ASTRONOMY

Winter Constellations Brilliant

Celestial calendar for 1960 holds many interesting prospects for astronomers, while Venus and Jupiter shine brightly in early morning.

By JAMES STOKLEY

IF YOU WANT to see planets in January, you will have to get up early in the morning. An hour or so before sunrise both Venus and Jupiter are shining brightly, low in the southeastern sky. Venus is now drawing closer to Jupiter, and the pair will make a striking sight on the morning of Jan. 21. At that time Venus will be less than twice the apparent diameter of the full moon to the north of Jupiter.

In the evening skies, the brilliant constellations of winter are shining, as depicted on the accompanying maps. These show the heavens as they appear about ten p.m. (your own kind of standard time) on Jan. 1, an hour earlier at the middle of the month and two hours earlier at the end.

Most conspicuous of these star groups is Orion, high in the south. Look first for the three stars that form the belt of this celestial warrior. Above it is Betelgeuse and below is Rigel, both stars of the first magnitude. A little higher and to the right is the figure of Taurus, the bull, in which the bright star Aldebaran shines.

On the other side of Orion you will see the two dogs: Canis Major, the greater, and Canis Minor, the lesser. The large dog is below. In it is Sirius, generally known as the dog-star, the brightest that we can see in the nighttime sky. The smaller dog is higher and farther east, and in it is the star called Procyon. Still higher stand Gemini, the twins, in which there are two bright stars, Castor and Pollux, although the former is of the second astronomical magnitude. And high overhead, in Auriga, the charioteer, Capella can be seen.

Low in the east, and shown on the map of the northern half of the sky, is Leo, the lion, with another first magnitude star, Regulus. However, because this is rather low, its light is absorbed by the atmosphere, and seems somewhat fainter than it would be at greater altitude.

This is true also, to an even greater extent, of Deneb, in Cygnus, the swan, just above the northwestern horizon. If you look at it earlier in the evening, before it has decended so low, you will find it considerably brighter.

The moon goes through its phases in January with first quarter on the fifth, at 1:53 p.m., E.S.T. (Subtract one hour for central, two hours for mountain or three hours for Pacific standard time.) Full moon comes at 6:51 p.m. on the 13th; last quarter at 10:01 a.m., on the 21st; and new moon at 1:16 a.m. on the 28th. The moon is nearest to earth (at perigee) on Jan. 26, when it is 224,800 miles away. Its farthest distance, called apogee, comes on Jan. 10, with a distance of 252,300 miles.

And on Jan. 4, at 2:00 p.m., the earth is at perihelion, or nearest the sun for the year. Its distance will then be 91,342,000 miles (compared to nearly 94,500,000 miles next July 2, when we will be farthest away, or at aphelion). It is mainly because the sun is now so low in our sky that we are having cold weather, despite the sun's relative proximity.

Looking ahead to the celestial calendar for 1960, we find several interesting events in store for us.

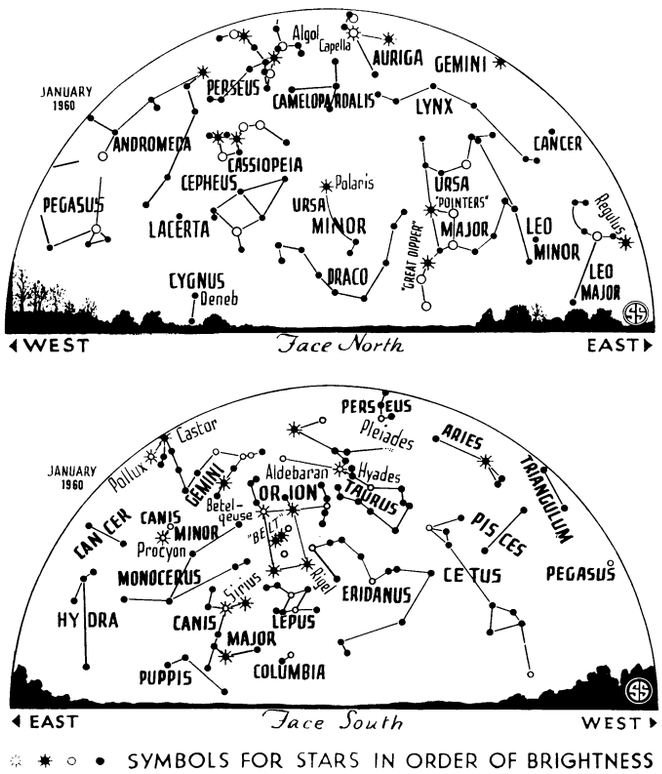
There are four eclipses, two of the moon and two of the sun. Both of the former and one of the latter will be visible from the United States. There will be a transit of Mercury, i.e., a passage of that planet across the face of the sun, likewise visible from this part of the world. And there will be a number of occasions, most of them also visible from the U. S., when the moon will occult, or "eclipse," the bright star Aldebaran.

