Case 2: A Perfect Solar Storm

Toward the end of spring, in 1859, the night skies as far south as Tahiti lit up with northern lights. Across the globe, people and animals awoke in the middle of the night and started their daily routines, mistakenly believing the day had begun. In some places, the sky turned so red that people thought the neighboring town was on fire. No one understood what was happening then, but we now know the Earth had undergone two successive solar storms, one on August 28 and the second on September 2. This is now known as "the Carrington Event."

The Carrington Event was so-named for an amateur British astronomer, Richard Carrington, who,
while observing sunspots on September 1, 1859, saw a brilliant solar flare burst from the side of the sun facing toward the earth. This event was accompanied by a coronal mass ejection (CME), a blast of plasma and electromagnetic field from the solar corona. CMEs are fairly common occurrences, but this one was exceptionally large, and it was aimed at Earth.

Besides causing spectacular celestial light-shows, CMEs produce electromagnetic fluctuations on Earth. In 1859, there was very little electrical infrastructure to be affected by such fluctuations. In fact, the telegraph system was almost all there was. The Carrington Event produced such large fluctuations in currents within that infrastructure that telegraph wires emitted sparks and started fires in telegraph
offices and elsewhere. If such an electromagnetic blast were to happen now, it would destroy transformers, power grids, communication satellites, GPS, and the Internet. In other words, no Internet, no telephone, no cable, no electricity, no communication of any sort, no water, no lights, no food, no anything one couldn't grow or steal. It might take months or even years to restore power to many parts of the United States.

Solar disturbances, while individually as unpredictable as hurricanes, mostly occur during periods of intense solar activity that result when the sun reverses its magnetic field every eleven years. In 2012, at the peak of an eleven-year cycle, a solar storm occurred of equal or greater intensity as the Carrington Event, but we did not experience its full severity because Earth was not directly in its path. If the blast had occurred one week earlier, Earth would have taken a direct hit. In short, we dodged a bullet. The next period of high solar activity will be in 2023.

How vulnerable will we be by 2023? Computers and AI have advanced to the point where, at least for limited tasks, they can process information better, make better decisions, and act faster and more efficiently than humans. Self-driving cars, for instance, promise to become so safe that humans will be much better off not driving. Advances in other areas, too, such as surgery, welding, or investment will predictably relieve humans from such tasks. Thus, at least one breed of futurist predicts that we will

turn over many of our basic skills to automation, and, by doing so, lose them when the next Carrington- type event strikes Earth.