

FOR THE RECORD

Does
CARBON
DATING
disprove the
BIBLE?

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For particles-to-people evolution to have a speck of plausibility, Earth needs to be billions of years old. People who ask about carbon-14 (^{14}C) dating usually want to know about the radiometric¹ dating methods that give the millions and billions of years, whereas ^{14}C -dating can give only thousands of years. So anyone who claims that ^{14}C -dating proves billions of years doesn't know much about the subject. Many also wonder how millions of years could fit into the Bible's account of history.

However, schemes for grafting the millions of years into the Bible entail accepting huge ages for rock layers that contain fossils of animals that died violently, painfully or from disease—before any people appeared on the scene. But the Bible teaches that such bad things originated after Adam and Eve sinned—the reason Jesus came into the world (1 Corinthians 15:21–22).

Christians take the statements of Jesus Christ, who was there at Creation, seriously. He said, 'But from the beginning of the creation God made them male and female' (Mark 10:6). This makes sense with a time line beginning with the Creation Week thousands of years ago, but makes no sense at all if man appeared at the end of billions of years.

We will deal with carbon dating first and then with the other dating methods.

THE CARBON 'CLOCK'

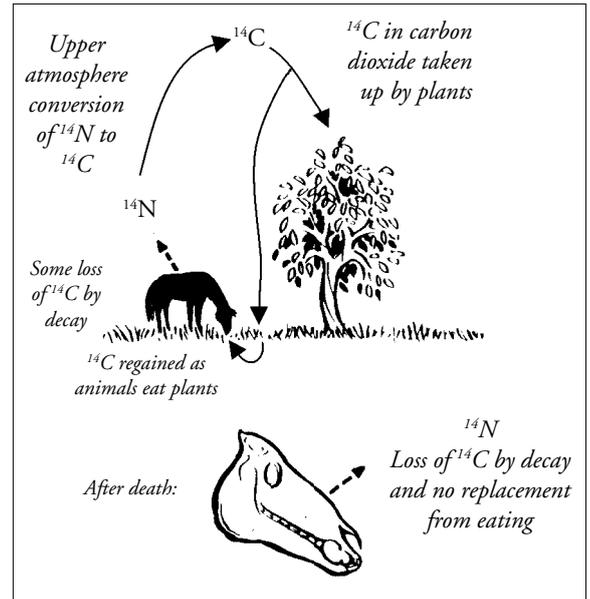
Familiar to us as soot and diamonds, carbon comes in several forms, or *isotopes*. One rare form has atoms that are 14 times as heavy as hydrogen atoms: carbon-14, or ^{14}C .

Carbon-14, or radiocarbon, is made when cosmic rays knock neutrons out of atomic nuclei in the upper atmosphere and these fast-moving neutrons hit nitrogen (^{14}N) at lower altitudes, converting it into ^{14}C . Unlike common carbon (^{12}C), ^{14}C is unstable and decays, changing back into nitrogen—that is, ^{14}C is radioactive.

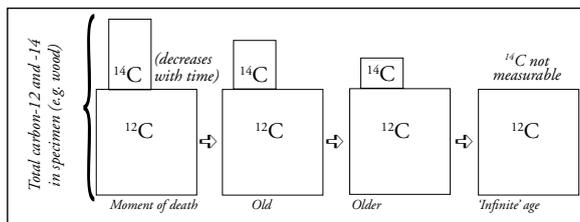
Ordinary carbon (^{12}C), as well as some ^{14}C , is found in the carbon dioxide in the air, which is taken up by plants and then cycles through animals, so that your body, or the leaf of a tree, or even a piece of wooden furniture, contains carbon.

If we measure how many ^{12}C atoms there are for every ^{14}C atom in a sample of air, this is called the $^{14}\text{C}/^{12}\text{C}$ ratio. Because ^{14}C is so well mixed up with the ^{12}C , we expect to find that this ratio is the same if we sample a leaf from a tree, or a part of your body.

^{14}C atoms are constantly changing back to ^{14}N , but living things are still exchanging carbon with their surroundings, so the $^{14}\text{C}/^{12}\text{C}$ ratio stays similar to the air. However, as soon as a plant or animal dies, the ^{14}C atoms that decay are no longer replaced, so the amount of ^{14}C starts decreasing. In other words, the $^{14}\text{C}/^{12}\text{C}$ ratio gets smaller. So, we have a 'clock' which starts 'ticking' the moment something dies (see diagram above).



^{14}C is gained by living things but lost after death.



After death, the amount of ^{12}C remains constant, but the amount of ^{14}C decreases.

