

ASTRONOMY

1940 Will Be Memorable

Spectacular Lining Up of Five Naked-Eye Planets Will Make Winter Evening Skies Gorgeous

By JAMES STOKLEY

FROM all indications, the year 1940 will probably be an important one, and astronomically it will be memorable as well.

The most spectacular event of the year that is visible all over the world will be the lining up of the five naked-eye planets in the western sky at the end of February. For the last few days of that month, and the beginning of March, they will be stretched out in a parade, with Mercury lowest, then Jupiter, Venus, Saturn and Mars above.

It is very rarely that all these planets can be seen at one time and especially so to have them in such a regular row.

As a matter of fact, it will be even more unusual than it might appear, because Uranus, the next planet out from Saturn, and just too faint to be seen without a telescope, will also be in the same line, above Mars, so the six brightest planets will take part in the formation. Only Neptune and Pluto will be left in other parts of the sky.

It will be a most interesting sight to watch the western sky night by night until this display appears, for then one can see how the planets slowly move into line.

The most important events of the year to the astronomer, however, will be the eclipses of the sun, especially the second.

The sun is eclipsed when the moon passes in front of it. Fortunately, it happens that, even though the sun is far larger than the moon, it is also much farther away, and hence they appear about the same size in the sky. However, the distance of each from the earth varies a little, and so the apparent size is subject to a similar change. Sometimes the moon appears a little bigger than the sun.

If an eclipse occurs at such an occasion, it is total, because then the sun is completely hidden.

But if it occurs when the sun is bigger, then, even though the moon passes in front, the former is not completely hidden. At the middle of the eclipse, one can see the outer edge of the sun as a ring around the black disc of the

moon. This is called an annular eclipse, from the Latin word "annulus," meaning a ring.

Such an annular eclipse will be visible on April 7, along a path crossing northern Mexico and the southern United States. San Antonio, Austin, Houston, Baton Rouge, New Orleans, Pensacola, Tallahassee, Savannah and Jacksonville will be in this path. Over the rest of North America, except Alaska, and a large part of the Pacific Ocean, there will be seen a partial eclipse, in which the moon will cover one edge of the sun.

An annular eclipse is not of great scientific importance, because even the small remaining part of the sun's surface which is visible is bright enough to prevent astronomers from making the observations for which they will travel thousands of miles to see at a total eclipse. But it will be interesting to watch, and anyone who is interested in the events of the heavens, and is able to get to one of the cities mentioned above to see this should certainly arrange to do so.

The astronomers are concentrating on 1940's eclipse number two, for that will be total and unusually good. On Oct. 1 the sun will be completely hidden, along a path crossing the northern part of South America, including the city of Pernambuco (Recife) in Brazil, the Atlantic Ocean and the tip of South Africa. The partial eclipse will be visible over most of South America, Central America, Florida and Southern Africa.

Where this eclipse lasts longest, a point in mid-Atlantic, the sun will be covered for 5 minutes 35 seconds. This is not as long as the record-breaking eclipse of June 8, 1937, in the Pacific Ocean, which lasted for more than seven minutes.

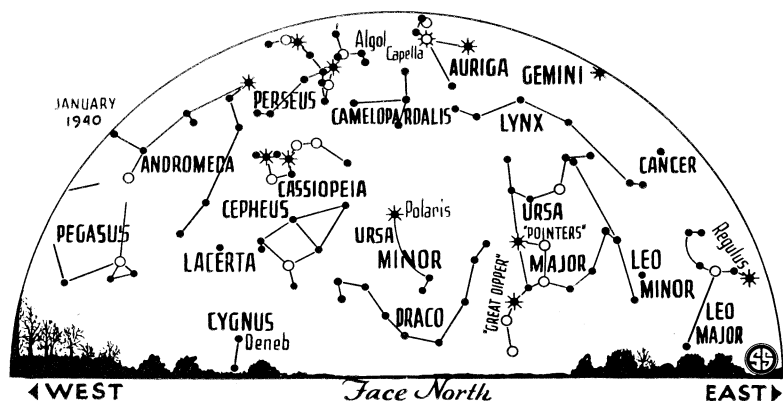
A small party did make observations from a boat at the point where it was longest, but these were limited. The longest land duration, where big instruments could be erected, was at Canton Island, for 3 minutes 33 seconds.

