

Thousands...Not Billions – Book Review
Review By Greg Neyman
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The book *Thousands...Not Billions*, is published by Master Books, and is written by Dr. Don DeYoung. The edition being reviewed is a paperback, copyright 2005, first printing August 2005, ISBN Number 0-89051-441-0.

The purpose of this book is to provide a layman's resource for the research that was done by the Radioisotopes and the Age of the Earth group, or R.A.T.E., which hereafter will be referred to as RATE.

With the conclusion of the RATE study, young earth creationist organizations are expediting their propaganda machine in order to promote the apparent discoveries of the RATE group. Evidence of this is the ministry [Creation Ministries International](#), and their "Thousands...not Billions" [tour](#), with speaking engagements all over Australia by the author.

Preface

The author starts by stating the scientifically accepted ages for the universe and the earth, with the intent of instilling a negative reaction from the young earth reader. He refers to the billions of years of the universe as "deep time," and says that this deep time is a major portion of evolution.

On the second page, he claims that "Evolutionary models for life, earth, and space are questioned today by a significant group of scientists worldwide." While it is true that some scientists believe in this "young earth" interpretation, one can hardly characterize this group as a "significant group." If this were a significant group, then there would be serious challenges within mainstream scientific circles. They are only "significant" in their own eyes.

DeYoung goes right into another misconception in the minds of young earth creationists. He says that besides scientists, there are others who are interested in earth history. He says "This refers to all of us who hold a biblical world view. That is, we accept the Bible as the uniquely inspired book given to humanity by the Creator." DeYoung is no doubt referring to young earth creationists, but he fails to realize that this statement also applies to old earth creationists. Granted, not all old earth creationists are conservative, but many are, and they can agree completely with DeYoung's words. Often, young earth creationists think they have the market when it comes to holding a biblical world view, but they do not.

DeYoung says that a straightforward reading of Scripture indicates a young earth. I agree. This is the "grandmother hypothesis." A grandmother, in her rocking chair, reading her Bible, would see the days as 24-hour days. However, a scientist, versed in big bang theory, can look at the same Bible, and see vast ages. Thus, the Bible can be interpreted differently, without changing the main theme of the Bible (salvation in Jesus Christ).

Despite the fact that old earth creationism violates no rules of Scripture interpretation, young earth creationists, including DeYoung, refuse to recognize the validity of old earth creationism. He says that adding billions of years is "neither satisfactory nor convincing." From the young earth perspective, these words ring true, however, millions of old earth creationists are satisfied, and are convinced of the old age of the earth, and that God created it. It is not a matter of old earth creationism being anti-biblical...it is a matter of it being anti-young earth.

DeYoung goes on to say that "many practical and profound implications follow from one's view of the earth's age." He gives a reference to a Henry Morris book, but gives no examples. However, old earth creationism changes none of the doctrines of the church. One still needs salvation in Jesus Christ, just as in the young earth belief system. Nothing is changed, other than a matter of time.

DeYoung says that this book will open a window to show how false and misleading the old earth viewpoint is. If the thousands of articles on this website is any indication, DeYoung will fail to open this window...we nailed it shut!

The author gives one final comparison in the close of the preface. He says based on a 25-year generation, a world of 6,000 years has just 240 generations, but a world of 4.6 billion years has 184 million generations. However, no old earth creationist claims that there has been 184 million generations. Mankind, from the time of Adam, has been around for 50,000 years at most, or 2,000 generations. There is a large difference between 2,000 and 184 million. DeYoung resorts to deceptive tactics before he even starts the first chapter!

Introduction to RATE

DeYoung begins this section with a story of a group of geologists who meet in 2003 to discuss the geologic time scale. They decide to create three laboratories to aid in the identification of dated rock layers...a very noble, worthwhile project deserving of much funding in my opinion. DeYoung mentions this merely to contrast it with the formation of the RATE group six years earlier. DeYoung says the goal of the groups were similar, although they are separated by billions of years.

The RATE scientists (if you can call them scientists...see Creation Scientist? for more) included two geologists, Steven Austin and Andrew Snelling, geophysicist John Baumgardner, three physicists, Eugene Chaffin, Don DeYoung, and Russell Humphreys, and one meteorologist, Larry Vardiman, who served as the chairman of the group.

DeYoung explains that several lines of research was explored over the eight year period of RATE. He explains that two books explain all of the

RATE research, but this book provides the results with a minimum of technical terms. Since this book is the one that the common young earth creationist is likely to read, this book is the one that needs a rebuttal. Although the final technical RATE book is available to anyone, hardly nobody will read it, aside from other young earth creation scientists.

This book is divided by topic, with DeYoung telling about the various topics by summarizing the research of the people involved in that topic. He begins with a general history of radiation studies in Chapter 1, and proceeds into individual topics from there on out, before providing a conclusion in Chapter 11.

Chapter 1

A Brief History of Radiation Studies

In this introductory chapter, DeYoung gives a brief history of the discovery of radiation, some background information on atoms and what causes radiation, and the varieties of radiation (alpha, beta, and gamma radiation). After explaining this, DeYoung explains the concept of half-life and gives some analogies for nuclear decay.

Overall, DeYoung presents a good summary which needs few comments. If you wish, you may read about these processes he explains in the links below.

[Radioactive Decay](http://en.wikipedia.org/wiki/Radioactivity) (Wikipedia) (<http://en.wikipedia.org/wiki/Radioactivity>)

[Marie Curie](http://en.wikipedia.org/wiki/Maria_Sklodowska-Curie) (Wikipedia) (http://en.wikipedia.org/wiki/Maria_Sklodowska-Curie)

Chapter 2

Overview of Radioisotope Dating

DeYoung uses this chapter of the book to give a brief introduction to the process of radioisotope dating. For the most part, his explanations are satisfactory. Instead of criticizing the methods here, he will do that in future chapters.

Rather than give detailed descriptions here, I'll provide links to various resources so that the reader may become familiar with the processes.

DeYoung first talks about the first suggested use of [radiometric dating](#) in 1905. The first process he mentions is [Potassium-Argon](#). This method is one of the most widely-used methods, due to the abundance of potassium in rock samples.

Next DeYoung mentions the use of [Isochron Dating](#), which introduces some checks and balances into the equation, and allows for factoring in changes in the parent-daughter isotope ratio over the life of the rock.

Two other types are briefly explained. One is the [Argon-Argon](#) method, and the other is the Lead-Lead Isochron (or, more appropriately, Uranium-Lead. See [Isochron Dating](#)).

He leaves several methods in the table on page 40 without discussing them, although some will come up later in great detail. These are:

[Carbon Dating](#)

[Rubidium-Strontium Dating](#)

[Samarium-Neodymium Dating](#)

Lutetium-Hafnium Dating

Rhenium-Osmium Dating

He apparently neglects to mention some other methods. Later on in the book, he does discuss [Fission-Track Dating](#). However, there is no indication at all that he addresses another popular dating method, [Optically Stimulated Luminescence Dating](#).

He concludes this chapter with a short discussion on radioisotope dating assumptions. The three assumptions are:

1. The initial conditions of the sample are known (there is no daughter isotope in the initial sample, or that a known quantity of daughter isotope is present)
2. We can tell if the rock has exchanged atoms with its surroundings (i.e. what level of contamination is present)
3. The half-life of the isotope has remained constant since the rock has formed

DeYoung claims that the RATE team has found numerous examples where the first two assumptions fail. Of the third assumption, he says this is the most damaging, as the RATE team has found multiple lines of evidence that the decay rates were much higher in the past. These claims will be addressed in the appropriate chapters of this review.

Chapter 3

Carbon-14 Dating

In this chapter, DeYoung summarizes the research done by John Baumgardner into radiocarbon dating.

HOW THE METHOD WORKS

DeYoung starts out with an explanation of how carbon dating works. One can get a similar explanation on the web by reading [Carbon Dating](#) from the Wikipedia website. Briefly, normal carbon is carbon-12 (^{12}C). In the upper atmosphere, carbon-14 (^{14}C) is formed when cosmic rays hit nitrogen-14 atoms. These ^{14}C atoms are incorporated, along with normal carbon atoms, into the cellulose structure of plants and trees, and they also enter into the tissues of animals.

When a plant or animal dies, no more carbon is added. ^{14}C has a half-life, or rate of decay, of 5,730 years. After this amount of time, half the original ^{14}C has decayed into ^{14}N . Therefore, one can check the ratio of ^{14}C to ^{12}C in the dead sample, and using the half-life, one can determine the age of the sample, or, the age at which it stopped incorporating new carbon into its cells.

