ASTRONOMY

Mars Becomes Prominent

The red planet Mars shines in the east in the January evening sky and the year's best display of stars is in view with Orion high in the south, James Stokley reports.

➤ THE RED PLANET Mars is now on view in the evening sky.

Low in the east (at about ten o'clock or later at the beginning of January) you will see the consellation of Leo, the Lion. In this group stands the first magnitude star Regulus, part of the subgroup called the Sickle.

But in the Sickle now stands an intruder —red in color and brighter than any of the stars—Mars. You can also distinguish Mars because it shines with the steady glow of a planet, so different from the scintillating stars.

Mars is the only planet shown on the January maps, which indicate the appearance of the heavens at about 10:00 p.m. (your own kind of standard time) at the first of the month, 9:00 p.m. around the 15th, and 8:00 p.m. at the end.

Mercury Visible

For a few days about Jan. 4, however, if you look low in the west soon after sundown, and before the sky is entirely dark, you may get a glimpse of Mercury. At that time it will be farthest east of the sun, and visible for a little while at dusk.

Higher in the western sky—and brighter —you will easily locate Jupiter, which is now in the constellation of Aquarius, the water carrier. But it also sets before the times for the maps.

As for the other planets that sometimes become visible to the naked eye, Saturn is now too near the sun's direction to be visible; Venus shines brilliantly in the eastern sky before dawn.

January brings the year's best evening display of stars. High in the south is the magnificent constellation of Orion, of which the three stars in a row forming the warrior's belt are characteristic. Near the belt are two brilliant stars—Betelgeuse above and Rigel below.

Following Orion are his two dogs. Canis Major, the greater dog, is lower and to the left. In it is Sirius, the brightest star in the sky, except for the sun. Farther to the left and higher is the lesser dog, Canis Minor, with the star called Procyon.

To the right of Orion and a little higher appears Taurus, the bull. Red Aldebaran marks his eye. In his shoulder is a little cluster of stars called the Pleiades. They are known in mythology as the seven sisters, although most people cannot see more than six of them.

And directly overhead, as indicated on the maps, is Auriga, the charioteer, with Capella. Just below this group, toward the east, are the twins, Gemini. They display two prominent stars: Pollux, the lower, is of the first magnitude, while Castor, above, is second.

In addition to these bright stars, in and around Orion, two others of the first magnitude are shown. One is Regulus, in Leo, low in the east, mentioned in connection with Mars. Very low in the northwest Deneb is shown, all that remains visible of Cygnus, the swan. Deneb is so low that atmospheric absorption dims it considerably.

The astronomical program for 1963 calls for five eclipses, and two of them occur in January. Probably, however, you will not see very much of either.

The first, on the night of Wednesday, Jan. 9, is a "penumbral" eclipse of the moon, probably the least interesting of the three kinds of lunar eclipses.

Any lunar eclipse involves the moon's entry into the earth's shadow, which consists of two parts. Innermost is the umbra, the true shadow, where the earth completely hides the sun. Around this is the outer, partial shadow, the penumbra. If you were in it, on a space ship, the earth would only partly cover the face of the sun.

So there are three possibilities for an eclipse. The moon may enter completely into the umbra, and then it is totally eclipsed. It may only partly enter the umbra. This is a partial eclipse, and the curved edge of the earth's shadow appears on the face of the moon. And finally, the moon may enter into the penumbra but not into the umbra, even partially.

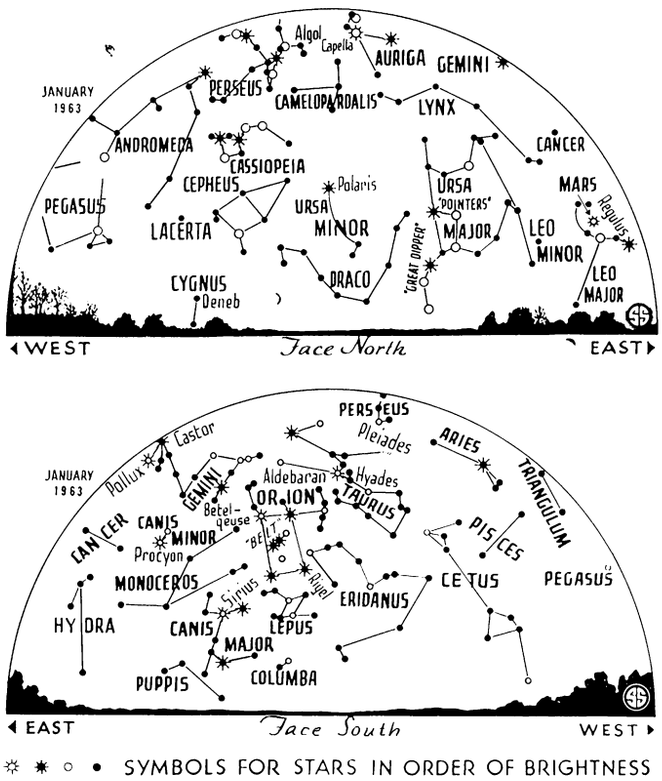
That is what occurs this month. From 4:05 p.m., E.S.T., to 8:34 p.m., the moon will be at least partly in the penumbra. At the beginning of this period the moon will not have risen in the United States and most of North America. When it rises, it will be in eclipse. But even with only part of the sun shining on the moon, it still shines with seemingly near normal brightness.

