

Carbon-14 and the Age of the Earth

On August 11-15, 2012, the American Geophysical Union and the Asia Oceania Geosciences Society held a joint meeting in Singapore. On the 13th, a paper was presented entitled, "A Comparison of $\delta^{13}\text{C}$ & pMC Values for Ten Cretaceous-jurassic Dinosaur Bones from Texas to Alaska Usa, China and Europe". (pMC is the percent modern carbon or the $^{14}\text{C}/\text{C}$ ratio as a percentage of what is in the air at present, or more precisely, what would have been in the air in 1950 if it had had the same concentration as 1850. Long story; don't ask.) They are measuring the radiocarbon age of dinosaurs! The rest of the abstract of the paper follows:

Hugh MILLER^{1#+}, Hugh OWEN¹, Robert BENNETT¹, Jean DE PONTCHARRA², Maciej GIERTYCH³, Joe TAYLOR¹, Marie Claire VAN OOSTERWYCH², Otis KLINE¹, Doug WILDER¹, Beatrice DUNKEL¹

¹Paleo Group, United States, ²Paleo Group, France, ³Paleo Group, Poland

#Corresponding author: hugocl4@aol.com +Presenter

Presented here are results of studies comparing $\delta^{13}\text{C}$ and percent of modern ^{14}C (pMC) for various bone fractions such as residual collagen, in-situ CaCO_3 (in bioapatite), etc. from eight dinosaurs from TX to AK and one from China. The Accelerated Mass Spectrometer (AMS) was used for 20 of 22 samples primarily at University of Georgia (USA) with Sensitivity $\geq 50,000$ RC years. All samples were pretreated to remove contaminants. The two large samples were tested on conventional equipment as another cross check.

The $\delta^{13}\text{C}$ range was -20.1 to -23.8 for collagen and -3.1 to -9.1 for CaCO_3 with the pMC range of 6.45 to 0.76 which translates to apparent ages of $22,020 \pm 50$ for CaCO_3 in a *Psittacosaurus* from the Gobi Desert to $39,230 \pm 140$ RC years for CaCO_3 in a *Triceratops* from Montana.

Included in this study were an *Allosaurus*, *Acrocanthosaurus*, *Apatosaurus*, two *Triceratops* and three *Hadrosaurs*. Documentation will include dinosaur verifications, geological formations, $\delta^{13}\text{C}$, pMC's, ^{14}C methodologies and laboratories.

When 2g of a Belgium *Mosasaur* were pretreated to remove contaminants the pMC was 4.68 or 24,600 RC years (Lindgren et al.

2011, PloS ONE, page 9). This *Mosasaur* age was also concordant with pMC's for dinosaurs from TX to AK and China (no $\delta^{13}\text{C}$).

$\delta^{13}\text{C}$ values in this study were similar to dinosaur $\delta^{13}\text{C}$ values from the Judith River formation in Alberta, Canada that also reported $\delta^{15}\text{N}$ but not pMC's (Ostrom et al. 1993, *Geology*, v. 21). Radiocarbon methods are valuable in geochronology (accuracy to $\geq 40,000$ RC years in varved Lake Suigetsu, Japan). Sediments deposit as function of particle size and density, not time in moving waters so this helps explain pMC's in dinosaur bones (Berthault 2002, *Geodesy and Geodynamics* 22, China). Primary areas for further fossil studies would be Alberta, Canada, Gobi Desert and Zhucheng, China.

The presentation was once available on YouTube.¹ The presenters kindly sent me some slides, and two of them follow:

