

ASTRONOMY

Orion, Prelude to Winter

The giant warrior is on his back, for the three stars in a row that form his belt are in a vertical line. Saturn is also visible on November evenings.

By JAMES STOKLEY

► ORION comes back to our maps this month, and with its reappearance we realize that winter is not far away. At the hours for which these maps are drawn (11:00 p.m. on Nov. 1, and an hour earlier at the middle of the month), this group can be seen low in the east. The giant warrior is on his back, for the three stars in a row that form his belt are in a vertical line. To the north of these is Betelgeuse, in one shoulder, and to the south is Rigel, in a leg. Above him is Taurus, the bull, with brilliant Aldebaran.

The brightest object (next to the moon) in the November evening skies, however, does not appear on the maps. This is the planet Venus, which is still drawing away from the sun and remaining visible longer and longer after sunset. This month it sets about two hours after the sun, and until then can be seen shining brilliantly in the western sky. In the astronomer's scale, its magnitude is minus 3.5, which is about 25 times as brilliant as the average first magnitude star.

One planet does show on our maps. This is Saturn, in the constellation of Gemini, the twins, and just north of Betelgeuse. Of zero magnitude, it is about two and a half times as bright as a first magnitude star, so it can easily be found. It rises in the northeast about three hours after sunset.

Brightest Star

Brightest of the stars visible these evenings is Vega, in Lyra, the lyre, a little group in the northwest just below the "northern cross," in Cygnus, the swan. At the top of the cross is another star of the first magnitude—Deneb. Lower, and directly west as shown on the maps, is Aquila, the eagle, with Altair shining within its boundaries.

Taurus, the bull, has already been located. To the left of this figure is Auriga, the charioteer, with Capella, second brightest of our stars of the November evening. Directly above this is the figure of Perseus, the champion, which con-

tains no stars of the first magnitude. It does, however, have one very interesting object, the famous variable star Algol. To the left of Perseus, and directly above the pole star, is Cassiopeia, the queen, with the stars forming a letter M.

High in the south are the four stars that outline the "Great Square" of the constellation Pegasus, the winged horse. The upper left star, however, named Alpheratz, is not really part of Pegasus, but a member of the next-door group of Andromeda. She, in mythology, was the beautiful princess, daughter of Cassiopeia, who was chained to a rock until Perseus rescued her.

Jupiter Appears

Below the square is part of Pisces, the fishes, through which the sun moves in April. Below Pisces is Cetus, the whale, and, to the right, Aquarius, the water carrier. Below Aquarius is the southern fish, Piscis Austrinus, in whose borders we find Fomalhaut, last of the first magnitude stars seen these evenings.

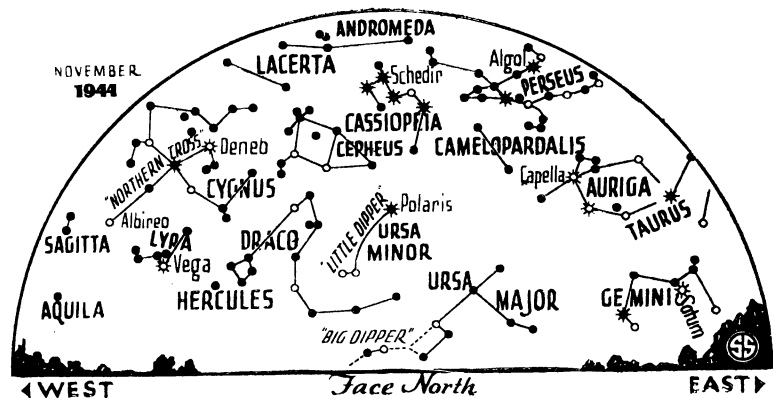
About 2:00 a.m., some 5 hours before sunrise, the planet Jupiter appears in the east, in the constellation of Leo, the lion. Its magnitude is minus 1.4, so it is considerably brighter than Saturn, for the smaller the magnitude number, the brighter the object. As for the other planets that may sometimes appear to the naked eye, Mars is not visible this month because it is in the same direction as the sun. Mercury is in the evening

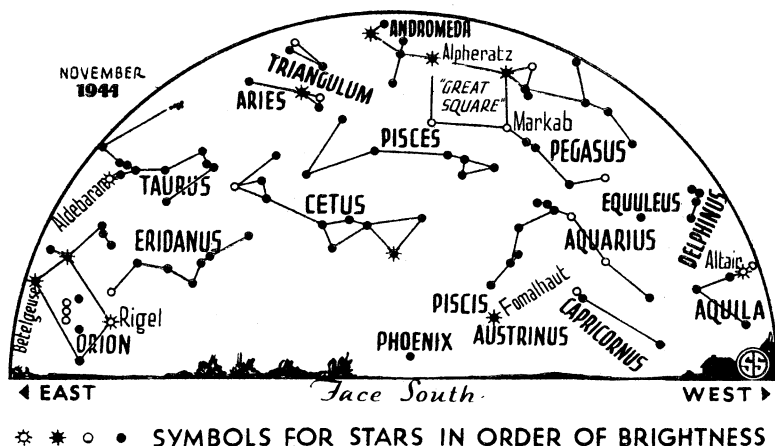
sky, but so nearly in the same direction as the sun that it cannot be seen.

Reference was made above to Algol, in the constellation of Perseus, and in the "Celestial Time Table" at the end of this article there will be found listed times for "Algol at minimum." Many stars in the sky change more or less regularly in brightness. With most, the variation is due to some physical cause which actually alters the amount of light that the star emits. But Algol, and a few others of the same type, known as "eclipsing variables," diminish in apparent brightness for the same reason that the sun is not as bright as usual during a solar eclipse. That is, something goes in front. In the case of the sun, that "something" is the moon, but for Algol it is a fainter star.

