ASTRONOMY

Four Christmas Stars

Brilliant Planet in the East Is Attended By Others In the South and West; Venus at Maximum Brightness

By JAMES STOKLEY

AS CHRISTMAS approaches this year we have not only a brilliant "star" in the east, but one in the south and another in the west as well. These are the planets, actually four in number, which have added their splendor to the constellations of late autumn to make the skies even more glorious than usual.

In December, as last month, we again have the unusual privilege of seeing four planets in the sky at once. While Mars has dimmed a little, two others, Venus and Jupiter, are now at their greatest brilliance, while the fourth, Saturn, is also brighter than average.

Venus is most brilliant of all and this month it reaches its maximum on the 28th, with magnitude minus 4.4 on the astronomical scale. It is not indicated on these maps, since it sets about three hours after the sun, while they are drawn for 10:00 p.m., Dec. 1 and 9:00 p.m., Dec. 15. However, it is very easy to find, because it is so bright. Long before dark it can be seen in the southwest, shining so brilliantly that it is hard to believe it is a heavenly body. Often in the past, when Venus was as bright as this, it was called the Edison star, because many thought that it was some kind of brilliant electric lamp that Edison hung on a balloon. Perhaps the 1941 version will make it some secret anti-aircraft device worked out in connection with America's defense program!

Shown on Maps

The maps shows the position of the other three planets. Jupiter is the second in brightness with magnitude minus 2.4. It is in the constellation of Taurus the bull, north of ruddy Aldebaran. Saturn is also in Taurus, just south of the little cluster of stars known as the Pleiades. It is of the zero magnitude. Faintest of the planets now in the sky, it is brighter than any star except Sirius, in Canis Major, the great dog, to the southeast.

Mars is to the southwest, in the constellation of Pisces, the fishes. Its magnitude is minus 0.5, so it also is inferior to Sirius which is minus 1.6.

Among the stars, which shine with their own light and are not, as the planets, illuminated by the sun, there are several of the first magnitude that we can see. Aldebaran, near Mars is one; so is Procyon, in Canis Minor, to the east. Above Sirius is Orion, the warrior, in which a row of three stars form the figure's belt. North of the belt is Betelgeuse, south is Rigel. High in the northeast is Capella, in Auriga, the charioteer, and below him are the twins, Gemini. One of these stars, Pollux, is also first magnitude. The two remaining stars of this class now seen are Deneb, in Cygnus, the swan, to the northwest, and Vega, below it near the horizon, about all that now remains of Lyra, the lyre.

Sirius Quite Close

The brilliance which the stars in the sky appear to have is due partly to their actual brightness, their "candlepower," and partly to their distance. Sirius is the brightest star we see in the night sky. Though it is 26 times the intrinsic brightness of the nearest of all stars, the sun, this is still not very bright as stars go. Sirius looks so bright because it is quite close, only 48,000,000,000,000 miles, or 8 light years as the astronomers say. That means that its light (traveling about 11,000,000 miles a minute) takes 8 years to reach us. Rigel, however, is 18,000 times as bright as the sun, yet it looks fainter than Sirius, because it is 543 light years away.

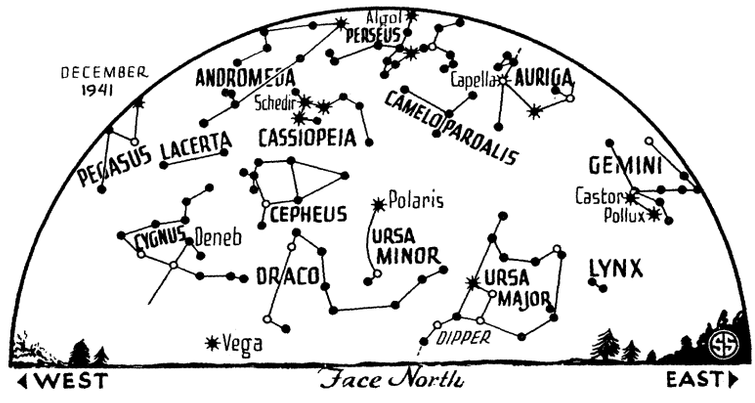
The brightness of a planet depends on slightly different factors. One, as with the stars, is distance. Naturally, the nearer a planet is to the earth, the brighter it looks. That is why Mars has been so brilliant during recent months. It was making a close approach which brought it, on Oct. 10, within 38,510,000 miles of earth, nearer than for the next 17 years. Now as it is drawing away, it is rapidly dimming, at the approximate rate of one magnitude per month.

