

which the original material was formed with a fair degree of accuracy. When a rock is remelted or new molten material wells up from the mantle to cool, a new clock starts or is reset. This is a very useful phenomena in dating new or remelted igneous rocks. It is by using this method that scientists are able to date the continental cratons that formed during the great age of land and continent formation and have determined that it took place between 3.5 and 2.5 billion years ago. In the United States, the craton is thought to exist under the soil and sediments of the continent's heartland. In eastern Canada, the craton is exposed to the surface to form the Canadian Shield.

The eruption of a volcano often spewed out large quantities of ash and dust that settled over the landscape. It may have left a deposit several inches or more in thickness. These deposits often contained radioactive nuclides that today tell geologists how many years ago the volcano erupted. The volcanic marker was sometimes covered over later by sedimentary deposits. The age of these sedimentary deposits can therefore be determined by determining the age of the volcanic deposit. Thus, the volcanic markers give important clues to the ages of fossils lying above or below them.

Fossils became abundant 570 million years ago with the advent of the Cambrian explosion of marine animal life. From this time forward to the present, the dating of sedimentary formations becomes much more reliable. The crust of the Earth contains sedimentary deposits literally miles thick. Many of these deposits contain fossils. Some of the fossil animals and plants lived only during certain geologic periods and serve as key indicators of the age of the formations in which they are found. For example, if geologists find dinosaur bones in a sedimentary deposit, they can assume the formation is more than 62 million years old, for our present knowledge indicates the dinosaurs became extinct 63 million years ago.

The record of ancient life is often worldwide in scope. Geologists in Europe can frequently correlate fossils with those found in America. Somewhere in the sedimentary deposits of the world there is likely to be a volcanic or igneous intrusion marker that will supply a radioactive date for calibration of the indicator fossils. To experienced geologists, reading the layers of sedimentary rocks is like reading the pages of a book. Geologists use indicator fossils and radioactive markers to tell them where they are in geologic history.