So watch the moon, which will then be full, when it comes up on the evening of Jan. 9. If the sky is clear, but the moon seems a little fainter than it should be, the effect may be due to the eclipse.

January's Second Eclipse

January's second eclipse comes on the 25th, and this time it is of the sun, for the moon comes between that body and the earth. But this is also not a total eclipse. When it occurs, the moon will be relatively far from the earth, and the sun relatively close. Thus, the solar disc will be larger than that of the moon. Even with the moon going in front of the sun, a ring of the solar surface will be visible. This is called an annular eclipse, from the Latin word annulus—a ring.

The path along which the annular eclipse



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will be visible starts in the South Pacific Ocean, crosses the southern tip of South America, the South Atlantic Ocean, South Africa, Madagascar, and ends in the Indian Ocean. Over a larger area, including Antarctica, and the southern parts of South America and Africa, there will be a partial eclipse of the sun.

But 1963 will bring two eclipses visible in the United States and Canada. First is a total eclipse of the sun on July 20. This time the relative distances of the sun and moon will be such that the moon will completely hide the sun. To see this happen you will have to be along the "path of totality"—the band the earth's shadow sweeps out. From its start in Japan at sunrise, this path crosses the North Pacific, Alaska, Yukon, the Northwest Territories, Northern Saskatchewan, Manitoba, Ontario, Quebec, Maine, just misses the southern tip of Nova Scotia, and ends at sunset in the Atlantic.

This eclipse is visible as a partial one from Central America and the very northern tip of South America.

On the night of December 30, there will be a total eclipse of the moon, visible generally throughout North America, as well as other parts of the world.

This monthly article will deal with each of these eclipses as the time for them approaches.

Celestial Time Table for January

Jan.	EST	
1	10:54 pm	Algol (variable star in Perseus) at minimum brightness
2	8:02 pm	Moon in first quarter
4		Earth nearest sun, distance 91,343,000 miles
	3:00 am	Moon nearest earth, distance 229,800 miles
		Mercury farthest east of Sun
	7:43 pm	Algol at minimum
9	6:09 pm	Full moon, penumbral eclipse
12	10:00 am	Moon passes Mars
17	3:00 am	Moon farthest, distance 251,300 miles
	3:35 pm	Moon in last quarter
19	3:50 am	Algol at minimum
20	6:00 am	Mercury between Earth and Sun
21	1:00 pm	Moon passes Venus
22	12:40 am	Algol at minimum
	10:00 pm	Venus farthest west of Sun
24	9:29 pm	Algol at minimum
25	8:42 am	New Moon, annular eclipse visible in Southern Hemisphere
27	6:18 pm	Algol at minimum
28	2:00 am	Moon passes Jupiter
29	2:00 am	Moon nearest, distance 228,500 miles

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

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VETERINARY MEDICINE

TB Diagnosis in Cattle

➤ A MORE accurate and faster procedure for diagnosing tuberculosis in cattle is under development at the Michigan State University microbiology department, under the direction of Dr. Walter L. Mallman, professor of microbiology, and George Leonard Wright, graduate research assistant.

A more exacting and precise diagnostic procedure will open new aspects in the diagnosis of bovine tuberculosis and the prognosis of human TB.

Successful development of the process would enable the diagnostician, in many cases, to tell whether the disease detected is actually tuberculosis or another disease closely resembling TB. This will bear on whether or not the cattle need to be destroyed.

Michigan State University and the U.S. Department of Agriculture research is aimed at isolating certain atypical mycobacterial organisms that resemble tuberculosis bacteria and which have been isolated from man and cattle in large numbers causing great concern in recent years, since they are highly resistant to treatment.

Blood serum of experimentally infected cattle will be examined to determine the total protein content.

"This serum will then be placed on cellulose acetate strips and placed in an electrophoretic chamber. An electric current will separate the various protein fractions contained in the serum. These produce a characteristic pattern somewhat resembling a series of curves and blotches to the untrained eye. The strip is next placed in an automatic scanner which will measure the density of the protein fractions in graph form."

Mr. Wright hopes eventually to be able to identify a particular disease by comparing the results of a test or graph with a pattern from a known disease obtained by the same method. A field technician could collect sera samples from suspected animals in the herd and compare the results with already known patterns, indicating whether the disease is tuberculosis or a non-tuberculosis disease.

There already exist methods of detecting human TB, but none that enable a doctor to quickly and easily follow the course of the disease in a patient. If this experimental technique can be perfected in cattle first of all, the procedure may be applicable to the prognosis of human tuberculosis.

This technique might be used to follow tuberculosis as it invades the human body. In previous research using the electrophoretic technique, there were definite variations in one or more of the protein fractions in the serum.

By applying this new technique, a series of blood samples might be taken from a patient. The resulting serum from each sample would then be placed in the electrophoretic chamber and the results compared with a known pattern. This method should tell the doctor how the patient is progressing in his personal fight against TB.

The research is sponsored by Christmas Seal funds granted by the Oakland County Tuberculosis Association and the Michigan Tuberculosis and Respiratory Disease Association.

• Science News Letter, 82:421 December 29, 1962

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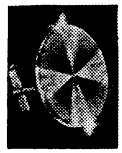

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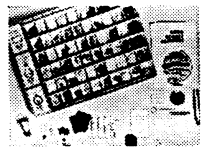

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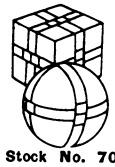

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