Obviously, this works only for things that were once living—it cannot be used to date rocks, for example.

Half of the amount of ^{14}C will convert back to ^{14}N in 5,730 years. This is the 'half-life.' So, in two half-lives, or 11,460 years, only one quarter will be left. If the amount of ^{14}C relative to ^{12}C in a sample is one quarter of that in living organisms at present, then it has a theoretical age of 11,460 years. If anything were over about 50,000 years old, there should theoretically be no detectable ^{14}C left. That's why radiocarbon dating cannot give millions of years. In fact, if a sample contains ^{14}C , it is good evidence that it is *not* millions of years old.

But it's not so simple!

Firstly, plants discriminate against carbon dioxide containing ^{14}C . That is, they take up less than would be expected and so they look older than they really are. Different types of plants discriminate differently.²

Secondly, the $^{14}\text{C}/^{12}\text{C}$ ratio in the atmosphere has not been constant—for example, with the industrial revolution the ratio decreased with the burning of fossil fuels that released into the atmosphere a lot of carbon dioxide that was depleted in ^{14}C . This would make things that died at that time appear older in terms of carbon dating. Then there was a 90% rise in $^{14}\text{CO}_2$ with the advent of atmospheric testing

of atomic bombs in the 1950s.³ This would make things carbon-dated from that time appear younger than their true age.

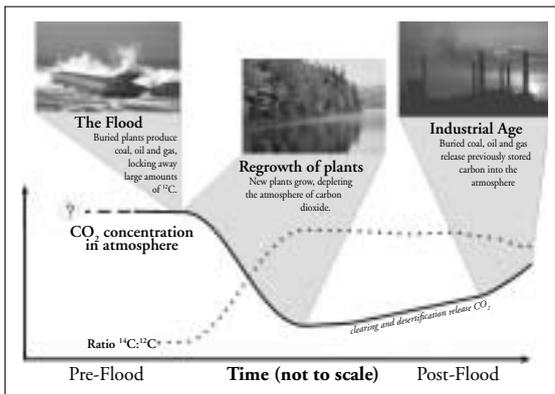
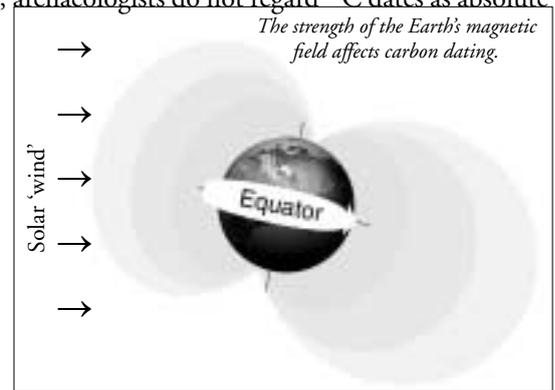
Measurement of ¹⁴C in historically dated objects (e.g. seeds in the graves of historically dated tombs) enables the determination of the level of ¹⁴C in that atmosphere at that time, and so partial calibration of the 'clock' is possible. Accordingly, carbon dating carefully applied to items from this period can be useful. However, even with such calibration, archaeologists do not regard ¹⁴C dates as absolute because of frequent anomalies. They rely more on other dating methods that link into historical records.

Outside the range of recorded history, calibration of the ¹⁴C 'clock' is impossible.⁴

Other factors affecting carbon dating

The amount of cosmic rays penetrating Earth's atmosphere affects the amount of ¹⁴C produced and therefore the dating system. The amount of cosmic rays varies with the sun's activity and passage through magnetic clouds as the solar system travels around the Milky Way galaxy.

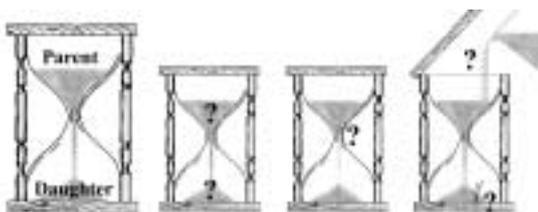
The strength of Earth's magnetic field also affects the amount of cosmic rays entering the atmosphere (with a stronger magnetic field, more cosmic rays are deflected away from Earth). Overall, the energy of Earth's magnetic field has been decreasing,⁵ so more ¹⁴C is being produced now than in the past. This will make old things look older than they really are.



