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JULY 2007

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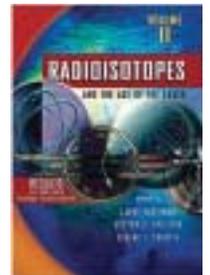
Do the RATE Findings Negate Mainstream Science?

GREG MOORE

[Note: This article will appear in two parts, this month and next.]

Young-earth creationists are touting a research project they call Radioisotopes and the Age of the Earth, or RATE. They describe the RATE findings as astounding, successful beyond all expectation and history in the making.¹ Why are they so ecstatic? They claim RATE researchers have uncovered powerful evidence that confirms the Earth is young and demonstrates the old earth model is not supported by empirical science.²

This is a remarkable claim. Do the RATE findings invalidate the mainstream view of Earth history? Most of the issues the RATE team examined are technical, making it difficult for laypeople to evaluate the significance of their work. This paper attempts to provide a balanced assessment of the project so Christians can decide for themselves what the RATE findings contribute to the age of the earth debate.



BACKGROUND

RATE was a joint venture between the Institute for Creation Research (ICR) and the Creation Research Society (CRS).³ Answers in Genesis (AIG) also supported the project.⁴ The RATE team was comprised of seven scientists, all committed young-earth creationists: Dr. Steven Austin and Dr. Andrew Snelling, geologists; Dr. John Baumgardner, geophysicist; Dr. Eugene Chaffin, Dr. Donald DeYoung and Dr. Russell Humphreys, physicists; and Dr. Larry Vardiman, a meteorologist.⁵

The goal of RATE was to challenge the mainstream view that radioisotope data confirms the Earth is billions of years old. The project was funded by donations of about \$1.5 million and occurred in two phases.⁶ The first phase, the literature-searching and hypothesis-developing stage, took three years. Those results were reported in the 2000 book, *Radioisotopes and the Age of the Earth*.⁷ The second phase, the research stage, took five years. Those results were reported in two 2005 books: *Radioisotopes and the Age of the Earth-Volume II*, a technical report, and *Thousands...*

Not Billions, a popular version.⁸

Scientists believe billions of years of nuclear (radioactive) decay have occurred in Earth history. This is based on the quantity of daughter elements found in rocks and minerals. (Daughter elements come from the decay of radioactive elements). In the first phase of the project, the RATE team set out to challenge this proposition. What they expected to find was the quantity of daughter elements on the Earth was far less than scientists claim and consistent with thousands, rather than billions, of years of decay. Instead, they found the quantity of daughter elements is thousands of times greater than the young-earth model would predict.⁹

This finding led to the hypothesis that defined the second phase of the RATE project. To explain the abundance of daughter elements on the Earth, the RATE team surmised that nuclear decay must have been accelerated at some time in the past, resulting in the production of large quantities of daughter elements in a short period of time. Five research projects were selected to test this accelerated decay hypothesis.¹⁰ It is these studies that young-earth creationists claim provide powerful evidence of a recent creation.¹¹

NUCLEAR DECAY

For those who are unfamiliar with the concept of nuclear decay and how scientists use daughter elements to determine the age of rocks, it is useful to begin with a brief primer.

There are currently 115 known elements and more than 2,000 different varieties of these elements called isotopes.¹² Most elements are stable and do not change. However, some elements are unstable and change through a process of nuclear, or radioactive, decay. Over time, the atoms emit particles and the element (called the parent element) changes to a new element (called the daughter element).¹³ For example, uranium-238 decays through a series of unstable elements until it ends up as lead-206, a stable daughter element that no longer decays.

Scientists believe nuclear decay occurs at a constant rate. The time it takes for half the atoms of the parent element to decay into the daughter element is known as the half-life of that parent element. By measuring the quantity of parent and daughter elements in a rock and applying the half-life, scientists can determine the age of the rock. This is the process known as radiometric dating. Scientists have measured the half-lives of more than 40 radioactive isotopes (or radioisotopes), giving them over 40 different radiometric dating methods.¹⁴

For those wanting a more comprehensive explanation of nuclear decay and radiometric dating, see "Radiometric Dating: A Christian Perspective" by Dr. Roger Wiens. This paper describes in relatively simple terms how the dating techniques work, how accurately half-lives and rock ages are known, and how dating results are verified. It is available on the web via the American Scientific Affiliation and related sites to promote greater understanding on this issue, particularly within the Christian community.¹⁵

Continued on page 4

In the **NEWS...**

[Stem Cell Research](#)

This Focus on the Family article by Dawn Vargo states that the public is not getting the full story on stem cell research. While the media touts the promise of embryonic stem cells, adult stem cells can do everything they can. The author then provides a long list of breakthroughs involving adult stem cells. Go to: <http://www.citizenlink.org/FOSI/bioethics/A000002145.cfm>.

