

ASTRONOMY

Sky as a Clock

Using Pointers in Bowl of Great Dipper as Hand And Following Formula To Allow for Season Gives Hour

By JAMES STOKLEY

BEFORE the days of watches, pocket sundials were a popular means of telling time. They were made in great variety, some of precious metals and elaborately decorated, others much simpler, with strict utility in mind. These were very useful in the daytime, and when the sun was shining, but were not much good at night. Accordingly another instrument was used, the "nocturnal," sometimes made in combination with a sundial. A few years ago a modern nocturnal was introduced as a novelty, even though they date back for many centuries.

The nocturnal consists of a disk with a hole in the center, which is sighted on the pole star, in the north. Projecting from the disk is an arm, which is lined up with the pointers, the two stars in the bowl of the great dipper which indicate the direction of the pole star. Then, setting the disk to the time of year, it is possible to read the hour.

However, even without the aid of such an instrument, it is not difficult to read the time from the stars to the nearest half hour, or even quarter hour, using the northern sky as the dial, and the pointers as the hour hand. There is no minute hand to this clock, but that should cause no trouble. The first mechanical clocks had only hour hands, in fact.

If you watch this celestial clock during an evening, you will find that the hand turns counter-clockwise. It makes a complete revolution in a little less than a day. For example, the map for the northern sky shows its position on July 1 at 10:00 p. m., but on July 2 it will be this way about 9:56, on July 3 about 9:52, and so on. Thus, by July 15, the map shows the position for 9:00 p. m. And six months from now, at the same time of the evening, the pointers will be on exactly the opposite side of the pole star.

From the stars we obtain star time, or "sidereal time," which the astronomer uses, but which would be inconvenient for everyday use, since any particular hour would sometimes come at noon, sometimes at midnight. But, for the purpose of finding ordinary time from the pointers, Dr. C. C. Wylie, University of

Iowa astronomer, has worked out the following rule:

Using the pointers as the hour hand of an imaginary clock, read the hour. Thus, if the pointers are directly left of the pole star, read nine o'clock, if they are directly below, read six o'clock. With a little practice, you can read this to the nearest quarter hour. To this figure add the number of months since the beginning of the year, to the nearest quarter month. Double this, and subtract from $16\frac{1}{4}$. If the total is more than $16\frac{1}{4}$, subtract from $40\frac{1}{4}$. Then you have the time in hours p. m. If the number is more than 12, subtract 12, and you have the time in hours a. m. This, of course, is local time, and may differ from standard time, unless you are on the central meridian of your time belt. If you are west of this meridian, it will be earlier than standard time, while if you are to the east it will be later.

Now for an example. On July 15 the pointers may show 7:30, or $7\frac{1}{2}$. You add this to $6\frac{1}{2}$ (the number of months since Jan. 1) which is 14, and double to get 28. Subtracting from $40\frac{1}{4}$, you have $12\frac{1}{4}$, so the time is 12:15, a. m.

Venus made her bow in the evening sky about a month ago. During July she can be seen low in the west in Leo, the lion, just after sunset. The position is indicated on these maps, which reveal the appearance of the heavens at 10:00 p. m. (standard time), in the beginning of the month, and an hour earlier in the middle. Of magnitude minus 3.3, Venus is far brighter than any other star or planet.

Later in the evening Mars can be viewed. Not so bright as Venus, of magnitude minus 0.7, he exceeds any of the stars. Look for his ruddy glow in the east, a little before midnight. Still later—a few hours before sunrise—Saturn, and then Jupiter, swing into view above the eastern horizon. The latter is even brighter than Mars, Saturn is fainter, though still equal to a first magnitude star.

On July 24 Mercury will have moved to its farthest west of the sun. For a few days before and after that date this planet will also be visible, in the east in the morning twilight. It will be about as bright as Saturn.

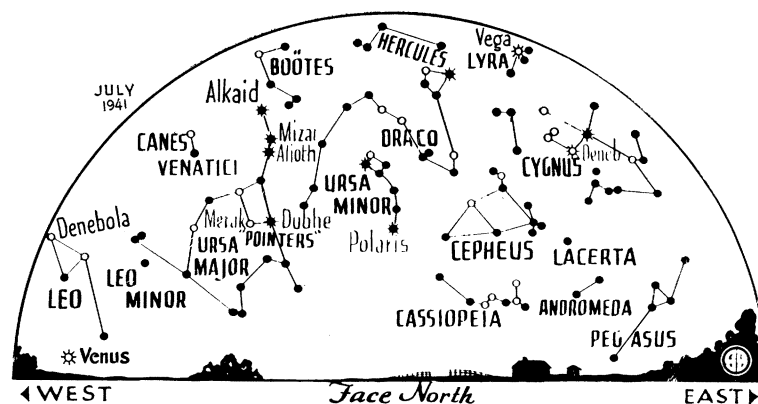
Among the stars of the summer evening, Vega, in Lyra, the lyre, is brightest, shining high in the east. With Deneb, in Cygnus, the swan, and Altair, in Aquila, the eagle, Vega makes a large right triangle of bright stars which is easy to locate. To the northwest is the familiar "great dipper," in Ursa Major, the great bear. Following the curve of the dipper's handle southward, you can find Arcturus, in Bootes, the bear driver, and then, to the southwest, Spica, in Virgo, the virgin.