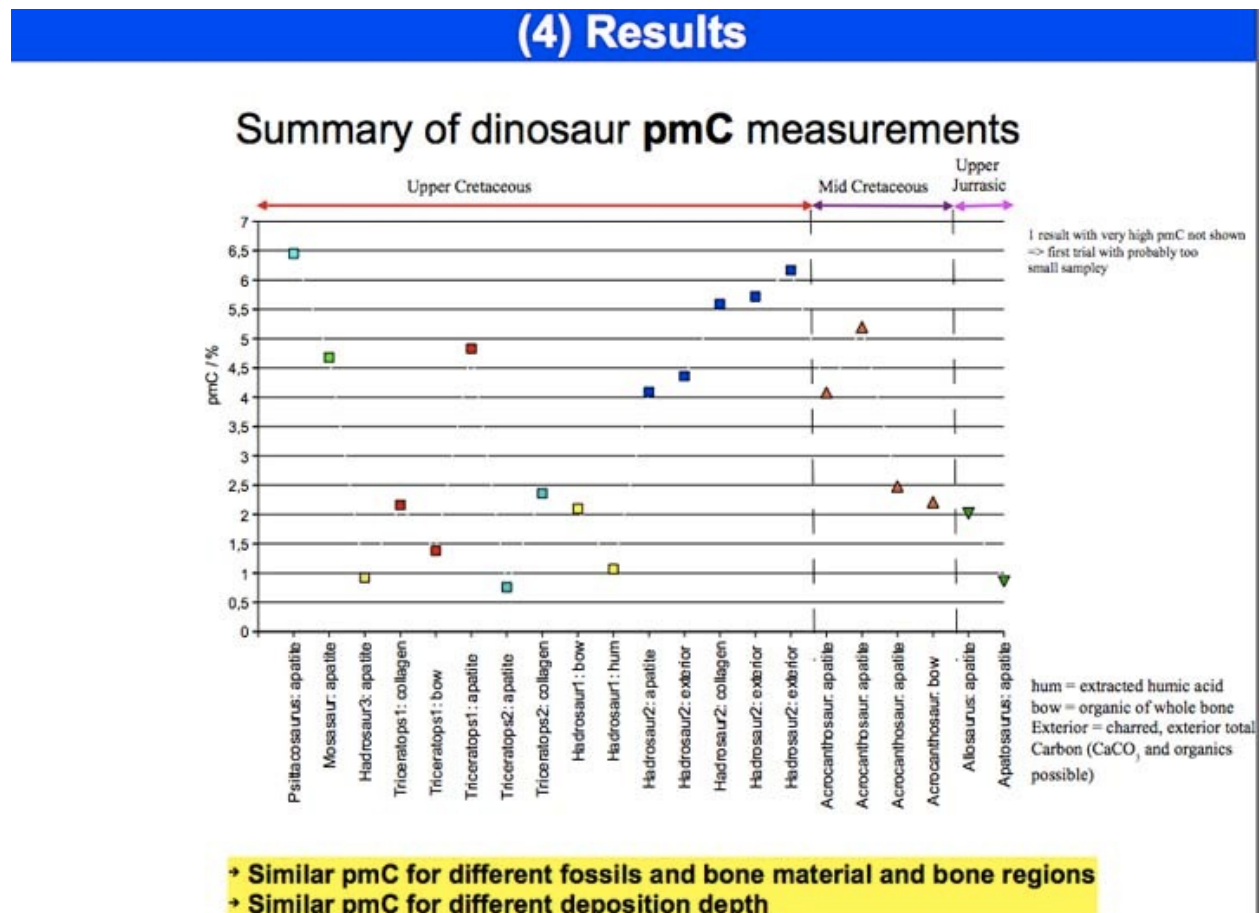


Figure 1. The Hadrosaur measurements are not statistically significantly different from each other; the Hadrosaur 1 measurements are but barely.

¹ <https://www.youtube.com/watch?v=QbdH31UjPQ>, now defunct.