[A Good Reason for Evil](#)

This article by Gregory Koukl of Stand to Reason discusses the problem of evil. According to Koukl, evil doesn't cause our bad actions but our actions are what cause evil. Thus, God is not the cause of evil, but our only hope for something better. Go to <http://www.str.org/site/NewsArticle&id=5903>.

[Challenging Darwin's Myths](#)

By today's rules, criticism of Darwinism is unscientific. But, is Darwinism so obviously true that no honest person could doubt it? Is creationism so unscientific that no reasonable person could embrace it? This article by Mark Hartwig discusses the reasons why the answers to those questions is a resounding no. Go to: <http://www.citizenlink.org/FOSI/origins/A000001481.cfm>.

[ID Scientist Denied Tenure](#)

Astronomer Dr. Guillermo Gonzalez, a Seattle Chapter member while at the UW, has been denied tenure by Iowa State University. For the latest news on his situation go to: <http://www.discovery.org/scripts/viewDB/index.php?command=view&id=2939&program=CSC%20-%20Views%20and%20News>.

[Help for Parents](#)

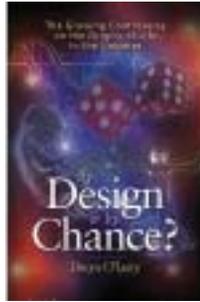
This Focus on the Family article discusses what you can do when your child's school hosts an event you find objectionable. Go to: <http://www.citizenlink.org/FOSI/education/A000004291.cfm>.

Book Reviews

By Design or by Chance?

Denyse O'Leary
Castle Quay Books, 2004

Reviewer: Mike Brown



Denyse O'Leary has been a freelance writer since 1971. She specializes in science news of interest to faith communities for such publications as *Christianity Today*, *Faith Today* and *Christian Times*. She has also published other books such as *Faith@Science: Why Science Needs Faith in the Twenty-First Century*.

The book is well written and an easy read for the average person. It is chock full of boxes that provide additional information, charts, quotes, etc. When I got to the section on young-earth creationism, it seemed she was advocating the YEC position. By the time I had finished the book I realized that was not the case. She revealed in the last chapter that she is an evangelical Anglican with personal views similar to Michael Behe's, who believes in common descent, but that descent was designed—not the result of random mutations and natural selection.

The book is divided into four sections: 1) the evidence for design in the universe; 2) the evidence for design in life; 3) the history and influence of creationism; and 4) the challenges ID faces if it is to be accepted as science. In the last chapter she summarizes the challenges ID presents to different beliefs:

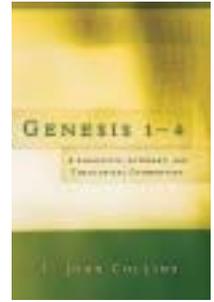
If you are an atheist, you may find the case for Darwinism compelling because no other explanation would suit your view of the world. If you are an ID sympathizer, you need to consider the danger of the idea that design is real ... what if you don't like the design you find? If you are a creationist, you may find ID almost as objectionable as atheism, and for the same reason ... ID does not even attempt a defense of Scripture. If you are a Christian evolutionist, you have made a precarious peace with a science whose backdrop is there is no real design in the universe, which is pretty much the opposite of what traditional Christianity teaches ... unlike Francis Schaeffer, who sought a "God who is there," you must be content with a God who is not there, except as an emotional experience."

The book is available at arn.org and christianbook.com.

Genesis 1 - 4

C. John Collins
P&R Publishing, 2006

Reviewer: Jon Greene



C. John Collins is Professor of Old Testament and department chair at Covenant Theological Seminary. He also served as Old Testament Chairman of the Translation Oversight Committee, for the English Standard Version (ESV), a recent and highly literal Bible translation.

Collins notes that many controversies surround the opening chapters of Genesis and he wrote this book to provide an academically rigorous treatment of the biblical text. In analyzing the text, he seeks to understand the text the way a reader in the original audience (ancient Israel) would have done so taking into account the genre, rhetorical features, grammatical structures, verb tenses, and authorial intent.

Collins devotes four chapters to exegesis of Genesis 1:1-2:3 (The Creation Week), Genesis 2:4-25 (Garden of Eden), Genesis 3:1-24 (The Man and Woman Disobey), and Genesis 4:1-26 (After Eden). He covers such topics as creation from nothing, evening & morning, the created "kinds," the use of the words "create" and "make," the length of the creation week (he favors the analogical days interpretation, which is compatible with the old-earth creation view), the curse, the Genesis genealogies, and death before the Fall.

