ASTRONOMY

Summer Begins on June 21

The planets Saturn and Venus will be visible in the evening sky. Antares, bright star in the constellation Scorpius, will be eclipsed by the moon.

By JAMES STOKLEY

➤ PERHAPS the most welcome astronomical event of June is the one that will occur on the 21st, at 1:03 p.m., eastern standard time (2:03 p. m., eastern daylight saving time). At that moment the sun, which has been moving northwards in the sky ever since last December, now reaches its turning point, and stands on the Tropic of Cancer. This is the summer solstice for it marks the beginning of summer in the northern hemisphere. At this time it turns and starts its southward journey. Incidentally, it is from this that the word, "tropic," gets its name, for it is derived from a Greek word (tropos) which means a turning. In December, just before Christmas, when winter begins in northern countries, the sun is on the other tropic, the Tropic of Capricorn. Underneath these lines in the sky are the corresponding circles on the earth. Between them are the "tropical" regions.

Longest Day

Because the sun is now so far north, it rises highest for us at noon and is above the horizon for the longest time, so June 21 will be our longest day. At 40 degrees north latitude, for example, there are 15 hours 1 minute between sunrise and sunset, while at 50 degrees north latitude the length of the day is 16 hours 22 minutes on the 21st. In contrast, at the winter solstice next Dec. 22, the day will be 9 hours 19 minutes long at 40 degrees and 8 hours 5 minutes at 50 degrees.

In the southern hemisphere, however, conditions are reversed, for there the noonday sun is lowest in the sky and the days are shortest. In other words, this is for them the beginning of winter.

In the evening skies, too, is reflected the coming of summer, for now we can see such constellations typical of warm weather as Scorpius, the scorpion, and even part of the southerly group of Centaurus, the centaur. To see all of this mythical creature, however, we must travel farther south than the United States.

Both these constellations are indicated on the accompanying maps. These show the heavens as they appear about 10:00 p. m. standard time (or 11:00 p. m., daylight time) of the zone that you are in, at the beginning of June and an hour earlier in the middle of the month.

In Scorpius is the bright star Antares, markedly red in color. On the evening of June 9, the moon, a day short of the full phase, will pass close by it. For people in the eastern half of the United States and Canada, the star will actually be occulted, or "eclipsed," by the moon.

As seen from Washington, Antares will go behind the moon at 9:38 p. m., EST (10:38 EDST) and will reappear at 10:36 (11:36). For a position in western Massachusetts, the disappearance occurs at 9:40 EST (10:40 EDST) and the reappearance at 10:48 (11:48). In Montreal the corresponding times will be 9:34 (10:34) and 10:35 (11:35). Farther west, the duration of the occultation is less. At a particular station in western Illinois, for which times of such phenomena are calculated by the Nautical Almanac Office of the U. S. Naval Observatory, the star will be hidden at 8:43 CST and will come into view again at 8:55. Where visible, this occultation can easily be observed with the naked eye, but a pair of binoculars, or even opera glasses, will help. Even in more westerly locations, where the moon misses Antares, it will be of interest to watch their very close approach.

As for the other constellations of a June evening, we have Libra, the scales, in the south to the right of Scorpius, and to the right of that is Virgo, the virgin, with the first magnitude star Spica. Continuing to the right, we see Leo, the lion, of which Regulus is the brightest star, and close to it stands the planet Saturn. High overhead we find Arcturus in Bootes, the bear-driver. Toward the east there is Vega, in Lyra, the lyre, and below this Cygnus, the swan, otherwise known as the "northern cross," with Deneb. To the right of this group one sees Aquila, the eagle of which the star Altair is of the first magnitude, though it is so low that its brilliance is somewhat dimmed.

This is even more true for the stars shown low in the northwest. Pollux, in Gemini, the twins, and Capella, in Auriga, the charioteer, are both of the first magnitude, as we recall from seeing them shining brilliantly overhead in the winter evenings. Now they are so low that their light has to pass through a great absorbing thickness of our atmosphere.

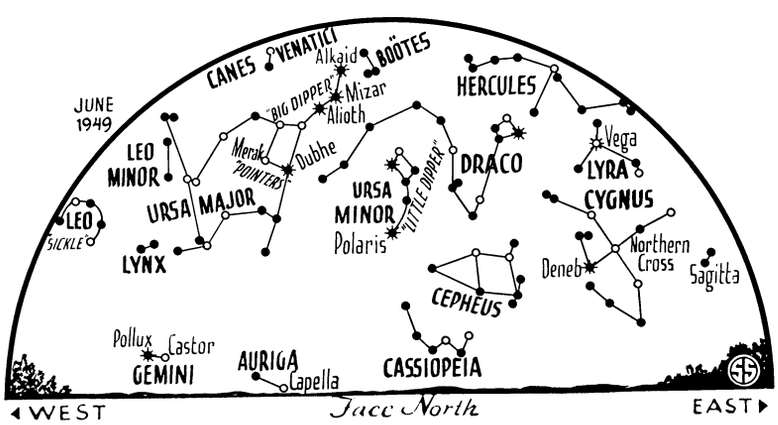
In addition to Saturn, Venus is another planet now in the evening sky. It is in the constellation of Gemini, very low in the west at sunset, so you have to look carefully to find it. It is so bright, however, that it can be located in the gathering dusk. Jupiter comes up around midnight, in the constellation of Capricornus, the sea-goat. It will be seen then low in the southeast, shining more brilliantly than any other star or planet.