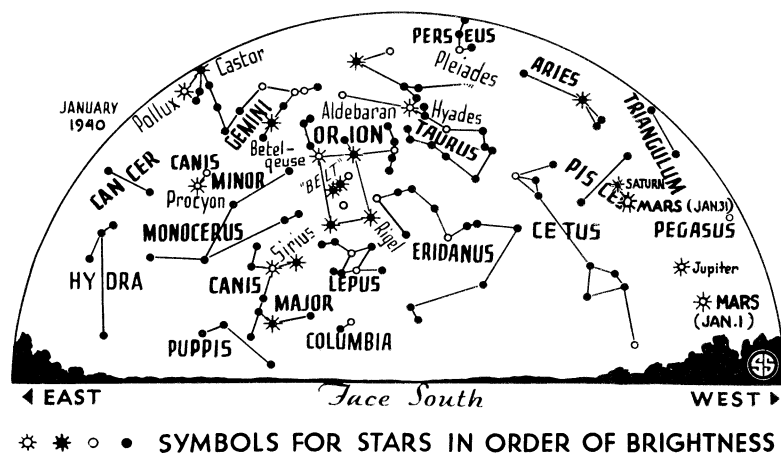
On the coast of Brazil, the eclipse of this year will be total for 4 minutes 45 seconds, while in South Africa it will last for 3 minutes 50 seconds.

Both of these locations are far more accessible than Canton Island, and so it is no wonder that many astronomical parties are planned to make observations from one point or the other.

Most of these will be to record the corona, the sun's outermost layer, which is fully visible only at a total eclipse. Others will be with the spectroscope, to learn more about the sun's atmosphere. Still others will record the changes of radio transmission through the moon's shadow. All told, a total eclipse of the sun offers the astronomer many opportunities, and they will take full advantage of them in October, if the weather is satisfactory.

The moon is not the only celestial object that passes in front of the sun. At rare intervals Venus does so, producing a "transit" of this planet. The last one was in 1882, and the next will occur in 2004. Transits of Mercury happen more often. The last was on May 11, 1937, and there will be one in 1940 on Nov. 11. This will not be visible to the naked





eye, but if one has a telescope, equipped with an eyepiece that permits observation of the sun, the little planet will be seen to come in front of the mighty sun during the Armistice Day afternoon. As the sun sets in the United States, the planet will still be in front of it.

Just as the moon can hide the sun, so it can pass before a star or planet, and this is called an occultation. Two rather rare occultations of planets happen this year, but they are not visible throughout the United States. On June 30 Saturn will be occulted in the early morning hours, visible only in southwestern states. On the afternoon of July 31 there will be a similar occultation of Venus, which will then be so bright it can be seen even in the daylight, especially with the aid of binoculars. This will be visible in western United States and Canada.

Most conspicuous of the objects to be seen in the January evening skies are the planets to the west, which are now beginning to line up for a most remarkable display which they will present at the end of February. The accompanying maps show them, as well as the stars that are seen at present. At ten o'clock on Jan. 1, nine o'clock on Jan. 15 and at eight on Jan. 31, the skies present this aspect. Mars is moving so rapidly that it is indicated for its place both on the first and thirty-first, while Saturn and Jupiter are in the position for the fifteenth. As they move so slowly, their position does not change noticeably during the month. In addition to these three, Venus is visible in the west for a while after sunset, but it goes down before the times of the maps.

Venus is the most brilliant of the planets and is so bright as it shines in the west that no one can possibly mistake it. Jupiter is next in brilliance. Mars

and Saturn are considerably fainter, though still as bright as a star of the first magnitude. Mars passes Jupiter on Jan. 7, and at that time the two, shining so close together, will be a striking sight. During the month the moon, in a crescent phase, joins the picture. On Jan. 12 it passes Venus, on the 15th Jupiter, on the 16th Mars and on the 17th Saturn.

