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ASTRONOMY

Orion Visible

Finest display of bright first magnitude stars is seen
in the sky. Also observable is the interesting double "eclipsing
variable" star, Algol, in the constellation of Perseus.

By JAMES STOKLEY

NO NAKED-EYE planets appear in the
evening skies during December this year,
but their loss is not very noticeable. The
display of stars at this season is the finest
that we can ever see.

The stars are shown on the accompany-
ing maps, which are drawn to depict the
skies as they look about ten p.m. (your
own kind of standard time) at the first of
December, an hour earlier at the middle
and two hours earlier at the end.

Orion, which stands in the southeast, is
the most conspicuous group and you can
easily recognize it by the three stars in a
row that form the belt of this warrior, as
the old star maps represented him. Modern
astronomers pay no attention to these an-
cient fancies.

Above and to the left of the belt you see
the first-magnitude star Betelgeuse (in one
of Orion's shoulders). Another, called Rigel,
is below and to the right. This is in one
of his legs. Rigel, incidentally, is an ex-
tremely bright star, as measured by its
actual luminosity, for it is about 60,000
times brighter than our sun. If the sun
were at Rigel's distance (900 light years)
we would need a telescope to see it.

Below Orion is Canis Major, the great
dog, with the star called Sirius. This ap-

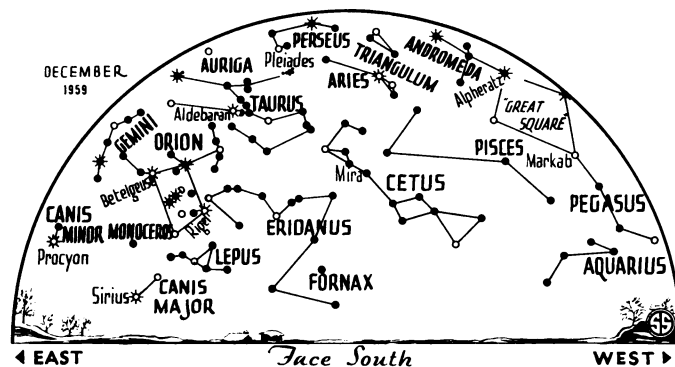
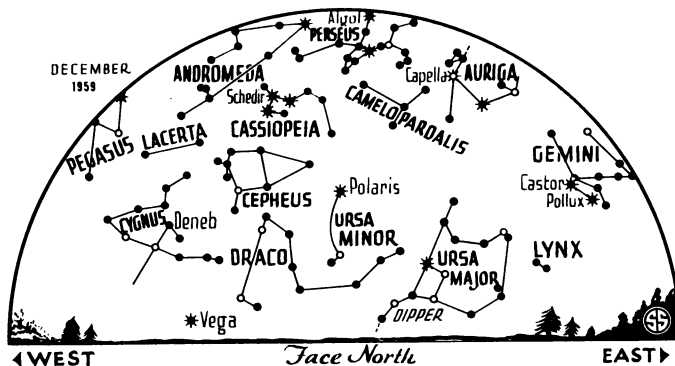
pears to be the brightest star in the night-
time sky, although its low altitude at pres-
ent dims it a little. Sirius, however, is only
about 20 times as bright as the sun; it ap-
pears so bright because it is relatively close,
at a distance of 8.7 light years. A light
year is the distance light travels in a year,
at a speed of 186,000 miles per second, or
about six trillion miles.

Above Orion stands Taurus, the bull. Its
brightest star—distinctly red in color—is
called Aldebaran. To the left of Taurus,
in the northern half of the sky, you will see
Auriga, the charioteer, with another first-
magnitude star, Capella. Below this group
are Gemini, the twins, with Castor and
Pollux. The latter is the brighter of these
two stars. Still lower is the lesser dog,
Canis Minor, with Procyon.

Thus, around Betelgeuse as a center,
there are six bright stars: Sirius, Procyon,
Pollux, Capella, Aldebaran and Rigel. These
are all of the first magnitude, or brighter.
No other part of the sky contains as many
in the same area.

Two others are visible toward the north-
west. Close to the horizon—and therefore
considerably dimmed—is Vega, of Lyra, the
lyre. And a little higher is Cygnus, the
swan, with Deneb, also fainter now than
when it is overhead.

(Continued on p. 369)



* * * • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

Orion Visible

(Continued from p. 366)

Although there is no naked-eye planet in the December evening skies, Uranus rises a little later than the time for which these maps are drawn. It is in Leo, the lion, but is too faint to be seen without a telescope.

About three hours ahead of sunrise Venus appears in the east, in the constellation of Libra, the scales. Its magnitude is minus 3.8, which is about seven times as bright as Sirius, so it is easily located. Mercury is farthest west of the sun on Dec. 12. For a few days around this date it will be visible low in the southeast just before sunrise.

On Tuesday, Dec. 22, at 9:35 a.m., E.S.T., winter begins in the Northern Hemisphere. Then the sun is farthest south and directly over a point on the Tropic of Capricorn. The sun will be at its highest for people in southerly countries, so for them it is the beginning of summer.

For those of us who live in the north temperate zone, Dec. 22 is the shortest day of the year—meaning by “day,” of course, the time from sunrise to sunset. But the word also refers to the period of time from one noon to the next, and it is noon when the sun is on the meridian, or directly south.

But if, with an accurate stop-watch, you were to time the sun from noon to noon, you would not find it to be exactly 24 hours—unless you performed the experiment about the middle of February or May, the end of August, or the beginning of November. At the end of March the day is about 17 seconds short of 24 hours. In mid-June it is about 13 seconds longer. By early September it is about 22 seconds short; then it starts lengthening to its maximum of the year, at about Christmas Day. The day is now nearly half a minute longer than the nominal time of 24 hours. Thus, when Northern Hemisphere daylight is at its shortest, the day itself is longest.

