ASTRONOMY

Taurus Shines in East

Appearance of heavens in October evenings heralds the coming of winter. A guide to autumn constellations is the triangle formed by Vega, Deneb and Altair.

By JAMES STOKLEY

➤ WITH TAURUS, the bull, in the eastern evening sky, the appearance of the heavens brings to our attention the fact that winter is but a couple of months off. For Taurus is one of the constellations that shine so conspicuously in the south on the evenings of January and February.

Its position (at 10:00 p. m., your own kind of standard time, at the first of the month, and an hour earlier on the 15th) is shown on the accompanying maps. Low in the northeast is shown Aldebaran, the brightest star of Taurus. Next, to the left, appears Auriga, the charioteer, with first magnitude Capella. Above Aldebaran is the little cluster of stars known as the Pleiades, the "seven sisters" of mythology.

Toward the west we can see three other stars of the first magnitude. One, shown on the map of the northern half of the sky, is Vega, in Lyra, the lyre. Above this is Cygnus, the swan, with brilliant Deneb as its brightest orb. To the left (on the southern map) we find Altair, marking Aquila, the eagle. These three stars—Vega, Deneb and Altair—form a large triangle in the sky which is a good figure to know if you want to learn the autumn constellations.

Though it does not contain any first magnitude stars, another characteristic figure that makes a good guide in finding one's way in the sky, is high in the south, mainly in Pegasus, the winged horse. This is the "great square," of which the upper left-hand star is Alpheratz, in the constellation of Andromeda, which represents a mythical princess. Below and to the left of the square we see the fishes, Pisces, one of the constellations of the zodiac, through which the sun, moon and planets seem to move. Aquarius, the water carrier, next to the right, is also one of them.

Fish Prominent in South

Below this group is Piscis Austrinus, the southern fish, with another first magnitude star, Fomalhaut, now as high as it ever rises in these northern latitudes. This fish is a prominent constellation in the southern hemisphere, where it comes overhead.

Brighter, even, than any of the stars mentioned is another object visible in the southwest, in the constellation of Ophiuchus, the serpent-bearer. This is the largest of the planets that, like the earth, revolve about the sun. It is Jupiter, with a diameter of 88,700 miles, or nearly 11 times that of the earth.

Though Jupiter is the only planet now visible in the evening sky, to the east, rising a few hours before the sun in the constellation of Leo, the lion, Venus shines. Of magnitude minus 3.7, it greatly exceeds any other star or planet. To the east of Venus, at the beginning of the month, and about a sixty-fourth as bright, is the planet Saturn. Venus passes it on Oct. 8, two days after it passes the star Regulus.

The month of October brings two eclipses, though one just barely gets under the wire to start before the last day of the month ends, and will not be visible from the United States at all.

The shadow of the earth, and that of the moon as well, has two parts. The dark, inner core, called the umbra, is the region from which the planet completely hides the sun. Around this is a larger region, called the penumbra, where the sun is only partially hidden. When the moon's umbra strikes the surface of the earth, there is a total solar eclipse, visible along the path which it traces as it moves toward the east. In the larger area covered by the penumbra there is a partial eclipse.

Track of Partial Eclipse

During the night of Oct. 31, while the sun is below the horizon for people in North America, the moon's shadow thus traces out an eclipse track starting in Kenya, East Africa, and crossing the Indian and South Pacific Oceans, ending southeast of Australia. The region covered by the penumbra, where there is a partial eclipse, includes south and east Africa, the Indian Ocean, Australia and New Zealand. The first small partial eclipse is visible from a point in Africa, in Ethiopia, at 10:19 p. m., EST, so that is why it manages to get into a description of astronomical events in October.

The earlier eclipse, however, is visible from the United States, and concerns the moon. On the evening of Oct. 17 our satellite gets entirely into the earth's penumbra, though not into the umbra at all. Consequently, this is called a penumbral eclipse. Since at no time will the sun be completely hidden from any part of the moon, it will not get as dark as at some lunar eclipses. However, at its height, enough sunlight should be cut off to give the moon, then in the full phase, a decidedly pale appearance.

Time of Greatest Effect

At 7:13 p. m., EST, the moon starts entering the outer shadow of the earth, and beginning at 9:10 it is completely immersed, most deeply at 9:35. By this time, the effect on the moon should be greatest. At 10:00 p. m. the moon starts to leave the penumbra and at 11:57 it is completely out of it.

Time Table for October

Oct.	EST	
1	11:00 a. m.	Moon nearest, distance 222,300 miles
2	2:42 p. m.	New moon
5	1:13 p. m.	Moon passes Mars
7	9:08 p. m.	Moon passes Jupiter
8	3:00 p. m.	Venus passes Saturn
9	5:10 p. m.	Moon in first quarter
13	4:00 p. m.	Moon farthest, distance 251,900 miles
17	9:23 p. m.	Full moon, penumbral lunar eclipse
22	early a. m.	Meteors of Orionid shower, radiating from constellation Orion
25	8:41 p. m.	Moon in last quarter
27	12:21 p. m.	Moon passes Saturn
29	2:02 a. m.	Moon passes Venus
	3:00 p. m.	Moon nearest, distance 226,200 miles

Subtract one hour for CT, two hours for MT, and three for PT.