The Bible (Genesis 6–9) tells of a cataclysmic global Flood some 4,500 years ago. Hundreds of different people groups around the world have their own stories of this great Flood. Such a flood would have greatly upset Earth's carbon balance, by locking up a lot of carbon in buried organic material, which became coal, oil and gas. Revegetation of Earth after the Flood would lower atmospheric carbon dioxide levels⁶ and thus *increase* the amount of ¹⁴C relative to ¹²C (¹⁴C comes from nitrogen, so the amount generated is unaffected by the level of carbon dioxide in the atmosphere).

Consequently, plants or animals from the pre-Flood world would have probably had very low amounts of ¹⁴C, maybe even too little to measure. Unless this was corrected for, carbon dating of fossils formed during the Flood would give 'dates' much older than the actual ages. Creationist researchers have suggested that dates of 35,000–45,000 years should be recalibrated to the Biblical date for the Flood.⁷ Such a recalibration makes sense of anomalous data from carbon dating—for example, very discordant

'dates' for different parts of a frozen musk ox carcass and an inordinately slow rate of accumulation of ground sloth dung pellets in the 'older' (¹⁴C dates) layers of a cave.⁷



The hourglasses represent radiometric dating. It is assumed that we know the amount of parent and daughter elements in the original sample, that the rate of decay is constant, and that no parent or daughter material has been added or removed.

decay chains, where both are present in the sample being dated. For example, potassium-40 decays to argon-40, uranium-238 decays to lead-206 via other elements like radium, etc. These techniques are applied to igneous (once-molten) rocks.

The isotope concentrations can be measured very accurately, but isotope concentrations are not dates. To derive ages from such techniques, unprovable assumptions have to be made (see hourglass diagram) such as:

- The starting conditions are known (for example, we know how much daughter product was present at the start).
- Decay rates have always been constant.
- No parent or daughter elements have been lost or added.

Patterns in the isotope data

Also, since volcanoes emit much CO₂ depleted in ¹⁴C, and the Flood was accompanied by much volcanism, this would also affect the dates, making fossils formed in the early post-Flood period appear older than they really are.

In summary, the carbon-14 method, when corrected for the effects of the Flood, can give useful results, but needs to be applied very carefully. It does not give dates of millions of years and fits well with the Biblical Flood when corrected properly.

OTHER RADIOMETRIC DATING METHODS

Other radiometric dating methods are often used to give results of millions or billions of years when applied to rocks. These techniques, unlike carbon dating, mostly use the relative concentrations of parent and daughter products in radioactive decay chains, where both are present in the sample being dated. For example, potassium-40 decays to argon-40, uranium-238 decays to lead-206 via other elements like radium, etc. These techniques are applied to igneous (once-molten) rocks.

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- The starting conditions are known (for example, we know how much daughter product was present at the start).
- Decay rates have always been constant.
- No parent or daughter elements have been lost or added.

Evidence abounds that the radioisotope dating systems are not the infallible techniques many think, and that they are not ‘measuring’ millions of years. However, there are still patterns to be explained. For example, deeper rocks do tend to give older ‘ages.’ Creationists agree that the deeper rocks are generally older, but not by millions of years. Geologist John Woodmorappe, in his devastating critique of radioactive dating,⁸ points out that there are other large-scale trends in the rocks that have nothing to do with radioactive decay.

‘Bad’ dates?

When a ‘date’ differs from that expected, researchers readily invent excuses for rejecting the date. This after-the-event reasoning shows that radiometric dating has serious problems. Woodmorappe cites hundreds of examples of excuses used to explain away ‘bad’ dates.⁸

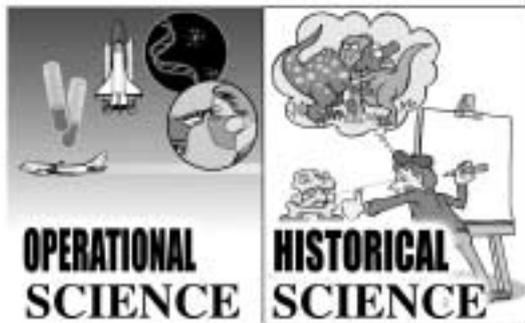
For example, researchers applied posterior reasoning to the dating of *Australopithecus ramidus* fossils.⁹ Most basalt samples closest to the fossil-bearing layers gave dates of about 23 Ma (*Mega annum*, million years) by the argon-argon method. The authors decided that was ‘too old,’ according to their beliefs about the place of the fossils in the evolutionary grand scheme of things. So they looked at some basalt further removed from the fossils and selected 17 of 26 samples to get an acceptable maximum age of 4.4 Ma. The other nine samples again gave much older dates, but the authors decided they must be contaminated and discarded them. That’s how radiometric dating works. It is very much driven by the pre-existing long-ages worldview that pervades academia today.