(4) Results

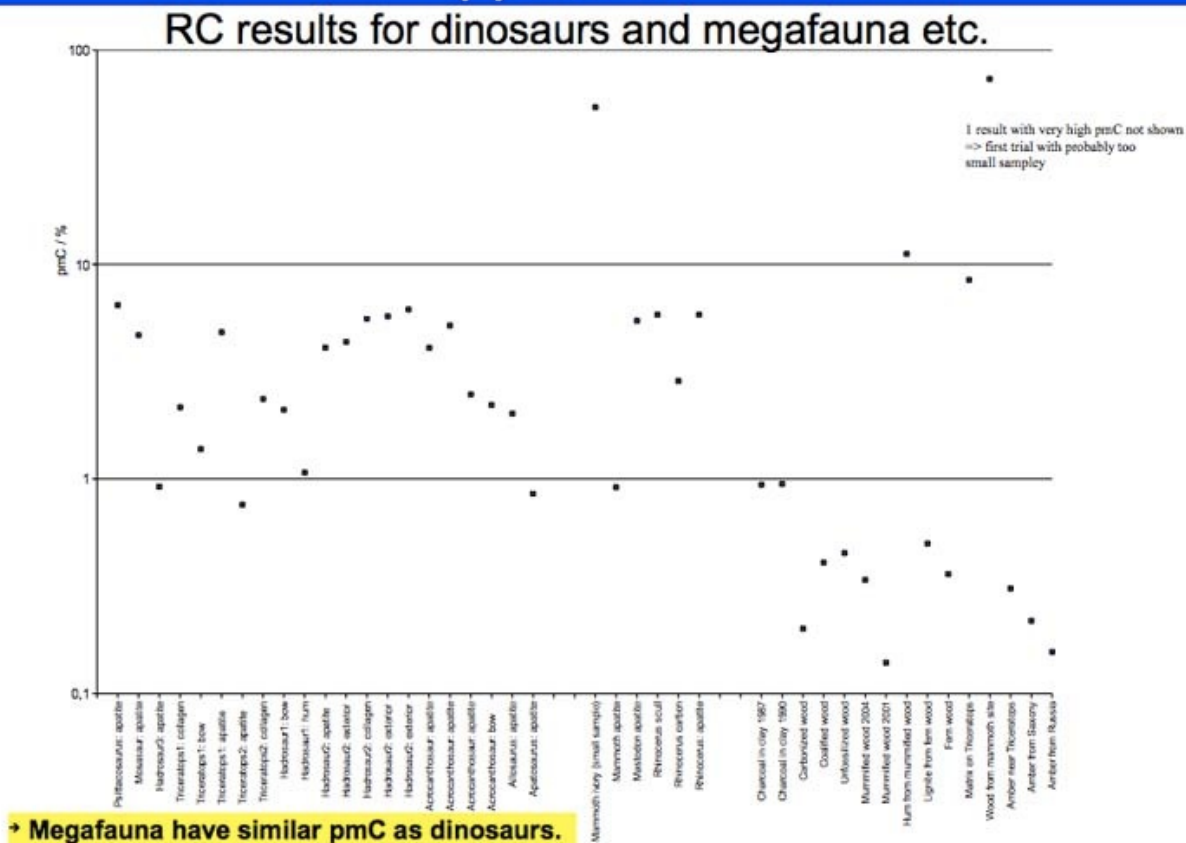


Figure 2. The dinosaur measurements are similar to the mammoth measurements, but noticeably younger than most of the measurements of plant material.

After the presentation, its presence was removed from the online program listings, leading to the subsection's presentations being listed as 1, 2, 3, 4, 6, 7, and 8, and eventually those listings themselves were removed from the internet. The program chairs eventually sent a letter to the presenters, stating in part,

As a result of comments from attendees at the recent AOGS-AGU (WPGM) meeting in Singapore we have examined your abstract which was delivered in session BG-02.

The interpretation which you present in your abstract is that the age of various dinosaurs, previously interpreted as being Mesozoic in age, are less than ~50,000 years. Your report that these ages were calculated using C-14 methods. There is obviously an error in these data. The abstract was apparently not reviewed properly and was accepted in error. For this reason we have exercised our authority as program chairs

and rescinded the abstract. The abstract will no longer appear on the AOGS web site.²

What would make someone go to all that trouble to suppress a paper? Perhaps we should first explain briefly how carbon-14 dating works, then explain the motive for suppressing the presentation by the Paleo Group, then note that their data do not stand alone, but fit into a pattern, then give some recent reactions from some who accept the standard geological time scale, then give a summary and some conclusions.

A brief explanation of how carbon-14 dating works

Carbon-14 dating is dependent on the presence of carbon-14. Carbon-14 is made when neutrons, usually what are known as thermal neutrons, that is, traveling with the same energy as molecules in the air, strike nitrogen-14 in the air. The neutrons themselves are mostly the product of the collision of cosmic rays with various atoms in the atmosphere, which shatter the atoms in question and leave multiple neutrons. However, any source of neutrons will do, including the fission products of uranium, for example, at an atomic bomb detonation which produces multiple neutrons per fissioned nucleus. When a nitrogen-14 nucleus captures a neutron, it usually emits a proton (hydrogen nucleus) and turns into carbon-14. This carbon-14 rapidly is oxidized to carbon-14 dioxide, which mixes in with regular carbon dioxide, first in the atmosphere, then in the rest of the biosphere, which consists of the plants, animals, and surface water including the surface ocean water. The deep water is usually not quite as well-mixed. The concentration of carbon-14 in today's biosphere is approximately 1 part in a trillion (1,000,000,000,000 or 10^{12}). The carbon-14 then slowly decays back to nitrogen-14.

