



THE GREAT NORTH AMERICAN ECLIPSE 2024

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THE excitement about the total solar eclipse of 8 April 2024 in North America is unprecedented. Years before it was to pass, astronomers, educationists, students, the administrations and the local communities, and the shadow chasers from all over had begun to plan and prepare for the greatest show on Earth. While it is the corona of the Sun that is of greatest interest, visible for a very short duration of the totality, its fascination is multifaceted. The sensation caused by a total eclipse has a lasting impact on the viewers, and the anecdotes travel far and wide.

The solar corona is a highly rarefied atmosphere of hot ionized gases, visible up to a few solar radii during totality. Its density is $\sim 10^{-16}$ g/cm³ or 4×10^8 atoms/cm³, 10^{13} times thinner than the atmosphere of Earth at sea. It is believed that magnetic energy heats the coronal plasma to two million degrees. However, the physical processes involved are not yet fully understood.

In a century, 238 solar eclipses occur; the maximum number in a year is five, whereas the minimum is two. A total eclipse occurs nearly every 18 months at some place on the Earth, but at any given place, it will repeat in 350–400 years only. The maximum theoretical duration for totality is 7 min 31 sec. The maximum width of the path of totality is about 250 km. The closer one is to the centre line of the path of totality the longer is the duration of totality.

The Path of Totality of the eclipse of 8 April 2024, 162–200 km wide, was to pass over Mexico, the US from Texas to Maine, and Canada, but also over the two great oceans on either side of the Americas, hence the epithet — the Great North-American Eclipse. With the Moon reaching 57.3 ER (Earth Radii; 1ER = 6371 km) at syzygy, it also became a near-Perigee eclipse (Perigee: 56.325 ER) so that totality lasted a good three to over four minutes on the central line. At 4m 26s on the Mexico-US border, it still could not beat the American eclipse of 16 June 1806 that had attained 4m 55s.

Weather predictions revealed it would be best over Mexico, fair over the southern United States, but risky over the northeast and Canada. In Mexico, cities such as Mazatlán, Durango, Torreón and Piedras Negras were among the best locations to observe this event. In the US, the prime destinations were Arkansas, Texas and Oklahoma, where weather was predicted to be relatively favourable. But the weathermen also cautioned about the El Niño factor — the warming up of the ocean surface.

Eclipse 2024: The Most-viewed Event in American History Anticipating huge arrivals and gatherings in parks, streets, highways, and in fact anywhere, even the small-town municipalities issued specific guidelines. The Federal Highway Administration got ready with resources and prepared solar eclipse interstate road maps, including lists of “do-not-stop” locations for truckers. Communities were advised to stock up on groceries, gas, water, medical and pet supplies and outstation people were encouraged to take to carpools and come prepared in terms of basic eclipse information, maps, chairs, and certified eyewear, hats and visors, packed food and hydration.