

ASTRONOMY

Debut of Venus

A Morning Star During Last Winter and Spring, Beautiful Planet Will Now Shine in Evening Skies

By JAMES STOKLEY

MAKING its debut in the evening sky this month for an appearance which will last until the end of the year and on into 1942 is the planet Venus. During the winter and early spring, it was a "morning star," visible in the east before sunrise. On April 19 it was between sun and earth. Now it has swung far enough east of the sun that it remains on view in the west after sundown.

At the beginning of June, it will be necessary to look to the west while the twilight is still quite bright. But at the end of the month it will have moved far enough away that it will set about an hour later than the sun, and it will be more easily seen. In succeeding months, it will continue to draw from the sun, and to brighten, making it a most brilliant object at Christmas time.

In the early part of June, the innermost planet, Mercury, is also visible for a few days, around the fifth of the month. It is in the west, a little to the north of the west point, under the star Pollux, which is shown on the maps. On these the heavens appear as at 10:00 p. m. at the beginning and 9:00 p. m., at the middle of June, in local standard time.

Most prominent stars of June are on view in the south and east. Brightest is Vega, in Lyra, the lyre, high in the east just above the northern cross of Cygnus, the swan. Second brightest is Arcturus, high in the south in Bootes. Below it is Virgo, the virgin, with Spica, another bright star. Antares, red in color, to the southeast, marks the scorpion, which will be prominent in the evening skies of mid-summer.

On Saturday, June 21, at 2:34 p. m., eastern standard time, the sun reaches its farthest north in the sky, and summer commences in the Northern Hemisphere. South of the Equator, it is the beginning of winter.

The planet Mercury, which makes its best appearance of the year this month, is by far the most elusive of the five visible to the naked eye. Mars, now seen in the east after midnight, Jupiter and

Saturn, which are too close to the sun to be visible at all this month, are able to come into plain view at any time of night. Venus becomes most brilliant of all, and frequently appears either for several hours before sunrise, or an equal time after sunset.

But Mercury is never above the horizon when the sky is really dark. Always it is seen, if at all, in the twilight of morning or evening. This is because Mercury, innermost of all the planets that revolve about the sun, is on the average 36,000,000 miles from the central fires of the solar system. However, its orbit is the least circular of all the planets except Pluto. It can approach to within 28,550,000 miles of the sun, or recede to a distance of 43,350,000 miles. Every 88 days it makes a circuit of the sun, but in this time the earth has made about a quarter of its own round trip. Every 116 days, consequently, Mercury catches up to us.

If we could watch the sun and Mercury continually as they travel across the sky, we should see the planet making a loop around the sun once in this 116-day period. At one time it would be farthest to the west (this is called its "greatest western elongation"). Then it would pass behind the sun, and reach its farthest to the east (greatest eastern elongation). In the former position, it is a morning star. In the latter, as this month, it remains in the sky after the

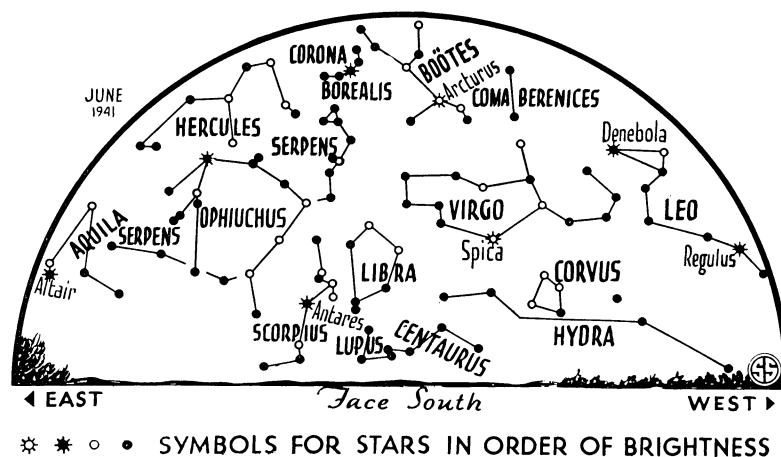
sun, and is an evening star. Even at best, it cannot get more than 28 degrees (slightly less than a third of the way from the horizon to the zenith) away from the sun. It is a little less than 24 degrees from the sun at this June elongation.

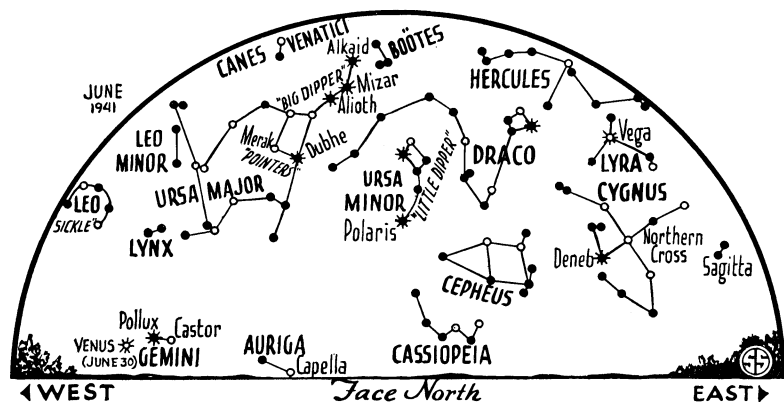
Darkness does not come until the sun is 18 degrees below the horizon, so even if the planet were directly above (as it could be only near the tropics) it would only be a few degrees high when the sky was really dark. Then the difficulty of seeing a star or planet very low, because of the absorption by the atmosphere, would make it quite invisible.