His exegesis suggests the "days" of creation are God's workdays; they are broadly sequential, successive periods of unspecified length with possible overlap. The creation Sabbath (Day 7) continues into the present. The author of Genesis makes no claim about the age of the universe or earth itself, since there is no discussion of how long God waited between verses 1 & 2 (Genesis chapter 1). One reviewer wrote, "This is a useful corrective to those who insist that the 'days' of creation are 'ordinary days,' as well as to those who hold that the text is merely mythopoetic."

This book provides a scholarly and masterful exegesis of Genesis 1-4. It is a wonderful resource for anyone searching for a thoughtful, informed, and orthodox explanation of the opening chapters of Genesis.

THE RESEARCH

The RATE research projects focused on five issues: helium diffusion rates, isochron discordance, radiohalos, fission tracks and nuclear decay theory.¹⁶ In order to judge the validity of the young-earth claims about RATE, it is important to examine what the RATE team was looking for, what they found, and the significance of their findings.

I. Helium Diffusion Rates

Background

In the 1970s, researchers at the Los Alamos National Laboratory obtained rock samples from a site at Fenton Hill, New Mexico. The researchers extracted small crystals called zircons from several samples and measured the quantity of uranium and lead in them. (Lead is a daughter element of uranium). Based on the uranium and lead in the zircons, the rocks were dated to about 1.5 billion years old.¹⁷

Other samples were sent to the Oak Ridge National Laboratory where researcher Robert Gentry measured the quantity of helium in the zircons. (Helium is a by-product of uranium decay that readily escapes, or diffuses, from rock.) He also estimated the quantity of helium that should have been produced by uranium decay from the quantity of lead in the zircons. By comparing these two values, Gentry concluded that 17 to 58 percent of the helium produced by uranium decay was still in the zircons.¹⁸

Gentry, a young-earth creationist, believed it was impossible for zircons to retain that much helium if the rocks were billions of years old. Thus, he concluded this was evidence the rocks were instantaneously created.¹⁹ Since the publication of Gentry's findings (1982), many young-earth creationists have agreed with him. However, because there were no conclusive measurements of the rate at which helium diffuses from zircon, there was no way to substantiate that belief.

The goal of this RATE study was to measure the helium diffusion rate in zircon.²⁰ What the RATE team expected to find was helium diffuses from zircons much too quickly for rocks containing helium to be billions of years old.²¹ They believed this would demonstrate the uranium decay (that produced the helium) must have occurred recently, thus supporting the accelerated decay hypothesis. Of the five RATE projects, this was given top priority.²²

Approach

The RATE team obtained rock samples from Fenton Hill at depths of 750 and 1,490 meters. One sample was sent to a laboratory that used several zircons to date the rock. Those results agreed with the earlier Los Alamos ages of about 1.5 billion years.²³ From the other samples, zircons were extracted and sent to a researcher to mea-

sure the helium diffusion rate. This was done by heating the zircons to various temperatures and measuring the rate at which the helium was "baked" out of the zircons.

The RATE team used this the data, along with the results of other similar studies, to calculate helium diffusion rates over a wide range of depths and temperatures. Based on these diffusion rates and measurements of the quantity of helium in the zircons, they then determined how long helium diffusion had been taking place in the rock. Initially, they concluded this limited the age of the Fenton Hill rock to between 4,000 and 14,000 years.²⁴ This was later revised to 6,000 ± 2,000 years.²⁵

The RATE team claims these findings provide powerful support for the accelerated decay hypothesis. Because the quantity of lead in the zircons indicates billions of years of uranium decay has occurred, while the helium diffusion data indicates the rock is only thousands of years old, they contend over a billion years of nuclear decay must have occurred sometime in the last 6,000 years.²⁶

Discussion

A number of things cast suspicion on the RATE data. For example, the RATE team assumed all the helium in the zircons was radiogenic (from nuclear decay). However, Fenton Hill is located in a tectonically active area and adjacent to a massive volcanic system known as the Valles Caldera. Tectonic and volcanic events can release helium from the Earth's interior that can migrate to surrounding areas and increase the helium content of zircons. Because the RATE team didn't rule this out, their helium measurements are unreliable.²⁷

Second, the RATE helium diffusion measurements were obtained under a laboratory vacuum, rather than pressures consistent with the depths of the samples. More helium will diffuse from a bare zircon in a laboratory vacuum, than a zircon deep within the Earth. In fact, studies have shown gas diffusion rates may decrease by three to six orders of magnitude (1,000 to 1,000,000 times) if studies are performed under pressure rather than in a vacuum.²⁸ Thus, actual helium diffusion rates are likely much lower, making the rock much older than they determined.

