

ASTRONOMY

Moon Joins Planets

Jupiter and Saturn, Still Brilliant in Southern Sky Will Have Nearly Full Moon Pass Between Them

By JAMES STOKLEY

WITH the planets Jupiter and Saturn still forming a brilliant pair in the southern evening sky, their attractiveness will be enhanced on the evening of Nov. 13, when the moon, nearly full, passes between them. It comes within a tenth of a moon diameter of Saturn. The two planets, at other times, can be easily recognized, because Jupiter is the brighter of the pair.

They are in the constellation of Aries, the ram, in which Hamal is the most brilliant star, but not of the first magnitude. However, eight members of this class of brightest stars are now in view, and are indicated on the maps. These, by the way, show the appearance of the heavens at 10:00 p. m. on Nov. 1, 9:00 o'clock on the 15th and 8:00 o'clock on the 30th.

These first magnitude stars are in two groups. To the west is Deneb, at the top of the northern cross, which is in the figure of Cygnus, the swan. Nearby, to the right of the foot of the cross, is Vega, still more brilliant, in Lyra, the harp. Altair, part of Aquila, the eagle, is to the left.

The other five appear to the east. Around to the north is Capella, in Auriga, the charioteer. A little lower, directly east, stands Aldebaran, in Taurus, the bull. Beneath him is Orion, the warrior. This is identified by the three stars in a vertical row, forming his belt. The bright star to the right of the belt is Rigel, that to the left is Betelgeuse.

The last of our bright stars shown is Pollux, in Gemini, the twins, which is near the horizon, directly below Auriga. Pollux is the lower of the two stars. It will be noted on the map that its symbol is that of the third magnitude. This is done because, when it is so low, the absorption of the atmosphere that its light has to penetrate makes it look much fainter than it does when higher in the sky.

The most important astronomical event of November is a transit of the planet Mercury across the face of the sun on Armistice Day. The last time this happened was in 1937, when the

planet just skimmed along the edge of the sun's disk, half on, half off, but even this was not visible here. Before that, there was one in 1927, but this was not visible in the United States or Canada either. The last time we could see one was in 1924.

At 3:49 p. m., Eastern Standard Time, the planet starts to enter upon the disk of the sun, at its eastern edge. Two minutes later it is entirely on the disk, and about five hours elapse before it completes the transit. By that time, in all of North America except the extreme northwestern part, the sun will have set. Over the Pacific Ocean area, the transit will be available in its entirety.

Because Mercury is so much smaller than the sun, appearing to be about one two-hundredth its diameter, this will not be visible to the naked eye. A telescope with the protective attachments that are used for observing sunspots will easily show it, however. The magnifying power should be about a hundred.

One good way of making such observations is to mount the telescope pointing to the sun, and to use it as a projector, throwing an image of the sun on a piece of white cardboard, held about a foot or more away from the telescope eyepiece. A large cardboard collar may be placed around the eyepiece so as to shade the image card from direct sunlight. Focusing the telescope will make the image sharp. If one looks at the sun through the instrument, a special eyepiece, to reduce the brilliance, should be employed, otherwise serious injury to the eye is likely to result.

The importance of this transit is stated as follows by Captain J. F. Hellweg, superintendent of the U. S. Naval Observatory in Washington:

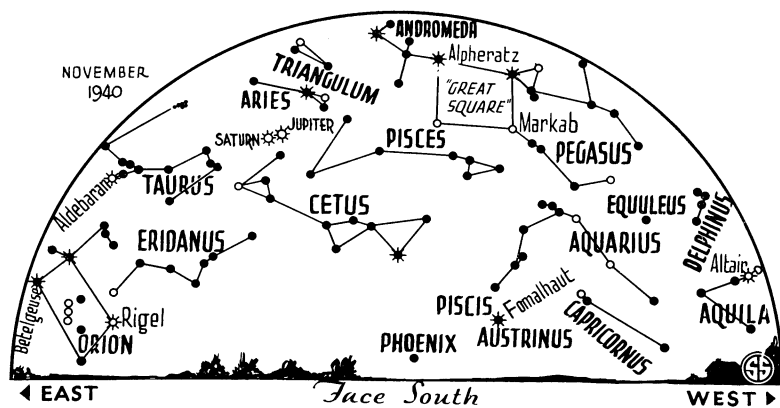
"It is now well established that the rotation of the earth on its axis is not uniform, but varies in an irregular manner which cannot be predicted in advance. That is, our standard of time, which is the period of rotation of the earth, must be checked frequently against the motions of other bodies so that we can correct for its error and obtain a more uniform system of this measurement. One of the most valuable checks is furnished by observations of transit of Mercury. Such observations also furnish information with regard to the motion of Mercury itself.

"Transits of Mercury occur but seldom; there will be only nine during the remainder of the present century. Of these nine, four will be of very little value by reason of their short duration. The transit of 1940 will be more favorable than any other yet to occur in this century, except that of 1973, which will be very little better.