A NOTED CARBON-14 RESULT

DeYoung notes that this method can be used in support of biblical ideas. He gives the example of the Dead Sea Scrolls, the linen wrappings of which were dated to between 150 B.C. and 70 A.D. Thus, his noted carbon-14 result is that ^{14}C dating supports the Bible.

THE PERVASIVENESS OF CARBON-14

He notes that for ancient rock layers, given the half-life of ^{14}C , all detectable amounts of ^{14}C should have decayed long ago, and should not be detectable. He claims that material older than 100,000 years should

be "carbon-14 dead." When dealing with ^{14}C produced in the atmosphere, he is correct. However, not all ^{14}C is produced by the bombardment of cosmic rays upon our air. He will deal with some of these other methods of ^{14}C production later in this chapter, but he does not deal with all of them.

He notes that "In recent years, readily detectable amounts of carbon-14 have been the rule rather than the exception." Is this claim true? I could find no evidence of it, until I considered the source of the claim. He is, of course, referring to young earth scientists who tested material that contains ^{14}C . While it may be true that a majority of rock layers contain ^{14}C , there are numerous ones that are truly "carbon-14 dead." Based on his explanation, as you will see, any dead layers invalidate his conclusion at the end of this chapter.

DeYoung lists several young earth people who have studied, and identified, ancient rocks in the literature with detectable amounts of ^{14}C . I agree that samples can be found which are not dead, however, in highlighting these samples and trumpeting them to their followers, they ignore the other samples which are dead. For some reason, you don't hear about these, because in the end, these would invalidate their conclusion, as you will see. Therefore, the young earth scientists "found exactly what they wanted to find."

DeYoung goes on to explain the carbon dating technique using accelerator mass spectrometry, or AMS. This method can detect much lower levels of ^{14}C than the method used prior to the 1970s. Currently, the limit for age dating is around 62,000 years. In the near future, scientists hope to have this extended out to around 180,000 years.

Finally, the author mentions a possible problem in the use of calibration standards. Background radiation is measured first, using materials that are thought to contain no ^{14}C . DeYoung claims that since virtually all material contains ^{14}C (a false claim, as even some coal deposits are carbon-dead), this background reading is false. He lists Precambrian graphite, purified natural gas, and optical grade calcite.

However, background radiation, even if the samples contain minute amounts of ^{14}C , would not influence the ages much. And, since these samples are tested, they can be compared to other carbon-dead samples, and if they give too high a reading, they are known not to be carbon-dead. In other words, when a new calibration standard is used, the scientists will know that it is not truly dead if it gives too high a reading, and thus the calibration material would be tossed out.

RATE CARBON-14 RESEARCH ON COAL

Coal is probably the most-used argument in young earth circles. DeYoung begins his discussion with stating that much of the coal deposits are Pennsylvanian in age, or approximately 300 million years old. Of course, he is stating this to claim that the coal should be carbon dead. The RATE group obtained ten samples of coal, taking care to make sure that there was no or little chance of contamination, and sent these samples to laboratories for AMS analysis. The results showed that all ten samples had detectable amounts of ^{14}C .

DeYoung will address possible old earth explanations for this ^{14}C in a later section, and I'll provide the rebuttal there.

RATE CARBON-14 RESEARCH ON DIAMONDS

DeYoung gives a brief explanation of the standard geologic setting for diamond formation and delivery to the surface. The RATE group had 12 diamond samples tested for ^{14}C , with detectable amounts showing up in all samples, at a rate of about 1/3 that of the coal.

ATTEMPTS TO EXPLAIN TRACES OF CARBON-14

This section is the most critical to the old earth creationist. DeYoung tries to explain away the old earth explanations of how these traces of Carbon-14 got into the coal and diamonds. He asks "Is there any way that new carbon-14 atoms could possibly enter and contaminate

materials which are truly ancient?" A good question, but this is the wrong question.

First, he says some have proposed that earth's atmosphere or moving groundwater supplies new ^{14}C to the ancient materials. He says this would have to be a constant process, with new ^{14}C being delivered constantly. The material would have to be replaced over and over over millions of years. To argue against this, he says the extreme variety in thickness, depth, and porosity of the rock layers would lead to great variation of ^{14}C levels, but this is not what is found. All ^{14}C levels are fairly uniform. This is only true to a point. They are uniform where they are found, but ^{14}C is not found in every rock layer, nor in every fossil fuel. Some fossil fuels are rich in ^{14}C , while others are dead. Believers in this hypothesis have nothing to worry about from DeYoung's argument.

A second proposal is that nuclear reactions from outside neutrons enter the samples and convert either nitrogen-14 or carbon-13 directly into carbon-14. He admits that this occurs, but he claims that the "resulting C-14 amounts are several thousand times less than the range actually measured." Since DeYoung gives limited information, we have no way of verifying RATE's calculations on this matter.

The final explanation he addresses is that radioactive decay of heavy isotopes within the coal/diamond, such as uranium, create new carbon-14. He explains this away by claiming that the amount produced is 100,000 times smaller than that observed in the coal samples. Without viewing RATE's calculations, there is no way to verify their claim.

Herein lies the problem with the young earth culture. Young earth creationists, who read this book, will accept the words of DeYoung as absolute truth. It does not matter that the calculations may be wrong, or may have missed some key element. DeYoung, and most creationist researchers, understand this about their culture, and use this "trust" in the fullest extent possible.

However, I must point out that DeYoung only addressed three possibilities, when in fact there are more. One of the most exciting research projects now being done examines the input of new ^{14}C from sulfur bacteria, which commonly grows in coal even at great depths. The scientists involved in this, and research into the third argument above, believes both contribute to the ^{14}C levels.

One must also realize that the threshold being detected by young earth creationists is very, very small. It would not take much ^{14}C to attain this level, even in coal. When you consider that coal is 70 percent carbon, and diamond is nearly 100 percent carbon (except for impurities), the statistical number of carbon atoms you are dealing with greatly favors there being ^{14}C even in ancient samples.

It is interesting to note that the young earth arguments are not attacking the carbon dating method itself...they are attacking ancient samples that give carbon readings. The method itself is not under attack...yet (that comes in the next section).

So how do we defeat the young earth arguments? They seem unwilling to accept the possibility of any contamination of ^{14}C by any outside sources. Of interest to defeating the young earth arguments is the diamonds. If you will recall, the source of ^{14}C is from the upper atmosphere. However, with diamonds, which are produced at great depths, we are not concerned at all with atmospheric ^{14}C . The ^{14}C in diamonds has to be produced during or after the diamond is made, most likely by radiation. Given that diamonds are nearly 100 percent carbon, the chance for radiation from uranium or other heavy metals to produce ^{14}C is greatly increased.

If you fire a bullet at a target that is 1 inch in size and 100 feet away, the chances of it hitting are slim. However, with 100 percent of the target being carbon, its like standing on the ground and firing a bullet at the ground. You can't miss the target. Even the smallest amount of radiation could account for these miniscule readings of ^{14}C in coal and diamonds.

The same applies to cosmic rays. Although they are greatly filtered out by our atmosphere, cosmic rays would still hit a coal sample when it is exposed to light. Given that coal is 70 percent carbon, the chances that even brief exposure to light could cause ^{14}C conversions, although slight, is present. Remember, we are not talking about great amounts of ^{14}C ...we are only talking about detectable amounts, and AMS can detect very small amounts since it actually counts the ^{14}C atoms.

This cosmic ray contamination is seen in the samples that DeYoung shows in Table 3-3 on page 57. Notice that the first five samples are all mine samples, with very low levels of ^{14}C . The other seven samples average much higher, in one case 10-15 times the ^{14}C of the mine samples. These samples come from placer deposits. Placer deposits are diamonds that were found in streams, after the earth's erosional forces eroded them and transported them in the streams. In other words, they have been exposed to sunlight for a while. DeYoung has actually provided evidence that cosmic rays at the earth's surface can cause ^{14}C .

Due to the structure of diamonds, this ^{14}C could not be from groundwater contamination...unless the samples were not cleaned prior to examination. However, DeYoung states that they were "rigorously and carefully cleaned." In theory, therefore, one would have to extract the sample to be dated in complete darkness, and keep it in such an environment until it was dated. I don't know if artificial light sources such as light bulbs would cause this effect as well, so that is also something to consider.

Although we don't have enough research on the sources of ^{14}C in coal and diamonds, there is enough evidence to give plausible reasons for its existence. The young earth criticisms do not provide any problems at all for an old earth interpretation.

INTERPRETATION OF THE CARBON-14 DATA

In this and the next section, DeYoung gives his young earth explanation of how to interpret the data. This section proposes that the worldwide flood of Noah would have a great impact upon carbon dating.

