"Northern Cross" Marks September Skies

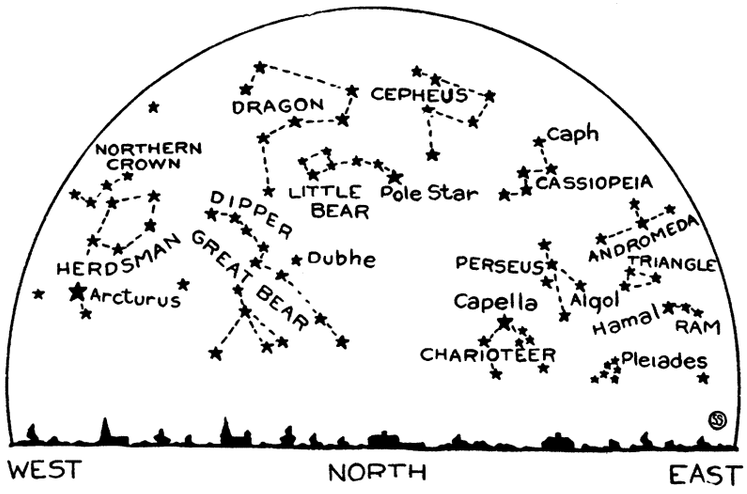
Astronomy

By James Stokley

A few months ago, the world was thrilled by the exploits of the airplane "Southern Cross," as it flew southward into regions where the original of its name, the celestial Southern Cross, or Crux, as the astronomer calls it, is visible. The constellation is one of those that never rise above the southern horizon for most people in the United States, though at certain times of the year it can just be seen from southern Florida—the southernmost part of our country.

There is, however, another cross—the Northern Cross—more properly known as Cygnus, the Swan. During September Cygnus is high overhead in the evening skies. The ancients conceived it as a swan in flight, with the long neck outstretched to the south, in which direction it is flying. Perhaps the fact that the birds of northern latitudes do fly southwards at this time of year suggested the name.

Though it more nearly resembles a bird in flight than some of the other star groups do their originals, most people will more easily see the cross than the swan. As a matter of fact, the nothern cross is more perfect than the southern, though it does not contain such bright stars. The Southern Cross consists of four bright stars which mark the extremities of the cross. There is no star at the intersection. In the northern cross there are five stars in the upright of the cross, one of which is at the intersection. The cross-piece is marked by two bright stars, one at either extremity.

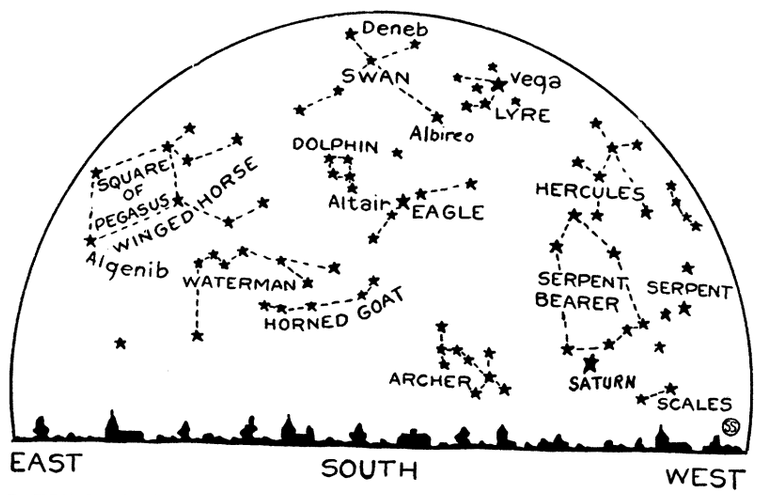


The map shows the location of Cygnus during the month. With its position almost overhead during the evening, and its characteristic shape, it is not hard to locate. Deneb, the bright star at the nothern end, or top, of the cross, is one of the six first magnitude stars now in the evening sky. Almost directly west of it is the brilliant Vega, in Lyra, the lyre, one of the others. To the south is Aquila, the eagle, containing the first magnitude Altair. Besides these three, which form a large and characteristic triangle of the autumn sky, there is Capella, of the constellation of Auriga, the charioteer, low in the northeast, and Arcturus, in Bootes, the bear-driver, are also visible. The sixth is seen low in the south. It is Fomalhaut, in Piscis Austrinus, southernmost of all the first magnitude stars ordinarily seen from these latitudes. The name of the constellation means the Southern Fish.