A similar story can be seen with the dating of the human skull known as KNM-ER 1470.^{10,11} An initial age of 212 to 230 Ma was, *according to the fossils*, considered way off the mark (humans ‘weren’t around then’). Various other attempts were made to date the rocks in the area. Over the years an age of 2.9 Ma was settled upon because of the agreement between several different studies (although the studies involved selection of ‘good’ from ‘bad’ results, as above).

However, preconceived notions about human evolution could not cope with a skull like 1470 being ‘that old.’ A study of pig fossils readily convinced most anthropologists that the human skull was much younger. After this was widely accepted, further studies of the rocks brought the ‘age’ down to about 1.9 Ma—again several studies confirmed *this* date. Such is the dating game.

Are we saying that evolutionists are being dishonest? No, it is just that all observations must fit the prevailing *paradigm*, or belief system. Molecules-to-man evolution over eons of time is so strongly entrenched it is not questioned—it is ‘fact.’ So every observation *must* fit this paradigm. Unconsciously, the researchers involved—‘objective scientists’ in the eyes of laymen—select the observations to fit the basic belief system.

Where’s my time machine?



Historical matters are not open to normal experimental testing.

The past is not open to normal experimental science; that is, repeatable experiments in the present. A scientist cannot do experiments on events that happened in the past. So scientists do not measure the age of rocks; they measure isotope concentrations. Isotope concentrations can be measured extremely accurately. However, the ‘age’ is calculated from the isotope concentrations using assumptions about the past that cannot be proven.

We should remember the admonition of God to Job, ‘Where were you when I laid the foundations of the earth?’ (Job 38:4).

Those researching the past gather information in the present and construct stories about the past. The level of proof demanded for such stories seems to be much less than for studies in the empirical sciences, such as physics, chemistry, molecular biology, physiology, etc.

Williams, an expert in the environmental fate of radioactive elements, identified 17 flaws in the isotope dating reported in just three widely cited papers that supposedly established the age of Earth at 4.6 billion years.¹² Woodmorappe has produced perhaps the most incisive critique of these dating methods.⁸ He exposes hundreds of myths that have grown up around the techniques. He shows how the few ‘good’ dates left after the ‘bad’ dates are filtered out could be explained as chance coincidences.

TESTING RADIOMETRIC DATING METHODS

If the long-age dating techniques were really objective means of finding the ages of rocks, they should work in situations where we know the age. Furthermore, different techniques should consistently agree with one another.

Methods should work on things of known age

There are many examples where the dating methods give dates that are wrong for rocks of known age. One example is potassium-argon dating of five lava flows from Mt Ngauruhoe in New Zealand. The ‘dates’ ranged from less than 0.27 to 3.5



Lava flows of known age often give wrong radioisotope dates.

Ma—but one lava flow occurred in 1949, three in 1954, and one in 1975.¹³

Again, using hindsight, it is argued that ‘excess’ argon from the molten rock was retained when it solidified. The secular scientific literature lists many examples of excess argon causing dates of millions of years in rocks of known age.¹⁴ This excess appears to have come from the upper mantle, below Earth’s crust. Interestingly, that the argon has not had enough time to escape suggests the world is much younger than many assume.¹⁵

If excess argon can cause exaggerated dates for rocks of *known* age, then why should we trust the method for rocks of *unknown* age?

Other techniques, such as the use of ‘isochrons,’¹⁶ make different assumptions about starting conditions, but there is a growing recognition that such ‘fool-proof’ techniques also give ‘bad’ dates.

Geologist Dr Steve Austin sampled basalt from the base of the Grand Canyon strata and from lava that spilled over the edge of the canyon.¹⁷ By evolutionary reckoning, the latter should be a billion years younger than the basalt from the bottom. Standard laboratories analyzed the isotopes. A standard isochron technique suggested that the recent lava flow was 270 Ma *older* than the basalts beneath the Grand Canyon—an impossibility.

Different radiometric dating methods derive different ‘ages’ for basaltic rocks that most geologists accept as only thousands of years old, from the Uinkaret Plateau of the Grand Canyon (Ma=millions of years).

Different techniques should agree

If the dating methods are an objective and reliable means of finding ages, they should agree *consistently*. If a chemist were measuring the sugar content of blood, all valid methods for the determination would give the same answer (within the limits of experimental error). However, with radiometric dating, the different techniques often give quite different results.

