million years old found in Nigeria and rocks 2 billion years old on the coast of Ghana matched the age of rocks found in corresponding sections of Brazil if the two continents were placed together. In fact, as a result of these tests, the scientific investigators report that a small coastal fringe of northeast Brazil really belongs in a geological sense to west Africa.

More-recent applications of the radioactive-dating methods, including the potassium–argon and rubidium–strontium techniques, have been made in connection with the rock samples brought back from the moon by the Apollo 11 astronauts. The AEC provided most of the fundamental techniques for age analysis of these lunar samples, and analytical work was carried out at several of our laboratories.

When it comes to determining the age of the earth, another isotope dating method has achieved prominence. It is based on the determination of the amounts of certain stable lead isotopes—which have been formed by the decay of their long-lived uranium precursors and are called radiogenic lead isotopes—in comparison with the lead isotopes present at the time the solar system was created (called primordial lead). Because of the physical processes that occurred upon the cooling of the earth, it is not possible to obtain a good sample in the earth's crust of primordial lead essentially free of radiogenic lead; primordial lead would presumably be found in the earth's iron core, which is not accessible. Ingeniously, scientists theorized that most of the iron meteorites striking the earth are parts of the core of a disintegrated planet that was formed at the same time as the earth and that the lead isotopes present in these iron meteorites would be a very close approximation to the earth's primordial lead. Careful mass spectrometric analyses of the earth and meteorite lead samples, followed by some simple mathematics, indicate that the earth was created about 4.55 billion years ago. This figure has been confirmed in general by other procedures.

Thermoluminescence dating

Another time-measuring technique is the relatively new thermoluminescence method of dating ceramic materials. This technique dates the artifact itself rather than presumably associated materials that may or may not be closely contemporaneous. It depends largely on the uranium and thorium content in clays. Radiation from these elements bombards other substances in the clay and raises electrons to slightly