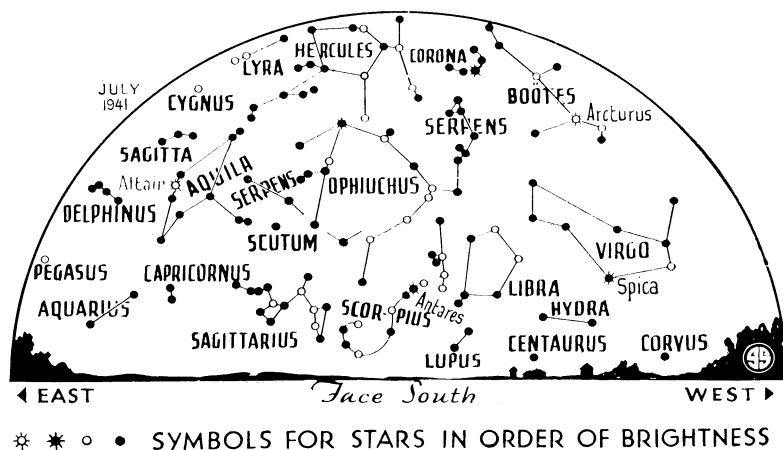
Directly south is Scorpius, the scorpion, with red Antares. This is the last of the six first magnitude stars shown on the maps.

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Celestial Time Table for July

Tuesday, July 1, 11:24 p. m., Moon in first quarter. **Wednesday, July 2, 7:00 p. m.**, Earth farthest from sun for year; distance 94,450,000 miles. **Saturday, July 5, 9:00 p. m.**, Moon nearest, 226,700 miles away. **Tuesday, July 8, 3:17 p. m.**, Full moon. **Monday, July 14, 8:39 p. m.**, Moon passes Mars. **Wednesday, July 16, 3:07 a. m.**, Moon in last quarter. **Thursday, July 17, 7:00 p. m.**, Moon





farthest, 251,300 miles away. **Friday, July 18**, 8:14 p.m., Moon passes Saturn. **Sunday, July 20**, 4:13 a.m., Moon passes Jupiter. **Tuesday, July 22**, 11:07 a.m., Moon passes Mercury. **Thursday, July 24**, 2:39 a.m., New moon. **Saturday, July 26**, 8:04 a.m.,

Moon passes Venus. **Monday, July 28**, Early a.m., Delta Aquarid meteor shower. **Thursday, July 31**, 4:19 a.m., Moon in first quarter.

Eastern standard time throughout.

AGRICULTURE—CHEMISTRY

More Tung Oil Production Needed in United States

Imports from China Supply Only Twelfth of Demand And Present Domestic Production Hardly Two Per Cent

RAPID increase in tung tree acreage in this country is urgently needed, W. M. Smith, Jr., technical adviser of the Reasor Tung Plantations, Inc., told the First Annual Southern Chemurgic Conference meeting in Nashville.

The normal annual requirements for tung oil in the United States amount to at least 150 million pounds, and the present imports from China, almost the only source, are supplying only a twelfth of that. Despite the extensive plantings that have been made in this country, present domestic production takes care of hardly 2% of our needs.

Tung trees, which are somewhat sensitive to frost, grow well only in a belt about 100 miles wide along the Gulf Coast, and across Florida to the Atlantic. Fortunately, they require an acid soil, which makes available for tung plantations vast stretches of land that are of little use for other crops. They require plenty of water (40 inches annual rainfall), yet they will not grow in wet soil. Tung planting is not a job for hit-or-miss amateur methods, Mr. Smith emphasized; it requires careful scientific investigation of ecological conditions before

the trees are set out, if the venture is to be a success.

Science News Letter, June 28, 1941

Farm Wealth in Weeds

FARMERS of the future may win wealth from wild plants that are now regarded only as weeds, Wheeler McMillen, president of the National Farm Chemurgic Conference, suggested to the Chemurgic Conference.

Reminding his hearers that there are about 250,000 known species of plants in the world, of which approximately 15,000 are native to the United States, the speaker called attention to the fact that the ones under cultivation number only a few scores, and those are mainly the same as our prehistoric ancestors chose because they could be used just as nature produced them. In modern times great changes have been made in cultivated plants by scientific breeding, yet we have not thought to pick up hitherto uncultivated plants and develop their good qualities in the same way. He urged the appropriation of funds for research in this direction, to

be conducted at state experiment stations.

Science News Letter, June 28, 1941

Farm to Forest

FELLING forests to create new farms, traditional practice in America since earliest times, isn't always the right thing to do, Dr. J. Alfred Hall of the U. S. Forest Service declared. Rather, the process should be reversed on much land which is now being unprofitably plowed year after year, with the farmers only sinking themselves and their families deeper and deeper into poverty.

Dr. Hall took the states of Tennessee and Kentucky as examples for his thesis. When the first settlers came, both states were practically continuous forest. The newcomers ravaged the woods with fire and ax, with no thought for the timber values but only for the soil they could plow and plant after the trees had been cleared.

The result, he said, is that in both states the cut of high-grade lumber is diminishing, with the proportion of lower grade lumber increasing. Men who used to have jobs in sawmills and other wood-using industries have been thrown out of work. Where oak, hickory, chestnut and gumwood used to be a source of pride as well as revenue, there is now a shortage so severe that hardwood lumber is even having to be brought in from the outside.

Science News Letter, June 28, 1941

RESOURCES

Fireworks for Defense Aids Safe and Sane Fourth

DEFEENSE production will tend to make this year's celebration of the Fourth of July more "safe and sane" than ever!

With the need for military fireworks, most manufacturing companies are loaded with government contracts. One large maker, producing big display pieces, reports that output for civilian use is now only a third of last year's while that for the Army and Navy has increased three-fold.

Another manufacturer, who makes the big three-inch firecrackers, or "salutes," says that their civil production thus far is only about a third off last year's, but it is falling rapidly, to enable them to take on more government orders. Thus, the 1942 Fourth of July may be almost completely fireworkless.

Magnesium and aluminum, the two