ASTRONOMY

Vega Now Brightest Star

Two planets are visible on June evenings. The summer solstice, or the date at which the sun begins to move southward again, is June 21, the beginning of summer.

By JAMES STOKLEY

➤ WITH the coming of June and, for us in the northern hemisphere, the shortest nights of the year, we have the fewest hours for looking at the stars. However June also brings us the beginning of summer (this year on June 21 at 6:37 p.m., EST) so perhaps warmer nights compensate for the shorter time that is available.

In any event the skies of early summer nights are now with us. The accompanying maps show their arrangement as they appear around 10 o'clock at the beginning of June and an hour earlier at the middle of the month. (Add one hour if you are on daylight time.)

Stars Brighter than Planets

Although two planets can now be seen in the evening skies, they are excelled in brightness by some of the stars. High in the east is Vega, the most brilliant, in the constellation of Lyra, the lyre. Just above the northwestern horizon is found Capella, in Auriga, the charioteer. Actually it is only slightly fainter than Vega, but its low altitude makes it appear considerably dimmer than normally. High in the south in the figure of Boötes, the bear-driver, we find Arcturus. This star comes next, though it is also nearly as bright as Vega.

Third in brightness among the stars and planets shown high enough to appear at reasonably full brilliance is Mars in the southwest. It is now in the direction of the constellation of Virgo, the virgin. It is of distinctly orange-red color and its steady light, so different from the twinkling stars, helps one to identify it as a planet. These shine by reflected sunlight, unlike the stars which are far distant suns, each a source of light itself.

The star Altair, in Aquila the eagle, to the right of Lyra and a little lower is next in our order of brightness. It also, being rather low, is somewhat dimmed. Then comes our second planet, Saturn, which is in the group of Leo, the lion, and a little to the right of Mars.

Among the stars again we next come to Spica, in Virgo, to the left of Mars. Then comes Antares, in Scorpius the scorpion, low in the south. This star is another made dim by its lowness. The same is true of Deneb, in Cygnus the swan, just below Lyra in the northeast. Pollux, in Gemini the twins, still remains visible in the northwest to the left of Auriga. It is also near the horizon. And then comes Regulus, in Leo, toward the west and to the right of Saturn.

The stars mentioned are all of the astronomer's first magnitude. The others shown on the maps are still fainter, of magnitudes two, three and four. However, some of these form conspicuous groups. Notable among them is the Great Dipper, high in the north, with the pointers which show the direction of Polaris, the pole star. The dipper is part of Ursa Major, the great bear. The handle of the dipper forms its long and quite unbearlike tail. Followed around to the south, incidentally, the curve of the handle brings you to Arcturus.

The pole star is at the end of the handle of the little dipper. It is part of the lesser bear, Ursa Minor. Between the two dippers can be seen part of the large but rather faint constellation of Draco, the dragon. The monster's head is to the right of the bowl of the little dipper, toward Vega and under Hercules, the champion. The long, snake-like body extends downward a little, then curls upward and down again toward the great dipper.

Summer Solstice

The event which occurs on June 21, at 6:37 p.m., EST, is the summer solstice—the time when the sun which has been moving northward through the sky since last December reaches the limit of its travels. From then on it is moving southward again, and will reach the other extreme on Dec. 22. This is the date of the winter solstice.

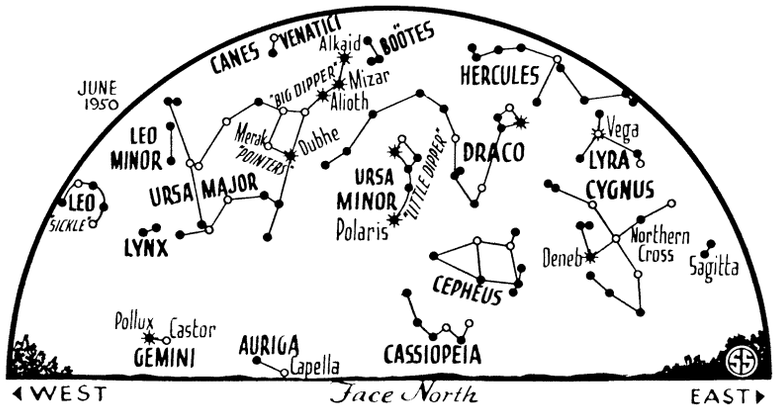
For those of us who live in the north temperate zone, the sun moves each day from its easterly rising point across the southern sky to its setting in the west. In December when the sun is far to the south, the sunrise point is well south of due east. Similarly it sets considerably south of due west. Its maximum height, at noon, is relatively low. Thus it has a short path from sunrise to sunset, and a much longer one from setting to rising. We, therefore, have short days and long nights.

