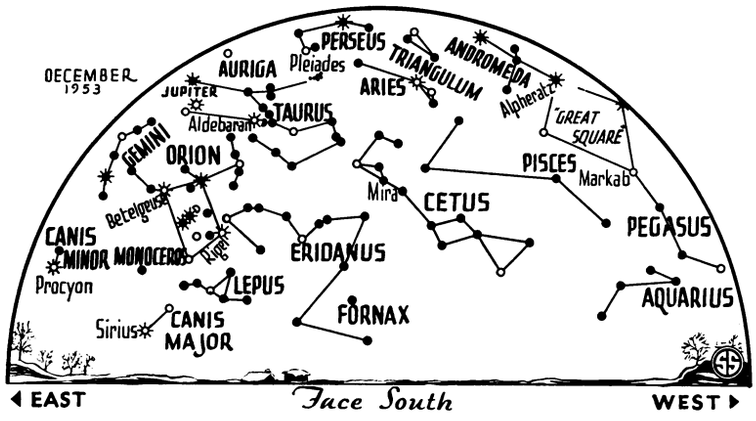

☼ ✷ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

in the development of radar, led to many new techniques for detecting faint radio waves and determining the direction whence they are coming.

Some of these same methods have been applied in "radio telescopes," which have revealed, in various parts of the sky, a number of discrete radio sources, called radio "stars." Two of the most intense of these in the northern hemisphere are in parts of the sky now visible in the evening, and shown on the maps.

Strongest Radio Source

The strongest of all is one in Cassiopeia, between the western part of the M and Cepheus, below. The first A in the name Cassiopeia marks its approximate position. The other, the second most intense, is in Cygnus, at the position indicated by a small X on the map of the northern sky.

While the radiation from the sun varies in intensity as much as a million times, that from the radio "stars" is much more constant. But even an average radio "star" emits radio wave radiation that is a hundred times as great as that from the sun when most disturbed, and the source in Cassiopeia is perhaps a hundred times stronger than the average radio "star."

Using light waves, the position of a source can be determined with a telescope with great precision. This depends on the size of the telescope lens or mirror, as measured in terms of the wavelength of light. Green light, about average, has a wavelength of 1/50,000th of an inch.

With a ten-inch telescope, which is of moderate size, the diameter of the objective is about half a million wavelengths. Radio telescopes may employ waves of about 15 feet wavelength. For the equivalent resolution of a ten-inch optical telescope, the dish —the concave reflector to collect 15-foot radio waves—would have to be some 7,500,000 feet, or more than 1,400 miles, in diameter!

Actually the largest radio telescope, at the Jodrell Bank Station in England, operated by the University of Manchester, is 250 feet in diameter. The 50-foot radio telescope at the Naval Research Laboratory in Washington, however, has a resolving power of more than 50 times the 250-foot giant, because it tunes in on a shorter wavelength.

Thus, in the last few years, a whole new field in astronomy has been opened. In the opinion of many, application of radio techniques to the study of the heavens will rank in importance with the introduction of the spectroscope about a century ago.

This instrument has yielded a vast amount of knowledge as to what the stars are made of and the processes going on inside them.

Radio astronomy is so new, in fact, that much of the most important work has been done by radio engineers rather than astronomers. However, as the latter learn the new techniques, and as the engineers learn more about astronomy, they should be able to combine effectively in ferreting out many new facts about our universe.

Celestial Time Table for December

Dec.	EST	
1	1:00 p.m.	Mercury farthest west of sun.
	11:29 p.m.	Moon passes Mars.
3	7:15 a.m.	Moon passes Saturn.
4	4:01 p.m.	Moon passes Mercury.
5	4:33 a.m.	Moon passes Venus.
6	5:48 a.m.	New moon.
8	3:33 a.m.	Algol (variable star in Perseus) at minimum brightness.
11	12:22 a.m.	Algol at minimum.
12	early a.m.	Meteors visible radiating from Gemini.
13	11:30 a.m.	Moon in first quarter.
	12:00 noon	Jupiter opposite sun and nearest earth, distance 391,900,000 miles.
	9:11 p.m.	Algol at minimum.
16	9:00 a.m.	Moon nearest, distance 228,700 miles.
19	5:44 p.m.	Moon passes Jupiter.
20	6:43 a.m.	Full moon.
21	10:32 p.m.	Sun farthest south, winter commences in northern hemisphere.
28	12:43 a.m.	Moon in last quarter.
	10:00 a.m.	Moon farthest, distance 251,300 miles.
30	5:36 p.m.	Moon passes Mars.
	8:31 p.m.	Moon passes Saturn.

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

Science News Letter, November 28, 1953

FORESTRY

Bark Beetles Are Most Serious Forest Enemy

➤ BARK BEETLES that destroyed 700,000,000 board feet of lumber in Montana and Idaho alone last year are perhaps the nation's most serious forest problem, the Forest Research Advisory Committee has reported.

The committee recommended to the U. S. Department of Agriculture that research on bark beetle control be expanded. In Colorado, 4,000,000,000 board feet of timber has been destroyed by beetles in the last 10 years.

The report also placed emphasis on study of diseases attacking seedlings in forest nurseries, study of root diseases of conifers, tree improvement and range reseeding.

Science News Letter, November 28, 1953