On March 13, in the very early morning hours, the moon will enter the shadow of the earth, and suffer a total eclipse. This will be visible from most of North America. Two weeks later, on March 27, part of the moon's shadow will fall on the earth, producing a partial eclipse of the sun. Australia, Antarctica and the Indian Ocean will be the only parts of the world where this will be seen, however.

Sept. 5 brings the next, a total eclipse of the moon, this time later in the morning hours. Persons in North America except for the extreme northeastern part will be able to see the moon entering the earth's shadow, but only along the West Coast will the end be visible. Again this will be followed, on Sept. 20, by a partial eclipse of the sun. This will not be visible along the eastern coast of the United States and Canada, for it will occur after sunset. From the Midwest the sun will set while it is partly hidden by the moon. In the mountain and Pacific states, persons will be able to see it from beginning to end.

Every 116 days the planet Mercury comes between the sun and earth, to the position called inferior conjunction. Generally, at such a time it is north or south of the line from sun to earth. But about 13 times in a century Mercury comes close enough to this line that, from the earth, it is seen to pass in front of the sun. Such an event is called a transit of Mercury, and one occurs on Nov. 7, beginning at 9:35 a.m., E.S.T., and ending at 2:12 p.m. This will be visible from the United States but not to the naked eye. Through a telescope, properly fitted to observe the brilliant face of the sun, you will be able to see a tiny black dot, slowly moving from the eastern to the western edge of the solar disc.

When the moon goes in front of the sun we call it an eclipse, but when it passes between us and a star (or, rarely, another



SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

planet) the event is termed an occultation. As it moves around the sky each month, the moon often occults stars, but mostly they are faint ones, often too faint to be seen without a telescope. Occultations of bright stars are rather uncommon. In fact, there are only four first-magnitude stars—Aldebaran, Regulus, Spica and Antares—which are in the part of the sky through which the moon moves. Hence only these can ever be occulted.

On Jan. 10, at 4:00 a.m., E.S.T., the moon will be in a phase between first quarter and full, and will occult Aldebaran, the bright star in Taurus, the bull. Each month the path of the moon across the sky is nearly the same as the preceding month, so this is one of a series of occultations of Aldebaran, which began last September, and occurs 13 times in 1960. Of these, eight will be visible from North America. Amateur astronomers will have an interesting time watching them. Several will happen in convenient evening hours.

Celestial Time Table for January, 1960

Jan.	EST	
5	1:53 p.m.	Moon in first quarter.
10	4:00 a.m.	Moon occults Aldebaran.
	8:00 a.m.	Moon farthest; distance 252,300 miles.
13	6:51 p.m.	Full moon.
14	1:34 a.m.	Algol (variable star in Perseus) at minimum brightness.
16	10:23 p.m.	Algol at minimum.
19	7:12 p.m.	Algol at minimum.
21	6:00 a.m.	Venus passes Jupiter.
	10:01 a.m.	Moon in last quarter.
25	3:00 a.m.	Moon passes Jupiter.
	10:00 a.m.	Moon passes Venus.
26	5:00 a.m.	Moon nearest, distance 224,800 miles.
28	1:16 a.m.	New moon.

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

Science News Letter, December 26, 1959

PUBLIC HEALTH

Many Cardiac Patients Can Get Life Insurance

MANY PERSONS who have heart disease, including even those who have recovered from a heart attack, can now get life insurance.

The reason for this is that life expectancy in persons with varying types of heart disease has been shown to be "vastly better" than was formerly supposed, two physicians have reported.