Third, the RATE team assumed subsurface temperatures at Fenton Hill have been constant over time. However, the history of Fenton Hill includes numerous heating and cooling events. This is important because helium diffusion is also affected by temperature. During hot events, radiogenic helium can rapidly escape from rock. During cool events, nonradiogenic helium can contaminate the rock. As a result, the RATE constant-temperature assumption is too simplistic and ignores the role thermal variations can play in the helium content of the zircons.²⁹

Fourth, some of the RATE calculations appear to be faulty.³⁰ The

RATE team also refers to the Fenton Hill samples as granodiorite–igneous rocks that crystallize from melts deep below the surface of the Earth.³¹ However, scientific literature indicates most of the Fenton Hill rock is gneisses—former igneous or sedimentary rocks that have been metamorphosed under relatively high temperature and pressure. Because gas diffusion rates can vary significantly for different types of rock, this could have introduced errors into their equations.³²

These are but a few of the issues that have been raised about this RATE project.³³ Scientific studies do not mean much until the results have been confirmed by other researchers. However, this is impossible because the research paper published by the RATE team lacks a thorough explanation of the methodology, including the assumptions made in the calculations and a full disclosure of all the data.³⁴ Given the small sample size and the lack of independent peer review, there is good reason to be cautious about the RATE findings. The study may provide the basis for further research, but not for drawing firm conclusions about helium diffusion in zircon.

II. Isochron Discordance

Background

Rocks that contain certain daughter elements usually contain nonradiogenic isotopes of that element (isotopes not from nuclear decay). In isochron dating, scientists determine the quantity of the parent element, daughter element and nonradiogenic isotope in a sample. They then plot the ratios of the parent and daughter element to the nonradiogenic isotope on a graph. From this, they can determine the quantity of the daughter element that was in the rock initially and, from that, the age of the rock.³⁵ There are two kinds of isochrons: mineral and whole rock. Mineral isochrons use samples consisting of a single mineral, whole rock isochrons use samples containing many different minerals. The agreement of whole rock and mineral isochrons usually indicates the age obtained is good and the rock system has not been disturbed.³⁶

The goal of this RATE study was to use several different isochron dating methods to date a body of igneous rock (rock formed from magma). What the RATE team expected to find was different dating techniques would produce different ages for the rock. The RATE team believed this discordance would demonstrate the constant decay rate assumption of radiometric dating is invalid, thus supporting the accelerated decay hypothesis.³⁷

Approach

The RATE team obtained rock samples from the Beartooth Mountains of Wyoming and the Bass Rapids sill in the Grand Canyon. The Beartooth Mountain rock consisted of a single

sample; the Bass Rapids rock eleven samples. The samples were sent to commercial laboratories and dated using four dating techniques: potassium-argon, rubidium-strontium, samarium-neodymium and lead-lead. Both whole rock and mineral isochrons were performed on most of the samples.³⁸

The published age for the Beartooth Mountain rock is 2.79 billion \pm 35 million years (based on rubidium-strontium whole rock isochron dating).³⁹ The RATE results were:

- potassium-argon whole rock isochron age of 2.01 billion \pm 45 million years and mineral isochron ages of 1.52 billion \pm 31 million years to 2.62 billion \pm 53 million years;
- rubidium-strontium mineral isochron age of 2.52 billion \pm 110 million years;
- lead-lead mineral isochron age of 2.69 billion \pm 9 million years;
- samarium-neodymium mineral isochron age of 2.89 \pm 190 million years.⁴⁰

The published age for the Bass Rapids rock is 1.07 billion \pm 30 million years (again based on rubidium-strontium whole rock isochron dating).⁴¹ The RATE results were:

- potassium-argon whole rock isochron age of 841 \pm 164 million years;
- rubidium-strontium whole rock isochron age of 1.06 billion \pm 46 million years and mineral isochron ages of 1.01 billion \pm 79 million years to 1.08 billion \pm 34 million years;
- lead-lead whole rock isochron age of 1.25 billion \pm 130 years and mineral isochron age of 1.33 billion \pm 230 million years; and
- samarium-neodymium mineral isochron ages of 1.33 billion \pm 360 million years to 1.38 billion \pm 140 million years.⁴²

The RATE team claims these findings demonstrate the constant-decay-rate assumption of radiometric dating is invalid. They contend the scatter in the ages obtained by the various dating techniques is evidence decay rates were greater in the past with different isotopes experiencing different levels of accelerated decay.⁴³

Discussion

This study is based on the premise that radiometric dating techniques must always yield concordant ages for radiometric dating to be valid. Most often, radiometric dating results do agree. However, the Earth's surface is constantly being rearranged through volcanism, tectonics and erosion. Such rearranging cannot occur without impacting some of the isotopes in rocks.⁴⁴ As a result, it is perfectly reasonable that different isotope systems will yield different ages when rock has experienced certain geologic events.