I agree that such a flood would have an impact, however, there is a problem...there is no geologic evidence of such a flood. DeYoung presents this with the assumption that there was a [flood](#), but this website and others has shown this to be a fallacy. He claims the biomass was distributed uniformly throughout the earth's rock layers. However, some fossil fuels/layers have no detectable ^{14}C . He goes on to claim that the rock layers corresponding to the Paleozoic, Mesozoic, and Cenozoic, or all the rock layers from 543 million years ago to the present, are thought to be flood deposits. However, this does not work when you examine the [stratigraphy](#) of the rocks. Other young earth claims have been based on this, such as the one in the book [Grand Canyon: Monument to Catastrophe](#), but they fail when you examine them.

Of even more significance is this claim..."the ratio of carbon-14 to total carbon was almost certainly less during pre-Flood times than it is today." We actually know what the levels were throughout history, by studying several sources that preserve the history of the carbon levels. In fact, we have the known carbon levels over the last 45,000 years. If there was such a flood only 4,300 years ago as young earth creationists claim, it would show up in these calibration charts. If you examine the charts, there is no indication of vastly different carbon levels from 4,300 years ago. To be sure of this, look at the [calibration charts](#) yourself. There is no indication of any significant event over the last 20,000+ years that greatly altered the carbon ratios. (These charts only go back a little over 20,000 years, but other charts go back as far as 45,000 years.)

DeYoung then suggests that the earth's magnetic field may have been stronger in the pre-Flood period. We know from geomagnetic studies that the [field has fluctuated](#) over earth's history...sometimes it is stronger, sometimes weaker. There is no data to support a claim that the

field was greatly stronger only 4,500 years ago. In fact, the geomagnetic record goes back many millions of years.

The final argument in this section is that since the earth is only 6,000 years old, some of the carbon-14 may be primordial, or existing from the moment of creation. Since we know the earth is not 6,000 years old, this argument has no teeth.

ACCELERATED NUCLEAR DECAY

The final proposal by the RATE group is that the constant rates of radioactive decay may not have been constant in the past. If you accelerate these decay rates, and squeeze them into the last six thousand years, or, into the creation week, you can account for the presence of carbon-14, and other issues as well in the following chapters.

I have addressed this claim on this website before, [in this article](#). However, one key point needs to be highlighted. Old earth creationists love this argument, because it rebuts itself. It is seen elsewhere with the originator of this theory, young earth creationist Russell Humphreys, and his helium arguments (the subject of the next chapter). Unfortunately, when you cram all that radiation into the creation week, you vaporize the earth. Condensing 4.5 billion years worth of radiation into a short amount of time also condenses 4.5 billion years worth of heat into this same time frame. Humphreys is aware of this problem of heat, but he admits he is unable to provide an answer. In short, the accelerated decay theory could be called the "vaporized earth theory." Since we are here discussing this issue, then the theory must be wrong.

FURTHER STUDY

In parting, DeYoung mentions one more possibility for further research. Beryllium-10, with a half-life of 1.52 million years, could provide some good data. If young earth creationists ever decide to go this route, we will be there to examine it and report the truth to you.

Sources

[Carbon-14 Dating](#)

[Radiocarbon](#) – An International Journal of Cosmogenic Isotope Research

[Coal](#) – Wikipedia

[Carbon-14 in Coal Deposits](#) (Talk Origins)

[Mass Spectrometry](#)

[Helium Diffusion from Zircons](#)

Chapter 4

Helium Retention in Zircon Crystals

In this chapter, DeYoung summarizes the research done by Russell Humphreys on helium retention in zircon crystals. The original work done by Humphreys is online, and can be read if you prefer to delve into the technical literature. There is a history behind these works. Here, in chronological order (as near as I can figure), is the articles in this series of discussions and rebuttals.

1. [Helium Diffusion Rates Support Accelerated Nuclear Decay](#), Published 2003. This first study is actually by four young earth theorists, Humphreys, Steven Austin, Andrew Snelling, and John Baumgardner.
2. [Helium Diffusion Age of 6,000 Years Supports Accelerated Nuclear Decay](#), Published 2004 in CRSQ. This is also by the same four theorists
3. [Young–Earth Creationist Helium Diffusion "Dates"](#), Published 2005?, by Kevin Henke. This lengthy rebuttal points out the problems in the helium research
4. [Helium Evidence for A Young World Remains Crystal–Clear](#), Published April 2005, a response to Henke's article, written by Humphreys
5. [Young–Earth Creationist Helium Diffusion "Dates"](#), Published 2005. This is Henke's response to Humphreys April 2005 article

Since the summary in this book by DeYoung is a non–technical summary, I will attempt to do the same thing.

DeYoung tells that in 1974, a bore hole was drilled through basement rock in New Mexico, at a location known as Fenton Hill. The drill team measured the underground temperatures as they drilled, and this data is relied upon in the young earth calculations. Some of the rock samples were obtained by the young earth creationists. Initial work in helium diffusion was done by a young earth creationist named Robert Gentry,

who is famous for proposing a young earth via polonium halos, another young earth theory which has proven to be false.

RADIOACTIVE ZIRCON CRYSTALS

The rocks we are concerned with is basically a granite, composed of quartz, feldspar, and biotite. The biotite, or black mica, contains the zircon crystals. The zirconium atoms can be replaced by uranium and thorium as impurities. The nuclear decay of the uranium produces stray alpha particles, which combine with free electrons to become helium atoms. The helium, being a tiny gas, escapes, or "diffuses" out of the zircon crystals.

The problem, according to the young earth study, is that there should be no helium in the zircons, as it has had 1.5 billion years to diffuse out of the crystals. However, zircons from a depth of 1,000 meters was found to still contain 58 percent of the total helium that should have been generated by past nuclear decay.

DeYoung claims that there are two possibilities. There is either a problem with the assumed time scale (i.e. the rocks are not 1.5 billion years old), or there is a problem with our understanding of how helium moves through rocks. However, neither is a problem. DeYoung fails to mention the real problem. The young earth research is faulty.

RATE RESEARCH ON HELIUM DIFFUSION

First, RATE looked into the possibility that the biotite mineral surrounding the zircons could act as a barrier, keeping the helium trapped. RATE commissioned an outside scientist to help determine the answer to this possibility. First, samples from the Beartooth Mountains in Wyoming were analyzed, and showed that the helium freely moved through the biotite. Encouraged by this, they then obtained some rock samples from the 1974 drilling at Fenton Hill in New Mexico. First, samples from a depth of 750 meters was tested, yielding similar results.

RESULTS OF HELIUM DIFFUSION IN ZIRCON

Next, samples from a depth of 1,490 meters were tested. This test led to the chart that DeYoung relies upon heavily, on page 74. In short, they analyzed the amount of helium that should have accumulated over the supposed life of the mineral (1.5 billion years), and showed that the amount of helium remaining in the mineral was too high. After 1.5 billion years, given the ease with which helium diffuses out of the zircons, there should be little helium remaining.

The chart shows that using an assumption of a young earth, the amount of helium in the zircons is a much better fit than the old earth, uniformitarian model.

CLOSURE TEMPERATURE

DeYoung says that some critics of this young earth explanation have brought up the issue of closure temperature. Closure temperature is the temperature at which the helium atoms do not have sufficient energy to escape the zircons, and thus if the temperature were below this level, the helium could be trapped for billions of years.

He contrasts that with the "real meaning" of closure (as if the old earth scientists did not understand this!). This real meaning, understood by all, is the temperature at which the rate of helium formation via uranium radiation exceeds the amount of helium escaping from the crystal, or in simple terms, more helium is being created than is escaping.

We know that closure does not seal the crystal and trap all the helium inside. And, we know that at some point, the zircon must lose helium just as quickly as it is produced (when it reaches this point of equilibrium). The point is that helium can be retained in the crystal in higher quantities than can be expected at higher temperatures.

FURTHER DISCUSSION OF ZIRCONS

Finally, DeYoung explores the claim that biotite, as a mineral that forms in thin layers, traps the zircon crystals between the layers, and

seals it. Since helium freely moves through the biotite as well, there is no reason to discuss this "flaky" argument.

Conclusions

Are these young earth claims about zircons true? Not at all. Although this is a noble attempt to do some real science, they failed to consider all the variables in their studies. Here are the problems. Note that although some of these are addressed by Humphreys in a rebuttal, he fails to answer these issues.

