

ASTRONOMY

# Eclipse of the Sun

## Partial Solar Veiling Visible Throughout United States; Ring Eclipse Can Be Seen in Florida and Texas

By JAMES STOKLEY

**C**HIEF astronomical event of April is an eclipse of the sun on Sunday the seventh. This will be visible throughout Central America, Mexico, the United States and Canada, and is the first large eclipse seen in this area since 1932. In that year, on August 31, the path of a total eclipse crossed New England, and it was seen over the larger region as a partial, with the moon covering only a section of the sun's disc.

Because the moon's path around the earth is not a circle, but an ellipse, its distance changes. Sometimes it is nearer, sometimes farther, than the average of 238,857 miles. This month it is nearest (or at "perigee") on the 20th, when only 223,700 miles from earth. On the 5th it is farthest (at "apogee"), 252,400 miles away.

This, naturally, produces a change in the size the moon seems to have in the sky. On the 5th its apparent diameter is only about 88 per cent what it will be on the 20th.

The distance of the sun varies too, though not as much as that of the moon and over the year instead of over the month. Thus, all through April the sun has approximately the same apparent size. On April 16, the sun and moon

look to be just about the same diameter. After that the moon will appear larger. Then, if the moon were to eclipse the sun by coming before it, the entire solar disc would be hidden, and the eclipse would be total. But before that date, the moon being smaller, its disc will be unable to cover the sun's completely.

On April 7, the moon, then new, will come between the earth and sun, causing a solar eclipse, but, because of the moon's smaller apparent size, it will not be total.

Instead, from the most favorable region, in line with the centers of moon and sun, one will see the dark silhouette of the moon with a ring of the outer rim of the sun around it.

After the Latin name for ring, the part of the sun remaining visible is called the "annulus," and so this type of eclipse is called "annular."

On April 7 the path along which the annulus can be seen begins in the western part of the Pacific Ocean, at a point about 175 degrees East longitude and 5 degrees South latitude. At this position, the moon will be in front of the solar disc at sunrise.

Since this is to the west of the international date line, it will be Monday, April 8, there, by local time, so this is one of those curious eclipses that start the day after they end!

The eclipse path, about 150 miles wide, travels eastward, crossing Christmas Island, then over Southern California, northern Mexico, Texas, Mississippi, Louisiana, Alabama, Georgia and northern Florida. Chihuahua, San Antonio, Austin, Houston, Baton Rouge, New Orleans, Pensacola, Tallahassee, Savannah and Jacksonville are the principal cities where it is visible.

At Austin, for example, the moon will first begin to bite into the edge of the sun at 2:07 p. m., Central Standard Time. At 3:46 p. m., the moon will be entirely in front of the sun, and the ring will be visible around it. This will last for a little over six minutes, then the ring will be broken as the moon comes to the other edge of the sun. At 5:16 p. m., as the last bit of the moon leaves the sun, the eclipse will be entirely over.

The entire eclipse will be later farther

east. At Tallahassee it will start at 3:37 p. m., Eastern Standard Time. The middle will come at 5:06, and the annular phase will last nearly five and one half minutes. It will be over at 6:22 p. m.

In other parts of North America there will be a partial eclipse, with the moon only partly covering the sun. The nearer one is to the annular path, the more of the sun will be hidden. In Sacramento, California, the first bite will be taken from the sun at 11:28 a. m., Pacific Standard Time. At 1:05 p. m., it will be at its maximum, with 57 per cent of the sun's diameter covered. It will be over at 2:37 p. m. The times at Denver, Colorado, in Mountain Standard, for the beginning, middle, and end, are 1:01 p. m., 2:36 p. m., with 66 per cent of the sun's diameter covered, and 4:00 p. m. For Chicago, in Central Standard Time, these are: 2:33 p. m.; 3:56 p. m., with 65 per cent; and 5:08 p. m. For New York; using Eastern Standard Time: 3:50 p. m.; 5:05 p. m. (68 per cent); and 6:12 p. m.

