

volcanic eruptions, and "extraterrestrial forces."

The reversal of the Earth's magnetic field is a possible explanation for the dinosaurs' extinction. The Earth's unique solid inner and fluid outer iron core acts as a giant magnet, generating a magnetic field that reaches far out into space to help shield the Earth from charged particles known as *cosmic rays*.

On a highly irregular time schedule and for reasons unexplained, the magnetic field is known to reverse: the North Pole becomes negative and the South Pole positive. Later the North Pole changes to positive and the South Pole negative, taking perhaps a few thousand years to reverse its direction.³ About eighty magnetic field reversals are known to have occurred in the last 110 million years.⁴

During the reversal it is possible that the magnetic field briefly collapses, leaving the surface of the Earth vulnerable to harmful cosmic radiation. Lethal cosmic rays could have damaged the genetic machinery of the dinosaurs on an unshielded Earth. Other forms of life might also have been selectively affected.

However, the magnetic field reversal hypothesis is, as yet, not well correlated with the dinosaur and other major mass extinctions that have taken place over geologic time. Furthermore, it is thought that the majority of lethal cosmic rays are absorbed by the Earth's protective atmosphere, rather than shielded by the magnetic field. For the present then, the possible collapse of the Earth's magnetic field can be listed only as one of several speculative possibilities for the extinction of the dinosaurs.

Volcanic eruptions are also a possible explanation. When volcanoes erupt they spew out gigantic clouds not only of water vapor, but of noxious gases such as carbon dioxide and carbon monoxide. The smoggy gases could have caused acid rain, which in turn raised the acidity of the oceans. This could have killed off the marine plankton and disrupted the food chain.

Volcanoes also spew out large quantities of ash and dust. The dust and gas pollution resulting from major volcanic eruptions could have suffocated the dinosaurs. The large animals would have been especially vulnerable. They would have had no place to hide. The clouds of dust and gas could also have brought about a sudden climatic change by blocking out the Sun's rays and disrupting the photosynthesis of plants. The dense volcanic clouds could also have produced the greenhouse effect discussed in Chapter 7. This could possibly have raised the Earth's temperature sufficiently to have caused problems for the dinosaurs.