1. In the experiments to see how readily helium diffused, they did use one variable, temperature, but they failed to use another one...pressure. Subsurface pressure is great at depth, especially 750 and 1,490 meters deep, the depth of the samples used. This increased pressure would have a great affect on the ability of the helium to diffuse. This fact alone invalidates the young earth experiments.
2. The Fenton Hill site has undergone several periods of faulting and volcanism (it is only a few kilometers from Valles Caldera). This caldera contains excess helium as well. Thus, contamination by outside helium is a real possibility.
3. In the scientific study published by Humphreys and his associates, they do not report on the variabilities and do not give measurement errors. Unlike real peer-reviewed articles, other scientists have no way of interpreting how accurate their results are.
4. When examined, the Q/Q_0 values (fraction of helium retained) contain math errors, and report values too high.
5. Humphreys did give their total data in the study, in Appendix C. However, when you total them for the 750 meter deep zircons, the helium greatly exceeds the amount that would be expected from 1.5

billion years of uranium decay. This clearly indicates an outside source which provided excess helium to the rocks in question.

6. The most damaging information to the young earth theory is not even addressed here. The RATE group acknowledges that billions of years of radioactive decay has occurred, however, they feel that it occurred within two time frames...during the creation week, and during the year-long flood. However, condensing that much radiation into a one-week period, or into a year-long flood, would produce enough heat to vaporize the earth! Humphreys does recognize this heat problem, but provides no solution.

7. Helium is a gas, and it diffuses, or passes through the rocks. Referring to the original studies, zircons from a depth of 1,000 meters had 58 percent of their total helium (total being the amount produced by 1.5 billion years worth of accumulation), and rocks from 2,900 meters deep had 42 percent. Since helium rises, one would expect as the helium navigates upwards, that the shallower rock would have more helium present, which is what they found. Helium which formed from radioactive decay at 2,900 meters deep would rise, and it would enter other zircons on its way to the surface. One cannot assume that the helium in a particular zircon was only formed within that zircon.

DeYoung says this higher level is expected at the top due to lower temperature. He is partially right. With lower temperature, you may reach the closure temperature. However, you also have less pressure, which must be considered also.

8. A point not even addressed by Humphreys in his rebuttal (he fails to provide rebuttals for several critiques) has to do with [secular equilibrium](#). Basically, as uranium decays to thorium, it reaches a point at which the rate of thorium decay equals its production, after which its concentrations remain constant. Uranium decays in a series of events, from uranium to the final product of lead. This series contains elements with half-lives of well over 10,000 years. If these decay rates changed suddenly (i.e. the young earth theory of accelerated decay), then we

would not expect to see these elements in secular equilibrium. However, uranium ores do indeed show secular equilibrium, and clearly indicate they have been in a fixed, constant decay rate for at least the last two million years (the extent of the current research goes back this far).

These points are merely a summary of the complete rebuttal done by Henke and others. As you have time, I urge you to investigate this matter for yourself.

Old earth creationists can rest assured that none of the evidence concerning helium diffusion in zircons indicates a young earth.

For Further Reading

[Helium Diffusion from Zircons](#)

Chapter 5

Radiohalos in Granite

In this chapter, DeYoung summarizes the work of Andrew Snelling concerning radiohalos in granite.

FINGERPRINTS FROM RADIATION

DeYoung explains that when decay of uranium, or another radioactive material occurs, it may leave a mark. These marks, or halos, form around the center point of radioactivity, or radiocenter. Since uranium and thorium concentrate in zircon crystals, the zircons tend to be the radiocenter. The alpha particles which form the halos come from the decay series from uranium-238 to lead-206. The radius of these halos is dependent upon the atom that is decaying. For instance, U-238 forms the smallest halo, followed by U-234, and so on. Scientists can tell from the halo what the parent isotope was that caused the halo.

Because biotite forms in sheets, these halos are often preserved in three dimensions. However, these halos can be healed if the rock is heated sufficiently, to about 150 degrees centigrade. This temperature is called the annealing temperature.

A RADIOHALO MYSTERY

However, polonium halos appear all by themselves, with no imbedded uranium halos. This means that the polonium is the only radioactive decay present for that location (the radiocenter). Since the three polonium isotopes have such short half-lives, it is a mystery how they formed without any parent isotope decaying to Polonium.

Interestingly, these polonium halos are found only a short distance away from other halos, which show the decay from uranium-238 and from polonium isotopes. In other words, halos from uranium have the entire sequence of halo rings, whereas these polonium-only halos only contain the polonium isotope rings.

RATE RADIOHALO RESEARCH

The original polonium halo research was conducted by young earth creationist Robert Gentry. His claims have been fully rebutted and shown to not be evidence of a young earth. However, RATE still thinks his claims are valid, and they decided to repeat, and expand upon, his original research. In this new research, they ask two questions. First, do these parentless polonium halos provide evidence for instant, supernatural creation or is there another explanation for their existence. Second, how does the distribution of polonium halos correspond to pre-Flood, Flood, and post-Flood rocks.

To answer this question, the RATE group set out to collect rock samples from each of these three rock groups. Unfortunately, their divisions of what is a Flood rocks itself is an untenable scientific position, but that has been addressed elsewhere on this site (see the [Noah's Flood articles](#)). In short, they assumed the following divisions:

Youngest	Cenozoic Era	Late- and post-Flood deposits
	Mesozoic Era	Mid- and late-Flood deposits
	Paleozoic Era	Early-Flood deposits
Oldest	Precambrian Era	Creation week and pre-Flood deposits

Of course no mention of this division being unworkable is made. For instance, Mesozoic rocks contain every single dinosaur fossil. Not only does it contain all the dinosaur fossils, it contains all the dinosaur trace fossils, such as fossil dung, nest sites, footprints, etc. Clearly the dinosaurs lived on these layers during the middle to late portion of the Flood! And, there is no evidence, footprint or otherwise, of dinosaur existence in what they consider "pre-flood" rocks. Also, most mammal fossils are in the Cenozoic rocks, therefore by the young earth model, most mammals survived until the very end of Noah's Flood!

Using this arbitrary and unscientific division of rocks, they collected the samples, and prepared over 5,000 slides for examination.

RADIOHALO COUNTS AND ANALYSIS

In this section DeYoung gives the total count of halos discovered in the samples, based on the supposed ages of the rocks. They noted a low number of halos in Precambrian rocks, which they attribute to heating/tectonic uplift during the Flood. However, DeYoung clearly states that some of the slides revealed no halos at all, which clearly indicates there are no radioactive isotopes in these samples. The statement about the Flood has no basis in fact.

For the flood rocks, they had a great number of halos, which DeYoung claims is from the year of the Flood. Again, this is a wild guess, as there is no scientific basis for making this claim. And, of course, the post-flood rocks have very little halos.

At this point, it is important to note that they found what they were looking for. In other words, if one wanted this pattern, one could easily seek out rocks during the Paleozoic/Mesozoic which are known to be high in radioactive isotopes. Also, one could easily seek out Precambrian and Cenozoic rocks which have little or no radioactive isotopes. Just on the basis of sample selection, you could prove your point. If RATE wants to be taken seriously they need to be more forthcoming in the locations of the samples taken, and also they need to show the levels of radioactive isotopes in the samples. With what DeYoung has presented here, it only makes one suspicious of the methods employed.

PARENTLESS RADIOHALOS

Of course this is the real issue. How do you get polonium halos with no parent (uranium and thorium) halos? DeYoung mentions that the movement of polonium atoms away from their uranium source has been discussed and debated. To DeYoung's credit, he notes that Radon-222, the parent of polonium, is a gas, and it readily migrates outward. As DeYoung notes, these polonium halos are always found near uranium halos. He also notes that the polonium halos are located along cleavages, cracks, or crystal defects, which can serve as the conduit for moving the gas. However, he then makes an unfounded assumption. He

says "The isotope transport activity would take place during the latter stages of crystallization and cooling of the granite magmas." Actually, one must cool the magma, then allow time for the parent Uranium 238 to decay into uranium-234, then allow it to decay into thorium-230, then allow that to decay into radium-226, and finally this decays into radon-222. Only then can this radon migrate, and after its short half-life of only 3.8 days, it decays into polonium-218. This is unworkable, as this model would seem to require the magma to have a cooling period of billions of years.

In reality, the radon being a gas, as DeYoung noted earlier, freely migrates outward, even in a solid granite rock. There is no scientific evidence for DeYoung to claim that this happens during the cooling period.

DeYoung suggests that the polonium formed in the newly-cooled magma, and then left the halos. This forces him to accept the unproved theory of *accelerated nuclear decay*. With this, the uranium halos are destroyed as the melt is still hot enough to be above the annealing temperature. After this rapid decay, the rock cools, and the polonium halos form. This all requires a very strict timeline. The rock must have accelerated decay, all the way from uranium-238 to polonium-218. With polonium-218's half life of 3.1 minutes, the rock must cool from a melt to below annealing temperature (~150 C) prior to polonium-218 decay.

