ASTRONOMY

Stars of the Summer Sky

As June 21 Brings Official End of Spring, Familiar Stars Reappear in Evening Heavens; Vega Is Brightest

By JAMES STOKLEY

AS June days bring the warmth of the first of summer, so do the evenings reflect the new season in the stars that have reappeared after months of absence. Indeed, one of the joys of knowing the heavens is to be able to recognize old friends again.

Now, for example, as you look to the south in the evening, you see, near the horizon, a bright star with a distinctly red color. This is Antares, in the figure of Scorpius, the scorpion, and its location is shown on the accompanying maps. (These, by the way, give the appearance of the skies at 11 p.m. war time, at the beginning of June and an hour earlier in the middle of the month.) Only the first part of the scorpion is shown; the rest, a long hook-shaped grouping of stars making the tail, rises later.

Besides Antares, you can see two other first magnitude stars to the south. In the southwest is the constellation Virgo, the virgin, and Spica stands in this. Above Virgo, and to the left, is Bootes, the bear-driver, with brilliant Arcturus.

If there is any doubt as to the identity of Arcturus, a good way to find it is to look in the northwest for the great dipper. The dipper's handle consists of the stars Alkaid, Mizar and Alioth. If you follow their curved line toward the south, it brings you first to Arcturus, and then to Spica.

The brightest star now visible can be seen in the northeast, in Lyra, the lyre —it is Vega. And just below Lyra is Cygnus, the swan, with another first magnitude orb, Deneb. And to the right of Cygnus, directly east, is Aquila, the eagle, with Altair.

Proceeding downwards in the southwest is Leo, the lion; the head made of stars shaped like a reversed question mark, the "sickle." At the end of the sickle's handle is Regulus.

Low in the northwest are several reminders of the splendors of the winter's sky, now shining feebly. Being near the horizon, their light has to pass through a much thicker layer of atmosphere than when we saw them high in the heavens, and their brightness is reduced. Capella, in Auriga, the charioteer, just barely gets on the map. Nearby is Pollux, one of the twins, Gemini. And alongside the twins is the sole remaining evening planet—Mars, which has drawn far away from earth since its close approach of last autumn. Of the second magnitude, its lowness makes it appear of the third.

During June, Mercury, Jupiter and Saturn are all too close to the sun to be seen. Venus, however, is still on view, as a morning star, as she has been for many months. Venus is now in Aries, the ram, and rises about two hours before the sun. Her magnitude is minus 3.5, so there is no difficulty about locating her when she is visible.

Ever since last December, the sun has been moving northward through the sky, and this month, on the 21st, at 9:17 p.m., EWT, it is farthest north. This is the summer solstice and, in the northern hemisphere, it marks the beginning of summer. Also, on that day, the sun rises farthest north of the east point, sets farthest north of the west point, and climbs highest into the sky, all of which means that we then have the longest day and the shortest night. However, for about a week, the sun's northerly position does not change appreciably, so there is very little difference in the length of the day throughout the last half of June.

In the southern hemisphere, the sun is now low in the sky, so our brave troops in Australia will now have winter beginning, and will experience short days and long nights. Let us hope that the latter will help them to raid our enemies!

Though it was nearly a decade ago that it happened, to many of us the sight of Arcturus again recalls the Chicago World's Fair of 1933, when the light from that star was used to turn on the illumination because it supposedly took 40 years—that is, from the time of the Columbian exposition of 1893—to come to the earth.

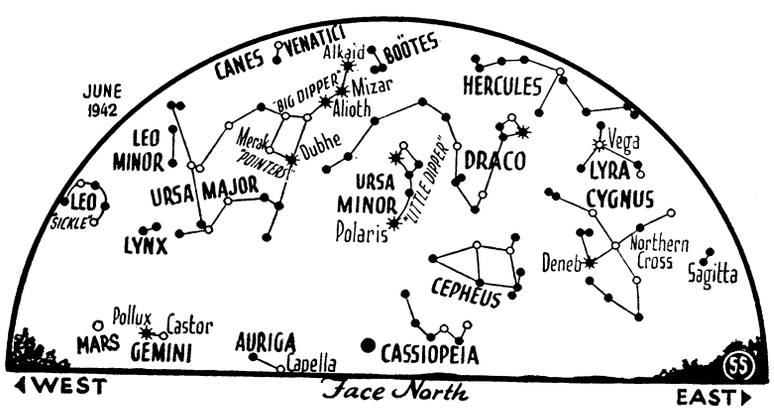
Perhaps now it can be revealed that actually the light of Arcturus does not take 40 years to travel to the earth. According to the best modern value for the distance of this star its light reaches us in a little less than 37½ years. Therefore the light that did the job left the star in the spring of 1896, several years after the Columbian exposition was over!

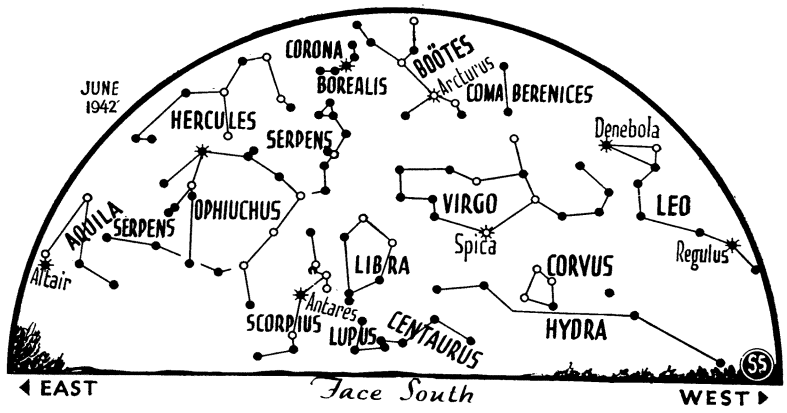
Perhaps the commonest question which the layman asks the astronomer is, "Can you really tell how far away the stars are?" For the nearer ones, the answer is yes, for the more distant ones we can form a pretty good idea of their distance.