Both the Beartooth Mountains and the Bass Rapids sill are known to yield discordant ages based on previous studies.⁴⁵

The history of the Beartooth Mountains includes numerous heating and metamorphic events.⁴⁶ Rock that has undergone metamorphism (recrystallization) is known to produce discordant dating results because heat scrambles the isotope systems.⁴⁷ As a result, the Beartooth Mountain results are about what would be predicted.⁴⁸ The samarium-neodymium system produced an older age (although within the error margins of the published age) because it is resistant to heat. The potassium-argon system produced a younger age because argon gas escapes and the clock is reset when rock is heated. Likewise, the lead-lead mineral isochron yielded a younger age because uranium and lead are not well retained in many minerals. The reason the rubidium-strontium mineral isochron yielded a younger age is strontium does not fit well into the crystal structure of some minerals.⁴⁹

For the Bass Rapids rock, the situation is entirely different. The Bass Rapids sill was formed when magma (lava) intruded earlier rock and solidified. This is the event that set the clock for most of the isotope systems. Thus, rather than exhibiting discordance, nearly all of the ages fall within the error margins of the published age.⁵⁰ One exception is the potassium-argon system that yielded a younger age and can be attributed to argon loss during subsequent events in the area. The other exception is the samarium-neodymium method that yielded older ages. Because this isotope system is more resistant to heat, this is likely the minimum age of the source of the flows that produced the Bass Rapids sill.

A few examples of discordant dating results do not prove radiometric dating is invalid. All they indicate is the dating methods are not infallible because each isotope system has unique characteristics.⁵¹ To prove radiometric dating is invalid, the RATE team must demonstrate different dating methods produce different ages most of the time. This is a tall order because tens of thousands of well-documented radiometric measurements have been conducted on rock from around the world with concordant results.⁵² Given the body of evidence that supports radiometric dating, the results for a handful of samples from two locations are statistically meaningless.

III. Radiohalos

Background

Some minerals have crystal structures that can accommodate varying amounts of uranium. When these minerals are enclosed in certain other minerals, they can develop spherical discolorations called radiohalos. Radiohalos are caused by radiation damage and often consist of several concentric rings. They form as the temperature of the magma drops below about 150°C (known as

the annealing temperature). If the rock is later reheated above the annealing temperature, the radiohalos disappear as the crystal atoms realign themselves and repair the defects.⁵³

Radiohalos are well known in geological literature and were brought to prominence by the 1980 book, *Creation's Tiny Mystery*, by Robert Gentry.⁵⁴ Gentry, a young-earth creationist, believed radiohalos represent different isotopes because the alpha particles emitted by the isotopes in the uranium decay chain have different energies and travel different distances.⁵⁵ Thus, he proposed that radiohalos from the decay of uranium-238 could be classified into four types: a single-ringed halo corresponding to polonium-210, a two-ringed halo corresponding to polonium-214, a three-ringed halo corresponding to polonium-218, and an eight-ringed halo corresponding to uranium-238.⁵⁶

Based on this classification, Gentry identified what he called “parentless” polonium radiohalos—polonium halos with no uranium rings. Gentry claimed these radiohalos could only have formed after the minerals had cooled below the annealing temperature and before the polonium decayed away. Given the short half lives of the three polonium isotopes (three minutes for polonium-218, 164 microseconds for polonium-214 and 138 days for polonium-210), Gentry concluded parentless polonium radiohalos were powerful evidence the rock was instantaneously created during the Creation week.⁵⁷

The goal of this RATE study was to determine the geological distribution of parentless polonium radiohalos and their relationship to the other radiohalos. The RATE team believed these findings would allow them to make inferences about the process of radiohalo formation to support the accelerated decay hypothesis.⁵⁸

Approach

The RATE team obtained samples from three types of rock: Precambrian granite which they classify as pre-Flood rock, Paleozoic/Mesozoic granite which they classify as Flood rock, and Cenozoic granite which they classify as post-Flood rock. Biotite (a mineral in the mica family) was removed from the samples and separated into thin layers. These flakes were then mounted on slides and examined for radiohalos.⁵⁹

The RATE team found the Paleozoic/Mesozoic samples contained significantly more radiohalos than the Precambrian and Cenozoic samples—both uranium radiohalos and parentless polonium radiohalos. They claim this is powerful evidence of accelerated decay during the Flood. They contend the large number of parentless polonium radiohalos in the Paleozoic/Mesozoic samples is evidence the rock formed very rapidly (based on the half-lives of the polonium isotopes); while the uranium radiohalos in the samples indicate at least 100 million years of radioactive decay occurred

during the Flood.⁶⁰

Discussion

There are a number of things to consider about this study. First, the RATE team assumed Gentry's classification of radiohalos is reliable. However, the correlation of radiohalo rings with specific isotopes in the uranium decay chain is actually quite speculative. There is no evidence radiohalos are the product of alpha particle decay and radiohalos have a number of features which cannot be reconciled with Gentry's model.⁶¹ As a result, any conclusions based on Gentry's classification must be considered tentative.