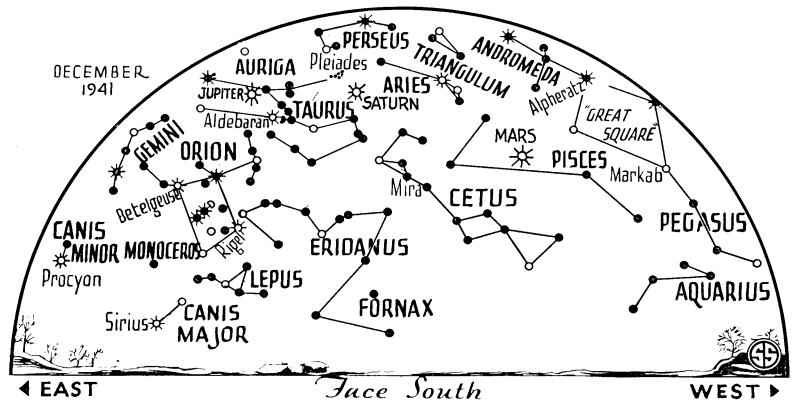
Jupiter Opposite Sun

Jupiter, too, is now very bright because it is close. On Dec. 8 it is in opposition to the sun. This means that, seen from earth, planet and sun are in opposite directions. In other words, the earth is then in the same direction from the sun as Jupiter. Distance from the earth to the planet is least, now about 380,000,000 miles.

Saturn was in opposition last month, so it, too, is fairly close. However, its brightness also comes from the fact that just now its rings are spread out at their fullest angle as viewed from here. In a few years when these thin rings, really a swarm of myriads of tiny moons, are seen on edge, very little of the light they reflect will come to the earth.

The changing brightness of Venus is more complicated. This planet, like Mercury which cannot now be seen, is nearer the sun than we are. As it swings between the sun and earth, most of the bright half is turned away, and the planet is in a phase like that of a crescent moon. This is the way you can see it now if you look at it through a telescope. If, like the moon, Venus remained at about the same distance as it changed in phase, it would be brightest when full, when the sunlit half was turned en-





tirely to the earth. But when Venus is full, it is far beyond the sun and its distance makes it faint. In recent months, it has been getting closer, and brighter, to reach a maximum on December 28. After that date it will get still nearer, and bigger, but the crescent will become so narrow that it will begin to get fainter once more.

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METEOROLOGY—GENERAL SCIENCE

Weather Scientists Doing Important Defense Work

Meteorologists Among Instructors in C.A.A. Courses At 1,000 Colleges; Few Who Do Not Give Part Time

METEOROLOGISTS watch the skies nowadays with first thought for national defense. They have postponed "for duration" many research projects dear to their hearts, and are devoting themselves to the training of field observers for the Army and Navy, and to the instruction of aviators in such parts of their science as will enable them to fly better. These and other contributions of weather scientists were pointed out by Prof. Charles F. Brooks, head of Harvard University's Blue Hill Meteorological Observatory, at a symposium on Scientists and the Emergency held by the American Association of Scientific Workers in Cambridge.

"I should estimate that perhaps a quarter to a half of the time of meteorologists in the United States is now being devoted to defense activities," Prof. Brooks stated. "There are those in the armed forces and civilian instructors in the numerous schools for airplane pilots and navigators who are devoting all their time to the defense effort.

"There are those in the universities and technical schools who are devoting practically all their time to training hundreds of cadet officers to become weather forecasters.

"There are probably 50 or 100 meteorologists among the instructors in the C.A.A. courses at 1,000 institutions of higher learning throughout the country.

"The U. S. Weather Bureau is working on many projects at the behest of the Army or Navy, and its general forecasting service is used directly or indirectly by the people of the United States, including defense workers, while special forecasting in connection with particular defense needs is much in demand.

"There are, indeed, few meteorologists whose time is not being devoted in part to defense."

Deflection of research effort to problems of immediate defense significance is felt most acutely in the fields of pure research. Prof. Brooks pointed out that it is exactly this kind of research that in the end pays the biggest, though often the least foreseen, dividends.

This handicap is partly offset, however, by the intensification of research in certain other applied lines, and in the increase in facilities which are being made available because the defense program calls for their use. Results thus obtained will not be confined to defense, nor will the benefits gained be discontinued with the cessation of the national emergency, the speaker concluded.

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Contacts in Mexico Urged

MEXICANS, far better disposed toward the United States than they ever were before the advent of the "Good Neighbor" policy, still await more effective implementation of that policy, so far as culture is concerned, and especially so far as science is concerned, declared Prof. Bart J. Bok of Harvard College Observatory, who reported on his visit in Mexico last summer.

If Americans with business or professional contacts in Mexico would only learn to speak Spanish, it would help enormously, Prof. Bok contended.

"Judging from what I heard throughout Mexico," he said, "the success of Vice President Wallace's visit to Mexico City was in no small measure due to his knowledge of Spanish and the delivery of his major address in that language."

Mexicans are keenly interested in science, especially since the spread of literacy through the government's educational program, Prof. Bok observed. He recommended that American educational foundations extend their activities in our neighbor republic, that the present excellent practice of granting scholarships in American universities to students from Mexico be followed through by giving them further aid after their return home, and that Americans do all they can to encourage adult education and science popularization in Mexico.

"The Mexican public wishes to know of modern science," he declared. "One feels that it would be a great thing if Latin America could receive a Spanish edition of our American SCIENCE NEWS LETTER, the news releases from Science Service and translations of our best popular scientific books."

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Colors of the French *tricolor* flag, which appear equally wide, are really in proportion of red — 3, white, — 3.3; blue—3.7; says the Better Vision Institute, explaining that the lens of the eye does not bend light rays of different colors in precisely the same degree, and early flags made of equal colors looked unequal.