"Observations of the transit are uncertain by amounts approaching half a minute of time, principally because of atmospheric conditions on the earth. The uncertainty can be reduced sufficiently only by obtaining great numbers of observations, and averaging the results. For this reason, the U. S. Naval Observatory desires cooperation from both amateur and professional astronomers in observing the transit of Nov. 11."

The observations consist mainly in determining, as accurately as possible, the exact time that the planet enters the solar disk. The Naval Observatory has prepared a special set of instructions for





* * ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

amateur observers, and these will be sent upon request and without charge to anyone who is interested.

Celestial Time Table for November

Saturday, Nov. 2, 11:00 p.m., Jupiter opposite from sun and nearest earth; 369,900,000 miles distant. **Sunday, Nov. 3,** 4:00 p.m., Saturn opposite from sun and nearest earth; 763,400,000 miles distant. **Wednesday, Nov. 6,** 4:08 p.m., Moon in first quarter. **Monday, Nov. 11,** 11:00 a.m., Moon farthest from earth; 252,300 miles distant; 3:49 p.m., Transit of Mercury across sun begins. **Wednesday, Nov. 13,** 5:56 p.m., Moon passes Jupiter; 9:20 p.m., Moon passes Sat-

urn. **Thursday, Nov. 14,** 9:23 p.m., Full moon. **Saturday, Nov. 16,** Maximum of shooting stars on Leonid shower—bright moonlight will interfere considerably with their view; 10:00 a.m., Uranus opposite from sun and nearest earth; 1,725,000,000 miles distant. **Friday, Nov. 22,** 11:36 a.m., Moon in last quarter. **Tuesday, Nov. 26,** 4:32 p.m., Moon passes Venus, which is visible in morning sky; 9:45 p.m., Moon passes Mars. **Wednesday, Nov. 27,** 7:00 a.m., Moon nearest earth, 224,900 miles distant. **Thursday, Nov. 28,** 5:00 p.m., Mercury farthest west of sun, visible around this date as morning star. **Friday, Nov. 29,** 3:42 a.m., New moon.

Eastern standard time throughout.

Science News Letter, October 26, 1940

PUBLIC HEALTH

In Defense Work Don't Overdraw Your Rest Account

Longer Hours Beyond Reasonable Day May Actually Decrease Output; White Collar Workers Also Affected

WITH DEFENSE preparations being speeded there is danger that many of us will work too long and get over-tired this winter. The result will be bad both for health and for defense. The Industrial Health Research Board of the Medical Research Council in England has just issued a summary of their findings on this subject which should be as valuable for American defense efforts as for English war efforts.

"One of the lessons learned in the last war," the Board points out, "was that excessive hours of work do not ultimately pay—even when considered solely on the basis of output and apart from the effect on the health of the workers."

Within certain limits, increasing the hours of work will increase the output. More can be done in six hours than in

four or five. But a 12-hour day, it was found, produced no more than a 10-hour day. When the actual weekly working hours of a group of men were reduced from 58.2 to 51.2, the total output increased by 22%.

The value of the lesson on hours of work is not confined to men and women in factories. The white collar workers and executives, under the stimulus of defense preparations, are perhaps even more likely to try to accomplish more by working longer hours, regardless of how tired they may feel. And housewives adding knitting and sewing for war refugees or orphans to their other duties also may be overworking.

If the day's work has been reasonable, a night's rest should restore one's energy. But if fatigue is prolonged for a

RADIO

E. K. Jett, chief engineer of the Federal Communications Commission will discuss "Radio Interference Problems" as guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Thursday, Oct. 31, 3:45 p.m. EST, 2:45 CST, 1:45 MST, 12:45 PST.

Listen in on your local station. Listen in each Thursday.

time, even a limitation of the hours of work does not result in a normal output for a number of weeks.


"It is," explains the Board, "as if a person who normally lived on income from a certain capital required extra money for an immediate purpose. He could draw on his capital, but later he would have less capital and therefore less income."

The lesson for all of us is not to overdraw on our reserve of energy or what might be called our rest account. Taking time for eight hours of sleep plus some recreation every day will keep us healthier and more efficient for our defense.

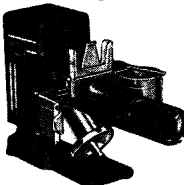
Science News Letter, October 26, 1940

Recent investigations show that there may be tin deposits in part of the Brazilian province of Bahia.

KEEP THEM UP
With Scientific Progress!

Illustrate
SCIENCE LESSONS
With  **PICTUROLS**

These 35 mm. filmstrips, consisting of a series of still pictures on scientific subjects, have proved their value in many of the nation's leading schools. When projected on wall or screen large enough for the whole class to see, the most minute scientific detail can be pointed out to the class as a group.



Picturols are most conveniently projected by compact S.V.E. Projectors

Write for new Picturol catalog and listing of Kodachrome 2"x2" slides.

Society for Visual Education, Inc.
Dept. 10SNL, 100 E. Ohio St., Chicago, Ill.