Method	‘Age’
Six potassium-argon model ages	10,000 years to 117 Ma
Five rubidium-strontium ages	1,270–1,390 Ma
Rubidium-strontium isochron	1,340 Ma
Lead-lead isochron	2,600 Ma

In the study of Grand Canyon rocks by Austin,¹⁷ different techniques gave different results. Four different techniques gave ages ranging from 10,000 years up to 2.6 billion years for the same rock. Again, all sorts of excuses could be suggested for the ‘bad’ dates. Techniques cannot be considered objective when the results can be dismissed just because they don’t agree with what we already believe.

In Australia, some wood found in basalt was clearly buried in the lava flow that formed the basalt, as seen from the charring. The wood was ‘dated’ by radiocarbon at 45,000 years old, but the basalt was ‘dated’ by the potassium-argon method at 45 Ma.¹⁸

Isotope ratios of uraninite crystals from the Koongarra uranium deposit in the Northern Territory of Australia gave lead-lead isochron ages of 841 ± 140 Ma.¹⁹ This contrasts with an age of 1,550–1,650 Ma based on other isotope ratios,²⁰ and ages of 275, 61, 0, 0 and 0 Ma derived from the thorium/lead ratios in five uraninite grains.¹⁹ The latter figures are significant because thorium-derived dates should be the more reliable, as thorium is less mobile than the uranium parents of the lead isotopes in the lead-lead system.¹⁹

SOMETHING IS WRONG

¹⁴C in fossils ‘millions of years old’

Carbon dating has given, in many cases, serious embarrassment to evolutionists by giving ages that are much younger than those expected in terms of their beliefs. A specimen older than 50,000 years should have too little ¹⁴C to measure.

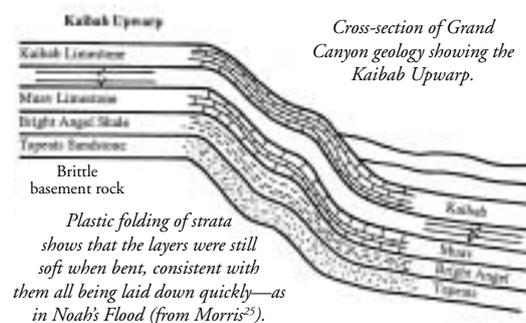
Radiocarbon labs would like a source of organic material with zero ¹⁴C to use as a blank to check that their lab procedures do not add ¹⁴C. Coal should provide such a blank, as the youngest coal is supposed to be millions of years old, with some of it hundreds of millions of years old. Such old coal should be devoid of ¹⁴C. It isn’t. Reports of coal without measurable ¹⁴C are rare. *No source of coal has been found that completely lacks ¹⁴C.*

Fossil wood found in rock ‘dated’ at 250 Ma still contained ¹⁴C.²¹ Recently, a sample of wood found in supposedly 230 Ma rock gave a ¹⁴C date of $33,720 \pm 430$ years.²² The checks done along with the dating showed that the ¹⁴C was not due to contamination and that the date was valid, within the criteria for this dating system.

It is an unsolved mystery to evolutionists as to why coal has ¹⁴C in it,²³ or why wood supposedly many millions of years old could be dated at all by the ¹⁴C method.²⁴ However, it makes perfect sense when we take the Bible account of Creation and the Flood as history.

The rocks are not that old

There is a wealth of evidence that the rock strata do not represent huge periods of time. For example, the huge Coconino sandstone formation in the Grand Canyon is over 300 ft (100 m) thick and extends to over 100,000 sq. miles (250,000 km²) in area. The large-scale cross-bedding (sand-dune structures) shows that it was all laid down in deep, fast-flowing water in a matter of days. Other rock layers in the Grand Canyon indicate that they were rapidly deposited also, and without substantial time-breaks between each unit. Indeed, the whole Grand Canyon sequence is



bent at the Kaibab Upwarp, in some spots quite radically, and without cracking. This indicates that the strata, which supposedly represent some 300 million years, were all still soft when the bending occurred. This is consistent with the layers being deposited quickly, during the Genesis Flood.¹⁷

Some other evidences for the non-existence of the eons of time and for the rapid formation of rock layers are:

- polystrate fossils—tree trunks, for example—running through strata supposedly representing many millions of years (these are common in coal) show that the strata must have been deposited in quick succession, otherwise the tops of the trunks would have rotted away;
- delicate surface features on underlying rock units—such as preserved ripple marks and footprints—indicate that there was no long time gap before the next unit was deposited;
- lack of fossilized soil layers in the rock strata indicates no long time gaps;
- lack of erosion features in the rock layers or between the rock units (any significant time break would result in channels formed in the exposed strata from the action of wind or water);
- limited extent of clear breaks in deposition (unconformities). Because no break is indicated in rocks of the same strata elsewhere, this shows that any time break was localized and brief;
- clastic dykes and pipes—where a sand/water mixture has squeezed up through overlying layers from underlying sand that has obviously not had time to harden, but is supposed to be millions of years older than the overlying layers;