This knowledge has been derived from long-term studies and experience of both insurane companies and practicing physicians, Drs. Richard S. Gubner and Harry E. Ungerleider of the Equitable Life Assurance Society report in *Modern Concepts of Cardiovascular Disease* (Dec.), published monthly by the American Heart Association.

Persons born with heart defects comprise another group of cardiacs who are becoming increasingly insurable, the doctors say.

Science News Letter, December 26, 1959

PUBLIC HEALTH

Foresee Isotope Problems

WHEN APPLYING radioisotopes for industrial and other purposes, scientists must sharply distinguish between isotopes produced by irradiation and separated fission products, the conference on "The Disposal of Radioactive Wastes," organized jointly by the International Atomic Energy Agency and UNESCO, was told by the American specialist, Dr. A. W. Kenney of the Du Pont Co.

He pointed out that no disposal problem need arise if the isotope used is one which was produced by irradiation in a reactor or an atomic accelerator. Such isotopes, he said, can be returned after a few half lives, in order to be re-irradiated. The re-irradiated source can then again be applied and since this process of re-irradiation can be repeated time and time again, radioactive isotopes having been formed by irradiation practically never constitute a waste.

Separated fission products from nuclear reactors, on the other hand, which are widely used in industry and medicine today cannot be reactivated and therefore do present a great problem in regard to the disposal of this waste.

Dr. Kenney demanded that a clear labeling should always give information about the origin of an isotope, in order to know whether the source was produced by irradiation and thus can be reactivated, or whether it is a fission product, which finally will become a waste. Already today, he declared, sources of both types may be used for the same purpose. Thus in well-logging, both antimony 122 and polonium 210 are begin used as neutron sources. Antimony 122, being an irradiation product, can be reactivated, while polonium 210, a fission product, cannot.

Science News Letter, December 26, 1959

GENETICS

Relate Growth to Tumors

IT IS NOT how fat the mice are, but how well-developed their bones and muscles are that appears to be related to lung tumors in mice.

There is a "highly significant" relationship between the number of lung tumors and body length, muscle weight and bone length, two researchers at the National Cancer Institute, Bethesda, Md., report. A similar relationship may exist between human body types and cancer, they suggest.

By crossing two strains of mice, one genetically highly susceptible to pulmonary tumors while the other carried the recessive gene for obesity, Drs. George Vlahakis and W. E. Heston obtained offspring with both characteristics. Nearly all the mice of the second generation had lung tumors, but the non-obese mice had almost twice as many as the obese group.

Although the obese animals weighed more than their "normal" brothers and sisters, analysis showed they were actually smaller animals, the researchers point out in the current issue of *The Journal of Heredity* (**50,** 99, May-June, 1959).

Measurements taken included the femur or thighbone and the gastrocnemius, the large muscle in the calf of the leg. The mice were also measured from the tips of their noses to the tips of their tails. In all cases the obese mice were significantly smaller in these three body measurements.

Noting that earlier studies have shown that "women most likely to develop breast cancer are those with good skeletal and muscular development with some tendency toward obesity rather than the very obese women," Drs. Vlahakis and Heston suggest that "it would be interesting to know what correlations exist in man in respect to other neoplasms, particularly lung cancer," and body types.

Science News Letter, December 26, 1959

OPERATIONS RESEARCH

Computers for Baseball

AN ELECTRONIC COMPUTER has been used to decide whether a sacrifice, stolen base or intentional walk is the best baseball strategy under given conditions.

Richard E. Trueman of the University of California at Los Angeles told the Operations Research Society of America meeting in Pasadena, Calif., that an International Business Machines 709 computer had been instructed how to "play" individual innings.

Batting statistics of a representative major league lineup form the starting point. From these, tables are made showing the probability of selecting each of 13 possible plays. Individual innings are then "played" by the computer, using random numbers to select the plays.

Some 5,000 innings are played for each possible combination of initial conditions, Mr. Trueman reported. The initial conditions can be varied according to the lead-off batter in the inning, location of base runners, and number of outs.

For each initial condition, statistics are kept on the probability of scoring a given number of runs, the average number of runs scored, and the probablity of a double play occurring.

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