

ASTRONOMY

Eclipse of Moon

A total eclipse of the moon will occur on Sept. 25 and 26. This will be the last total eclipse until the first part of 1953.

► THE BIG celestial show for this month is the total eclipse of the "harvest" moon on the night of Sept. 25 and 26. Only a last minute veto of the weatherman will cause cancellation of the performance as viewed from the earth.

The show will be visible during the late evening hours throughout the United States and most of the Western hemisphere. The entire performance will last five hours, 53.5 minutes, although the moon is totally eclipsed only 46 minutes.

Lunar eclipses occur when the moon, as it revolves around the earth, passes into the great conical shadow cast by the earth in space. By putting a bright light on a table in the middle of an otherwise dark room, then walking around the table and watching the wall, you can get an idea of how the shadow of the earth sweeps across space.

There are two parts to the earth's shadow, as there are to every shadow cast by an object where the light source has an appreciable size. The inner core is called the umbra and is the true shadow. Around this there is a region of partial shadow known as the penumbra.

The edge of the moon first enters the

penumbra at 8:20 p.m. E.S.T., but so little sunlight is cut off that it will take until about the time the moon enters the umbra to notice a change in its brightness. This will be at 9:31.5 p.m. E.S.T.

The total phase of the eclipse begins at 10:54 p.m. E.S.T. Before totality begins, the earth's shadow on the moon will have appeared gray, then black. However, as totality commences, the moon takes on a coppery-red glow. Although the earth completely eliminates the direct solar rays, some of them are bent by prismatic action of the earth's atmosphere thus giving the moon its coppery-red color, since red predominates in the light thus bent. This same effect is observed in the sunset's red color.

Totality is over at 11:40 p.m. E.S.T. The moon leaves the umbra at 1:02 a.m. E.S.T. on Sept. 26, and the whole performance will be over and the moon again shining with undimmed brilliance at 2:14 a.m. E.S.T.

This will be the last total eclipse of the moon visible from the United States until Jan. 29, 1953. There will, however, be a partial eclipse on Feb. 10, 1952.

Science News Letter, September 23, 1950

of the path which the moon will follow across the sky. This would mean about 15 degrees west of the moon's position when you begin. If you adjust your finder so that the moon is in the lower left hand corner, it will be correctly aimed and the moon should then be in the lower left part of your negative when it enters the first visible stage of the eclipse.

Take your first picture when the edge of the moon first disappears and another picture every ten minutes after that until eight pictures are taken. Then the eclipse will be total.

At that time, if you wish to take pot luck with a roll of film, you can try to see what pictures you can turn out of the moon in full eclipse. Test an exposure time of four or five seconds. It might also be possible to record some of the coppery color on color film, using a very wide lens opening.

When the moon emerges from totality at 11:40 p.m., you can record the second half of the eclipse by taking a picture every ten minutes for the hour and 12 minutes until the moon passes out of the earth's deep shadow or umbra. This should be done with a new film and your camera should again be aimed at the middle of the expected path.

Either for the series of pictures of the earth's shadow covering up the moon or for the pictures of totality, if you attempt those, it is not necessary to move your camera. The rotation of the earth will space the images on your film properly. The moon moves its own distance in approximately two minutes.

Your pictures of the eclipsed moon will be more satisfactory if the focal length of your camera is at least 10 inches. Whatever the focal length of your camera, the photograph that you take of the moon will reduce its image to approximately one-hundredth of that focal length, so the moon in your picture may be quite small.

Science News Letter, September 23, 1950

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"Shooting" the Eclipse

► YOU can take a picture of the eclipse of the moon on Sept. 25 with your own camera in your own backyard, weather permitting.

Your camera must be one which can be focused for infinity, and you must have a good, solid support for it. This support need not be a tripod—a chair or a fencepost with a chunk of wood or a solid book to give the correct angle to the camera will serve.

Your picture of the moon in eclipse will probably come out better if you keep the lens open all the time, shielding it with a piece of black cardboard when the film is not being exposed. In this way, you will not jar the camera, thus spoiling your picture.

The kind of film you use and your lens opening will affect the exposure time necessary for a good shot. To be absolutely certain that you have the right settings, it would be a good idea for you to take some trial pictures of the moon a day or two before the eclipse is scheduled. Then the moon will be about the same brilliance as on the night of the big performance.

Test various exposure times with different lens openings, varying only one of these at a time and keeping a record of the settings used for each picture. A lens opening of $f/8$ and an exposure time of one second could be used for the first trial photograph. If you do not have time to make test runs, for the eclipse itself try a one-second exposure for a lens opening of $f/32$, or one-fourth of a second for lens opening $f/16$ or one-twenty-fifth of a second for $f/8$. A box camera would take about a fifth of a second exposure.

Set the distance for infinity and use high speed panchromatic film for best results. Avoid taking pictures during the times the sky is cloudy.

Because exposures are made in the dark, it is best to test the steps necessary to get a complete record of the moon's eclipse before you actually start to take the pictures. Be sure that no light other than that from the moon shines into the lens of your camera.

Just before the moon begins to enter the full shadow (9:31.5 p.m. E.S.T.), adjust your camera so that it is aimed for the center

On This Week's Cover

► THE Reddish Frogfish is one of those odd creatures that is equipped with a "built-in" fishing apparatus. The fish has a very large mouth above the center of which projects a long whip-like ray. A small tag of flesh known as a lure is attached to the end of the ray. When the fish becomes hungry and a suitable fish is near, the lure is tossed to and fro, and as the rod is almost invisible, the bait looks like some tiny creature. The attracted fish tries to catch it whereupon the wiley frogfish gives him a merry chase which leads directly into the mouth of the frogfish. Net result: A sad ending for the attracted fish but a succulent meal for the frogfish.

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