For more, see books by geologists Morris²⁵ and Austin.¹⁷

Uluru (Ayers Rock), in central Australia, is also supposed to have formed slowly over hundreds of millions of years, but the structure of the rock shows that it must have formed very quickly, and a major mineral (feldspar) could not have lasted that long.²⁶

‘Living fossils’ also challenge the supposed hundreds of millions of years of ‘Earth history.’ For example, fossils of starfish, jellyfish, brachiopods, clams and snails, dated by evolutionists as 530 million years old, look just like those living today.

Red blood cells and hemoglobin have been found in dinosaur bone. But these could not last more than a few thousand years—certainly not the 65 Ma since the last dinosaurs died, according to evolutionists.²⁷

Thousands not millions?

There are many indications that Earth is much younger than commonly claimed:

- Earth’s magnetic field has been decaying so fast that it looks like it is less than 10,000 years old. Rapid reversals during the Flood year and fluctuations shortly after would have caused the field energy to drop even faster.^{28,29}
- Radioactive decay releases helium into the atmosphere, but not much is escaping. The total amount in the atmosphere is only 1/2000 of that expected if the atmosphere were really billions of years old. This helium originally escaped from rocks. This happens quite fast, yet so much helium is still in some rocks that it has not had time to escape—certainly not billions of years.^{30,31}
- A supernova is an explosion of a massive star—the explosion is so bright that it briefly outshines the rest of the galaxy. The supernova remnants (SNRs) should keep expanding for hundreds of thousands of years, according to the physical equations. Yet there are no very old, widely expanded (Stage 3) SNRs, and few moderately old (Stage 2) ones in our galaxy, the Milky Way, or in its satellite galaxies, the Magellanic Clouds. This is just what we would expect if these galaxies had not existed long enough for wide expansion.^{32,33}
- The moon is slowly receding from Earth at about 1½ in (4 cm) per year, and this rate would have been greater in the past. But even if the moon had started receding from being in *contact* with Earth, it would have taken only 1.37 billion years to reach its present distance from Earth. This gives a *maximum* age of the moon, not the actual age. This is far too young for evolutionists, who claim the moon is 4.6 billion years old. It is also much younger than the radiometric ‘dates’ assigned to moon rocks.^{34,35}
- Salt is pouring into the sea much faster than it is escaping. The sea is not nearly salty enough for this to have been happening for billions of years. Even granting generous assumptions to evolutionists, the seas could be *no more than* 62 Ma old—far younger than the billions of years claimed.^{36,37}

Creationists cannot prove the age of Earth using a particular scientific method, any more than evolutionists can. All science is tentative because we do not have all the data, especially when dealing with the past. This is true of both creationist and evolutionist scientific arguments—evolutionists have had to abandon many ‘proofs’ for evolution just as creationists have also had to modify their arguments.

Creationists understand the limitations of dating methods better than evolutionists who claim that they can use processes observed in the present to ‘prove’ that Earth is billions of years old. In reality, all dating methods, including those that point to a young Earth, rely on unprovable assumptions.

Creationists ultimately date the Earth using the chronology of the Bible. This is because they believe that it is an accurate eyewitness

account of history, which bears the evidence within it that it is the Word of God.

WHAT THEN DO THE DATA MEAN?

What then do the radiometric ‘dates’ of millions of years mean, if they are not true ages? In other words, what processes are producing the isotope ratios, since radioactive decay over time is an inadequate explanation? To answer this question, it is necessary to look carefully at the results from the various dating techniques, the interpretations made on the basis of the results and the assumptions underlying those interpretations.³⁸

The isochron dating technique¹⁶ was claimed to be infallible because it supposedly covered the assumptions about starting conditions and closed systems. This claim is not correct.

Geologist Dr Andrew Snelling worked on ‘dating’ the Koongarra uranium deposits in the Northern Territory of Australia, primarily using the uranium-thorium-lead (U-Th-Pb) method. He found that even highly weathered soil samples from the area, which are definitely not closed systems, gave apparently valid ‘isochron’ lines with ‘ages’ of up to 1,445 Ma.

