



ASTRONOMY

Jupiter and Saturn Now Visible

Jupiter will be visible in the November sky but rises a bit later than Saturn, the other planet that can be clearly seen by the naked eye in late fall

By James Stokley

➤ JUPITER and Saturn—the most distant of the planets that are clearly visible without telescopic aid—will be visible on evenings in November. Saturn, more than 800 million miles away, appears in the southeast as soon as the sky is dark. It remains on view until it sets in the west about two hours after midnight.

The accompanying maps show the sky as it looks about 10:00 p.m., your own kind of standard time, at the first of November. It appears about the same at 9:00 p.m. Nov. 15, and 8:00 p.m. at the end of the month.

High in the south stands four stars that outline the Great Square. Three of them are in the constellation of Pegasus, the winged horse, while the one in the upper left, Alpheratz, is part of Andromeda, the chained princess. Below the Square and south of Pisces, the fishes, is Saturn, shining with a brilliance equal to a first magnitude star.

Jupiter Rises Late

Jupiter does not appear on the maps, because it rises a little later. It is in Cancer, the crab, which is below the horizon, next to Gemini, the twins, shown low in the east. By 11 o'clock at the first of the month (and correspondingly earlier at the middle and end) Jupiter will shine brilliantly above the horizon in the same part of the sky. It is about 16 times as bright as Saturn, so when it comes up you should not have much difficulty locating it.

The brightest star visible on Novem-

ber evenings is Vega, in Lyra, the lyre, which shines in the northwest. Above it stands Cygnus, the swan, some of whose stars form the Northern Cross. Deneb is the bright star at the top of the Cross. Low in the west (shown mainly on the southern sky map) is Aquila, the eagle, with the first magnitude star, Altair.

Low in the east are some of the constellations that make the southern sky so brilliant on winter evenings. One of these is Orion, the giant hunter, with two brilliant stars: Betelgeuse and Rigel. A little higher is Taurus, the bull, with bright and ruddy Aldebaran. To the left of Taurus (shown on northern map) is Auriga, the charioteer, with Capella.

Below Auriga stands Gemini, which contains a bright star called Pollux, but it has not risen at the times for which these maps are drawn. It will rise a little later, before Jupiter.

There are three other planets that can be clearly seen at times with the naked eye: Mars, Mercury and Venus. At rare times, Uranus is just barely visible. Mars rises about 1:00 a.m., in Leo, the lion, while Mercury and Venus will not be easily visible this month. They are too nearly in the same direction of the sun.

On any clear, dark night, if you watch the sky for a long enough time, you will see a "shooting star." Actually these are not stars at all. They are small bits of matter that enter the earth's atmosphere and burn as they pass through. The streak of light that you see is not the actual meteoric body, but is a trail of gases excited to glow by its passage.

A meteor is the light phenomenon resulting from the entry of a solid particle into the earth's atmosphere. A meteoroid is a solid object in interplanetary space, smaller than an asteroid. A "meteorite" is any "meteoroid" that has reached earth's surface without being vaporized.

Showers Every Minute

At some times of year there are meteor showers: instead of falling at the rate of one an hour, they may fall as often as one every minute. On a few memorable occasions, such as 1833 when the "stars fell on Alabama," they fell so rapidly they resembled snowfall.

The meteors come from groups of meteoroids that are moving around the sun in an elliptical orbit—the debris of a comet that had moved in a similar path. If the meteoric orbit intersects the orbit of the earth, meteors are encountered each year on the date that the earth reaches that particular position.

Before entering the atmosphere, the meteoroids are moving in parallel paths. The streak of light that they generate are similarly parallel. Like the parallel tracks of a railroad, they seem to converge on the distance. Thus, the "shooting stars" seen at the time of one of these showers seem to radiate from one particular part of the sky called the "radiant."

One famous shower, seen every August, which seems to radiate from the constellation of Perseus, is called the Perseid shower. In mid-November, from the 15th to 17th, comes another shower, the Leonids; their radiant is in

Leo, the lion. The constellation of Leo, which shines in the southern evening sky in spring, does not rise now until after midnight.