Second, scientists believe so-called parentless polonium radiohalos result from the migration of radon-222 in rock.⁶² (Radon-222 is a decay product of uranium and a precursor to the polonium). The RATE team agrees with this view. However, they contend the radon migration had to occur while the granite was cooling; then once the radon decayed to polonium, the temperature of the rock had to drop below the annealing temperature for the polonium radiohalos to form. Based on the short half-lives of radon (3.8 days) and the polonium isotopes (seconds to days), they conclude the Paleozoic/Mesozoic granite had to form in a matter of days.⁶³

The problem with the RATE timetable is the migration of uranium decay series isotopes (including radon) is known to occur in solid rock.⁶⁴ As a result, there is no time restriction on when the radon migration could have occurred. Equally important, the Paleozoic/Mesozoic samples contained mature uranium radiohalos, often in close proximity to the polonium radiohalos.⁶⁵ These uranium radiohalos indicate the rock must have cooled below the annealing temperature long before the polonium radiohalos formed (since radon and polonium come from the decay of uranium).

Third, the RATE conclusions hinge on their classification of the Paleozoic/Mesozoic strata as Flood rock. While the RATE team admits the exact boundaries of how the geologic column relates to the Flood are still under investigation,⁶⁶ for the purposes of this study they claim:

- Precambrian rock (dated 4.5 billion to 543 million years old) is pre-Flood deposits,
- Paleozoic rock (dated 543 to 248 million years old) is early Flood deposits,
- Mesozoic rock (dated 248 to 65 million years old) is mid to late Flood deposits, and
- Cenozoic rock (dated 65 million years old to present) is late and post Flood deposits.⁶⁷

However, such a division is unworkable. The Precambrian contains only simple sea creatures, the Paleozoic contains insects and small primitive land creatures, the Mesozoic contains fossils of every

dinosaur, and the Cenozoic contains the vast majority of mammal fossils. Therefore, based on the fossil record, dinosaurs would have survived global floodwaters for over six months and mammals for nearly a year.⁶⁸ Such a scenario is unbelievable, but it is totally absurd when accelerated decay is added to the equation. If a burst of millions of years of decay occurred early in the Flood, the heat from the radiation would have been many tens of thousands of degrees and the Earth would have been molten.⁶⁹ Obviously, any water on the surface would have vaporized, ruling out the possibility of a global flood.

Fourth, the RATE team contends the small number of radiohalos in the Precambrian (pre-Flood) granite is due to the fact the rock was heated above the annealing temperature during the Flood.⁷⁰ However, according to the RATE model, this granite would only have been a few thousand years old at the time of the Flood. As a result, nearly all of the original uranium-238 would have still been in the rock (due to its long half life). Therefore, if accelerated decay occurred early in the Flood, this rock should contain a comparable number of radiohalos as the Flood rock because it would have experienced a similar level of accelerated uranium decay.

The RATE conclusions are based on a compounded set of assumptions. These assumptions are not derived from empirical data, but from the young-earth view of Earth history. Until the RATE team can demonstrate the validity of these assumptions, the study findings do little to prove the accelerated decay hypothesis.

[End of Part 1. Part 2 will appear in August.]

Greg Moore is president of the Seattle Chapter of Reasons to Believe. He is a trained RTB apologist and works for the city of Everett, WA.

REFERENCES

1. Mike Riddle, "RATE Strikes at the Heart of Evolution," September 2005, <http://www.answersingenesis.org/docs2005/0913RATE.asp> (May 12, 2006); Larry Vardiman, "What Comes after RATE?" September 2005, <http://www.icr.org/article/2468> (May 12, 2006); Jason Lisle, "RATE Research Reveals Remarkable Results—a Fatal Blow to Billions of Years," November 2005, <http://www.answersingenesis.org/docs2005/1107rate.asp> (May 12, 2006).
2. Riddle.
3. Institute for Creation Research: <http://www.icr.org/discover/>; Creation Research Society: http://www.creationresearch.org/about_crs.htm.
4. Larry Vardiman, "Rate Group Prepares Status Report," August 1999, <http://www.icr.org/article/443/> (May 14, 2006). AIG's contribution included providing the expertise of Andrew Snelling. When he went to work for ICR, the project reverted to a joint project of ICR/CRS.
5. Don DeYoung, *Thousands...Not Billions* (AR, Master Books,