If we assume that the ratio of carbon-14 to ordinary carbon ($^{14}\text{C}/\text{C}$ ratio) in the biosphere has always been constant, we can create a dating method. In the biosphere, plants get carbon from the atmosphere with this $^{14}\text{C}/\text{C}$ ratio, animals eat plants with this $^{14}\text{C}/\text{C}$ ratio (or other animals who ate plants with this $^{14}\text{C}/\text{C}$ ratio, or perhaps after several such steps eventually getting back to this $^{14}\text{C}/\text{C}$ ratio), and then when plants or animals die, or plants lay down wood, the carbon-14 starts to decay but is no longer replenished. Now, the carbon-14 decays at an exponential rate, and if one measures the present $^{14}\text{C}/\text{C}$ ratio in the sample, one can calculate when it matched the $^{14}\text{C}/\text{C}$ ratio in the atmosphere today, which by hypothesis was the $^{14}\text{C}/\text{C}$ ratio in the atmosphere back then also. The formulas in question are:

² See Appendix, Figure 1

$$^{14}\text{C}/\text{C} = (^{14}\text{C}/\text{C})_0 e^{-kt}$$

$$t = \ln ((^{14}\text{C}/\text{C})_0 / ^{14}\text{C}/\text{C}) / k$$

$$\text{(where } k = \ln(2) / t_{1/2}\text{)}$$

$$t_{1/2} = 5,568 \text{ years}$$

We have found that the half life is closer to $5,730 \pm 40$ years, but since we have also found that the $^{14}\text{C}/\text{C}$ ratio is not constant, and we now calibrate by matching the $^{14}\text{C}/\text{C}$ ratio of the unknown sample with one or more samples of “known” age, the calibration automatically corrects for any error in the half-life, and so calibrated ages do not need to take into account the precise half-life. Since much literature is already based on the old half-life, we simply keep the same formula as before, to avoid confusion, and only use the newer half-life when we explicitly say so.

Why the Paleo Group’s Data Had to Be Suppressed

If accurate, the Paleo Group’s data is incompatible with the standard geological time scale. For in only one million years, the entire earth’s weight in carbon-14 would disappear. That’s not just all the carbon-14 in the world; that is all the carbon, nitrogen, oxygen, silicon, aluminum, hydrogen, uranium, lead, and all the other elements, converted into carbon-14

The calculations are relatively easy. One only needs a calculator that can do logarithms. The numbers are as follows:

$$(5.972 \cdot 10^{27} \text{ g [the mass of the earth]} / 14.0 \text{ g/mole [the atomic weight of carbon-14]}) * 6.02 \cdot 10^{23} \text{ atoms/mole [Avogadro’s number]} = 2.568 \times 10^{50} \text{ atoms of carbon-14}$$

$$\log_2 (2.568 \times 10^{50}) = 167.5 \text{ half lives}$$

$$1,000,000 \text{ years} / 5730 \text{ years/half life} = 174.5 \text{ half lives}$$

$$167.5 - 174.5 = -7 \text{ half lives}$$

That means that there are seven half lives to get rid of the last carbon-14 atom, which gives it a 1 in 128 (2^7) chance of surviving, or less than 1%. In fact, at 250,000 years, starting with today’s $^{14}\text{C}/\text{C}$ ratio, there should be less than an atom of carbon-14 per gram of carbon, which should be technically unmeasurable. So if we are finding carbon-14 in 65+ million year old material,

then either there is something wrong with our measuring device, or some kind of contamination is happening, or new carbon-14 is being produced in the sample, or it isn't that old. Period. One can see why a program chairman completely committed to the standard geological time scale would conclude that there must be some mistake, and that the data must be in error.

It might be argued that 20,000 to 40,000 years is still not a short-age creationist date for a Flood. However, remember that what we are measuring is not actually the age, but rather the $^{14}\text{C}/\text{C}$ ratio in the sample. If in the past, the $^{14}\text{C}/\text{C}$ ratio was lower than it is today, this would result in a falsely elevated radiocarbon age. This could happen if there was less carbon-14 in the past than there is today, perhaps because a stronger magnetic field protected better from cosmic rays in the past than it does now. It could also happen if there was much more ordinary carbon in the past than there is now. If, for example, all the coal were once in the biosphere diluting out what ^{14}C there was, the $^{14}\text{C}/\text{C}$ ratio would accordingly be decreased.³ That means that it is possible that a Flood could have happened as recently as 4,300 years ago, from the point of view of the carbon-14 data alone. The date of a Flood would have to be determined on another basis. But even if one insisted blindly that carbon-14 is inconsistent with a traditional date for the Flood, it would still be true that it is also wildly inconsistent with millions of years for the Phanerozoic.