The reason for this effect is that the sun's apparent motion around the sky from west to east during the year is not uniform. If you could see the stars behind the sun on Dec. 22, you would find that the sun was in the direction of Sagittarius, the archer, a group visible in the south on summer evenings. But the next day you would find that it had moved to the east about twice its own diameter as measured from the starry background. The distance it moves is greater now than at any other time of year.

This means that the sun is delayed in getting back to the meridian, because its easterly motion across the sky partly offsets the daily westward movement from sunrise to sunset. The delay is greatest, now that the eastward movement is at a maximum. In March, when it is at a minimum, the delay is least, and the length of day is about 45 seconds shorter than it is at Christmas time.

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(Continued on p. 374)

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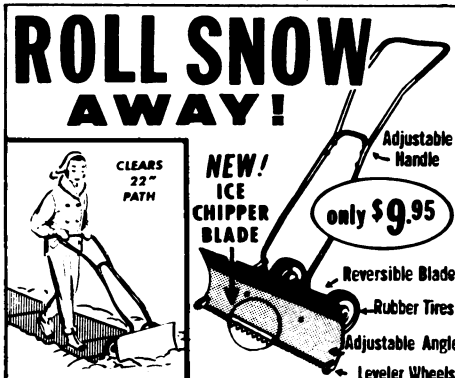
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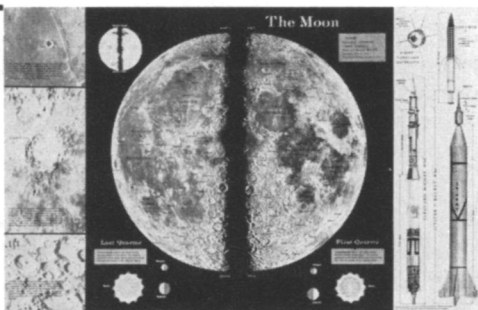
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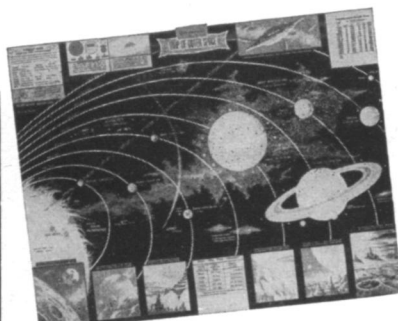
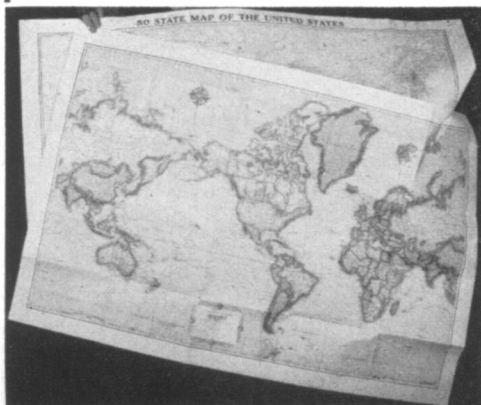
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Orion Visible

(Continued from p. 369)

of year and slow others, we reckon time from a fictitious body, called the "mean sun," which moves uniformly around the sky. This is the reason that sundial time does not agree with clock time. The sundial may get more than 15 minutes ahead of the clock, or nearly that much behind.

During December the constellation of Perseus is seen to good advantage, for it is directly overhead at a convenient hour. (Its position is shown on the maps.) In Perseus stands the star called Algol, which is a famous variable, i.e., one that regularly changes in brightness.

Normally it is of the second magnitude, or about as bright as the pole star, but every two days and 21 hours it is about a third of that brightness. It takes five hours to dim, and five more to return to normal. In the Celestial Time Table at the end of this article the times when Algol is at minimum brightness during evening hours are listed, so if you look at it on these occasions, you will find its light reduced.

Two-Starred Algol

Actually, Algol consists of two stars. One is about 27 times as big as the sun and the other is still larger, although it is about a fifteenth as bright. These two stars revolve around a point between them—the center of gravity—once in two days 20 hours and 49 minutes.

On each revolution, as seen from our direction, the faint star passes in front of the bright one and causes a partial eclipse. Algol is the best-known example of a class of stars called "eclipsing variables." In addition there are many other stars that are truly variable. These are single orbs, in which some internal disturbance makes a variation in the output of light.

Celestial Time Table for December

Dec.	EST	
2	1:17 a.m.	Algol at minimum
	1:02 p.m.	Moon passes Saturn
4	10:06 p.m.	Algol at minimum
5	2:00 p.m.	Jupiter behind sun
7	6:55 p.m.	Algol at minimum
	9:11 p.m.	Moon at first quarter
12	2:00 a.m.	Mercury farthest west of sun
13	early a.m.	Geminid meteors visible (seem to radiate from constellation of Gemini)
14	2:00 a.m.	Moon farthest, distance 252,600 miles
	11:49 p.m.	Full moon
22	9:35 a.m.	Winter solstice—sun farthest south and winter begins in Northern Hemisphere
24	11:49 p.m.	Algol at minimum
26	2:00 p.m.	Moon passes Venus
27	8:39 p.m.	Algol at minimum
28	8:00 p.m.	Moon nearest, distance 222,300 miles
29	2:09 p.m.	New moon
30	5:28 p.m.	Algol at minimum

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

Science News Letter, November 28, 1959