ASTRONOMY

Total Lunar Eclipse

Some of the most brilliant stars in the heavens are visible during December, including the planets, Saturn and Mars. Eclipse of the moon is on the 18th.

By JAMES STOKLEY

➤ WITH DECEMBER bringing the typical evening skies of winter, we now have visible some of the most brilliant stars in the heavens. To these are added this December, right in the middle of the brightest of these orbs, two bright planets. And in addition, on the evening of Tuesday, Dec. 18, there will be a total eclipse of the moon, making the celestial menu for the month an unusually good one.

To the southeast is the brightest star in the night-time sky—Sirius, the dog star, in Canis Major, the greater dog. Its magnitude in the astronomers' scale is minus 1.6, though its brightness is now somewhat reduced because we see it low in the sky.

Directly above Canis Major, Orion, the warrior, is visible. This, perhaps the best known of all constellations after the Great Dipper, is recognized by reason of the three stars in a row which form Orion's belt. Above the belt and to the left is Betelgeuse, and at about the same distance in the opposite direction is Rigel, another star of the first magnitude.

Saturn Visible

About as high as Rigel and almost directly east is the lesser dog, Canis Minor, in which bright Procyon stands. And above Canis Minor are Gemini, the twins. It is in this group that one of our planets, Saturn, is seen. The two brightest stars in Gemini are Castor and Pollux, whose positions are indicated on the accompanying maps. These depict the appearance of the skies at 8:00 p.m. standard time, on Dec. 1, and 9:00 p.m. on Dec. 15.

The usual appearance of Castor and Pollux in the constellation is altered this month by the presence of the planet Saturn below and to the right, so that the twins temporarily seem to be triplets! Saturn, of magnitude zero, is considerably brighter than Pollux, which in turn exceeds Castor.

Still more brilliant is the second of our planets, Mars, which is just below Saturn. Its magnitude is minus 0.7, nearly twice as bright as Saturn. If this is not enough to distinguish Mars, there is also its characteristic red color. And on the evening of Dec. 21, at 7:05 p.m., EST, the moon passes close by, about two lunar diameters to the south.

A third planet is visible later in the night. About 2:00 a.m., around the middle of the month, Jupiter, with magnitude minus 1.4, nearly the same as that of Sirius, appears in the east. At sunrise it is on the meridian.

Exceeding any of these stars or planets in magnitude, with minus 3.4, is Venus but it is not well placed to view as it is only a little above the southeastern horizon at sunrise. A glimpse of it may be obtained if the sky is quite clear. Near it, on Christmas morning and a day or two after, Mercury, which is farthest west of the sun on the 26th, may be seen as well. It rises then about an hour and three quarters before the sun.

On Dec. 22, at 12:04 a.m., EST, winter begins. This event is called the winter solstice. The sun, which has been traveling southward through the sky since June, reaches the end of its path, and after this moves northward again. Because it is so far south, this is the shortest day of the year in the northern hemisphere. In the southern hemisphere it is the longest day—and the beginning of summer.

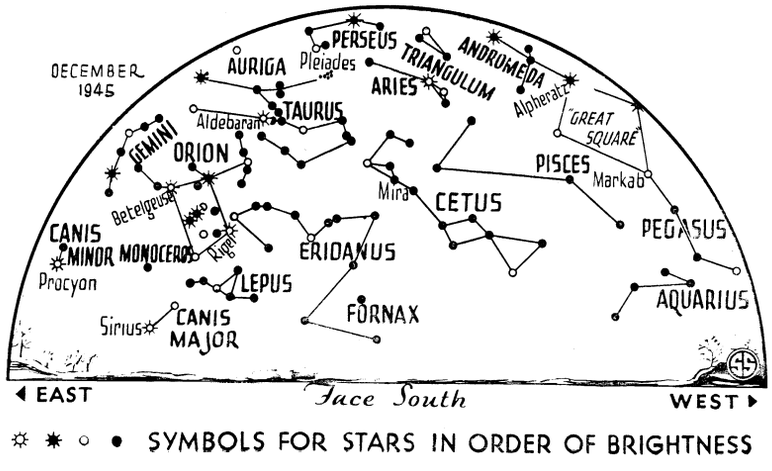
When, on the evening of Dec. 18, the moon goes through the shadow of the earth producing a total lunar eclipse, it will be the first seen generally in the United States since August, 1942. It is not, however, the first eclipse in that period, for last July there was one of the sun, caused by the moon's passing between the sun and earth. This was total in some parts of the northwestern United States and Canada, and partial over nearly all of the two countries.

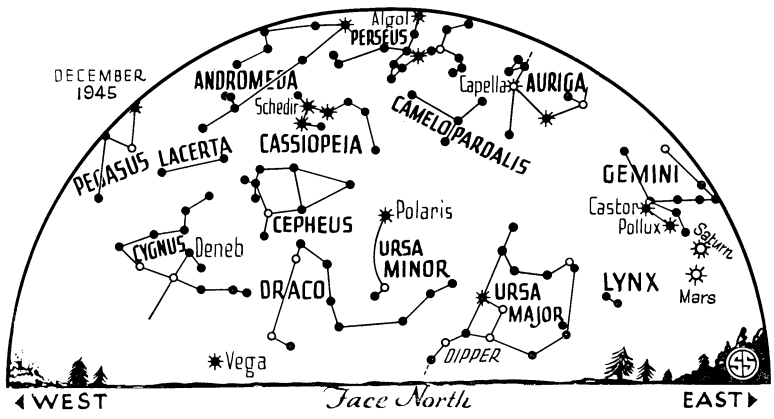
The shadow of the earth, like that of the moon, has two parts. The core, or umbra, is the conical region where the sun is completely hidden by our planet. Outside this is a larger region, the penumbra, from which the sun would only be partly covered.