Other Data That Support the Paleo Group's Findings

Residual carbon-14 in fossil carbon has been predicted by creationists at least as far back as 1980.⁴ That same year, another researcher noted carbon-14 in fossil carbon,⁵ but did not deal with the problem of laboratory background. In 1988, another creationist noted that with the then new method of accelerator mass spectrometry (AMS), the laboratory background problem was apparently solvable, but the finding of carbon-14 in fossil carbon persisted.⁶ I noted published data suggesting residual carbon-14, and called for experiments, in

³ See the discussion in Giem P, 2001. Carbon-14 content of fossil carbon. *Origins* 51:6-30. Available at <https://www.grisda.org/assets/public/publications/origins/51006.pdf>

⁴ Butler LG, 1970. A Research Challenge. *Creation Research Society Quarterly (CRSQ)* 7:88-9

⁵ Whitelaw RL, 1970. Time, life, and history in the light of 15,000 radiocarbon dates. *CRSQ* 7:56-71, 83

⁶ Brown RH, 1988. The upper limit of C-14 age? *Origins* 15:39-43. Available at <https://www.grisda.org/assets/public/publications/origins/15039.pdf>

1997.⁷ Andrew Snelling did several carbon-14 dates starting in 1997.⁸ I called for testing creationist models in 2000,⁹ and reviewed the literature in 2001.¹⁰ I then called the attention of the RATE Group to the review, and they launched an evaluation of the carbon-14 content of coal deposits, with preliminary results published in 2003,¹¹ and final results in 2005.¹² Their results are shown in Figure 3. Note that the putative age (Pennsylvanian, Cretaceous, Eocene) of the specimen seems to have little influence on the ¹⁴C/C ratio, nor does the state from which the coal was taken. These results have already had a pMC subtracted from them equivalent to the red line, and therefore are clearly different from zero.

In addition, the RATE Group dated diamonds, the first time this had been done. I initially suggested dating diamonds as they could have very low ¹⁴C/C ratios, and thus the difference between the diamond ¹⁴C/C ratios and the coal ¹⁴C/C ratios, at least, could not be blamed on laboratory error. However, it turned out that at least some diamonds had significant amounts of carbon-14 (see Figure

⁷ Giem PAL, 1997. *Scientific Theology*. Riverside, CA, La Sierra University Press. See especially chapter 5 Available at https://scientifictheology.us/wp-admin/uploads/2017/08/05_The_Pentateuch_and_Joshua.pdf

⁸ Snelling AA, 1997. Radioactive “dating” in conflict! Fossil wood in ancient lava flow yields radiocarbon, *Creation Ex Nihilo*, 20:24-27.

Snelling AA, 1998. Stumping old-age dogma: radiocarbon in an “ancient” fossil tree stump casts doubt on traditional rock/fossil dating, *Creation Ex Nihilo* 20:48–51

Snelling AA, 1999. Dating dilemma: fossil wood in ancient sandstone, *Creation Ex Nihilo* 21:39–41

Snelling AA, 2000. Geological conflict: young radiocarbon date for ancient fossil wood challenges fossil dating, *Creation Ex Nihilo* 22:44–47.

Snelling AA, 2000. Conflicting “ages” of Tertiary basalt and contained fossilized wood, Crinum, central Queensland, Australia, *Creation Ex Nihilo Technical Journal* 14:99–122. Available at <https://www.icr.org/i/pdf/technical/Conflicting-Ages-of-Tertiary-Basalt-and-Fossilized-Wood.pdf>

⁹ Giem P, 1997. Carbon-14 dating models and experimental implications. *Origins* 24:50-64. Available at <https://www.grisda.org/assets/public/publications/origins/24050.pdf> . The official date of publication was 1997, but in fact the article was published in 2000.

¹⁰ Giem P, see note 3.

