ASTRONOMY

Brilliant Winter Stars Visible

The brilliant winter constellation Orion, shines in the southern sky on evenings during January. Jupiter is seen in the southwest soon after sunset, James Stokley reports.

➤ WITH THE APPEARANCE of the constellation Orion and his brilliant neighbors in the January evening sky, the absence of the naked-eye planets will hardly be noticed. At the beginning of January you may get a glimpse of Jupiter low in the southwest soon after sunset. It goes below the horizon long before the times for which the accompanying maps are drawn.

These show the skies as they look at 10:00 p.m., your own kind of standard time, on New Year's Day; an hour earlier in the middle of the month, and two hours earlier at the end.

Over in the southeast you can see the brightest of all the stars that appear in the nighttime sky: Sirius, the dog star, in Canis Major, the great dog. Sirius is several times as bright as any other star visible from most of the U.S. (except, of course, for the sun), but two stars seen from points farther south are more nearly equal to it.

Above Sirius, and a little to the right, stands Orion, generally considered as the finest constellation in the sky. It is one of two that contains more than one star of the first magnitude or brighter. The other is a southern group, Centaurus; like Orion, it has two.

Rigel Is Dimmed

One of the brighter stars in Orion, the lower, is Rigel, its light somewhat dimmed because of absorption by the atmosphere. Betelgeuse, higher and somewhat red in color, is the other. Between them you will see what is perhaps the most characteristic feature of Orion—the row of three stars that form the belt of this warrior. That is the way he was pictured on the old star maps, which showed the figures around the stars.

They depicted Orion with an upraised club, defending himself from a charging bull. This animal is represented in the sky by the next-door constellation of Taurus, a little higher than Orion and farther right. In it is the red star Aldebaran, which is one of the bull's eyes.

Canis Major was supposed to be one of Orion's two dogs; the other is Canis Minor —the lesser dog—above the large one and to the left. In it is another first magnitude star, called Procyon. Still higher is Gemini, the twins, with Castor and Pollux. However, only Pollux is bright enough to rate as first magnitude; Castor is second magnitude.

Extending upwards from Taurus is Auriga, the charioteer, with still another first magnitude star, called Capella. It appears on the map of the northern skies.

Over in the eastern sky stands the eighth and last of the first magnitude stars shown on these maps. This is Regulus, in Leo, the lion. Six of the stars in this figure outline a sickle, with Regulus, the lowest, at the end of the handle. Leo, like Gemini, is one of the 12 constellations of the zodiac, the band through which the sun, moon and planets seem to move around the sky.

Toward the northeast these evenings lies the familiar figure of the great dipper, likewise with the handle directed downwards. Above are the two stars called the pointers. Following their line to the left leads to Polaris, the pole star, which is always seen to the north. The dipper is actually part of Ursa Major, the great bear, while the pole star is in Ursa Minor, the lesser bear.

High in the northwest is Perseus, in which there is a famous variable star, Algol. Every few days it drops from second to third magnitude, as a faint star passes in front of the brighter member of the pair and partially eclipses it.

The reason that none of the naked-eye planets—Mercury, Venus, Mars, Jupiter or Saturn—is easily visible in January is that they are all nearly in the same direction as the sun. Thus, they rise about sunrise and set about sunset and are in the sky during the daylight hours, when the glare hides them. Later in the year, however, they will all come into prominence in the evening sky.

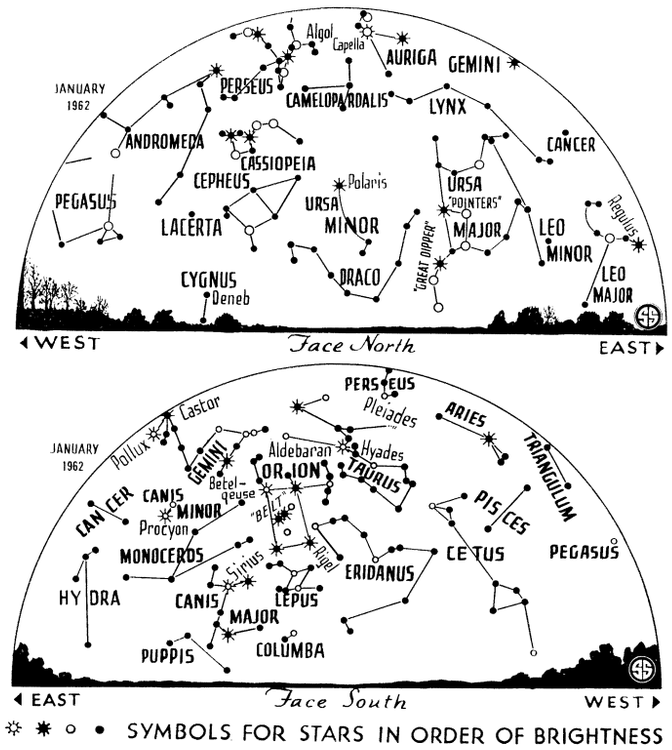
Mercury and Venus move around the sun in orbits that are smaller than earth's. Thus they may come approximately between us and the sun (inferior conjunction) or they may pass beyond the sun (superior conjunction).

At either conjunction they are invisible, because they are nearly in line with the sun. But prior to inferior conjunction they follow the sun in its apparent daily motion across the sky, and may remain long enough after sunset to be seen in the west. After the conjunction they are west of the sun, and may appear in the east before sunrise.

