

ASTRONOMY

Chance To See Mercury

Seldom-Viewed Smallest Planet Will Set an Hour and A Half After Sunset for a Few Evenings Near May 18

By JAMES STOKLEY

ALTHOUGH the spectacular display of bright planets during the past winter is just about at its end, we have in this month of May the best opportunity of seeing the least familiar of the five that ever are visible without a telescope.

Mercury, the innermost of the planets, never wanders very far away from the sun, and mostly it is so nearly in line with that daytime star that it is completely lost in its glare. Only when it is farthest to the east of the sun, a position called its "greatest eastern elongation," does it remain in view long enough after the sun has set to be visible in the twilight. Every 116 days it reaches such a greatest eastern elongation, but not every one is favorable for bringing the planet into view.

This month's elongation, however, happens to be a rather good one. It comes on May 18, and for a few evenings around this date Mercury will set about an hour and a half after sunset. Thus, it will go down before the sky is quite dark, but the planet, nearly as bright as the first magnitude star Procyon, in Canis Minor, the little dog, should be easy to locate as a reddish object low in the northwest.

Since Mercury sets so early, it is not shown on the accompanying maps, as they depict the sky for about 11:00 o'clock, war time, at the beginning of the month, an hour earlier at the middle, and two hours earlier at the end of May. However, two other planets are indicated. Brightest is Jupiter, in the constellation of Taurus; while still higher, in Gemini, the twins, is Mars. Because of its great distance from us at present, Mars is no brighter than a star of the second magnitude.

As for the other two naked eye planets, Saturn is now lost in the sun's glare.

On May 23 it will be directly beyond the sun. Venus is a bright "morning star," and shines brilliantly in the east before sunrise.

With Sirius, the dog star, gone from view, Vega, in Lyra, the lyre, is the brightest star seen in the evening. It can

be found in the northeast. Below it is Cygnus, the swan, with first magnitude Deneb. In the northwest, not far from Jupiter, is Capella, in Auriga, the charioteer, while nearby in Gemini, the constellation in which Mars is sojourning, Pollux, of the first magnitude, and Castor, of the second, are visible. Canis Minor, already mentioned, is to the west, just left of Gemini, and contains Procyon.

High in the north, in an inverted position, is the Great Dipper, part of Ursa Major, the great bear. The two stars called the "pointers" are so marked—a line drawn through them shows the position of Polaris, the pole star. And a line continuing the curve of the dipper's handle, around to the south, will bring you to Arcturus, in Bootes, the bear driver and, still farther, to Spica, in the virgin, Virgo.

Adjoining Virgo, to the right, is Leo, the lion. The front part of the animal, toward the west, makes up the "sickle," which has the star Regulus at the end of the handle at the bottom. And low in the southeast there is just appearing the first part of a constellation that so conspicuously marks the evening sky of summer—Scorpius, the scorpion. The bright red star Antares is just above the horizon, as seen on the maps.

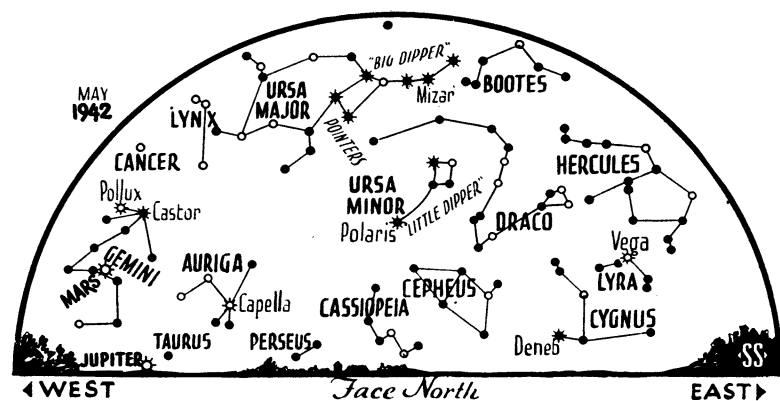
In models of the solar system, usually called "orreries," after the 18th Century Earl of Orrery, an Irish nobleman for whom a very famous one was built, it is usual to represent the planets as moving in circles about the sun, and all in the same plane. This greatly simplifies

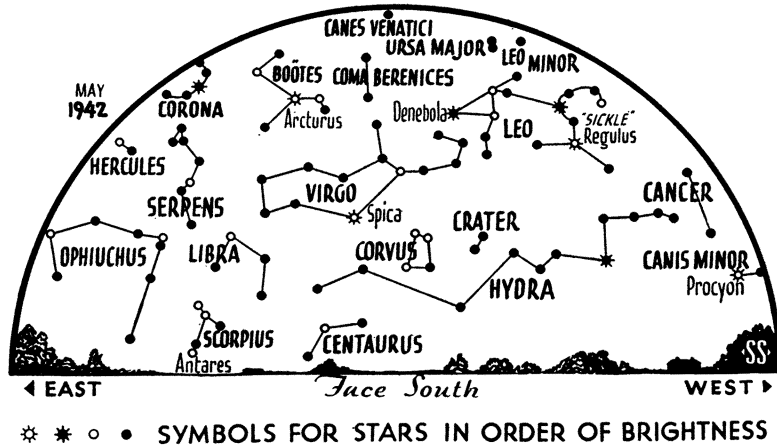
the construction, though some have been built, notably the famous one that David Rittenhouse made for the University of Pennsylvania in colonial days, in which the paths are much more accurate. Actually, the planets move in ellipses, though most of them are nearly circular, and in planes that are inclined to that in which the earth travels. Of the naked eye planets, the orbit of Mercury is inclined the most, 7 degrees, and is also the most elliptical. On the average 36,000,000 miles from the sun, Mercury can approach that orb to within 28,550,000 miles, and it can recede as far as 43,350,000 miles. In contrast, the range of distance of the earth from the sun is only from about 91,500,000 to 94,500,000 miles.