With astronomers often going halfway around the world to observe an eclipse, one might imagine that this, in an easily accessible region, would be particularly popular. An astronomer who might happen to be in the path would hardly turn his back, but no scientific expeditions are being organized to observe it, as they are for the year's second eclipse, visible in South America and South Africa on October first.

This will be total, the moon will completely cover the sun, and the corona, the outer solar layer, will appear. Many other important observations can also be

### Illustrate

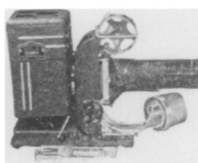
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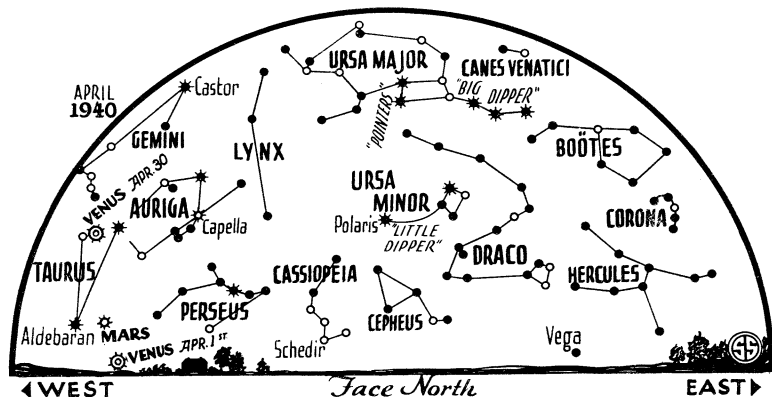
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made when the sun's inner part is entirely hidden. With an annular eclipse, even the narrow ring of the sun that remains visible still gives enough light to hide all these effects.

Even though this month's eclipse lacks scientific importance, it is a rare phenomenon, and interesting to watch, especially to one in the path of the annulus. No one, of course, should look at the sun, even when partially covered, without some protection, such as the traditional smoked glass. Better still is very dense photographic negative. If this is not available, one can make a pinhole in a card, and easily look at the sun through it. Looking directly at the sun may well cause a permanent injury to the eye.

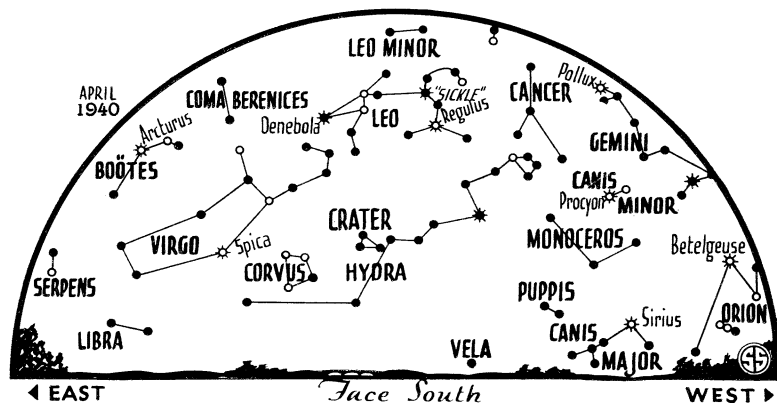
As is always the case with an eclipse of the sun, this one occurs at the time of new moon. The full moon, then, comes about two weeks later, on April 21, and this is the one marking the beginning of the Hebrew celebration of Passover. Actually, it starts at sunset on April 22, because the Jewish calendar, like that used by the Christian church for calculating religious festivals, keeps only approximately in step with the celestial events themselves.

