:17 a. m. the next morning, eastern time, Venus and the moon will be in conjunction, which means that the two bodies will be close together. At the time they are closest, however, both will be below the horizon for Americans, but the previous evening the two will be close,

with Venus above the young crescent moon. Mars is also visible, a little higher in the sky, and to the south, and on the afternoon of the fifth, the moon will be in conjunction with it. closest, when Mars will be less than a lunar diameter north of the moon. By evening, when Mars can be seen, they will have separated to some extent, but will still be close together. The planet Saturn, the most distant of the planets that can be seen with the unaided eye, is visible later in the evening in the east, in the constellation of Ophiucus. On the 26th of the month, it is in opposition to the sun, which means that the planet rises in the east just as the sun sets in the west, and so it is visible all night and directly south at midnight.

Science News-Letter, May 7, 1927

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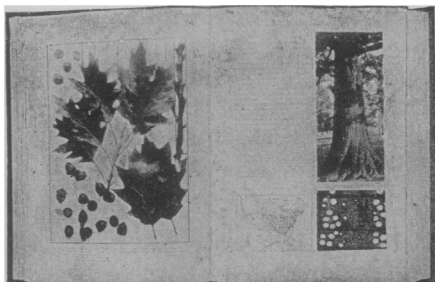
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