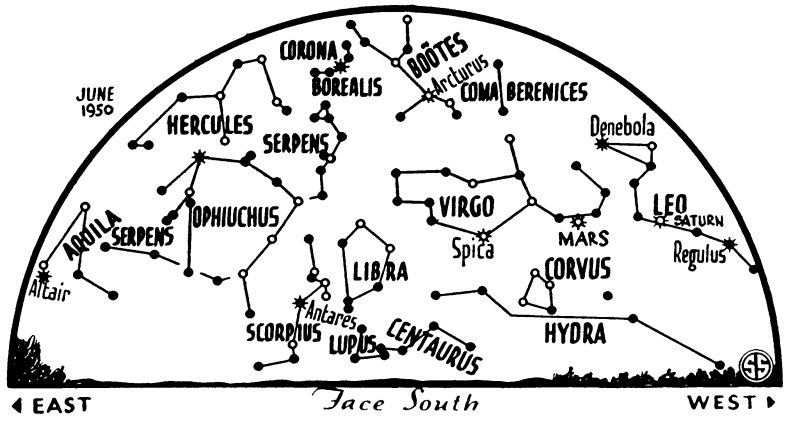
Conditions now are reversed, for sunrise is well to the north of east and sunset an equal distance north of west. The noonday sun climbs well up toward the zenith, so it has a long daytime path and a short one at night. This is one of the reasons for warmer weather. Naturally, with the sun above the horizon for about 15 hours (as it is at 40 degrees north latitude in mid-June) its warming effect on the earth is considerably greater than it is in December. Then it is below the horizon for about 15 hours and above for only nine.

Angle of Sun Rays

However there is another and even more important factor involved. That is the angle with which the sun's rays strike the ground. Imagine a yard square beam shining from directly overhead. Then the energy would cover just a square yard, and would be as concentrated as it could be without the aid of some optical device. At 40 degrees north latitude on June 21, the sun at noon is only 16.5 degrees south of the zenith, so its rays are nearly vertical.

In contrast, on Dec. 22 we see the noonday sun low in the south—only 26.5 degrees above the horizon, or 47 degrees lower than at noon in June. Now consider what happens to our yard-square beam. It strikes ground at such a low angle that it covers approximately two square yards, so its heating effect is halved. Thus at the winter solstice because of the combination of both these effects, we get the least heat from the sun, while at the summer solstice





we get the most. In the southern hemisphere, of course, the effect is reversed. Then the sun travels across the northern sky each day, so it is low in June and high in December.

In view of this it might be thought that June 21 would mark the middle of summer rather than the beginning. In England St. John the Baptist's day, June 24, approximately the date of the summer solstice, is actually called Midsummer Day. It is one of the "quarter" days, marking the dates at which rents, etc., which are due quarterly are to be paid. The others are Christmas, March 25 and Michaelmas Day, Sept. 29.

Probably these are survivals of the time when the new year began not on Jan. 1, but at the beginning of spring about March 25. With June 25 the middle of summer rather than the beginning, that season covers the whole time of year when the sun is highest in the sky. With the system we use of beginning summer on June 21, we have the curious condition that on the last day of summer, Sept. 22, the height of the sun is about the same as on March 20, the last day of winter.

Logic to Solstice Theory

However, it is an undeniable fact that the warmest weather of the year comes well after the summer solstice, and that the season from this date to Sept. 22 covers roughly the hottest time of year. This is because the earth itself acts as a reservoir for the heat that the sun gives it.

For some weeks after June 21 the ground each day will take in more heat than it gives off in the same period. Temperatures therefore rise. Finally toward the end of July, income and outgo become equal and after that the loss of heat each day becomes greater than the gain. Therefore it gets cooler.

Similarly, because it is not until well into January that the daily gain exceeds the loss, the coldest weather of the year comes a month or so after the winter solstice. Thus, there is really some logic to the custom of taking June 21 as the first rather than the middle of summer!

Time Table for June

June	EST	
6	11:37 a.m.	Moon passes Jupiter
7	6:35 a.m.	Moon in last quarter
9	10:00 p.m.	Mercury farthest west of sun
12	1:00 a.m.	Moon farthest, distance 252,-200 miles
	2:47 a.m.	Moon passes Venus
15	10:53 a.m.	New moon
21	5:43 p.m.	Moon passes Saturn
	6:37 p.m.	Sun farthest north, summer commences
23	12:12 a.m.	Moon in first quarter
	6:29 a.m.	Moon passes Mars
27	4:00 p.m.	Moon nearest, distance 224,-900 miles
29	2:58 p.m.	Full moon

Subtract one hour for CST, two hours for MST, and three for PST.

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AERONAUTICS

Cheap Wind Tunnel for Supersonic Studies

➤ A "SHOCK tube" type of wind tunnel for studies in supersonic air velocities, under construction at the University of Illinois, is inexpensive in cost when compared with giant tunnels now in use but is effective in studying behavior in speeds up to 1.8 times the speed of sound.

This tunnel will cost $25,000, instead of $500,000 for a comparable standard wind tunnel. The tube, made of 1.75-inch thick aluminum, is 35 feet long, four inches wide and 15 inches high. It is modeled on the pioneer device of this sort which is at Princeton University in New Jersey.

The shock tube, as described by University scientists, will operate something like the result of sticking a pin into a balloon. A thin sheet of tough plastic will be stretched across inside the tube six feet from one end. Air pressure will be increased in the short part of the tube behind this sheet while in the rest of the tube the pressure will be lowered.

Then a pin will prick the plastic, making it split in all directions like a burst balloon. A shock wave will then rush the length of the tube. Inside the tube, near the low pressure end, will be a model of an airplane wing or other object. Shock wave photographs will be taken to show the air movements over the model during the very short period of the high-speed blast.

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DENTISTRY

Teeth Anesthetics Made to Last for Week

➤ THE local anesthetic effects of the procaine, or novocaine, that dentists inject before painful drilling and tooth pulling, can be made to last more than a week instead of the usual two to four hours, Drs. Samuel Monash and Alvo Guiducci of New York reported at the meeting of the Medical Society of the State of New York.

The longer lasting effect is achieved by a special method of preparing a suspension of procaine base in water.

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