Turning now to the stars, we find that they, unlike the planets, appear the same as always at this time of year. High in the south shines Orion, the warrior, recognizable from the three "belt" stars. Betelgeuse, above, marks one of his shoulders; Rigel, below, one of his feet. Below and to the left is Sirius, brightest star in the night-time sky, which is even more brilliant than Jupiter, though not as bright as Venus.

Higher, and farther east, is Procyon, in Canis Minor, the lesser dog. Still higher is Pollux, which, with Castor, forms Gemini, the twins. Nearly overhead we see Capella, in Auriga, the charioteer. In the south, above and to the right of Orion, is Aldebaran, in Taurus, the bull.

Two other stars of the first magnitude are also visible. Coming up in the east, we see Regulus, in Leo, the lion. Low in the northwest, about to disappear from the evening skies for a while, is Deneb, in Cygnus, the swan.

Celestial Time Table for January

Monday, Jan. 1, 11:56 p. m., Moon at last quarter. **Tuesday, Jan. 2,** 1:00 a. m., Earth nearest sun; distance 91,343,000 miles. **Sunday, Jan. 7,** 10:00 a. m., Mars passes Jupiter. **Tuesday, Jan. 9,** 8:53 a. m., New moon. **Wednesday, Jan. 10,** 6:34 a. m., Algol at minimum brightness. **Friday, Jan. 12,** 8:23 a. m., Moon passes Venus. **Saturday, Jan. 13,** 3:23 a. m., Algol at minimum. **Sunday, Jan. 14,** 7:00 a. m., Moon farthest; distance 251,900 miles. **Monday, Jan. 15,** 5:02 p. m., Moon passes Jupiter. **Tuesday, Jan. 16,** 12:13 a. m., Algol at minimum; 2:07 a. m., Moon passes Mars. **Wednesday, Jan. 17,** 11:48 a. m., Moon passes Saturn;

1:21 p. m., Moon at first quarter. **Thursday, Jan. 18,** 9:02 p. m., Algol at minimum. **Sunday, Jan. 21,** 5:51 p. m., Algol at minimum. **Wednesday, Jan. 24,** 6:22 p. m., Full moon. **Friday, Jan. 26,** 6:00 a. m., Moon nearest; distance 223,900 miles. **Wednesday, Jan. 31,** 9:47 a. m., Moon at last quarter.

Eastern Standard Time throughout.

Science News Letter, January 6, 1940

ASTRONOMY

"Super-Shell" Stars Have Speeding Envelope

"SUPER-SHELL" stars, a class of celestial objects long observed but hitherto neglected by astronomers, were described by Dr. Ernest Cherrington of Ohio Wesleyan University to the American Association for the Advancement of Science. Their distinguishing character is an outer gaseous envelope or atmospheric shell that speeds away from the star itself with explosive velocities up to 70 kilometers (43.5) miles a second.

Spectrum photographs of these stars, technically known as the B and Be types, have been almost in the class of nuisances to astronomers, because some of their lines are fuzzy rather than clear and sharp. These faint and fuzzy lines proved, upon analysis, to be indicators of the existence and recessional speeds of the stars' "super shells."

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ASTRONOMY

Christmas Eve Nova Discovered at Harvard

A NOVA, or "new" star, similar to what the Star of Bethlehem may have been, was discovered on Christmas Eve by Dr. F. L. Whipple of the Harvard College Observatory. It was then of tenth photographic magnitude, and thus invisible to the naked eye. Evidence indicates that it flashed to its maximum brightness some time last summer, but for some reason it then eluded the watchfulness of astronomers. It is located in the minor constellation Monoceros, the Unicorn, near the southern horizon.

Science News Letter, January 6, 1940

● RADIO ●

W. H. Cameron, of the National Safety Council will tell how you can help reduce accidents as guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Thursday, January 11, 4:15 p. m., EST, 3:15 CST, 2:15 MST, 1:15 PST. Listen in on your local station. Listen in each Thursday.