See Mercury East of the Sun

On Jan. 20 Mercury will be farthest east of the sun, and it may be seen then, very low in the southwest, after sundown as dusk gathers. However, it will not be easy to find. It will be in a similar position May 13, when it should be easier to see, and again on Sept. 10. Around March 3 it will be west of the sun and visible with difficulty in the morning sky. It will be similarly situated, though not as favorably, on July 1, and Oct. 21, which will be the most favorable elongation to observe.

Venus will be behind the sun Jan. 27 and after that will move toward the east of that orb. During the spring it will begin to shine brilliantly in the southwestern evening sky. On Sept. 3 it will be farthest east



of the sun, remaining in the sky for the longest time after sunset. On Oct. 8 it will be at greatest brilliance, with magnitude minus 4.3, which is about 15 times as bright as Sirius. Then it will quickly disappear, reaching inferior conjunction Nov. 12, but it will quickly reappear in the morning sky, as bright as it was before the conjunction.

Mars, Jupiter and Saturn move in orbits larger than the earth's, so they can never come to inferior conjunction. They are most conspicuous at opposition, when they are in the opposite direction from the sun. Mars was out beyond the sun, in conjunction with it, on Dec. 14. Now it is gradually coming into view in the morning sky, but not until spring will it be at all prominent. By the end of the year it will be conspicuous in the evening, with opposition on Feb. 4, 1963.

Jupiter is now out beyond the sun, with conjunction Feb. 8. By late spring it will move into the evening sky, opposition arriving Aug. 31. Saturn will be at conjunction on Jan. 22, with opposition July 31.

Thus, by next fall we will have a fine display of planets, with Venus, Mars, Jupiter and Saturn all visible.

The new year will also bring two eclipses of the sun. The first, on Feb. 4 and 5, is total. Along a belt crossing the Pacific Ocean, from New Guinea to a point about a thousand miles west of Lower California, the sun will be completely covered by the moon for as long as four minutes. Over a larger area, including the west coast of North America, a partial eclipse will be seen.

On July 31 there will be an annular eclipse. That is, the moon will come in front of the sun but will not cover it. A ring of the solar surface appears around the dark disc of the moon. This effect will be visible along a path from Brazil, crossing the South Atlantic, then traversing Africa and Madagascar. All of Africa, most of South America and Florida and Georgia in the U.S., will see a partial eclipse.

Celestial Time Table for January

January	EST	
2	7:04 p.m.	Algol at minimum
6	7:36 a.m.	New moon
7	8:00 a.m.	Moon passes Mercury and Saturn
8	3:00 a.m.	Moon passes Jupiter
	9:00 a.m.	Moon nearest; distance 225,400 miles
13	12:02 a.m.	Moon at first quarter
14	6:21 a.m.	Algol at minimum
17	3:11 a.m.	Algol at minimum
20	1:17 p.m.	Full moon
	7:00 p.m.	Mercury farthest east of sun
	midnight	Algol at minimum
22	1:00 p.m.	Saturn in conjunction with sun
	8:50 p.m.	Algol at minimum
24	8:00 a.m.	Moon farthest; distance 252,100 miles
25	5:39 p.m.	Algol at minimum
27	5:00 a.m.	Venus at superior conjunction with sun
28	6:37 p.m.	Moon in last quarter

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

Know the Sky to Watch Satellites

These star maps showing the positions of stars and planets can help you locate satellites when they flash briefly across the sky. Familiarity with the constellations and their relative positions makes locating artificial moons much easier whenever they are visible from your area.

• Science News Letter, 80:418 December 23, 1961

MEDICINE

Mice Protected Against Cancer With TB Germs

➤ UNIVERSITY of California scientists have protected mice against five experimental cancers by injecting them with living and killed tuberculosis germs.

In various experiments, the bacterial preparations proved from 10% to 90% effective against later inoculations with the cancers. All the cancers used had originated recently and spontaneously in the strains of the animals tested.

Such cancers bear a closer resemblance to the development of clinical malignancies in man than to the growth of old, established laboratory lines of malignant cells, or of tumors produced artificially in animals by means of chemical agents.

These experiments were described in a report by Drs. David W. Weiss and Kenneth DeOme and Mrs. Rose Bonhag, of the Department of Bacteriology and the Cancer Research Genetics Laboratory.

The results of the research indicate that a single non-toxic agent can have at least some protective effect against several cancers of a different type, in animals which are the natural hosts of the cancers. Heretofore, it has been generally found that effective anti-tumor agents are either considerably toxic, or are rather limited to a particular type of tumor.

Various forms of extracts of tubercle bacilli were tested against cancers of mouse uterine connective tissue, liver and bone, and two types of breast cancer.

The various preparations were composed of living tuberculosis germs, germs killed with phenol, and killed germs extracted with acetone and other chemical solvents yielding various fractions.

All the preparations elicited some protection, but the degree of protection varied from tumor to tumor.

Dosage turned out to be a critical factor—too much or too little of any of the preparations brought poor protection. Small doses usually were best. The dead germs were as effective as living bacilli, and sometimes more so.

Tuberculosis germs mixed with other substances or given beforehand have long been known to improve the ability of many animals to respond subsequently to unrelated antigenic materials. They have also been found to raise considerably an animal's resistance to subsequent infection with other disease-causing germs. The mechanism of the resistance produced by tubercle bacilli against the cancers is not yet understood, but there is some suggestion that it might involve a similar stimulation of the immunological abilities of the animals.

The results point to the high possibility of some degree of cancer prevention if, as some contend, cancerous cells act as antigens for the animals in which they arise.

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