Ordinarily, the Passover full moon is

also the one that determines the date of Easter, but this year they happen to be a month apart. The current year in the Hebrew calendar, 5700, is a leap year, with 13 months instead of 12. We are now in the extra month, called Veadar. On April 9 commences the next month, Nisan, in which, on the 14th day, comes the beginning of Passover. Thus the extra month pushes the Jewish festivals later than they would come in an ordinary 12 month Hebrew year. (See discussion of determination of date of Easter, SCIENCE NEWS LETTER, February 24, 1940.)

More brilliant than any other star or planet, our neighbor world, Venus, is now conspicuous in the western sky after sunset. Just as soon as the sun goes down, long before any other celestial object can be seen, this beautiful orb shines brilliantly well above the horizon. On the accompanying maps, where we see the aspect of the heavens at 10:00 p. m., April 1; 9:00 p. m., April 15, and 8:00 p. m., April 30, the position of Venus is indicated for two positions, at the beginning and end of the month.

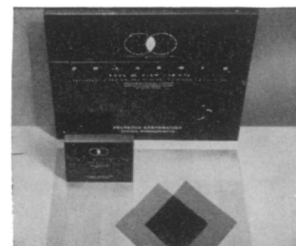
Close to it is shown another planet, the only other visible these evenings, Mars. At 7:00 p. m., Eastern Standard Time, on April 10, Venus passes Mars.



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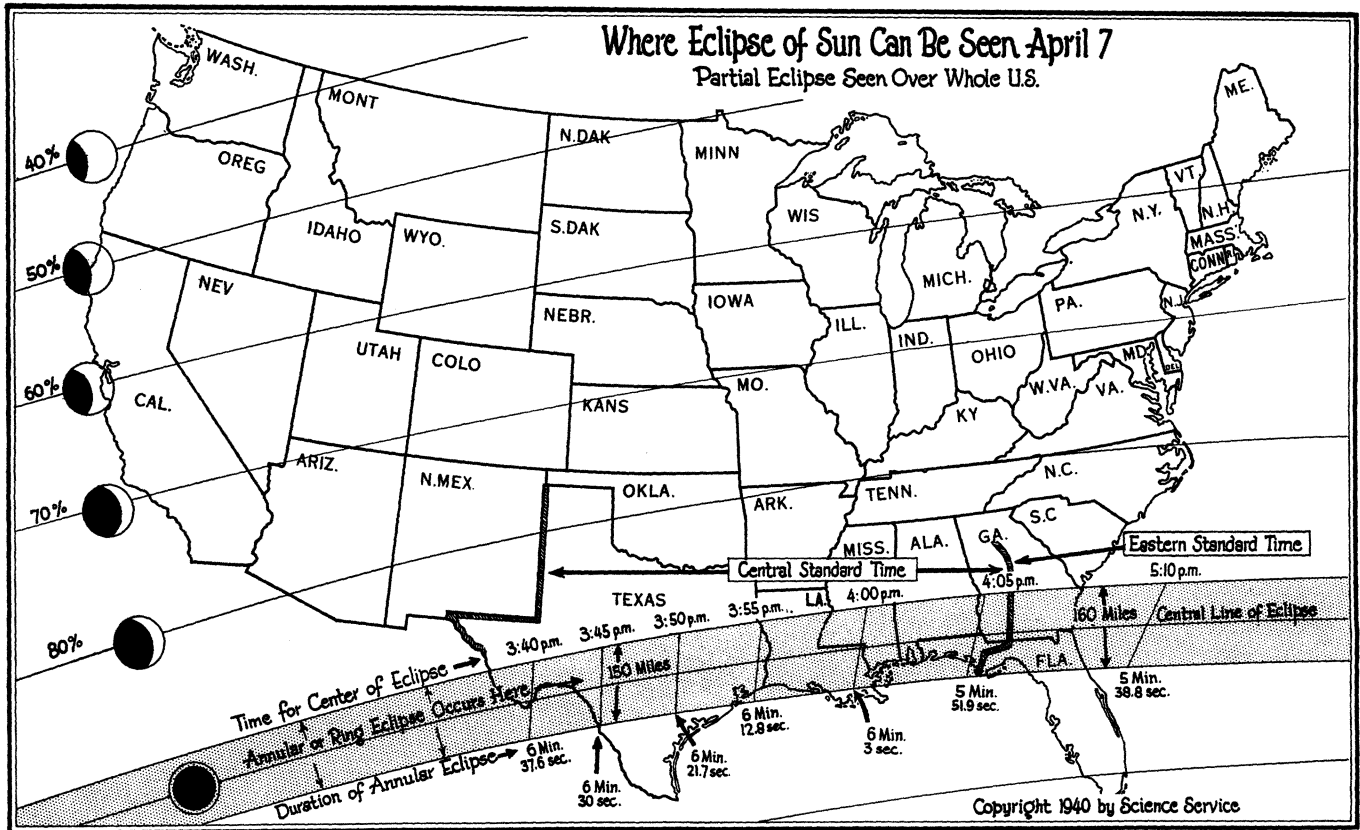
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When closest, Venus will be about  $4\frac{1}{2}$  times the moon's diameter to the north. In contrast to Venus, now unusually bright, Mars, which is very far away, is quite faint. In the astronomer's scale, Venus is now of magnitude minus 3.9; more than 160 times the brightness of Mars, with magnitude plus 1.7.

