

ASTRONOMY

# Cross Glitters Overhead

Vega is brightest star in September sky. Cygnus, the swan, forms "Northern Cross." Partial eclipse of the sun will not be visible here. Autumnal equinox arrives.

By JAMES STOKLEY

► **BRIGHTEST** of the stars which appear on September evenings is Vega, which is high in the west in the constellation of Lyra, the lyre. And locating this, one can easily find his way to several other stars of the first magnitude which are now in a prominent place, as depicted on the accompanying maps.

Directly east of Vega, and practically overhead for the times for which the maps are made (11:00 p. m., on September 1, and 10:00 p. m. on the 15th) is Cygnus, the swan. One glance at this group is enough to explain why it is often called the "northern cross." The foot of the cross is to the southwest, and the head, with brilliant Deneb, to the northeast. Though the stars in it are not as bright as those of the famed "Southern Cross," visible from more southerly parts of the world, it is a more perfect cross.

Due south of the foot of the cross is the group of Aquila, the eagle. Here there is a bright star, Altair, with a fainter companion visible above and below. And between Aquila and Cygnus are the two tiny constellations of Sagitta, the arrow, and Delphinus, the dolphin. The latter is often called "Job's coffin," for no easily apparent reason.

## Charioteer Star

In addition to Vega, Altair and Deneb, three other stars classed as first magnitude are indicated. Second only to Vega in brilliance is Capella, in Auriga, the charioteer, just appearing above the northeastern horizon. Its low position, however, serves to dim somewhat its splendor.

Low in the north is the great dipper, of Ursa Major, the great bear. The dipper's handle points to the left, to Arcturus, which marks the group of Bootes. Our last star of the first magnitude is Fomalhaut, in Piscis Austrinus, the southern fish, low in the south.

No planets are shown on the maps, though Saturn is now in Taurus, the bull, and rises in the east soon after 11:00 p. m. About 1:30 a. m., brilliant Jupiter, in the constellation of Gemini, the twins, appears to the northeast. Venus, still brighter, is the next to rise,

appearing about an hour and a half before the sun. Mars is not visible at all. It is directly behind the sun on October 5, and on September 18 is farthest from earth—245,300,000 miles away. After that it will start drawing near again, for another close approach next year.

Also on the astronomical calendar for September is the year's fifth and last eclipse—a partial of the sun on Thursday, September 10. It will not be seen at all in the United States, though it will be visible in northern Canada, around the North Pole, in Greenland, Iceland, Europe and North Africa. American soldiers in Rejkavik and in Ireland will have a chance to see it.

By eastern war time, the eclipse will be occurring on some part of the earth between 9:57 a. m. and 1:24 p. m. In the Arctic regions where the largest part of the sun is hidden by the moon, about 52% of the diameter of the solar disk will be covered.

## No Total Eclipse

The central cone of the moon's shadow, from inside which the sun would be completely obscured, misses the earth at this time, and hence there is no path of totality, as there is for a total eclipse of the sun.

Only at total eclipses is it possible to make those observations for which astronomers have traveled half way around the world, so scientists are not bothering about this one. Even if it were

total, the war might interfere, though not entirely, perhaps. About a year ago there was a total eclipse visible in Russia and China, and despite war efforts astronomers in both these countries managed to make some good observations.

Another astronomical event of the month, though one that produces no immediately visible effects, is due on September 23, at 12:17 p. m., EWT. At that moment the sun, which has been moving southward in the sky since last June, reaches its halfway mark, and stands directly over the equator. This, for us, is the beginning of autumn, though for our troops in Australia, as in other parts of the southern hemisphere, it is the beginning of spring. This is called the autumnal equinox.