Eclipse on the 18th

On the evening of the 18th the moon enters the penumbra at 6:30 p.m. EST, but nothing will be visible until it is almost ready to enter the umbra, which it does at 7:37. The northeastern edge of the moon is the first to go into the inner shadow. As it advances farther, the shadow will be visible creeping across the moon's face, its curvature attesting to the roundness of the earth. At 8:40 p.m. the eclipse is total, with the moon completely in the shadow.

When this happens the moon does not completely vanish, even though it is completely cut off from the sun's direct light. The reason for this is that the atmospheric layer around the earth acts as a prism, bending some of the sunlight into the shadow. Passing through the air, the blue rays in this light are scattered—producing the blue color of the daytime sky. With blue removed, the residual





light is redder than normal, and so the moon, during a total eclipse, has a coppery red color.

At 10:00 p.m. the moon starts to emerge from the umbra, and at 11:03 is out of it completely, the last bit to be shaded being at the western edge. At two minutes after midnight, EST, the moon is out of the penumbra as well and the eclipse is entirely over.

In westerly parts of the country, the eclipse occurs earlier in the evening but even on the Pacific coast, where the end of the total phase comes at 7:00 p.m., PST, it will still be visible, since the evenings now are the longest of the year, because of the early sunset.

Celestial Time Table for December

Dec.	EST	
1	3:00 p.m.	Moon farthest, 252,400 miles
3	4:21 a.m.	Moon passes Venus
4	1:06 p.m.	New moon
7	4:00 p.m.	Uranus nearest, 1,694,000,000 miles
12	Early a.m.	Meteors of Geminid shower visible
	6:05 a.m.	Moon in first quarter
	10:00 p.m.	Mercury passes Venus
14	2:09 a.m.	Algol (variable star in Perseus) at minimum
16	10:58 p.m.	Algol at minimum
17	8:00 a.m.	Moon nearest, 224,100 miles
18	11:17 p.m.	Full moon—total eclipse of moon
19	7:48 p.m.	Algol at minimum
20	4:17 p.m.	Moon passes Saturn
21	7:05 a.m.	Moon passes Mars
22	12:04 a.m.	Winter commences
26	3:00 a.m.	Moon in last quarter
	10:00 a.m.	Mercury farthest west of sun
27	4:18 p.m.	Moon passes Jupiter
29	6:00 a.m.	Moon farthest, 251,800 miles

Subtract one hour for CST, two hours for MST, and three for PST.

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METEOROLOGY

Jobs for Weather-Men

The American Meteorological Society will help those discharged from the armed forces in their hunt for civilian jobs.

➤ YOUNG weather-men now receiving their discharges from the Armed Services will be helped by the American Meteorological Society in their hunt for civilian jobs along the lines of their special talents and training. Need for a placement service of this kind is sharpened by the fact that whereas there were about 500 trained forecasters and weather analysts before the war, special training programs to meet the sudden emergency needs have now swelled their number to something between 5,000 and 10,000.

Whether all these new meteorologists can be absorbed into civilian meteorology will have to depend to a considerable degree on developments in postwar industry and business. If civil aviation enjoys the rapid development that many expect, a considerable proportion of the young war-trained weathermen will find jobs there. Other types of business may be able to offer some jobs, though as a rule only after some additional specializing training. Although considerable interest in obtaining meteorological service has been expressed in business circles, relatively few firms have directly indicated a willingness to provide actual jobs themselves.

Probably the greatest number of openings will be in government service. The Weather Bureau can take on some men, and such agencies as TVA, the Geological Survey, the Army Engineers, etc., will find places for more, especially for those who can qualify in the special branch known as hydrometeorology.

Additional places may be found on the faculties of colleges and universities. Few institutions offered courses in meteorology before the war, but at least part of the many that added them to the curriculum after Pearl Harbor may want to retain them. In some instances there may not be enough teaching work in meteorology to keep a full-time instructor busy, but courses in weather science may be combined with instruction in mathematics, physics or other related subjects to make a fulltime job.

A detailed review of the situation, with suggestions for young meteorologists seeking jobs to follow, is given in the *Bulletin of the American Meteorological Society* (Sept.).

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INVENTION

Several Glass Sheets Inspected at Same Time

➤ QUICK inspection of a dozen or more large sheets of glass at the same time is made possible by a simple device on which U. S. patent 2,388,789 has been issued to L. I. Louviaux of Toledo, Ohio.

A common source of trouble in sheet glass, the inventor explains, is the type of flaw known as a ream. This is a small smear or gob of unhomogeneous glass within the sheet, having a different index of refraction from that of the rest of the glass. Inspection of glass sheets one by one does not always find the reams.

In Mr. Louviaux's invention, the glass sheets are stacked up on edge, nearly vertically, on both sides of a rack known as a buck. Into the narrow A-shaped space between the two stacks a frame carrying lamps and a reflector can be thrust. The inspector, looking at the stack from the outside, can see if there is a ream in any of the sheets, and by moving them one at a time isolate the faulty sheet and discard it.

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