A very simple experiment will show the basic method. Close your right eye, hold a finger up at arm's length and notice the place it seems to stand against the distant background. Now close your left eye and open your right, blinking back and forth from one to the other. As you do, you notice that the finger seems to jump to and fro before the objects in the background.

Now move your finger in to half the distance, and repeat the experiment. This time, the finger seems to move a much greater distance, as measured on the background.

Perhaps you can imagine working out





some system by which, measuring the distance your finger seems to shift, you could tell how far it was from your eyes, though naturally, if you wanted to find out, it would be much easier to use a tape measure.

We cannot, however, extend a tape measure out to the stars, so this method is practicable for finding their distances. Instead of blinking from one eye to the other, we take photographs of the stars six months apart. In the meantime the earth has moved half way around in its orbit, about 186,000,000 miles away from its former position.

For the nearer stars, this is enough to produce a minute but perceptible difference that can be detected by very careful technique. The shift is called the star's parallax, and is larger the nearer the star.

Though the measures are made from observations taken when the earth is on opposite parts of the orbit, the parallax is expressed as half the actual shift, that is, the difference between the view from the earth, and that from the sun.

No star is close enough to have a parallax as large as a second; and a second is the angle that a penny would seem to have when held up at a distance of 2.45 miles! Alpha Centauri, visible from the southern hemisphere, is closest, with largest parallax — about three-quarters of a second.

The parallax of Arcturus is .087 seconds, and converted into light years (the distance — about 6,000,000,000,000 miles—that light will travel in a year) its distance is 37.46. There is a little uncertainty in this figure, but it is not likely to be as much as 40. Perhaps, for the purpose of a World's Fair, this was close enough!

Celestial Time Table for June

Friday, June 5, 5:26 p.m., Moon in last quarter. Wednesday, June 10, 1:28 a.m., Moon passes Venus. Friday, June 12, 3:55 a.m., Moon passes Saturn. Saturday, June 13, 3:00 p.m., Moon farthest, 252,700 miles; 5:02 p.m., New moon. Wednesday, June 17, 3:06 a.m., Moon passes Mars. Sunday, June 21, 4:44 p.m., Moon in first quarter; 9:17 p.m., Summer commences. Thursday, June 25, 1:00 p.m., Jupiter in line with sun. Saturday, June 27, 9:00 p.m., Moon nearest, 222,000 miles. Sunday, June 28, 8:09 a.m., Full moon. Monday, June 29, 4:00 p.m., Venus passes Uranus.

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ASTRONOMY

Sun's Temperature To Reach 23-Year Low Point in 1945

THE SUN will be at its lowest ebb, thermally speaking, in 1945. This is indicated by data compiled by Smithsonian Institution observers in many parts of the world, and by Dr. Charles G. Abbot, Secretary of the Institution, together with L. B. Aldrich and W. H. Hoover. After that, our planetary system's central furnace will begin to warm up again.

The relation between the sun's radiation and the earth's temperature is not direct, however. Cooling off of the sun might even result indirectly in warming up of certain parts of the earth, by reducing the amount of cloudiness and thereby letting the sun's rays, even though diminished, shine longer on the earth's surface.

Confident prediction of long-range fluctuations in the heat radiated by the sun can be made because of the many thousands of accurate readings of solar heat, taken daily with specially designed, highly sensitive instruments, in observatories at Mt. Montezuma in Chile, Mt. Saint Katherine in the Sinai wilderness, and Table Mountain in the Mojave Desert of California. These have been carefully tabulated and are published, with interpretations, in vol. 6 of the Annals of the Astrophysical Observatory of the Smithsonian Institution, just off the press.

Study of this mass of data shows that there are 14 distinguishable intensity cycles in the sun's radiation. Some of them are of only brief duration, others require years for the swing from high to low. Once every 23 years, all the lows come in together, and that combination low-point is due in 1945.

There seems to be little direct relation between solar radiation per se and the number of sunspots. Sunspots, however, do have their own effect on the earth's weather. They give off vast streams of electrically charged particles that shoot through space. Some of them, entering the earth's atmosphere, serve as nuclei for the condensation of water vapor in the upper atmosphere and thus lead to the increase of cloudiness and of rainfall, which may be entirely independent of heat effects.

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PSYCHIATRY

Self Analysis May Be a Possibility in Psychiatry

PSYCHOANALYSIS for millions instead of millionaires is the possibility opened up by Dr. Karen Horney, New York psychoanalyst, in her new book *Self-Analysis, (Reviewed, SNL, this issue)*.

Self analysis, within limits, is not only possible but desirable, Dr. Horney concludes. Many people could benefit from psychoanalysis who are now excluded by its almost prohibitive cost in time and money.

Her conclusions suggest that under "favorable conditions" much of the psychoanalytic work can be done by the patient alone, with the analyst serving as trainer and guide rather than constant companion. While this would probably lengthen the total time required, nevertheless many people could afford a few months of intensive analysis and subsequent check-up visits who cannot afford