Look again at the pages describing this (pages 94-95). There is no hint of these strict timelines. DeYoung says that "the magma cooled to solid rock very rapidly." Given that it must cool in under three minutes, this is an extreme understatement! Readers are told bits and pieces, but not a coherent picture.

Another problem exists. As previously discussed, the young earth scientist does not deny that this radiation occurred. Therefore, since you condense billions of years radiation into one week (or one year of the flood), you also condense billions of years of heat from this radiation into the same time frame, which essentially would melt the entire earth. Since you are reading this, your very existence testifies that this accelerated decay did not happen.

RADIOHALOS IN METAMORPHIC ROCKS

In the final section, DeYoung correctly mentions that metamorphic rocks, which were essentially reheated, would destroy all evidences of prior halos. The RATE team examined 21 samples of metamorphic rocks, and they indeed showed large numbers of polonium halos. Unfortunately, DeYoung does not give us all the data. He fails to say if there are uranium-238 halos present, or if there are any halos at all present from any parent material of the polonium series. Why would he omit such information? If there were no halos from a parent, that would support his argument, yet he fails to even mention this. This leads me to believe that there were other halos present.

But what if there are no parent halos present? His basic argument here is that there were hydrothermal fluids circulating the polonium atoms through the metamorphic rocks. Sure, this is a possibility. However, this argument does not prove that the rocks were created only 4,500 years ago during the flood, nor 6,000 years ago during creation. It only means that polonium was delivered to the rocks via hydrothermal fluids. Nothing can be inferred about the ages of these rocks. The rocks themselves could be a billion years old, and the polonium could have been brought in by fluid a year ago. Or, the rocks could be a billion years old, and the fluid brought them in 500 million years ago. This argument is useless to the young earth creationist.

For a more thorough refutation of this topic, see the references below.

For More Reading

[Polonium Haloes Refuted](#)

[Evolution's Tiny Violences: The Po-Halo Mystery](#)

[Polonium Halo Claim](#)

Chapter 6

Fission Tracks in Zircons

In this chapter, DeYoung summarizes the work of Andrew Snelling concerning fission tracks in zircons.

FORMATION OF FISSION TRACKS

DeYoung adequately describes the conditions under which fission tracks form. The most common fission track is from uranium-238, which splits into two palladium atoms through fission. As DeYoung notes, for every two million U-238 atoms which undergo normal alpha decay, only one atom undergoes fission.

When this fission happens, the two palladium atoms leave a track in the zircon. As with radiohalos, the fission tracks can be repaired if the mineral is heated above the annealing temperature.

FISSION TRACK DATING

When dating a sample using fission tracks, the scientist will count the number of fission tracks in a particular surface area. Next, the number of remaining undecayed U-238 atoms is counted, giving you the number of parent isotope left in the sample. This is usually done via the external detector method. The sample is bombarded with neutrons, inducing fission of the remaining U-238 atoms. Sometimes this causes tens of millions of tracks in a single square centimeter. With this data, scientists can calculate how many U-238 atoms remained in the sample, and thus they can calculate the age of the sample.

RATE FISSION TRACK RESEARCH

The RATE group examined rocks, but again they based their research on the breakdown of pre-Flood, Flood, and post-Flood rocks, just as they

did in the previous chapter for radiohalos. Please refer back to Chapter 5 of this review for an explanation of why this breakdown is unworkable.

Twelve rock samples were obtained that were considered Flood and Late-Flood to Post-Flood in origin. All samples were from volcanic tuff from the Grand Canyon region. It is interesting to note that the tuff samples ranged in size from 6 to 11 pounds. It is also interesting to note that removing a rock from a national park is a crime. There is a process by which scientific research can be conducted in the park, but it is unclear if they followed these regulations. Since the rocks could have possibly come from outside the Canyon, we cannot jump to any conclusions.

The RATE group contracted out the fission track dating to a known laboratory in Australia.

RATE FISSION TRACK RESULTS

Interestingly, the fission track dates for nine of the twelve samples are not disputed, as they fall within the range published by old earth geologists. DeYoung focuses on the three samples from the Middle Cambrian period, which are thought to be about 535 million years old. The dates obtained by RATE for these samples indicate an age that is significantly less. They are dated at 34.9, 68.4, and 48 million years. As DeYoung points out, fission track dating can give not the absolute age, but the cooling age, or time since the crystal was last above the annealing temperature (for zircons, this is about 150 degrees centigrade). Above this temperature, and the fission tracks could be repaired (think of it as melting back together).

From this point DeYoung boldly claims that this confirms that "substantial spontaneous decay of uranium-238 has occurred in these rocks." By spontaneous he is referring to the young earth theory of accelerated nuclear decay. However, there is no way to justify such a claim. We can only say that there may have been heating of the rock above the annealing temperature, therefore ruining the possibility of obtaining an absolute date for the rock.

As previously noted, putting billions of years worth of radioactive decay, especially fission, into a short period of time such as the year of the flood, would essentially melt the earth. Let's suppose that this spontaneous decay occurred. With such heat, there would be absolutely no record of it in fission tracks, as a temperature high enough to melt the entire earth would certainly be above the annealing temperature of 150 degrees centigrade! This young earth argument easily defeats itself!

Think of it this way. The United States has about 892 million pounds of uranium reserves, in the form of uranium oxide (85% by weight of which is uranium).¹ The atomic bomb dropped on Hiroshima contained 132 pounds of radioactive material. Normally, the uranium must be processed, but the young earth creationists claim that this uranium "spontaneously" fissioned. If you consider only what is in the United States, that is enough to equal more than 6,700,000 nuclear bombs exploding at once. And that is only a small fraction of world uranium reserves. Fortunately for us, this did not happen as the young earth creationist claims!

FISSION TRACK SUMMARY

DeYoung concludes that these fission tracks give evidence of accelerated decay. If accelerated decay had occurred, the temperature would have been far above the annealing temperature, and there would be no tracks...nor any minerals...nor an earth, for that matter.

¹ From [US Uranium Reserves Estimates](#) (2003). Uranium ore contains less than .2% U₃O₈. There are 498 million tons of ore, yielding 1,155 million pounds of uranium oxide. Adding the mass of three U-238's and eight O-16, 85 percent of the weight is from uranium, yielding 892 million pounds pure uranium.

Chapter 7

Discordant Radioisotope Dates

In this chapter, DeYoung summarizes the work of Steven Austin concerning discordant radiometric dates.

SELECTIVITY OF RADIOISOTOPE DATA

As DeYoung points out, many thousands of reports on rock ages have been accomplished. And he is correct...when a rock sample gives a bad date, which is not consistent with the other dates, it is filed away and not used. But rather than seeing this as a good process, DeYoung describes this as "bias" against dates that do not agree. He is correct, but this bias is required in this case.

DeYoung makes an interesting statement in the first paragraph. Some items do not show up in geologic reports, such as "how and why were particular rock samples chosen for analysis and reporting?" In my study of young earth radiometric studies, one must ask the same question...why did the young earth author choose this particular sample to date? Typically, the answer is because the young earth author knew in advance that it would give a bad date. It was chosen because he knew it would fail in advance. As we examine this chapter, we will see if this is the case.

To verify that there are discordant dates, RATE conducted examinations based upon two rock samples. Naturally, the larger your sample size, the better your results, therefore one must ask why only two sites were examined. Clearly, they were "stacking the deck" in their favor.

The term "discordant" means that two different radioisotope methods do not agree with each other. For instance, the Potassium–Argon method may yield an age of 1 billion years, but the Rubidium–Strontium method yields an age of 100 million years. Geologists familiar with dating know how to get discordant dates...they could tell you what types of rocks/what locations to sample. The young earth creationists know this as well.

If the RATE group truly wanted to show that radiometric dating was discordant, they should have used a large sample size. However, they would have discovered many more dates that were not discordant, which would undermine their entire purpose.

RATE SAMPLE COLLECTION

The RATE rock samples were taken from Precambrian rocks, one is in the Beartooth Mountains of Wyoming, and the other is a diabase sill located at Bass Rapids in the Grand Canyon. The sites were chosen because previous studies were accomplished on these rocks. It should be noted that the Beartooth site involves metamorphic rocks.

ROCK SAMPLE PREPARATION

ICR scientists prepared the rock samples for analysis. Nothing of interest here, other than the fact that this is not a normal procedure that is accomplished by ICR. Although they may know how it is done from reading guides, they have little practical experience. For the purposes of this review, we will assume that they did this procedure properly.