Algol, like a great number of stars (possibly even a majority), is double, consisting of two stars revolving around each other, and one member of the pair is about 16 times as bright as the other. It happens that the plane in which they revolve is almost in line with the earth, so every time the faint one goes around the bright one, every 2 days 21 hours, there is a partial eclipse. Normally of magnitude 2.2, when the eclipse starts it drops in about five hours to 3.5, thus losing about two-thirds of its light. Then, in about five hours more, it returns to normal, which it maintains until the next eclipse, two days later. The "Time Table" gives the times at which the minimum occurs in November during night hours. There are others, of course, during daylight, when the star is not visible.

Some 200 stars that vary in this way





are known, and they offer a wide variety of periods. For example, there is one such system in the constellation of the eagle, known as sigma Aquilae, in which the eclipse occurs every 1 day 23 hours. Auriga is rather well provided with them. Just below Capella, as shown on the maps (below the initial letter A), is the star beta Aurigae, which is eclipsed every 3 days 23 hours. In this case, the faint star barely comes in front of the bright one, and the change is only a tenth of a magnitude, from 2.1 to 2.2, not easily apparent to the naked eye.

In the same constellation, not far away from Capella, are also located the two with the longest known periods. One is zeta Aurigae, which drops from 4.9 to 5.6, a difference in brightness of more than twice, every 2 years and 8 months. A short distance north of this

star is epsilon Aurigae, in which the eclipse occurs every 27 years! Here the drop is from 3.3 to 4.1, nearly the same ratio as for its neighbor.

Celestial Time Table for November

Nov.	EWT	
1	11:20 p.m.	Algol at minimum
4	8:08 p.m.	Algol at minimum
	8:20 p.m.	Moon passes Saturn
7	2:28 p.m.	Moon in last quarter
10	1:31 p.m.	Moon passes Jupiter
	11:00 p.m.	Moon farthest; distance 251,900 miles
14	2:00 p.m.	Mars in line with sun
15	6:29 p.m.	New moon
16	early a.m.	Meteors of Leonid shower visible in east
18	9:40 p.m.	Moon passes Venus
19	4:13 a.m.	Algol at minimum
22	1:02 a.m.	Algol at minimum
23	3:53 a.m.	Moon in first quarter
24	9:51 p.m.	Algol at minimum
26	midnight	Moon nearest, distance 227,100 miles
27	6:40 p.m.	Algol at minimum
29	8:52 p.m.	Full moon

Subtract one hour for CWT, two hours for MWT, and three for PWT.

Science News Letter, October 28, 1944

duty. Since the program was started in November, 1942, 40,000,000 man-hours of physical and educational activities have been given in Army Air Force Hospitals.

The battery of 20 psychological tests given each aviation cadet candidate have not only proved valuable for selecting candidates and classifying them for training as bombardiers, navigators and pilots but for predicting success in combat, Gen. Grant reported. Men subsequently rated by squadron commanders as most successful in combat are those who rated on the upper end of the test scale. Those with the least acceptable scores tend to be the ones most frequently missing in action.

Selection of men for lead bombardier, which is the key job in a bombing mission, is now made on the basis of the psychological aptitude and proficiency tests which are given all bombardiers in the U. S. Army Air Forces in Western Europe.

The total cost of the psychological testing program is less than \$5 per candidate, but the saving in time, money and lives, Gen. Grant said, cannot be estimated.

Science News Letter, October 28, 1944

AGRICULTURE

Apple Juice Concentrate Keeps Fresh Cider Taste

► THE NATURAL taste of fresh cider will be available throughout the year in a new apple juice developed by the U. S. Department of Agriculture. The new product is a full-flavored apple juice concentrate which can be reconstituted, by the mere addition of water, to an apple juice which tastes and smells just like fresh apple cider.

It is made by heating fresh apple juice rapidly enough to avoid modifying its natural flavor, vaporizing the volatile flavoring constituents, and then collecting them as an essence from a single fractionating column. The juice from which the flavoring constituents have been stripped is concentrated by evaporation and the flavoring essence added to the concentrated juice. This gives a full-flavored, self-preserving apple juice concentrate.

Science News Letter, October 28, 1944

Dehydrated butter made in Australia for Allied troops in the tropics is approximately 15% lighter than ordinary butter but remains hard except in extreme climatic temperatures.

PSYCHOLOGY

Air Medicine Triumphs

► THE PSYCHOLOGICAL testing program of the U. S. Army Air Forces has contributed directly to the number of bombs which hit in target areas of the U. S. Army Air Forces in Western Europe during this past year, Maj. Gen. David N. W. Grant, Air Surgeon, AAF, declared at the meeting of the Inter-State Post-graduate Medical Association of North America, held in Chicago.

A 90% reduction in the anoxia (oxygen lack) accident rate has been achieved in the Eighth Air Force during the past year as a result of the altitude training program of the AAF, Gen. Grant reported. The anoxia accident rate among Eighth Air Force heavy bomber crews has been reduced from 116 per 100,000 man-missions to 11.

These are two of five wartime achieve-

ments of aviation medicine. The other three Gen. Grant listed are: the flight surgeon's care of the flyer; the convalescent training program, and air evacuation of casualties.

The Army Air Forces have evacuated 426,000 sick and wounded men since September, 1942, Gen. Grant reported. Of these slightly over half, 53%, were U. S. Army ground forces, 30% were British and other allies, 6% were Navy and Marines and only 9% were AAF personnel.

The death rate in flight among these men, some of whom were in a critical condition, was only seven per 100,000 patient-trips.

Through the convalescent training program of the AAF, about 80% of combat casualties have been returned to