Mars, red in color, is close to the star Aldebaran, in the figure of Taurus, the Bull, but the star is of magnitude plus 1.06, and this makes it about one and three quarters as bright as the planet. The latter, however, has a rather steady glow, while the star may be seen to scintillate, or twinkle.

Several other stars of the first magnitude are on view this month in the eve-

ning. Brightest of all is Sirius, the dog star, low in the southwest. Nearby, to the right, are three stars in a row, the belt of Orion, the warrior, and above these is Betelgeuse. Still higher is Pollux, the brighter of the twins, Gemini. Castor, to the north, is the other.

High in the south is a figure called the "sickle," because of its shape. The blade of the implement curves over to the southwest, the handle is down, with the brilliant Regulus at the end. This is actually a part of the constellation of Leo, the lion. Next to it, below and to the left, is Virgo, the virgin, with first magnitude Spica.

To the north is Ursa Minor, the little bear, in which we find the little dipper,

**ECLIPSE MAP**

*Here is your guide for watching the beautiful annular eclipse of the sun on April 7. Although of little scientific interest because it is not a total eclipse, but leaves a ring of the sun's surface visible around the disc of the moon, this spectacular event will be well worth your watching.*

that has the pole star, or the north star, at the end of the handle. Above this is the great dipper, in Ursa Major, the big bear. The pointers, which indicate the direction of the pole star, are at the western extremity of the dipper. If we follow the dipper's curved handle to the south we come first to Arcturus, in Bootes, the bear driver, and then to Spica. The latter, by the way, can be easily found because near it, to the right, is a quadrilateral of fainter stars, called Corvus, the crow, though it looks more like the mainsail of a ship than a bird.

Very low in the northeast can be found Vega, in Lyra, the lyre, the last of our first magnitude stars of the April evenings. In future months it will be much more prominent, as it is the brightest star to be seen in the evening skies of summer.

**Celestial Time Table for April**

Friday, April 5, 4:00 a. m., Moon farthest, 252,400 miles away. Sunday, April 7.

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Annular eclipse of sun; 3:18 p. m., New moon. **Monday, April 8**, 4:02 a. m., Algol at minimum; 9:09 p. m., Moon passes Saturn. **Wednesday, April 10**, 7:00 p. m., Venus passes Mars. **Thursday, April 11**, 12:51 a. m., Algol at minimum; 1:38 p. m., Moon passes Mars; 2:14 p. m., Moon passes Venus; 5:00 p. m., Jupiter in line with sun. **Friday, April 12**, 4:00 a. m., Mercury farthest west of sun. **Saturday, April 13**, 9:40 p. m., Algol at minimum. **Monday, April 15**, 8:46 a. m., Moon at first quarter. **Tuesday, April 16**, 6:29 p. m., Algol at minimum. **Wednesday, April 17**, 7:00 a. m., Venus farthest east of sun. **Saturday, April 20**, 2:00 p. m., Moon nearest, 223,700 miles away. **Sunday, April 21**, 11:37 p. m., Full moon. **Wednesday, April 24**, 1:00 p. m., Saturn in line with sun. **Monday, April 29**, 2:49 a. m., Moon in last quarter.

