Isaac Exchange

RATE Responds to the Isaac Essay Review

Randy Isaac published an essay review on *Radioisotopes and the Age of the Earth, Vol. II* in the June 2007 issue (pp. 143–6). The members of the RATE group who conducted the research and published this work representing the Institute for Creation Research and the Creation Research Society appreciate the thoroughness with which Isaac reviewed our report and his investment of time. However, we disagree with his accusations of deception and lack of integrity in claiming that our data affirm a young earth. Thank you for allowing us to defend ourselves against these charges and briefly respond to some of the more serious technical issues he raised.

Although our research on radioisotopes and the age of the earth is a work in progress, we discovered several major evidences for *accelerated nuclear decay* during the eight-year project, and therefore we felt justified reporting them as we did. Even though a full understanding of the mechanism of accelerated decay is not yet complete, we wanted to encourage others that the apparent conflict between the billions of years of earth history commonly espoused by conventional science and the thousands of years declared by Scripture seems to be resolvable. We were careful to point out not only the evidence that supports our theory of accelerated decay, but to also state explicitly where we still had problems and shortcomings. To accuse the RATE group of deception and lack of integrity for concluding that the earth is young based on our evidence is like requiring Isaac Newton to delay publishing his law of Gravity because he could not explain the mechanism of gravitational attraction. We believe the rate of helium diffusion from zircons, the presence of polonium radiohalos near uranium radiohalos in granite, the discordance of isochron dates among multiple conventional dating methods, and the presence of measurable concentrations of carbon-14 in coal and diamonds as explicated in our book provide strong evidence for a young earth. To weakly assert the significance of this evidence would not only do a great disservice to Christians but also to the advancement of science.

In response to Isaac's specific technical criticisms of the RATE research, we encourage the reader to find the details in our reports and evaluate for themselves if we have presented evidences that are *"… not based on any accepted scientific methodology"* and *"… are not reliable for dating"* (p. 145). The methods in our report are widely used for dating of rocks and minerals. Our report carefully applies accepted geochronological practices, discovers new evidence for rapid nuclear decay, points out inconsistencies in conventional interpretations, and calculates alternative, young-earth dates. We address most of the criticisms which he raises in detail either in our book or in published research reports and show that they are invalid. For example, his criticism that our helium diffusion measurements made for zircon crystals in a laboratory vacuum do not apply to high-pressure conditions found underground is refuted in Humphrey's article, *Helium Evidence for A Young World Overcomes Pressure,* www.trueorigin.org/helium02.asp. The bottom line is that external pressure has practically no effect on diffusion rates in crystals when they are hard. Zircons are some of the hardest crystals known. Diffusion rates in our zircons were influenced far less than one percent by removing them from underground pressures to a vacuum chamber.

Isaac made the statement that "*the presence of uranium also seems to provide a reasonable explanation for the source of the polonium and polonium halos with normal decay rates and standard ages of granite"* (p. 144). He apparently does not recognize that below the annealing temperature of 150°C, hydrothermal convective systems can only last for a short time. Laboratory observations show that water below that temperature will flow through the biotite for only a few months, certainly not for millions of years. Uniformitarian rates of decay in a uranium halo fall vastly short of producing the hundreds of millions of water-transported polonium atoms needed to make a fully-developed polonium halo, particularly for polonium-214 and polonium-218 radiohalos. Because of their extremely short half-lives, on the order of days to months, only accelerated decay will work.

In his critique of the chapter, Do Radioisotope Clocks Need Repair? Isaac faults the authors, *"… they fail to explain why there are so many cases where there is good concordance of isochrons …"* (p. 144). Again, he says the RATE authors, *"… fail to invalidate the vast amount of concordance"* (p. 144). Isaac needs to provide documentation from technical literature where *vast amount of concordance* is established. Does he have examples of concordant isochrons between U-Pb, Sm-Sr, Rb-Sr and K-Ar in suites of earth rocks? If he has such documentation of a vast amount of concordance, he could easily trivialize the RATE researcher's statements about discordant isochrons. If Isaac could provide this documentation, he would have one of the strongest arguments in favor of the accuracy of radioisotope ages. Good scholarship and scientific integrity require documentation of such statements.