BEARTOOTH MOUNTAINS SAMPLE RESULTS

The rock samples were analyzed using four radioisotope pairs. They used potassium-argon (K-Ar), rubidium-strontium (Rb-Sr), samarium-neodymium (Sm-Nd), and lead-lead (Pb-Pb). The work was contracted out to commercial labs, and isochron graphs were plotted for all data.

RATE quotes a previous dating study which puts the age of this rock unit at about 2,790 million years, using the Rb-Sr method. In RATE's results, the Rb-Sr yielded an age of about 2,515 million years. The discordance comes with the comparisons of the other methods. K-Ar yielded ages, depending on how the data was obtained, from 1.52 to 2.6 billion years. The Sm-Nd (2.886 billion years) and Pb-Pb (2.689 billion years) was close to the results obtained with the other methods, with the exception of the K-Ar.

It should be noted that if one wants to disprove radiometric dating, geologists know that the K–Ar method should be used, since it is known that excess argon is a factor that throws off the dating results (usually dates appear as "too old", although laboratory corrections for this anomaly can overcorrect and make them appear too young). This may be the case here. Notice the chart on page 115. RATE gives four different dates obtained from four methods of sampling of the rock using K–Ar dating. They apparently did not do these four methods with the Rb–Sr, Sm–Nd, or Pb–Pb method. Why not? Because the RATE scientists know that K–Ar will give the desired result...a "different" answer from the other methods.

CATEGORIES OF DISCORDANCE

DeYoung mentions four categories of discordance, and says that the Beartooth samples fit all four categories. Yes, but the deck is stacked in their favor.

How does one get discordance? A secular geologist can sample a rock and have it dated, and another geologist can do the same thing, right in behind the other geologist, and they get different dates. This could be due to any number of factors, such as how the samples were prepared by the two different scientists, the laboratories the samples are sent to, the quality of the laboratory equipment used during the procedure, and whether any contamination occurred anywhere along this process. Geologists understand these limitations, and work within them. Young earth creationists take these same limitations, and use them to their advantage. In doing so, they have merely proved that you can get discordant dates from the same rock. They have not proved overall that radiometric dating is unreliable.

BASS RAPIDS SILL RESULTS

The secular, old earth age given to the Bass Rapids sill is about 1.07 billion years. The data obtained from the RATE study shows ranges from 656 million years to 1.379 billion years, depending upon the method

used. The most divergent dates given are the ranges for the K–Ar, which read as younger than the accepted age, and the Pb–Pb and Sm–Nd methods, which reads older than the accepted age. The same limitations apply here...differences could be in sample preparation, contamination, or the laboratory equipment, or even laboratory procedures. Although the results do vary and show discordance, such discordance does not disprove radiometric dating.

DISCORDANCE AT OTHER LOCATIONS

RATE shows that the geologic literature reveals there is discordance at other locations as well. This is no surprise, as discordance is a known factor in dealing with radiometric dates.

POSSIBLE EXPLANATIONS OF DISCORDANCE

DeYoung lists three possible explanations for discordance.

First, he alludes to a mixing of isotopes between the magma and the rock body into which the magma intrudes. He will deal with this issue more in the next chapter, thus we will defer discussion of it until then.

Second, some have suggested that cooling rates vary, and thus some minerals form more quickly than others, leading to these being older. Of course, this alludes to the belief that magma may take millions of years to cool. DeYoung dismisses this out of hand, saying there is no evidence of such slow cooling. However, if true, the different dates by themselves are indeed evidence of such a phenomenon. DeYoung dismisses it for two reasons...first and foremost in his mind, the earth is young, and therefore it could not have been cooling for millions of years, and second, nobody has ever observed it cooling for millions of years (as none of us are millions of years old). However, he presents no direct evidence against this slow cooling, and it remains a valid possibility.

Finally, he says the decay rates for the radioisotopes were different in the past. This is the preferred young earth explanation, although this accelerated nuclear decay is an unworkable theory, as you will see in the discussions for Chapter 9.

SIGNIFICANT TRENDS

In this section, the RATE scientists note that in the Bass Rapids sill, dating methods based on alpha particle decay yield older dates than those based on beta particle decay. They say it may be due to the "accelerated nuclear decay" which accelerated the alpha decay at a faster rate than the beta decay. While nice to know, there is still no evidence to support their theory of accelerated decay.

One other thing should be mentioned. From a statistical standpoint, the RATE group sampled two locations. There are literally millions of locations they could have chosen. Their sample size of only two is insignificant. You cannot have a "significant trend" based on only two sample locations. Assuming ten million locations that we could date (the number is much higher), that's a ratio of 1 to 5 million (.0000002 percent). Without a larger sample size, the RATE data is meaningless.

In essence, they knew from previous studies that these two locations would yield discordant dates. They even admitted up front that the locations were chosen because they had already been dated. In other words, they picked two locations that they knew would give discordant dates. In doing so, they have proven nothing concerning the overall reliability of radioisotope dating.

Chapter 8

Radioisotope Dating Case Studies

In this chapter, DeYoung summarizes the work of Andrew Snelling concerning case studies of radioisotope dating. Concerning studies in radioisotope dating, it is known by geologists that if your intent is to disprove radiometric dating, you can pick samples which have known issues. Such selective sampling means that you intentionally pick rock samples to prove your point. This is typical of young earth creationist methods when trying to disprove radioisotope dating. Another method would be to apply the wrong dating method to the wrong rock. Not all methods are applicable to all rocks. Again, this has been shown to be typical of the RATE team. For more specifics on these claims, see [RATE, More Faulty Creation Science from ICR](#).

FURTHER ROCK SAMPLING

Based on the two rock samples in the previous chapter, RATE decided to sample some more rocks to see if this discordant trend continued. As noted above, this is a highly subjective subject. You can pick rock samples which you know will support discordance. Naturally, the RATE study will not mention the thousands of other date studies which give valid results with no discordance.

There are three questions they seek to answer. First, does this general trend of discordance continue? Second, if there is discordance, does the trend in Figure 7–3 continue? And third, can physical explanations be identified for the discordant dates?

SAMPLE LOCATIONS

The RATE rock samples were taken from ten new locations, thus upping their sample size to twelve total locations. To simplify matters, they chose ten basaltic rock samples, varying in age from over 2.7 billion years old, to less than 100 years old.

RATE SAMPLE ANALYSIS

DeYoung starts out by stating how the samples were prepared for testing. This will sound fine to the casual reader, but it should be pointed out that none of the RATE scientists have practical experience in radioisotope dating. This is a procedure that is rarely accomplished by them, or by the ICR graduate students, who probably aided or did the actual sample preparations. Thus, having ICR personnel prepare samples for radiometric dating is like asking a pastor of a church to prepare chemical samples...his expertise is in theology, not chemistry.

RADIOISOTOPE RESULTS

The results are presented in Table 8-1. To summarize, as one can expect from amateurs working in radioisotope dating, the results are not uniform and show discordance.

INTERPRETATION OF THE RADIOISOTOPE RESULTS

This section summarizes the discordance. I admit that the data shows discordance. The real issue is whether the RATE research is accurate. Rather than discussing each point raised, I'll merely link to studies, where available, concerning the claims of RATE. As you will see, RATE's methods are less than satisfactory.

[A critique of ICR's dating of Grand Canyon Rocks, including the Cardenas Basalt and Bass Rapids](#)

[RATE, More Faulty Creation Science from ICR](#)

[Isochron Dating](#) – An excellent summary of the method

Other Articles of Interest

[Rats in RATE](#)

[RATE Deception](#)

You may find yourself thinking that I'm not addressing the claims of this chapter. You are right, I am not directly addressing these claims. But I am addressing the underlying basis of these claims...the methods used by ICR and RATE to obtain the results. For the best explanation of Isochron Dating as it relates to young earth claims, see the Isochron Dating article. Given the thoroughness of this article, it is unnecessary to repeat its arguments here.

INHERITANCE OF RADIOISOTOPES

DeYoung notes that daughter isotopes may be incorporated into the rising magma bodies, and then become part of the rock once it cools. This is true, and is a known limiting factor taken into consideration by geologists who do radiometric dating.

Next, he focuses on the two young rocks...the Mount Ngauruhoe rocks, at less than 100 years old, and the Uinkaret Plateau rocks, at 1.16 million years old. Dating of these rocks produced wild results, which is touted as evidence that daughter isotopes were present prior to the rock cooling. Specifically, argon is mentioned. Radiometric labs will tell you that you cannot date rocks less than about 2 million years old, as lab equipment is limited in its ability to detect the smaller amounts of argon. Nonetheless, RATE throws their money away to have them K-Ar dated, knowing in advance that they will give unreliable results.