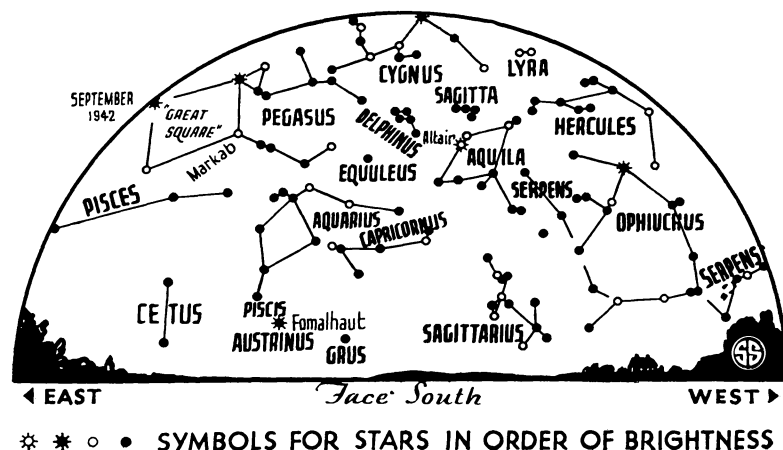
## Day and Night Unequal

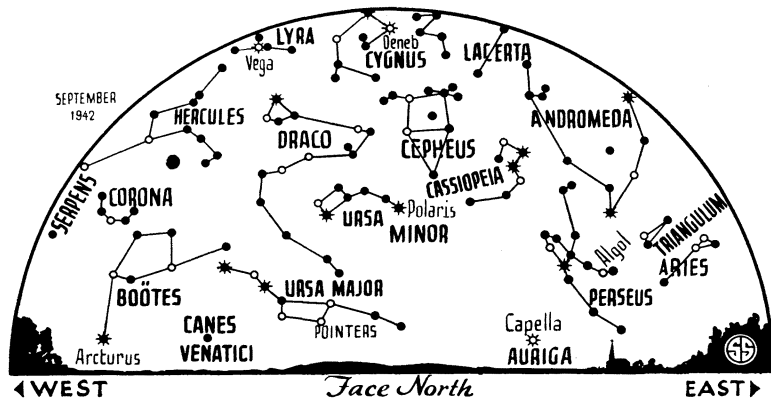
The name "equinox" refers to the fact that day and night at this time are supposedly equal. Actually, they are not. The effect of the bending of light by the earth's atmosphere is to raise a little the apparent position of objects low in the sky. Thus even after the sun is below the horizon, or before it has risen, this effect makes it visible. Consequently, on September 23 the sun is above the horizon for some minutes longer than it is below. Not for several weeks will day, as measured from sunrise to sunset, be as short as night, from sunset to sunrise.

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## Celestial Time Table for September

Wednesday, Sept. 2, 11:50 p. m., moon in last quarter, and about noon moon occults bright star Aldebaran; at 3:54 p. m., moon passes Saturn. Friday, Sept. 4, 2:00 p. m., moon farthest, 251,300 miles. Saturday, Sept.





5, 7:42 p.m., moon passes Jupiter. Wednesday, Sept. 9, 1:24 a.m., moon passes Venus. Thursday, Sept. 10, partial eclipse of sun; 11:53 a.m., new moon. Tuesday, Sept. 15, 1:00 p.m., Mercury farthest east of sun. Thursday, Sept. 17, 12:56 p.m., moon in first quarter. Friday, Sept. 18, Mars farthest, 245,300,000

miles; 11:00 p.m., moon nearest, 229,600 miles. Wednesday, Sept. 23, 12:17 p.m., sun crosses equator, autumn commences. Thursday, Sept. 24, 10:34 a.m., full moon. Wednesday, Sept. 30, 1:01 a.m., moon passes Saturn. Eastern War Time is used throughout.

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#### MILITARY SCIENCE

## Russian Weapons Good

➤ **HOWEVER GREAT** the difficulties of Russian armies may be, they do not result from inferiority in quality of Russian arms. The weapons used by Soviet soldiers will stand comparison with those of any first-class military power, states Garrett Underhill, well-known writer on military subjects (*Infantry Journal*, August).