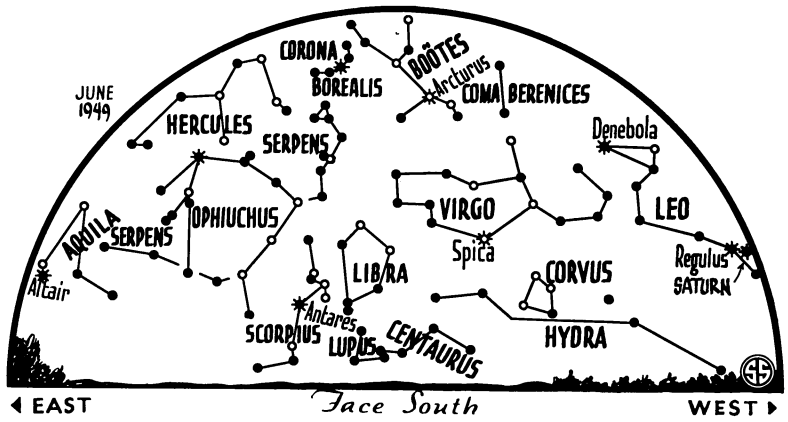
Sun's Warmth

Something that often puzzles people is why the sun should be so much warmer in June and the succeeding months, and why we do not have the warmest weather when the sun is sending the most heat to our part of the earth. First of all, it is not because of the sun's proximity, for in fact the sun is several million miles farther away in our summer than it is in winter.

Part of the cause is found in the longer days. With the sun so far north, it rises far to the north of the east point and sets far north of the west point of the horizon. Ascending so high at noon, it has the longest path of the year across the sky, which takes the greatest time. And with the sun above the horizon so long, it has more opportunity to heat the ground.

Also, when the sun is high, its rays of light, and of heat, are more concentrated. If the sun were directly overhead, a yard-square beam of radiation would cover just a square yard of the earth's surface. In the





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winter, on the other hand, when the sun is low and its rays strike the ground at a very low angle, the yard-square beam might be spread over as much as two square yards of ground. Hence the heating effect would be only half as much.

But this does not explain why on June 21, when these two factors are at their maximum, we do not have the hottest weather. The reason is that each night the earth loses a lot of the excess heat it gained during the previous daylight hours. During June, and even much of July, the short nights do not permit it to get rid of as much as it gained, and it continues to get warmer. Finally, by the end of July, it starts to suffer a net loss of heat, and then begins to get cooler. A similar effect, in reverse, is responsible for the fact that Dec. 22, when the sun gives the northern hemisphere the least heat, is not the coldest of the year.

Time Table for June

June	EDST	
2	11:38 p. m.	Moon passes Saturn
3	11:27 p. m.	Moon in first quarter
7	3:00 a. m.	Moon nearest, distance 228,100 miles
9	evening	Occultation of Antares (see text of article)
10	5:45 p. m.	Full moon
13	5:48 p. m.	Moon passes Jupiter
18	8:29 a. m.	Moon in last quarter
19	4:00 a. m.	Moon farthest, distance 251,100 miles
21	2:03 p. m.	Sun farthest north, summer commences
24	10:50 a. m.	Moon passes Mars
26	6:02 a. m.	New moon
27	5:07 p. m.	Moon passes Venus
28	6:00 a. m.	Mercury farthest west of sun
30	8:47 a. m.	Moon passes Saturn again

Subtract one hour for CDST, two hours for MDST, and three for PDST.

Science News Letter, May 28, 1949

ASTRONOMY

British Get Giant 'Scope

➤ THE GIANT, 98-inch glass mirror for the largest telescope in the world outside of the United States has been presented to Britain's Royal Greenwich Observatory by the McGregor Fund of the University of Michigan.

Gift of the 98-inch pyrex glass disk and a secondary mirror and plug for the planned Isaac Newton telescope at the Royal Observatory was disclosed when the lords commissioners of the British Admiralty sent their thanks to Judge Henry S. Hulbert of Detroit, president of the McGregor Fund board of trustees.

Only larger telescopes in the world are the 200-inch giant eye of Mount Palomar and the 100-inch 'scope on Mount Wilson, both in California. A third larger telescope of 120-inch diameter is being planned for the Lick Observatory, also in California. Biggest 'scope outside of the U. S. at present is a 74-inch one at Radcliffe Observatory, Pretoria, South Africa.

The big glass for the Royal Observatory is a little brother of the Palomar mirror. It was made at the Corning Glass Works in Corning, N. Y., after the 200-inch eye for Palomar was poured. The 98-inch mirror was originally planned for a University of Michigan telescope which was not built because the depression reduced available funds.

Arrangements for the gift were completed at Ann Arbor, Mich., late in March during the visit there of the Astronomer Royal, Sir Harold Spencer Jones.

The Isaac Newton telescope which will use the mirror will be located at Hurstmonceux, England, where the Royal Greenwich Observatory is in the process of moving from its traditional home in Greenwich.

Value of the 98-inch mirror, a secondary, 26.5-inch disk and the plug for the center hole of the large glass is hard to estimate. Original cost was only some $15,000, thanks to the fact that they were made at the time Palomar's mirror was poured. They would probably cost about $80,000 to make now.

The late Dr. Heber D. Curtis of the University of Michigan, directed planning for the 'scope at the University, and funds were appropriated by the Michigan legislature. After the mirror, a gift from the McGregor Fund, had been completed, the depression came and funds were cut off.

Science News Letter, May 28, 1949

GENERAL SCIENCE

Fellowships To Train Scientists for Atom Jobs

➤ FELLOWSHIPS to help in training more scientists for radiology work with atomic products in industrial laboratories, U. S. Atomic Energy Commission laboratories, and hospitals are being offered to science or engineering graduates.

The Atomic Energy Commission fellowships in radiological physics are being administered by the National Research Council. They carry an annual basic stipend of $1,500 for single fellows and $2,500 for married students. Applications for next year must be received by June 10.

Science News Letter, May 28, 1949