In November 1799, 1833 and 1866 there were sensational displays of Leonid meteors. Apparently, while there are some meteoroids scattered all along the orbit, producing a few meteors every year, they are concentrated at one particular point of the orbit. The earth encounters this concentrated area at intervals of 33 years, the time required for one orbital revolution.

Another brilliant shower was expected in 1899, but failed to appear. Possibly by the attraction of the planet Jupiter, the main swarm had been drawn aside from its regular orbit, so it missed the earth. In 1933 it was still switched aside. However there is some chance that now the meteor swarm may

be back on the previous orbit. Predictions are risky but there is a slight hope that 1966 will bring a fine shower—and possibly a spectacular one.

These meteors are scheduled to appear in the eastern sky in mid-November, especially the night of Nov. 16. Any meteor shower is better after midnight, at which time we meet them head on; in the evening they have to catch up to us. If you see a good display of meteors during the evening hours, it may be worthwhile to continue watching into the early morning.

November also brings a total eclipse of the sun, on the 12th. The shadow will travel in a path some 50 miles wide and 10,000 miles long. The eclipse starts in the Pacific Ocean at a point near the equator and south of Mexico. The end is in the Indian Ocean, south-east of Cape Town. About 2,000 miles

are on land, crossing South America from Peru to southern Brazil.

This path is traced out by the shadow of the moon as it sweeps across the earth. Several thousand astronomers from all parts of the globe will be present to make a number of observations possible only at the time of a total solar eclipse, when the sun will be hidden as the moon comes in front of it.

Over all of South America, South Africa, part of Antarctica, much of Central America, and parts of Texas, Louisiana and Florida, the sun will be partially eclipsed.

Celestial Timetable for November

NOV.	EST	
4	12:00 p.m.	Moon passes north of Jupiter
5	5:19 p.m.	Moon in last quarter
8	8:00 p.m.	Venus behind sun
10	4:00 a.m.	Moon nearest; distance 225,800 miles
12	9:27 a.m.	New moon, total eclipse of sun visible in South America.
16		Leonid meteors (at height after midnight)
17	6:00 a.m.	Mercury between earth and sun
19	7:21 p.m.	Moon in first quarter
21	9:00 p.m.	Moon passes south of Saturn
	10:00 p.m.	Moon farthest; distance 251,500 miles
27	9:41 p.m.	Full moon

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

SPACE

UFO's to Be Probed

► DR. EDWARD U. CONDON has been named scientific director of a Government-financed study of unidentified flying objects by Secretary of the Air Force Harold Brown. The study will be centered at the University of Colorado and will be completely independent of Air Force control, although it will be supported by the Air Force.

The university investigators will be free to follow whatever lines of study they decide are most important, using whatever means of study their judgment indicates is most suitable. Moreover they will be free to publish their findings without control of any kind.

All information in Air Force possession that bears on the subject will be made available to the university investigators.

Although all such information is to be made available to the university, not all of it will be disclosed to the public, because some of it involves classified information about U.S. missiles and aircraft now under development, or classified details concerning performance of defense radar systems. The holding back of essential security information will not be made a cover for withholding basic data.

The university investigators will work cooperatively with Air Force staff members wherever and whenever this seems desirable. The Air Force plans to continue its studies of UFO reports through an activity known as Project Blue Book, which has headquarters at Wright-Patterson Air Force Base, Ohio.

All Air Force activities have been ordered to "cooperate with UFO investigators to insure that pertinent information relative to investigations of UFO sightings is promptly obtained."

All field investigation reports prepared by Air Force base investigators that are sent to Project Blue Book at Wright-Patterson are also to be sent to Boulder for use by the university investigators.

To avoid duplication of effort, the public, including police officials and news media, is requested to make reports of sightings to the nearest Air Force base, or directly to Project Blue Book at Wright-Patterson Air Force base. However, reports may be received by the university group at Boulder when there is some special reason to handle them this way.

The university investigators will make results of the studies available to the public freely and promptly once they are complete.

The university group hopes to establish and maintain close cooperative working relations with all other interested scientific agencies, especially the National Center for Atmospheric Research and the Institutes for Environmental Research of the Environmental Science Services Administration, both of which have their headquarters in Boulder; and also with concerned private groups such as the National Investigations Committee for Aerial Phenomena, the Airline Pilots Association, and representatives of the news media.

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