- 2005) p.18.
6. Troy Britain, transcript of Larry Vardiman presentation to the "Question of Age: Conference on Creation, the Bible and Science," April 2006, <http://www.calvin.edu/archive/asa/200605/0153.html> (April 4, 2006).
 7. Larry Vardiman, Andrew A. Snelling, Eugene F. Chaffin, *Radioisotopes and the Age of the Earth* (CA, Institute for Creation Research, 2000).
 8. Larry Vardiman, Andrew A. Snelling, Eugene F. Chaffin, *Radioisotopes and the Age of the Earth-Volume II* (CA, Institute for Creation Research, 2005); Don DeYoung, *Thousands...Not Billions* (AR, Master Books, 2005).
 9. Britain.
 10. Vardiman, "Rate Group Prepares Status Report."
 11. Riddle.
 12. DeYoung, pp.22-23.
 13. Roger C. Wiens, "Radiometric Dating: A Christian Perspective," 2002, <http://www.asa3.org/ASA/resources/Wiens.html> (May 12, 2006).
 14. Ibid.
 15. Wiens.
 16. Vardiman, "Rate Group Prepares Status Report."
 17. Russell Humphreys, "Nuclear Decay: Evidence for a Young World," October 2002, <http://icr.org/article/302/> (April 20, 2006).
 18. Russell Humphreys, et al., "Helium Diffusion Rates Support Accelerated Nuclear Decay," October 2003, http://icr.org/pdf/research/Helium_ICC_7-22-03.pdf (April 26, 2006).
 19. R. V. Gentry, G. J. Glish, and E. H. McBay, "Differential helium retention in zircons: implications for nuclear waste management," *Geophysical Research Letters* 9(10):1129-1130, October 1982.
 20. Russell Humphreys, "New Rate Data Support a Young World," December 2003, <http://www.icr.org/article/114/> (April 26, 2006).
 21. Vardiman, "Rate Group Prepares Status Report."
 22. John Morris, "Rate Group to Release Book (#200008), December 2005, <http://www.icr.org/article/988/> (April 20, 2006).
 23. Humphreys, "Helium Diffusion Rates Support Accelerated Nuclear Decay."
 24. Ibid.
 25. Humphreys, "New Rate Data Support a Young World."
 26. DeYoung, p.78; Russell Humphreys, et al., "Helium Diffusion Age of 6,000 Years Supports Accelerated Nuclear Decay, CRSQ, Vol. 41, No. 1, June 2004, http://www.creationresearch.org/crsq/articles/41/41_1/Helium.htm (April 26, 2006).
 27. Kevin Henke, "Young-Earth Creationist Helium Diffusion Dates: Archived Original Version," March 2005, <http://www.talkorigins.org/faqs/helium/original.html> (April 21, 2006); Kevin Henke, "Young-Earth Creationist Helium Diffusion Dates: Fallacies Based on Bad Assumptions and Questionable Data," November 2005, <http://www.talkorigins.org/faqs/helium/zircons.html> (April 21, 2006).
 28. Ibid.
 29. Ibid.
 30. Talk Origin Archive, "Claim CD015," March 2005, <http://www.talkorigins.org/indexcc/CD/CD015.html> (May 21, 2006).
 31. Humphreys, "Helium Diffusion Rates Support Accelerated Nuclear Decay."
 32. Talk Origin Archive, "Claim CD015."
 33. Henke; Talk Origin Archive, "Claim CD015"; Timothy Christman, "Critique of the RATE Group's Zircon-Helium Diffusion Project, http://www.answersincreation.org/RATE_critique_he-zr.htm (June 14, 2007)
 34. Greg Neyman, "Thousands...Not Billions, Chapter 4," 2006, http://www.answersincreation.org/bookreview/tnb/thousands_not_billions_chapter4.htm, (March 21, 2006); Talk Origin Archive.
 35. Wikipedia, "Isochron Dating," http://en.wikipedia.org/wiki/Isochron_dating (December 20, 2006); Lenny Flank, "Radio-Dating and the Creation Scientists," <http://www.geocities.com/CapeCanaveral/Hangar/2437/radiodte.htm?200627> (May 27, 2006).
 36. "Evidences for a Recent Creation," December 2003, <http://www.cs.unc.edu/~plaisted/ce/Evidences.htm>, (May 4, 2007).
 37. Vardiman, "Rate Group Prepares Status Report."
 38. DeYoung, p.113.
 39. Ibid., p.115.
 40. Ibid.
 41. Ibid., p.117.
 42. Ibid.
 43. Ibid, p.120.
 44. Wiens; The Talk Origins Archive, "Claim CD014."
 45. Neyman, "Thousands...Not Billions, Chapter 7," 2006, http://www.answersincreation.org/bookreview/tnb/thousands_not_billions_chapter7.htm, (March 21, 2006).
 46. Darrell Henry and Dave Mogk, "Selected Features of the Precambrian Rocks of the Eastern Beartooth Mountains, Montana and Wyoming," http://serc.carleton.edu/files/NATGWorkshops/petrology03/Selected_Features_of_Beartooths.doc (June 13, 2007).
 47. Chris Stassen, "Isochron Dating," 1994, <http://www.talkorigins.org/faqs/isochron-dating.html#cogenetic> (April 25, 2006).
 48. J. G. Meert, "More Faulty Creation Science from the Institute for Creation Research," February 2003, <http://gondwanaresearch.com/rate.htm> (April 12, 2006).
 49. Wiens.
 50. DeYoung, p.117.
 51. Brent Dalrymple, "Radiometric Dating Does Work!" 2000, http://www.ncseweb.org/resources/rncse_content/vol20/4180_radiometric_dating_does_work_12_30_1899.asp (April 27, 2006); Brent Dalrymple, "How Old is the Earth: A Response to Scientific Creationism," 1984, http://talkorigins.org/faqs/dalrymple/scientific_age_earth.html (April 27, 2006).