Such ‘false isochrons’ are so common that a whole terminology has grown up to describe them, such as apparent isochron, mantle isochron, pseudoisochron, secondary isochron, inherited isochron, erupted isochron, mixing line and mixing isochron. Zheng wrote:

‘... some of the basic assumptions of the conventional Rb-Sr [rubidium-strontium] isochron method have to be modified and an observed isochron does not certainly define valid age information for a geological system, even if a goodness of fit of the experimental results is obtained in plotting $^{87}\text{Sr}/^{86}\text{Sr}$ against $^{87}\text{Rb}/^{86}\text{Sr}$. This problem cannot be overlooked, especially in evaluating the numerical time scale. Similar questions can also arise in applying Sm-Nd [samarium-neodymium] and U-Pb [uranium-lead] isochron methods.’³⁹

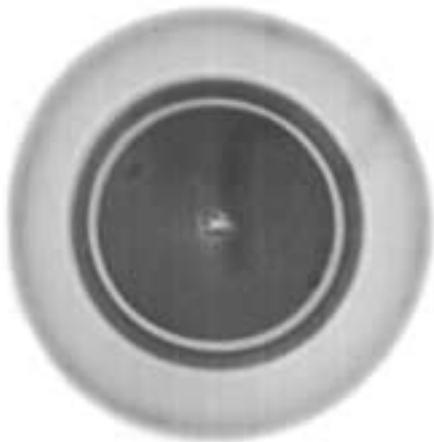
Straight lines can be obtained from graphs of ratios of non-radioactive elements also, showing that radioactive decay is not necessarily the cause of such relationships. Clearly, there are factors other than age responsible for the straight lines obtained from graphing isotope ratios. Again, the only way of knowing if an isochron is ‘good’ is by comparing the result with what is already believed.

Another currently popular dating method is the uranium-lead concordia technique. This effectively combines the two uranium-lead decay series into one diagram. Results that lie on the curve have the same age according to the two lead series and are called ‘concordant.’ However, the results from zircons, for example, generally lie off the concordia curve—they are discordant. Numerous stories have been thought up to explain such data.⁴⁰ However, such exercises in story-telling can hardly be considered as objective science that proves an old Earth, because again the stories are evaluated according to their success in agreeing with the existing long-ages belief system.

Snelling has suggested that fractionation (sorting) of elements in the molten state in Earth’s mantle could be a significant factor in explaining the ratios of isotope concentrations, which are interpreted as ages.

As long ago as 1966, Nobel Prize nominee Melvin Cook, Professor of Metallurgy at the University of Utah, presented evidence that lead isotope ratios, for example, may involve alteration by important factors other than radioactive decay.⁴¹ Cook noted that, in ores from the Katanga mine, for example, there was an abundance of lead-208, a stable isotope, but no thorium-232 as a source of lead-208. Thorium has a long half-life (decays very slowly) and is not easily moved out of the rock, so if the lead-208 came from thorium decay, some thorium should still be there. The concentrations of lead-206, lead-207 and lead-208 suggest that the lead-208 came about by neutron capture conversion of lead-206 to lead-207 to lead-208. When the isotope concentrations are adjusted for such conversions, the ages calculated are reduced from some 600 Ma to recent. Other ore bodies seemed to show similar evidence. Cook recognized that the current understanding of nuclear physics did not seem to allow for such a conversion under normal conditions, but he presents evidence that such did happen, and even suggests how it could happen.

‘Orphan’ radiohalos



A concentric series of radiohalos. Photo by Robert Gentry

Decaying radioactive particles in solid rock cause spherical rings of damage to the surrounding crystal structure. A speck of radioactive element, such as uranium-238, for example, will leave a discolored spherical ring of a characteristically different radius for each element it produces in its decay chain to lead-206.⁴² These rings, called radiohalos, can be seen with a microscope. Geophysicist Dr Robert Gentry has done many years of research on radiohalos, with many papers published in leading scientific journals.⁴³

Where all possible rings are present, it is called a ‘mature’ radiohalo. Some of the intermediate decay products—such as the polonium isotopes—have very short half-lives (i.e. they decay quickly). For example, ^{218}Po has a half-life of just 3 minutes. Curiously, rings created by polonium decay are often found embedded in crystals without the parent uranium halos. Now the polonium has to get into the rock before the rock solidifies, but it cannot derive from a uranium speck in the solid rock—otherwise, there would be a uranium halo, assuming uranium decayed slowly, as it does today. Either the polonium was created, or it is primordial (not derived from uranium), or there have been radical changes in decay rates in the past.