As for the planets of the month, Saturn is still the only one well placed for observation in the early evening. On the fifth it is in the position known as "quadrature." That means that it is 90 degrees east of the sun, or that when the sun sets, Saturn is directly south. Hence it is in the southwestern sky for about four hours after the setting of the sun. A little later in the evening Jupiter is visible in the southeast, but it is not shown on the map. At 2.57 a. m. it is directly south, and can be recognized by its great brilliancy—greater than any other body in the neighborhood except the moon.

The September evening skies are rather uneventful as far as happenings of a sensational nature are concerned. But there occurs on the 23rd an event that marks the end of one season and the beginning of another. At 2.06 a. m. Eastern Standard time, the sun enters the zodiacal sign of Libra the scales. This has been selected by astronomers to mark the beginning of autumn. However, there is no visible change that takes place in the sky at the time.

This year the sun has been of interest to astronomers because of the great number of spots that have appeared on it. Some of these have been large enough to be visible with the naked eye. Of course, it is not safe to look at the sun without some protection, such as smoked glass, or, even better, a piece of exposed and developed photographic film or plate. Above all, one should never try to look at (*Turn to next page*)



HOLD THESE MAPS IN FRONT OF YOU. The upper then shows you the northern and the lower the southern sky as it appears on September evenings

"Northern Cross" in Skies—*Continued*

the sun through a pair of binoculars or a field glass without such protection as the photographic film over both lenses. But with such a simple piece of optical equipment, many spots can be seen that could not otherwise be observed.

The reason that the spots are numerous this year is because of the fact that we are now practically at the sun spot maximum. The number of spots on the sun is not uniform, but varies in a cycle of eleven years, on the average. Once in this period they are particularly numerous. Then their numbers decrease, and a time comes when months may pass without the appearance of a single spot. But eleven years is only an average. Sometimes this cycle is several years shorter or longer, and it is only after the maximum has definitely gone by, and the spots are certainly on the decline, that the time of the maximum can be determined. Therefore, although many astronomers believe that this year marks the maximum, it may be a year or two before they can be certain.

Sun spots and terrestrial conditions are related, although many attempts to correlate weather with them have failed. Others have tried to use them to predict Wall Street panics, famines in India, the state of the Irish potato crop and the price of wheat, and there has been enongh correlation to mislead the advocates of these ideas. It is a fact that the sun is more active when there are more sun spots, and so sends out more radiation, or heat. But this increased heat results in somewhat more cloudiness over the earth as a whole, and so, at the time of sun spot maximum, the average temperatures of the earth are lower. The important thing is that this is an average for the whole earth, and so no one can say that because there is a large spot crossing the sun, it will rain on a certain day in a certain place.

There is another connection between sunspots and terrestrial events. That has to do with the aurora borealis, or northern lights. The sun spots are constantly sending out free electrons, pieces of the atoms of which matter is made. When produced in the laboratory, a stream of free electrons is called a beam of cathode rays, and when it shines on certain substances, such as minerals, or rarefied gases, they are caused to glow. When a spot is facing the earth, that is, when it is near the center of the sun's disc as seen from the earth, these cathode rays from the sun cross the 93 million miles separating it from the earth. Reaching the highly rarefied gases of the upper part of the earth's atmosphere, they excite these gases to luminescence, and cause the aurora.

There is still another effect. An electric current is believed to consist of a flow of electrons. Therefore this intense beam of electrons from the sun behaves like an electric current, and is surrounded by a magnetic field. This disturbs the magnetic field of the earth, and the result is often what is called a magnetic storm, which is an entirely different thing from an electrical storm. There is no visible effect, other than the auroræ, during such a storm, but the instruments of a magnetic observatory show it in various ways. The compass needle wavers, while strong electric currents are caused in telephone and telegraph lines. Sometimes such currents neutralize the currents already in use, and so make telegraphic communication impossible. At other times the earth current flows in the right direction, and it may even be possibile to telegraph for many miles with them alone, and without the aid of batteries. Curiously enough, radio is practically unaffected by a magnetic storm, though an electrical storm may cause enough static to stop its use.

But even the magnetic disturbances are not an absolutely certain consequence of a sun spot, as was shown only a few months ago. On July 7 a large sun spot passed across the meridian of the sun. When most nearly on line with the earth an exceedingly severe magnetic storm occurred. Displays of northern lights were seen as far south as Texas, in regions where they had almost never been noticed previously. A few days later another, an even larger spot, appeared, gradually moving to the center of the sun's disc. It came even more nearly on line with the earth than its predecessor, but the magnetic instruments behaved perfectly. So sun spots are rather too uncertain to be taken as prophets!

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The rise of commercial airplane service in Alaska has already cut down the use of dog teams.