52. Ibid.
53. Thomas Baillieul, "Polonium Haloes Refuted," April 2005, <http://talkorgins.org/faqs/po-halos/gentry.html> (April 21, 2006).
54. Robert Gentry, *Creation's Tiny Mystery* (Earth Science Associates, Knoxville, 1988).
55. Baillieul.
56. Tas Walker, "New Radiohalo Find Challenges Primordial Granite Claim," April 2001, <http://www.answersingenesis.org/tj/v15/i1/radiohalo.asp> (April 10, 2007).
57. Andrew Snelling, "Polonium Radiohalos: Still 'A Very Tiny Mystery'" August 2000, <http://www.icr.org/article/471> (April 27, 2006).
58. Vardiman, "Rate Group Prepares Status Report."
59. DeYoung, pp.88-89.
60. Ibid., pp. 91-92; Andrew Snelling, "Radiohalos—Significant and Exciting Research Results," November 2002, <http://www.icr.org/article/301/> (April 20, 2006).
61. Baillieul; Brent Dalrymple, "Creation's Tiny Mystery," March 1985, <http://www.halos.com/book/ctm-app-18.htm> (May 4, 2007)..
62. Lorence Collins, "Polonium Halos and Myrmekite in Pegmatite and Granite," February 1997, <http://www.csun.edu/~vcge0005/revise8.htm> (April 11, 2007).
63. Andrew Snelling and Mark Armitage, "Radiohalos—A Tale of Three Granitic Plutons," 2003, <http://www.icr.org/research/ICCRADIOHALOS-AASandMA.pdf> (April 12, 2007).
64. Collins.
65. DeYoung, p.94-95.
66. Ibid., p.89.
67. Ibid.
68. Neyman, "Thousands...Not Billions, Chapter 5," 2006, http://www.answersincreation.org/bookreview/tnb/thousands_not_billions_chapter5.htm, (March 21, 2006).
69. Joe Meert, "Were Adam and Eve Toast?" March 2002, <http://gondwanaresearch.com/hp/adam.htm> (March 21, 2007).
70. DeYoung, p.90.



Seattle Chapter Reasons To Believe

Who Are We?

The Seattle Chapter of Reasons To Believe is a local extension of the worldwide, interdenominational Reasons To Believe ministry. We exist to support our parent organization and foster local involvement in the ministry. We serve the Puget Sound area and are composed of Christians of different ages and backgrounds.

It is our conviction that the same God who created the universe inspired the Bible. Therefore, what God says through His word must agree with the facts of nature. We reject the notion that science and the Bible are at odds and provide a scientifically-sound and Biblically-faithful alternative to Darwinism and young-Earth creationism.

What Do We Do?

Our mission is to remove the doubts of skeptics and strengthen the faith of believers. We provide scientific, historical and philosophical evidence that supports the Christian worldview and helps remove barriers to a belief in God, the Bible and the Gospel of Jesus Christ. We carry out this mission by:

- Helping people access RTB and other scientifically and biblically sound resources.
- Bringing nationally-known speakers into the area to promote the scientific reliability of the Bible.
- Assembling a team of local apologists to address questions about science, the Bible and related topics.
- Working with teachers and homeschoolers to achieve a balanced approach to the teaching of origins.
- Building alliances with local churches, ministries and groups to maximize the exposure of the RTB ministry.
- Reaching out to unbelievers with gentleness and respect, encouraging them to evaluate their worldviews.

We welcome your involvement and support. For more information, contact us at seattle@reasons.org. Tax-deductible donations can be sent to: Seattle RTB, PO Box 99683, Seattle, WA 98139-0683.

Questions? Get Answers.

Whether you are looking for scientific support for your faith or answers to questions about God, the Bible, and science, contact us at seattle@reasons.org. You can also call the RTB hotline seven days a week, 5:00 to 7:00 PM at 626-335-5282.