But, this month, especially about June 5, and even for as much as five days before or after, it may be glimpsed low in the western sky, about a fifth of the way around from the west to the north point of the horizon, while darkness is falling.

In the same way that the moon always presents the same side to the earth, so does Mercury always have the same half to the sun, an effect of the braking action of tides during past ages. Thus, one part of Mercury, the sunlit hemisphere, is extremely hot; above the melting point of lead. The other hemisphere, where the sun never shines, is so cold that helium gas would freeze. It is almost at the absolute zero of outer space—460 degrees below zero. Because of the small size of Mercury, about 3,000 miles, it does not have enough gravitational pull to hold an atmosphere even if it should be given one, so it is hardly a comfortable place to live!

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Celestial Time Table for June

Monday, June 2, 4:56 p.m., Moon at first quarter. **Thursday, June 5**, 11:00 p.m., Mercury farthest east of sun. **Saturday, June 7**, 9:00 p.m., Moon nearest; distance 223,800 miles. **Monday, June 9**, 7:34 a.m., Full moon. **Monday, June 16**, 4:24 a.m., Moon passes Mars; 10:45 a.m., Moon in last quar-

ter. **Friday, June 20**, 2:00 a.m. Moon farthest; distance 251,900 miles; 7:00 a.m., Venus passes Mercury. **Saturday, June 21**, 2:34 p.m., Sun farthest north, summer commences. **Tuesday, June 24**, 2:22 p.m., New moon. **Wednesday, June 25**, 12:54 p.m., Moon passes Mercury. **Thursday, June 26**, 5:50 a.m., Moon passes Venus.

Eastern standard time throughout.

GEOLOGY

"Reverse Matter" Theory of Meteorites Called Unnecessary

THE theory of meteorites made of "reverse matter," which explode and vanish when striking ordinary matter, is not necessary to explain the failure to locate meteoritic fragments around certain craters which seem to have been produced by the impact of giant masses of stone or rock from the sky, says Dr. H. H. Nininger, director of the American Meteorite Laboratory in a report to the Society for Research on Meteorites.

The theory of reverse, or "contraterrene," matter was proposed about a year ago by Dr. Vladimir Rojansky, of Union College. Ordinary matter is made of atoms having nuclei of positively charged protons, and negatively charged electrons revolving around them. Contraterrene atoms, on the other hand, if they exist, have negative nuclei and positrons, electrons with positive charges, revolving around. If ordinary and contraterrene matter were to come into contact, the charges would cancel, and both would disappear in a violent outburst of energy.

Following this proposal, it was suggested by Dr. Lincoln La Paz, of Ohio State University, and also by Dr. Samuel Herrick, Jr., of the University of California, Los Angeles, that contraterrene meteorites sometimes land on the earth. Dr. La Paz's idea was that they

might have caused craters like those at Tunguska, Siberia, which seem to have been the result of meteoritic impact in 1908, even though expeditions have found no meteorites in the vicinity.

Dr. Herrick made the proposal that a contraterrene meteorite was responsible for the "phantom Bertha," last summer, when a boating party in Long Island Sound were startled by what seemed to be a shell fired across their bow, hitting the water and exploding nearby. It was shown, however, that it could not have been a shell.

Without commenting on whether or not contraterrene matter may exist, Dr. Nininger declares that either the meteorless craters or the mysterious "shell" can be explained "without assuming the existence of any such purely hypothetical material." He says that if even the famous Arizona meteorite crater, near which many tons of meteorites have been found, had been formed in a partly swampy and wooded area, like that of central Siberia, probably not a single meteorite would have been found.

The story of the "phantom Bertha," he declares, "is entirely consistent with an ordinary daylight meteorite fall, such as hundreds that have been related either in the literature on meteorites or to the

writer in conversation with witnesses of such events."

"We should never be afraid to look for new facts or new explanations," Dr. Nininger concludes, "but, so long as well-established facts are sufficient to explain a given set of phenomena, we are surely courting a return to the days of 'spirits and mystery' when we shrink from painstaking or even back-breaking investigation and seek refuge in untried hypotheses, especially when these hypotheses rest entirely on assumptions."

In a later report to the Society for Research on Meteorites, Dr. La Paz answers Dr. Nininger, and defends his hypothesis. The Russian Academy of Sciences, he says, "sent well-organized expeditions, elaborately equipped with excavating tools, drills and modern geophysical equipment," to the Siberian site to search for meteorites. Their methods, he states, were essentially similar to those used successfully to hunt for meteorites in Arizona.

"On the basis of discoveries actually made at the Arizona crater," he declares, "there can be no reasonable doubt that intensive searches made by Russian scientists would have resulted in the recovery of meteoritic material if, as Nininger asks us to imagine, the Canyon Diablo rather than the Podkamennaya Tunguska fall had occurred on the Stony Tunguska River in 1908."

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and butter, meat, and potatoes, and so on, it was discovered that some of the standards set could not be supplied from any combination of foods that the majority of people were able to get. So the scheduled announcement was cancelled and the whole problem restudied. Now the National Research Council's committee on food and nutrition, representing doctors, nutritionists and public health authorities among others, is satisfied that it has standards which will guide us to fitness for defense along the diet route.

The yardstick, translated from laboratory terms, was announced by Dr. Lydia J. Roberts, head of the department of home economics of the University of Chicago, at the National Nutrition Conference for Defense called by President Roosevelt. Here it is:

One pint of milk daily for an adult, more for children.

One serving of meat.

One egg daily, or some suitable substitute such as beans.