Eastern Standard Time throughout.

*Science News Letter, March 30, 1940*

## From Page 198

minishes, as the exposure to open-air life during active service supersedes the childhood influences. And this exposure is of course identical for northerners and southerners.

The average case fatality rate of cancer for white persons born in the south is substantially lower than for northerners. Army officers have a cancer mortality 48.5% lower than the civil population of New York City or of other big cities.

Under the same environmental conditions, the skin of colored persons is less likely to develop cancer than the skin of white persons, Dr. Peller and Col. Souder report.

Of 100 white cancer patients in the U. S. Army, 35% suffer from lip or skin cancer, of 100 colored patients only 6.5%. The higher resistance of the colored skin to the sun rays is, however, of no avail to the colored people. On the contrary, due to their higher percentage of the much more malignant internal tumors, the average case fatality rate is much higher for colored than for white cancer patients.

*Science News Letter, March 30, 1940*

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### Desert Night Life

**D**ESERTS are not so devoid of animal life as they seem to the motorist driving rapidly through them, or even to the casual observer who gets out for a stroll through the cactus and mesquite, Prof. Charles T. Vorhies of the University of Arizona pointed out.

The animals are there, but mostly invisible. Some of the rodents burrow deep, to find coolness and conserve their body moisture. Other animals—rodents, birds, reptiles and insects alike—rest in the shade of the tough desert plants or hide in cracks in the rocks. Very few of them brave the sun: "There are no 'cactus animals'," said Prof. Vorhies. At dawn and dusk, and during the dark hours of night, is when the desert is really alive.

Another point developed by Prof. Vorhies is a reversal of the commonly held belief that rabbits and smaller rodents hasten the disappearance of good range grasses from overgrazed land and encourage the appearance of economically worthless weeds. Recent evidence seems to indicate that the coming of huge rodent populations to harmed rangelands is a consequence, not a cause, of their ruin. They are themselves "weed animals".

*Science News Letter, March 30, 1940*

### PHYSICS

## Communication Disruption Blamed on Sun Disturbance

**A** TERRIFIC disturbance on the sun was the cause of the worst magnetic disturbance since 1921 which blacked-out telegraph lines, disturbed radio communication, and interfered with long distance telephony on Easter.

Unusual radiation from the sun swept down upon the earth, setting up vast currents of electricity in the upper atmospheric layers, 60 to 90 miles above

the earth, and shooting electrical currents through the earth to mix up or make inoperable communication lines, especially those that use the earth as one side of the circuit.

Preliminary indications are that the storm was even more severe, especially on communication by wire, than the famous Easter storm of 1938, which occurred on Easter Saturday, April 16. In that storm a telegraph station in Oslo was set on fire by the current created and telephone bells rang without anyone calling.

In this Easter's storm, earth currents on communication wires as high as 250 volts were reported and it is believed likely that as much as several million amperes of current was generated in the ionosphere high above the earth.

The horizontal intensity of the earth's magnetic force had a range of over 1,000 gammas, compared with a range of 50 for an ordinary day. A range of 200 gammas is considered a magnetic storm. Gamma is a unit of magnetic intensity.

A large sunspot group visible to the naked eye properly protected by smoked glass, was in its best observing position on Sunday, but three previous appearances of the same group had brought no such extreme magnetic effects. Evidently the solar disturbance was a gigantic flare-up rather than just a sunspot.

*Science News Letter, March 30, 1940*

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