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Radiocarbon Dating

In the upper atmosphere, we have the conversion of ^{14}nitrogen, stable nitrogen, into ^{14}carbon which is an unstable isotope of carbon. That carbon circulates through the atmosphere, in carbon dioxide for the most part, and is taken in by organisms. Organisms at the earth's surface, when they take in carbon, they are taking in the normal form of carbon, the stable form, which is ^{12}carbon. They are also taking in ^{14}carbon, and they are also taking in another isotope, ^{13}carbon, which is relatively stable, too. So when we get a radiocarbon date, what we are trying to do is to convert the amount of ^{14}carbon that we can measure in a sample into a date.

So what's going on here? The ^{14}carbon is unstable, it's a radioactive isotope, and over time it decays back through beta emission, it changes back to ^{14}nitrogen and it's lost. To compute a radiocarbon date then, we have to compute the amount of ^{14}carbon that is present and compare it to the amount of ^{12}carbon and ^{13}carbon that are present in the sample and the ratio that we determine gives us an idea of how long it has taken for this ancient sample to change from the state that it had when it was alive. We take in ^{14}carbon of course during life; we are always taking in ^{14}carbon, so we maintain a fairly constant level of it in our body. As soon as we die, the ^{14}carbon starts to die, so the ratio between the ^{12}carbon, ^{13}carbon and ^{14}carbon is going to change. That's the basis for our date. So that's an absolute dating technique.