Whatever process was responsible for the halos could also be a key also to understanding radiometric dating.⁴⁴

Anomalies in deep rock crystals

Gentry also pointed out that the amount of helium and lead retained in zircons from deep bores is not consistent with an evolutionary age of 1,500 Ma for the granite rocks in which they are found.⁴³ The *amount* of lead may be consistent with current rates of decay over millions of years, but it would have diffused out of the crystals in that time.

The amount of helium in zircons from hot rock is also much more consistent with a young Earth.

The lead and helium results suggest that rates of radioactive decay may have been much higher in the recent past. We have measured decay rates for only about 100 years, so we can't be sure they would have been constant over the alleged billions of years. Recent laboratory research has demonstrated that the beta decay rate was sped up a *billion times* when atoms were stripped of their electrons.⁴⁵ Nuclear physicists Drs Eugene Chaffin and Russell Humphreys suggest that nuclear decay rates were highly accelerated during Creation Week and possibly during the Flood year. They support this theoretically by applying quantum mechanics and the effect of the universe's expansion, and evidentially by the amount of helium still retained in minerals, and by mature uranium radiohalos and their lack in 'Phanerozoic' strata (rocks with abundant fossils).⁴⁶

This would make things look much older than they really are when current rates of decay are applied to dating. Whatever caused such elevated rates of decay may also have been responsible for the lead isotope conversions noted by Cook (above).

CONCLUSIONS

Creationists ultimately date Creation using the chronology of the Bible. They do this because they believe that the Bible gives an accurate eyewitness account of world history. And this history is consistent with much data. It is important to understand that no scientific method exists for measuring the age of something directly. *All* dating systems rest on unprovable assumptions. The evidence suggests there is something radically wrong with the assumptions upon which radiometric dating rests. We don't have all the answers, but we do have the sure testimony of the Word of God to the true history of the world.

HERE'S THE GOOD NEWS

Answers in Genesis seeks to give glory and honor to God as Creator, and to affirm the truth of the Biblical record of the real origin and history of the world and mankind.

Part of this real history is the bad news that the rebellion of the first man, Adam, against God's command brought death, suffering and separation from God into this world. We see the results all around us. All of Adam's descendants are sinful from conception (Psalm 51:5) and have themselves entered into this rebellion (sin). They therefore cannot live with a holy God, but are condemned to separation from God. The Bible says that 'all have sinned, and come short of the glory of God' (Romans 3:23) and that all are therefore subject to 'everlasting destruction from the presence of the Lord and from the glory of His power' (2 Thessalonians 1:9).

But the good news is that God has done something about it. 'For God so loved the world, that He gave his only-begotten Son, that whoever believes in Him should not perish, but have everlasting life' (John 3:16).

Jesus Christ the Creator, though totally sinless, suffered, on behalf of mankind, the penalty of mankind's sin, which is death and separation from God. He did this to satisfy the righteous demands of the holiness and justice of God, His Father. Jesus was the perfect sacrifice; He died on a cross, but on the third day, He rose again, conquering death, so that all who truly believe in Him, repent of their sin and trust in Him (rather than their own merit), are able to come back to God and live for eternity with their Creator.

Therefore: 'He who believes on Him is not condemned, but he who does not believe is condemned already, because he has not believed in the name of the only-begotten Son of God' (John 3:18).

What a wonderful Savior—and what a wonderful salvation in Christ our Creator!

(If you want to know more of what the Bible says about how *you* can receive eternal life, please write or call the *Answers in Genesis* office nearest you—see inside front cover.)

1. Also known as isotope or radioisotope dating.
2. Today, a stable carbon isotope, ^{13}C , is measured as an indication of the level of discrimination against ^{14}C .
3. Radiation from atomic testing, like cosmic rays, causes the conversion of ^{14}N to ^{14}C .
4. Tree ring dating (dendrochronology) has been used in an attempt to extend the calibration of carbon-14 dating earlier than historical records allow, but this depends on temporal placement of fragments of wood (from long-dead trees) using carbon-14 dating, assuming straight-line extrapolation backwards. Then cross-matching of ring patterns is used to calibrate the carbon 'clock'—a somewhat circular process which does not give an independent calibration of the carbon dating system.
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16. The isochron technique involves collecting various rock samples from different parts of the rock system being dated. The concentration of a parent radioactive isotope, such as rubidium-87, is graphed against the concentration of a daughter isotope, such as strontium-87, for all the samples. A line is drawn through these points, representing the ratio of the parent:daughter, from which a 'date' is calculated. If it is a straight line of good fit, it is considered a 'good' date. A further refinement involves dividing both the parent and daughter concentrations by the concentration of a similar stable isotope—in this case, strontium-86.
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