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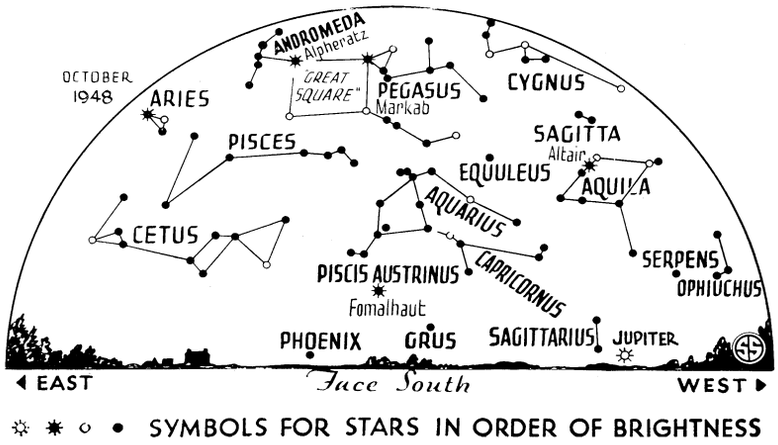
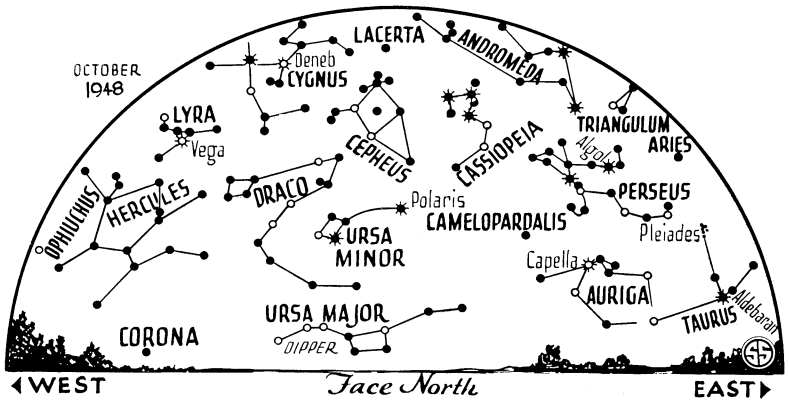


☼ ✷ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



Truman Address

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is precisely in this area that we, as a nation, have been weakest. We have been strong in applied science and in technology, but in the past we have relied strongly on Europe for basic knowledge.

Pure research is arduous, demanding, and difficult. It requires unusual intellectual powers. It requires extensive and specialized training. It requires intense concentration, possible only when all the faculties of the scientist are brought to bear on a problem, with no disturbances or distractions.

Some of the fundamental research necessary to our national interest is being undertaken by the Federal Government. The Government has, I believe, two obligations in connection with this research if we are to obtain the results we hope for. First, it must provide truly adequate funds and facilities. Second, it must provide the working atmosphere in which research progress is possible.

Program in Many Fields

As to the first point, the Government is developing impressive programs in many scientific fields. Fundamental research is being carried on for the National Military Establishment in the laboratories of the armed forces, of industry, and of our universities. The Atomic Energy Commission has been pushing its extensive research. The National Advisory Committee for Aeronautics has expanded its many aeronautical developments. The Federal Security Agency has engaged in extensive medical studies, in its own laboratories like the National Institutes of Health, and through grants to colleges and universities. Other Federal agencies, such as the Departments of Commerce, of Agriculture, and of the Interior, have pursued vigorous programs. The Inter-Departmental Committee on Scientific Research and Development, appointed by me last March, aids in coordinating the Government's many research programs. I sincerely hope that these programs will be further developed and coordinated by the early passage of a National Science Foundation bill.

The second obligation of the Federal Government in connection with basic research is to provide working conditions under which scientists will be encouraged to work for the Government. Scientists do not want to work in ivory towers, but they do want to work in an atmosphere free from suspicion, personal insult, or politically motivated attacks. It is highly unfortunate that we have not been able to maintain the proper conditions for best scientific work. This failure has grave implications for our national security and welfare.

There are some politicians who are under the impression that scientific knowledge belongs only to them. They seem to feel that it is dangerous to let scientists know anything about scientific developments in this country.

Telegram from Scientists

This situation has been of increasing concern to me. It was highlighted by a telegram I received last week from eight distinguished scientists. These men expressed their alarm at the deterioration of relations between scientists and the Government because of the frequent attacks which have been made on scientists in the ostensible name of security. The telegram points out that the actions of certain groups are "creating an atmosphere that makes men shun Government work," and that the Federal Government is losing the services of excellent scientists because they have been looked upon from certain quarters as "men not to be trusted." The telegram points out that scientists fully appreciate the need for sensible security measures. But scientists very understandably are reluctant to work where they are subject "to the possibility of smears that may ruin them professionally for life."

That telegram was a balanced and sober presentation of a vital problem that concerns every American.

Continuous research by our best scientists is the key to American scientific leadership and true national security. This indispensable work may be made impossible by the creation of an atmosphere in which no man feels safe against the public airing of unfounded rumors, gossip and vilification. Such an atmosphere is un-American. It is the climate of a totalitarian country in which scientists are expected to change their theories to match changes in the police state's propaganda line.

I hardly need remind this Association that it is primarily to scientists that we owe the existence of our atomic energy enterprise.

It was the scientists who first saw the possibility of an atomic bomb. It was the scientists who proved the possibility. It was the scientists who first saw the need of security measures, and who on their own initiative clamped down a tight lid of secrecy on all experiments. It must not be forgotten for a moment, and certainly it must not be obscured by any smear campaign, that but for the scientists we would have no atomic energy program.

We are only in the beginnings of the atomic age. The knowledge that we now have is but a fraction of the knowledge we must get, whether for peaceful uses or for national defense. We must depend on intensive research to acquire the further knowledge we need. We cannot drive scientists into our laboratories, but, if we tolerate reckless or unfair attacks, we can certainly drive them out.

These are truths that every scientist knows. They are truths that the American people need to understand.