The lead-lead method of dating these very young volcanics yielded ages in excess of 3 billion years. DeYoung notes that other studies of recent volcanics (less than 100 yrs old) have yielded very ancient dates. True...that is how geologists know not to date certain rock types. Geochronologists recognize this limitation. In this instance, context is everything. Where was the rock found...what is its relationship to other rocks which have dated good? Rather than accept these dates as the truth, geologists work around these false dates. RATE gives the

impression to the casual reader of this book that geologists blindly accept these dates...this is not the case.

The remainder of this section deals with the magma sources from the earth's mantle, and with the mixing of mantle material as the magma rises.

MIXING OF RADIOISOTOPES

DeYoung goes to great lengths to show that magma, as it rises, melts nearby rocks and incorporates that material into the magma body, thus "contaminating" the radiometric signature of the rock. This leads into a discussion of argon contamination, therefore leading to exaggerated ages for rocks dated by K-Ar. The problem of excess argon has long been known by geologists, and presents no barrier to accurate dating (when it is taken into consideration).

THE GEOLOGIC RECORD AND BIBLICAL HISTORY

This section notes that as you get closer to the surface, you get younger rocks. An attempt to answer this by using the young earth theory of accelerated nuclear decay is used. A "burst of nuclear decay" corresponding to billions of years worth of decay, during the creation week, helps explain all this decay. As we have seen from earlier chapters, this would also melt the entire earth, and there would be no earth (the next chapter deals specifically with this theory). DeYoung goes on to explain that another burst, equal to about 500 million years of decay, occurred during the Flood. However, if these bursts occurred, then all flood rocks would date to about the same time, or 500 million years. They do not. This is explained as rocks deposited late in the Flood year experienced less decay, thus they date younger. This is a neat theory, but one that fails when you consider that this one-year global flood model is unworkable. There is no evidence of a global flood only 4,300 years ago. For more, see [Flood Articles](#).

SUMMARY OF DISCORDANCE

In summary, RATE has shown discordance among 12 rock samples. This is still a statistically insignificant number, and cannot be used to indicate a trend. It is based on selected samples, chosen by RATE scientists, who know which rocks to date to cast doubt upon radiometric dating. In short, they found what they were looking for. They were looking not for the truth, but to disprove radiometric dating.

In reality, there are thousands of other rock samples which have provided valid radiometric dates. No discussion of these, nor any efforts to disprove them, have been undertaken by the RATE group. These thousands, perhaps hundreds of thousands, still stand unrefuted by young earth creationists. (No doubt many will point to the studies of young earth creationist John Woodmorappe, who identified about 200 bad dates. However, these were not all bad, as some were the result of Woodmorappe's twisting of the data. For more, see the Henke rebuttals (www.answersincreation.org/henke.htm).

For More Reading

[Radiometric Dating: A Christian Perspective](#)

Chapter 9

Theories of Accelerated Nuclear Decay

In this chapter, DeYoung summarizes the work of Eugene Chaffin concerning accelerated nuclear decay.

A CHALLENGE TO CONVENTIONAL SCIENCE

DeYoung begins by saying that one of the conclusions of the RATE study is that there was accelerated nuclear decay during the creation week, and during the year-long Flood of Noah. It should be noted that this is not a claim made as a result of the evidence. Instead, RATE acknowledged that there has been an apparent decay equal to billions of years. They must fit this decay into a time period of the last 6,000 years, therefore this decay must have happened during the formation of the rocks, which mostly occurred during the creation week and during the Flood. Thus, it is not an argument from the evidence...it is an argument based on the need to show how billions of years of decay could occur.

Part of their proof of this accelerated nuclear decay is helium retention in zircons. This has already been dealt with in Chapter 4 of this review.

As DeYoung notes, nuclear decay is very constant today, and any accelerated rate in the past would have profound implications. However, there is no scientific evidence to support accelerated nuclear decay. In the end, DeYoung gives a defense of the validity of young earth creation science, which some regard as backwards and less than scientific. While this is largely true, with this RATE work and other ongoing works, it is evident that young earth creation scientists are trying to appear "scientific." To anyone willing to look inside the windows of young earth creationism, it is easy to note that this scientific appearance is nothing more than a facade...once you get past the walls and windows, the truth reveals the errors of their scientific work. While "beauty is only skin deep," young earth creation "science" is also only skin deep.

THE SHELTERED NUCLEUS

As DeYoung notes, the nucleus of atoms are very stable, and experiments over the years to accelerate decay have largely produced little results. As a result, science has no evidence to support accelerated nuclear decay, and there is no evidence that accelerated nuclear decay has occurred in the past. It is clearly upon the shoulders of young earth creationists to explain how this could have happened scientifically.

THE NUCLEAR POTENTIAL WELL

DeYoung explains the nuclear potential well in this section. In short, the alpha particle must escape from the atom. Factors such as the energy of the particle, and the distance from the center of the nucleus are considered. RATE did calculations based on shortening the distance from the nucleus, which greatly increases the chances of the particle to escape. However, as DeYoung explains, methods of speeding up this decay, and shortening the half-life have had little effect. No mechanism or means has been theorized that shortens this nuclear potential well. Even if there were, this would be laboratory conditions. One would have to explain how this happened naturally.

RATE also did some theoretical calculations based on treating the alpha particle as a wave, and its relation to the [Coulomb Barrier](#). While interesting to know, these theoretical adjustments are fictitious and could not occur in nature.

STRING THEORY AND NUCLEAR DECAY

This section shows the wild grasping that the RATE group is doing in order to justify their accelerated nuclear decay theory. In String Theory, there are multiple dimensions, beyond just the length, width, depth, and time that we can experience. They speculate that through these extra dimensions it may be possible to account for this accelerated decay. However, if true, these dimensions are present today as well as during the creation week and the flood. Theoretically, if they caused accelerated

nuclear decay, they would still be causing accelerated nuclear decay...hence, this is not a possible answer for young earth creationists.

THE EPISODES OF ACCELERATED DECAY

The young earth position proposes two periods of accelerated decay. Some 90 percent of the decay occurred during the creation week, and 10 percent occurred during the global Flood of Noah. There is no direct evidence to support this. Also the heat problem would even prevent it...more below.

Note that the radiation during the creation week had to occur prior to life forming, on Day Three. Thus, there was four billion years of decay crammed into Days 1&2 of creation.

FURTHER QUESTIONS TO PONDER

The next sections address these questions.

PURPOSE OF ACCELERATION

RATE does not propose any direct reasons why acceleration occurred. They merely state that God could have done it. In other words, it turns into a [God of the Gaps](#) type argument, with no real solution.

So, why would there be a two-day period of accelerated decay during creation, which accounts for 90 percent of all decay, and why would there be a year-long period of accelerated decay during the Flood, and why would it only account for 10 percent of all decay? Why would a year long event only account for 10 percent, and two days account for 90 percent? It would be more likely that two days would be 1 percent, and a whole year would be 99 percent. Why would God cause this accelerated decay in the first place? All these questions beg to be answered.

HEAT DISSIPATION

This is the biggest problem facing the accelerated nuclear decay theory. Releasing 4 billion years of nuclear decay in a period of two days would easily melt the earth. As we saw before, the uranium reserves in the United States alone would equal 6,700,000 nuclear bombs exploding during the two day period...and that does not include the uranium from the rest of the world!

They list only one possible output for this heat...Humphreys idea of cosmological cooling, basically dissipating the heat into the expansion of the fabric of space itself. There is no proof to back up this claim. With such heat dissipation, it would be a fine line between maintaining a warm enough temperature not to freeze the planet. Also, this effect would still be seen today...I guess without it, earth today would be thousands of degrees!

When scientists today observe nuclear decay, they also observe the heat generated from this decay. It does not dissipate into the "fabric of space." Humphreys has been watching too much *Star Trek*...he should come back down to earth.

Interestingly, DeYoung says that the heat problem is taken seriously, but it is not seen as an insurmountable problem. That is because no matter what the science says, it can be twisted to support a young earth. Give them time...they will twist some theory to neatly explain it, and we will be here to give you the truth.

As it stands now, they have no answer to this heat problem, nor to the "why" of accelerated nuclear decay.

RADIATION HAZARD

This is a neat problem. Since there is so much potassium in our bodies, if 500 million years worth of decay occurred in the year of the flood, Noah, his family, and the animals, would have roasted from the inside due to the heat from the nuclear decay! DeYoung says this problem is a topic of current research.

