



skywatch

Raymond E. Bullock

THE FIRST of this month's two meteor showers reaches its peak during the pre-dawn hours of the 14th.

The Geminiid (GEM in id) shower is named for the constellation of Gemini, from which all the "falling stars" appear to radiate. The Geminiid shower is one of the years best, with as many as 50 meteors visible each hour.

Unfortunately, the moon is in Gemini and its bright light will make seeing the fainter Geminiid meteors very difficult.

Also on the 14th, Venus attains its maximum brightness. The planet is so bright, some people claim they have seen their shadows cast by Venus-light.

If you want to find your own shadow using Venus, you must move away from any bright lights that will illuminate the ground and compete with Venus. The darker your surroundings, the better your chances.

If you have been keeping track of Saturn, you can use it to locate Mercury. Mercury will be 2 1/2 degrees below Saturn on Dec. 16. Both objects are low in the southwest, 45 minutes after sunset.

You may need to use binoculars to find them in the glare of evening twilight, and you will certainly need an unobstructed horizon. Mercury will be slightly higher in the sky within a week, but Saturn will be long gone.

THE MOON is high in the southwest 45 minutes before sunrise Dec. 17. The bright star above the moon is Regulus (REG u lus), the "heart" of Leo the lion.

By the morning of the 18th, the moon has passed Regulus. On the 19th, the moon is below the star Denebola (de NEE bu la), the "tail" of Leo.

The moon is officially at last quarter phase at 4:45 p.m. Dec. 19. It is beginning the last quarter of its orbit around the earth.

Winter officially arrives on Thursday, Dec. 21, at 4:22 p.m. On this day the sun will be rising at its farthest point south of east, have its lowest altitude in the sky for the entire

year, and set at its farthest point south of west.

The sun appears in different parts of the sky at different times of the year. Remember where the sun was rising back in June? It was rising at its farthest north of east and setting north of west. The days were long and warm and we had summer. The difference in the sun's position is not due to any movement on the part of the sun. Instead it's due to the tilt of Earth's axis of rotation.

We orbit around the sun, but our axis is tilted 23 and one-half degrees. It just happens to be pointing toward a star named Polaris, the North Star.

In summer, when the North Pole of the earth is pointed toward Polaris, it is tilted 23 and one-half degrees toward the sun as well. Six months later the earth is on the opposite side of the sun. The North Pole is still aimed toward Polaris, but now it tilts 23 and one-half degrees away from the sun. Therefore the sun appears in a different part of the sky.

The moment when the earth reaches the point in its orbit, where the North Pole is at the greatest tilt away from the sun, is the exact moment of winter. At least it is for the Northern Hemisphere. When the North Pole is tilted away from the sun, the South Pole is tilted toward it. We may be facing the start of winter, but for people south of the equator it's the start of summer.

IF IT WERE not for the tilt of Earth there would be no change of seasons. If the earth's axis was straight up and down, everyone would have March-type weather year-round. That may not be bad if

you live in the tropics, but it's awful in Michigan!

The waning crescent moon is approaching Spica (SPY ca), the brightest star in Virgo, on the morning of Dec. 21. By the following morning, the 22nd, the moon is below Spica.

The morning of the 22nd, the moon is also the peak of the Ursid meteor shower. Named for the constellation of Ursa Major, the Big Bear, the Ursid shower is fairly weak. It produces an average of only 15 meteors each hour.

Mercury is at its maximum elongation (greatest apparent angle) from the sun on the evening of the 22nd. It is 20 degrees to the east (left) of the sun but still difficult to see, only five degrees above the southwestern horizon.

Look for the moon, Mars and Antares (an TART es) on the morning of the 24th. The crescent moon is about twelve degrees to the south (right) of the red planet. Eight degrees below Mars is Antares. The name Antares means "rival of Mars" because that star has about the same color and brightness as Mars. (Mars is officially three-fifths of a magnitude fainter than Antares right now.) There are major differences between the two however.

Mars is a planet, a member of our solar system. It orbits about 141.5 million miles from the sun and reflects sunlight. Antares is a supergiant star about 700 times the size of the sun. It produces its own light and is nowhere near our solar system. Antares is around 520 light years away; the light we see tonight left Antares 520 years ago in 1469. That

translates to about 3.12 quadrillion miles.

Jupiter is at opposition on the 27th. It is located opposite the sun, as seen from the earth. Jupiter will rise as the sun sets, be visible all night, and set as the sun rises. Jupiter is the 4th brightest object in the sky. Only the sun, the moon and Venus are brighter.

Also on the 27th, Venus is stationary. It has been moving slowly eastward from the constellation of Capricornus into Sagittarius, but has reached the point in its orbit where it will begin its swing between the earth and the sun. It will begin to move westward (retrograde) toward the sun. As Venus gets closer to the sun, it will set earlier each evening.

New Moon is at 10:20 p.m. on Dec. 27. The moon is located between the earth and the sun and is not visible.

Two evenings after new moon, Mercury, Venus and the waxing crescent moon are grouped together in the southeast. The moon and Venus are easy to see. Mercury remains five degrees above the horizon, but not for long.

On Dec. 30, the moon has moved above and to the south (left) of Venus. Mercury reaches its stationary point and will begin retrograde motion back toward the sun. Within a few days Mercury will be too close to the sun to be seen.

Mars will be five degrees above Antares on the morning of the 31st. This is a good time for you to check out the similar color and brightness of the two objects.

Dec. 31, as everyone knows, is the last day of the year. It is not, however, the end of the decade. The year

1990 does not begin the decade of the '90s. It ends the decade of the '80s!

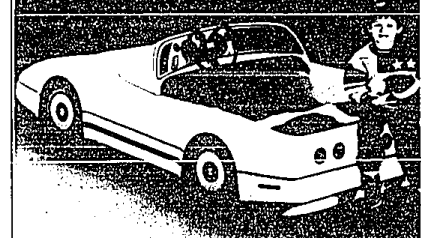
THE CALENDAR BEGAN with the year 1; we had to complete that year for the calendar to be one year old. Likewise, completing the year 9 did not close out that first decade; the calendar was only nine years old. It wasn't until after year 10 was completed that the first decade came to a close.

That same logic holds true whether we consider the year 100,

1000, 1000 or 1980; each Dec. 31 of that year was the conclusion of the previous decade. Our new decade will not begin until after Dec. 31, 1990, after we have completed the tenth year of the '80s.

An excellent aid for learning constellations and keeping up to date with the sky is the monthly "Sky Calendar." A one year subscription is \$6. It is available from Abrams Planetarium, Michigan State University, East Lansing, 48824.

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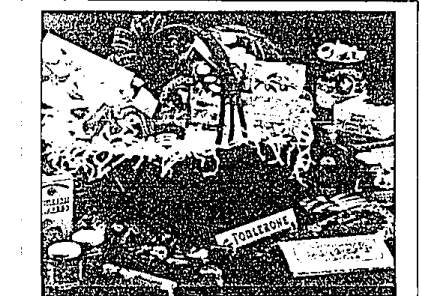
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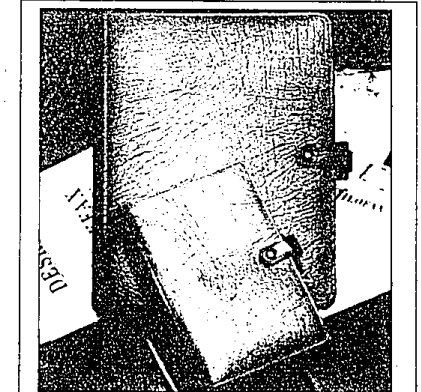
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