Russia has even beaten the United States to the draw a time or two, in the adoption of new-type weapons. As far back as 1891, the Tsar's ordnance experts adopted a modern, .30-caliber clip-loading magazine rifle. We were still using the old single-shot Springfield .45-caliber "smoke-wagon" and did not adopt a comparable magazine rifle, the Krag-Jorgensen, until the following year. Clip-loading, which makes for rapidity of fire, came in our forces' weapon only in 1903, with the introduction of the .30-caliber Springfield.

More recently, the Soviets developed their own semi-automatic rifle, the Simonov, and by 1938 part of their troops were equipped with this weapon, "even before our Garand was being issued in quantity," Mr. Underhill notes.

The Red Army is strong for light, rapid-firing weapons that can move up with front-line troops. They have a particular fondness for "tommy" guns, their standard weapon having a considerable resemblance to our own Thompson sub-machine gun. They have an "opposite number" to our .50-caliber heavy ma-

chine gun in an air-cooled weapon of the same caliber.

Russian artillery has been rated as superior ever since old-time muzzle-loading days. The Germans think well enough of the 76.2-millimeter Pulitov field gun to send numbers of captured pieces to oppose the United Nations forces in North Africa.

There is also a dual-purpose gun of 76 millimeters caliber, built originally as an anti-aircraft cannon, but modified so that it can be used also against tanks, like the better advertised German 88-millimeter dual purpose gun. It has the steadying muzzle brake which has found favor in the minds of many artillerists.

For medium and heavy fire, the Red Army has 122 and 152-millimeter howitzers of modern type, including again the slotted muzzle brake. The 152-millimeter howitzer is said to outrange the comparable 150-millimeter German weapon. The 122-millimeter howitzer has double pneumatic tires on both the piece and its limber, to make movement possible over muddy Russian roads and plowed fields.

At the outbreak of their part of the war, the Germans had the drop on the Soviets in numbers and caliber of smoothbore mortars, invaluable infantry-support weapons. But the Russians soon caught up. Agreeing with their enemy on the value of heavy mortars, they adopted a 120-millimeter "mine-thrower", which is now being turned out by a

"converted" industry that formerly produced mining machinery. Our own heaviest mortar has a caliber only two-thirds as great—81 millimeters.

Anti-tank weapons include a 45-millimeter gun, throwing a much heavier projectile than our light, 37-millimeter anti-tank weapon. The Red Army also has a peculiar weapon which we have never used in this country, an extremely long-barreled .57-caliber shoulder rifle carried and managed by two men. Its solid slugs must have a terrific velocity and high penetration against light tank armor.

The Red Army has a great variety of tanks, for the Soviet ordnance officers have for years been exceedingly active in trying out all promising models, both home-produced and foreign. The 54-millimeter anti-tank gun and the 76-millimeter rifle are mounted in light and medium tanks, and there is also a heavy tank of 52 tons that carries a 152-millimeter gun.

Concluding, Mr. Underhill remarks, "Looking at Russian materiel from a broadly objective point of view, it seems only just to recognize that an excellent job has been done."

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#### MEDICINE

## Gloves Do Not Protect Surgeon from Mustard Gas

➤ **DOCTORS** who depend on the thin rubber of surgeons' gloves as protection for their hands against mustard gas may run into "unpleasant consequences," Prof. C. I. Reed of the University of Illinois College of Medicine warns.

Prof. Reed was an officer in the experimental laboratory of the Chemical Warfare Service in Washington, D. C., during 1918, and had "opportunity to see numerous demonstrations of the sad results of this particular error," he states (*Journal, American Medical Association*, Aug. 22).

In the kind of rubber used in surgeons' gloves, he explains, mustard gas is soluble, and a droplet that would produce only a small blister on bare skin may spread through an entire glove, in time, and burn the whole surface.

Rubber gloves can be used for short-time protection, if their limitations are recognized. Mustard gas is not quick-acting, Prof. Reed adds; wiping with a cloth is often ample protection, and even rubbing the skin with damp earth is efficient if nothing else is available.

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