This is also a problem with Carbon-14. He explains this away with the wild claim that prior to the flood, the carbon-14 content in an organism would have been 100 times less than it is today. However, carbon calibration charts prove what levels of carbon were in the atmosphere over the last 22,000+ years. At the time of the supposed flood, 4,300–4,500 years ago, there is no significant change to carbon levels. To see for yourself, check out the carbon calibration charts linked from [Chapter 3](#) of this review.

DeYoung says that "The exploration of accelerated nuclear decay mechanisms has taken us to many unexpected topics." Young earth creationists have hinted at accelerated decay for years, but have not addressed it. Finally, with RATE, they realized, "Hey, this is a real problem." So far they have failed to answer the problem, but given long enough, they will find a way to twist science and come up with an explanation.

WHAT THEY DIDN'T TELL YOU

Another problem is one of a "very good" creation. By their understanding, this decay occurred during Days 1 and 2 of creation, before the creation of any life. Is not decay bad? And, by admitting this decay, they are admitting that there was harmful radiation as a part of the "very good" creation. It would appear that this radiation would destroy the young earth arguments for death and decay prior to sin.

Chapter 10

A Proper Reading of Genesis 1:1 – 2:3

In this chapter, DeYoung summarizes the work of Steven Boyd concerning how to properly interpret Genesis.

THE GENESIS ACCOUNT OF CREATION

As is typical with any young earth creationist interpretation of the different positions one may take with regards to creation, Boyd (and DeYoung) show that they do not understand the old earth creationist position. They describe three different possible positions of belief in Genesis. First, some believe it is not accurate scientifically, and they believe the Bible is simply wrong (the atheists). The second group believes Genesis is poetry, and not necessarily history. The third and final group believes Genesis is a literal, truthful account of creation. It is to this group that the young earth creationists belong. However, it also contains all the old earth progressive creationists, like Dr. Hugh Ross and myself, and some theistic evolutionists as well. I'm certain the authors did not intend this, but that is the truth. DeYoung does mention that this group believes in 24-hour creation days. Since many old earth creationists are literalists, DeYoung does not speak for everyone who is a literalist, and in making such a claim, he shows his ignorance of old earth creationism.

This is a matter of omission, I believe. DeYoung and other YECs are smart people, and thus they must realize that one can be a Christian, and believe in a literal translation, and an old earth. They do not, however, want this to become public knowledge, for they fear some of their own young earth creationists may abandon them for a more rational, scientific position.

Because this chapter focuses on history vs. poetry, and because old earth progressive creationists believe just as young earth creationists do, this chapter has no implications with progressive creationism. Some theistic evolutionists, who are non-literalists, would be affected by the

discussions in this chapter. Because this chapter says little against old earth belief, the review will be short.

NARRATIVE AND POETRY DEFINED

This section describes the difference between narrative and poetry. Nothing here of interest for the old earth believer, unless you are a non-literalist theistic evolutionist.

HEBREW VERB FORMS

This section presents little of interest to the old earth creationist.

PAIRED SCRIPTURE TEXTS

This section deals with narrative versus poetry in more depth, analyzing several passages of Scripture to show the difference to the reader.

SAMPLING AND VISUALIZATION OF TEXTS

DeYoung throws out some impressive numbers meant to show the exhaustive nature of this study. The idea is to make this look like a scientific analysis of this issue. While this is good stuff, it hardly fits with the name of the group, which is *Radioisotopes and the Age of the Earth*.

APPLICATION OF STATISTICS

The RATE authors came up with a statistical model for examining whether or not a story is poetry or narrative.

HISTORICAL FICTION VERSUS NONFICTION

The authors refer to other stories in the Old Testament as literal history, to which I agree, as will most old earth creationists.

THE MEANING OF GENESIS 1:1 – 2:3

The RATE group concludes that: 1) it is not possible to interpret the creation account as poetry or metaphor; 2) since Genesis 1:1–2:3 are narrative, it should be read as other Hebrew narratives are read, and 3) when it is read as narrative, "there is only one tenable view: God created everything during six literal days." As a progressive creationist, I can agree with all these statements. The last statement refers to six literal days, but does not address the length of those days. Clearly, the young earth author is inferring a 24-hour day, but it could be a "day" to God, which could be billions of years. Or, the "day" could represent a literal amount of time which refers to specific acts within the creation story. Just because it is "literal" does not mean that it must be a 24-hour day...millions of progressive creationists testify to this fact!

While I agree that Genesis is literal, one final caveat must be given. One must be cautious of young earth methods of Biblical interpretation. They have a history of inventing rules to support their viewpoint...rules which do not exist in Hebrew. For instance, the use of an ordinal with the word "[yom](#)" (day) always signifies a 24-hour day, is an example of an invented rule. Hebrew experts, who are young earth creationists, accept this rule, but old earth creationist Hebrew experts do not. Therefore, when dealing with Hebrew, take the words of young earth creationists with a grain of salt.

Chapter 11

RATE Conclusions

In this chapter, DeYoung summarizes the work of the RATE group and gives some conclusions based on the eight-year study.

A BEGINNING

DeYoung characterizes the RATE research as a beginning. He freely admits that "there is a need for additional research on nearly every topic in this book." This is because none of the topics were scientifically convincing. Although some interesting data was presented, there was nothing that would overturn the belief that radiometric dating is wrong. DeYoung claims that "the RATE project has made good progress in challenging evolution's icon or assumption of deep time." In reality, the RATE research will only convince young earth creationists that RATE is a first-rate scientific study, when in fact, if you look into their science, you find that they make no valid points against radioisotope dating. This book will be a "winner" among lay young earth creationists, but it fails completely within the scientific community.

GUIDING PRINCIPLES OF RATE

The first sentence says "One principle agreed on by all the RATE members is that the earth is young, on the order of 6,000 years old." This is the major problem with RATE. Science, when done properly, consists of conducting an experiment, or making observations, or both, and then coming to a conclusion. In contrast, the RATE members already had their conclusion before they conducted these experiments. Thus, they were able to look at the data, and "see what they wanted to see." This is not science. At best, they could be called "theorists." For more on this, see *Creation Scientist?*

In defending their beliefs, DeYoung says that the young earth viewpoint does not require you to stifle science or reject any data. He is

correct. However, it does require you to twist the data into something that it does not support. Feel free to browse around this website's thousands of rebuttal pages, and you will get a feel for the quality of the work done by the young earth creation scientist.

The other guiding principle DeYoung lists is the RATE team's belief in accelerated nuclear decay. Again, this is not based on any evidence for accelerated nuclear decay. It is based on the fact that creating this so-called decay is the only way to fit the scientific data into the last 6,000 years. And, it is a horrible "fit." As you have seen, if this accelerated decay occurred, it would have melted the earth. To explain away this, the young earth creationist must turn to other dimensions of reality to dissipate the heat. Nuclear decay as we observe it today produces heat in our own time and space...there is no reason to believe that the heat from the past dissipated any differently.

RATE FINDINGS

DeYoung lists eight findings of RATE, which have already been discussed in this review. None of the findings cast doubt upon the old age of the earth.

CHALLENGES FOR THE FUTURE

In this section DeYoung lists six known problems of these studies, which need further research. Since none of these RATE studies has presented any valid data, RATE should be seen as a failed attempt to prove a young earth. Future studies along these lines will merely be a waste of the church's money. Since you can accept an old earth, and a literal Genesis, we should not focus on science, but on Jesus Christ.

THE IMPACT OF RATE

The first sentence claims that "The RATE results provide support for the young-earth paradigm or model of earth history." The RATE results will be accepted as the truth by young earth creationists who are not

scientifically inclined. This is an integral part of the young earth culture. The words of these scientists are taken as absolute truth, and no thought is given to the validity of the words. If you doubt the words of these "experts" in a young earth church, your faith is questioned.

The real truth is that the RATE results provide no support for a young earth. And, by producing such poor scientific work, the RATE group has succeeded in driving young earth creationism further into a corner. Eventually, young earth creationism will go away, just like geocentrism did. However, we still have geocentrists around today, so it will not completely disappear.

Don't get me wrong, though. There is no harm in being a young earth creationist. There are many fine Christians who believe in a young earth. However, there is harm to the church as a whole when young earth creationism is paraded as true science, when in fact it is so full of holes that it cannot hold water. The world sees young earth creationism, and stereotypes Christians based on these observations. In essence, this drives the world away from Christ. The church would be better off embracing old earth creationism, and then we can have a credible scientific witness to the world.

Because of these issues, the overall impact of the RATE study upon the church will be negative, although this will not be realized by those caught up in its untruths.