This is responsible for a great variation in the distance of Mercury from the sun at the time of elongation. If it occurs when Mercury is nearest to it, then the greatest elongation is only 18 degrees, as measured against the sky; but if it comes when the planet is farthest from the sun, it can get as far as 28 degrees away. The elongation this month is about average, 22 degrees 11 minutes.

However, there is another factor determining the visibility of Mercury. In the United States, or any place not in the tropics, this 18 to 28 degree figure is never measured in a vertical direction, but always to the side. However, when, for the northern hemisphere, greatest eastern elongation comes at this time of year, the line from the sun to Mercury is most nearly vertical, and then it is highest in the sky at sunset.

There is still another factor in the distance the planet is north or south of the sun's path, a line called the ecliptic.





It happens that on May 18, Mercury is about 5 degrees, out of a possible 7, north of the ecliptic and this brings the line from sun to planet still more nearly vertical, with the result that this month Mercury will set as much as an hour and a half after sunset.

Because of its proximity to the sun, Mercury is very difficult to observe, and no very distinct markings have been seen. However, the planet is so small, about 3100 miles diameter, that it does not have an atmosphere; it is not massive enough to hold one even if we could now endow it with such a layer of air. And just as the moon always keeps the same face toward the earth, so does Mercury always present the same hemisphere to the sun. This was demonstrated several years ago at the Mt. Wilson Observatory when very delicate measurements, with a device called a thermocouple, were made of the planet's surface temperature. No heat whatever could be detected from the dark side, which is close to the absolute zero of minus 460 degrees Fahrenheit, even though the side toward the sun is about 660 degrees Fahrenheit, hot enough to melt lead. Even if Mercury turned at such a speed that many weeks were required from sunset to sunrise, the dark side would hold a little heat, which could be detected.

The reason why Mercury should rotate so slowly as always to keep the same face to the sun is the same as that for the similar behavior of the moon to the earth. When Mercury was younger, and the globe was still in a plastic condition, tides were caused by the sun's pull. These acted as brakes, and gradually slowed its turning, but finally, when the present condition was reached, this braking action ceased. The same thing happened with the moon, due to tides caused by the earth's pull. The effect is

still going on with the earth. Tides here, largely caused by the moon's attraction, are gradually slowing down our rotation, and the time will come, in the very distant future, when one hemisphere of the earth is always turned to the moon. As this will be some 25,000,000,000 years from now, we hardly need worry about it!

Celestial Time Table for May

Saturday, May 2, 3:00 a.m., Moon nearest, distance 223,700 miles. Monday, May 4, early a.m., Meteors of eta Aquarid shower. Thursday, May 7, 8:13 a.m., Moon in last quarter. Monday, May 11, 2:50 a.m., Moon passes Venus. Friday, May 15, 1:45 a.m., New moon. Sunday, May 17, 12:18 a.m., Moon passes Mercury; 11:00 a.m., Moon farthest distance 252,500 miles; 3:50 p.m., Moon passes Jupiter. Monday, May 18, 4:00 p.m., Mercury farthest east of sun. Tuesday, May 19, 8:49 a.m., Moon passes Mars. Saturday, May 23, 5:11 a.m., Moon in first quarter. Saturday, May 30, 1:29 a.m., Full moon; noon, Moon nearest, distance 222,000 miles.

Science News Letter, May 2, 1942

ARCHAEOLOGY

Life Was Long Clambake For Tennessee Indians

VANISHED traces of a vanished people are described and pictured in a new publication of the Smithsonian Institution, by William S. Webb and David L. DeJarnette of the Tennessee Valley Authority staff (Reviewed, *SNL*, this issue).

The vanished people were Indians who lived on the banks of the Tennessee so long ago that their only record consisted of vast heaps of river-mussel shells, remnants of their feasts. Even these have vanished now, flooded by the waters backed up in the 75-square-mile artificial lake behind Pickwick dam.

When it became evident that the new lake was going to flood the shell-mound

areas, TVA archaeologists went to work on the mounds, using WPA labor and taking advantage of the facilities of the WPA Archaeological Laboratory at Birmingham and the Alabama Museum of Natural History.

Life for these vanished Indians appears to have been one long clambake. The shellfish of the river, together with fresh-water snails, seem to have constituted their staff of life. They lived right on the mounds their own feasts had created, and even buried their dead in them.

It is inferred that they were a very early people because no evidence has been found that they used bows and arrows, and in their more primitive stages at least they had no pottery. In these traits they tie in with the Basket-maker people of the Southwest, whom they also resembled in using the spear-thrower, or atlatl, as their principle projectile weapon.

Lowest in the mounds, and therefore earliest in time, were fireplaces indicating that they cooked their mussels by simply baking them on hot rocks. Higher up were crudely hollowed-out vessels of sandstone and soapstone, in which food might be boiled. Finally pottery vessels and other objects appear. There is no evidence at any stage of agriculture, though there is some indication of the use of storage bins, in which they may have kept collections of nuts, seeds, roots and other wild vegetable foods.

Primitive as they were, these Indians had the same domestic animal that has been found with all other North American tribes, the dog. The dog appears to have been of some special significance in their religion, for dog skeletons have been found showing signs of elaborate ceremonial burial.

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Diamonds are believed to have been first discovered in Brazilian gold washings in 1670.

Earliest zoo of which there is record was founded in China about 1100 B.C. by the First Emperor of the Chou Dynasty; it was called the Park of Intelligencé.

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