The RATE group shows large *discordances* in isochron estimates of the age of rocks and minerals to be normative and as large as factors of two or three in some cases, much larger than the 15% Isaac stated in his review. These discordances were far outside the usual statistical confidence limits. We believe such common mismatches show

large differences in decay rates depending on decay type and atomic weight. These consistent trends may be hints of a mechanism of accelerated decay. The large discrepancies invalidate the usual isochron ages, requiring an extensive overhaul of the conventional analysis to account for variable decay rates.

The basic argument for a young earth from the presence of carbon-14 in coal and diamonds is that they cannot be older than about 50,000 years even using uniformitarian assumptions about the concentration of atmospheric carbon-14. These dates are young compared to the millions or billions of years conventionally assumed. Isaac's criticism of circular reasoning in estimating a biblical age of 5,000 years does not apply to our basic premise. His concerns about contamination were considered in our reported results by subtracting an experimentally-determined standard background from the measurements. *Contamination* becomes unlikely when one considers that roughly the same amount of radiocarbon has been reported in over seventy published measurements of fossil carbon from a wide variety of materials, depths, and sites all over the world. His alternative hypothesis for the presence of carbon-14 due to the interaction of neutrons with nitrogen impurities in diamonds would require a neutron flux four orders of magnitude higher than the largest fluxes observed deep underground, as we pointed out on pages 614–6.

We believe the four primary evidences for accelerated decay stand on their own merit. This does not mean that we have solved all the problems, far from it. The primary concern openly admitted by the RATE group is the disposal of the large amount of heat if the decay processes were multiplied by a factor of one million or so during the Flood. We discussed this frankly and suggested at least one possible solution—cosmological cooling. There are other problems such as the radiation problem and the exact explanation of the mechanism of accelerated decay. Isaac stated that we assumed that *"C-14 did not have an accelerated decay constant while heavier nuclei did"* (p. 145). What we assumed was that the C-14 decay would not be accelerated as much as heavier elements. This assumption is supported by more recent research which shows that variation in the strength of the nuclear force would not affect the C-14 nucleus as much due to weak or nonexistent pairing forces in light nuclei such as C-14 (Chaffin, paper submitted to the 2008 International Conference on Creationism). We discussed some of these issues and problems in great detail in our book and offered suggestions on several others.

Rather than name calling and putting down quality scientific progress because we have not answered all of the questions, we would encourage Isaac and the ASA to recognize good science when it occurs and join us in advancing research on the problems yet to be overcome. Since reporting the RATE results, we have been encouraged to hear of work being done in various university and government laboratories on accelerated decay, particularly as applied to the disposal of radioactive waste. It would be a feather in the cap of Christian scientists of all stripes if we were to make a contribution to such an important topic as the age of the earth. We could claim a more accurate understanding of earth's history and contribute to advances in conventional science and its applications. And, most importantly, we could increase confidence in the Word of God. Will you not join us?

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Isaac Replies

We share with the RATE team the fundamental belief in the doctrine of creation and we unite with them in worshiping God our Creator. We agree that an accurate study of God's book of nature will reveal a story of the creation that is complementary and not contradictory to the inspired book of Scriptures. As an important step toward quality in such a scientific endeavor, we encourage the RATE team to ensure that all work is published in relevant peer-reviewed technical literature prior to being publicly claimed as a scientific result. Henry Morris, Jr., writing in an appendix to the introduction in the RATE Vol. II report, deems it sufficient to obtain reviews from those preselected to be committed to a young-earth conclusion.[1]

Christian leaders from St. Augustine to contemporary evangelical theologians have maintained that there is no clear teaching of the age of the earth in the Scriptures. Christians who agree on the reliability of the Bible can differ on their estimates of the age of the earth as inferred from the Bible. We should distinguish between the clear *teachings* of Scripture and *inferences* which we may draw from biblical texts.

The interested reader is invited to peruse the technical geochronology literature which addresses the key scientific issues raised by the RATE team. Space permits us to reference only a few examples.

The high sensitivity of noble gas diffusion in solids to many factors, particularly grain size and structural phase, is addressed by McDougall and Harrison.[2] They attribute a two order of magnitude higher diffusivity in vacuum measurements to early phase breakdown during heating. In a method known as zircon (U-Th)/He thermochronometry, it is possible to determine the rate at which helium is produced in a zircon from alpha-emitting radioactive elements. The time since a zircon cooled to the closure temperature, when helium outdiffusion became