¹¹ Baumgardner JR *et al.*, 2003. Measurable ¹⁴C in fossilized organic materials: confirming the young earth Creation-Flood model. *Proc Int Conf Creationism* 5:127-142. Available at https://digitalcommons.cedarville.edu/cgi/viewcontent.cgi?article=1162&context=icc_proceedings

¹² Baumgardner J, 2005. Carbon-14 Evidence for a Recent Global Flood and a Young Earth. In *Radioisotopes and the Age of The Earth: Results of a Young-Earth Creationist Research Initiative*, (Volume II), L. Vardiman *et al.*, eds. Available at <http://www.icr.org/i/pdf/technical/Carbon-14-Evidence-for-a-Recent-Global-Flood-and-a-Young-Earth.pdf>

The RATE Group

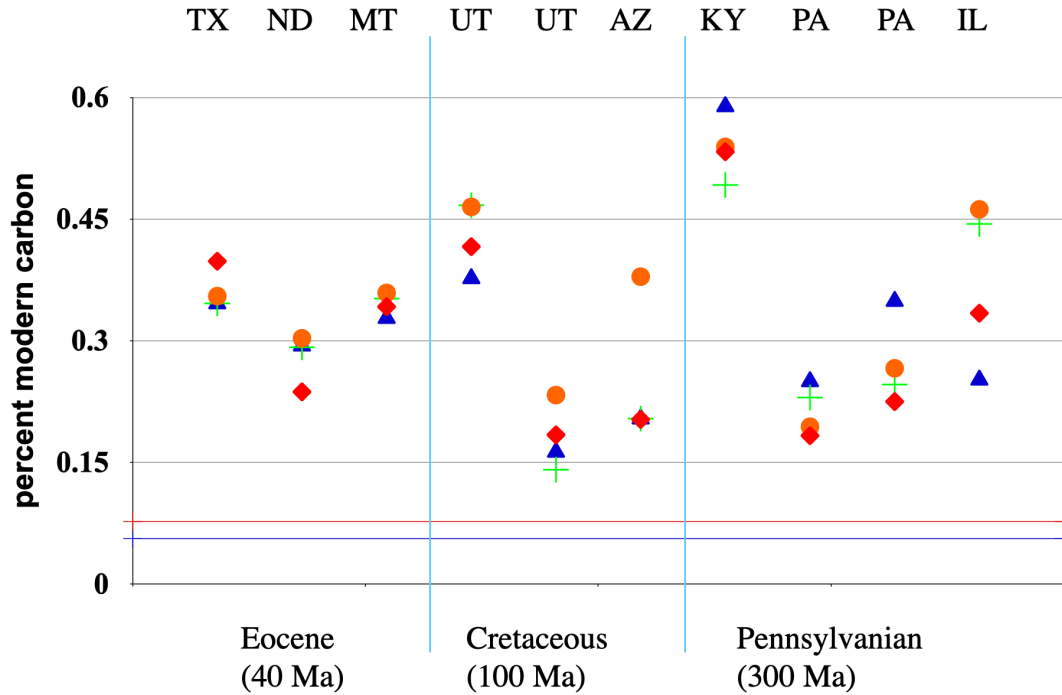


Figure 3. Graph of results of the RATE Group's coal measurements

The RATE Group

Diamond data

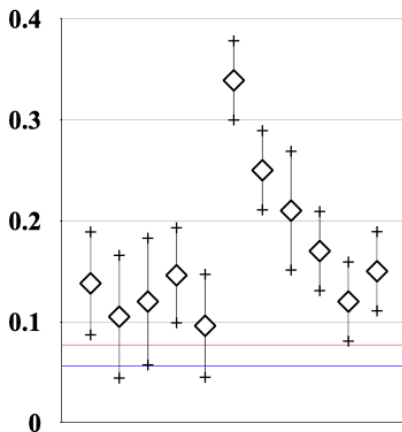


Figure 4

4). This time, in the reporting, the background has not been subtracted from the value for the diamonds.

These results were not expected by the majority of the scientific community, and Taylor and Southon undertook a further investigation of diamonds. But instead of burning the diamonds and reducing them back to carbon, Taylor and Southon put the diamonds directly into the AMS machine. At first they got very low $^{14}\text{C}/\text{C}$ ratios (see Figure 5). But with a fourth diamond, they cut it several ways to see if it made a difference, and not only did it not make a difference, but the $^{14}\text{C}/\text{C}$ ratio of the diamond was significantly higher than that

The UCI Diamond Data in Chronological Order

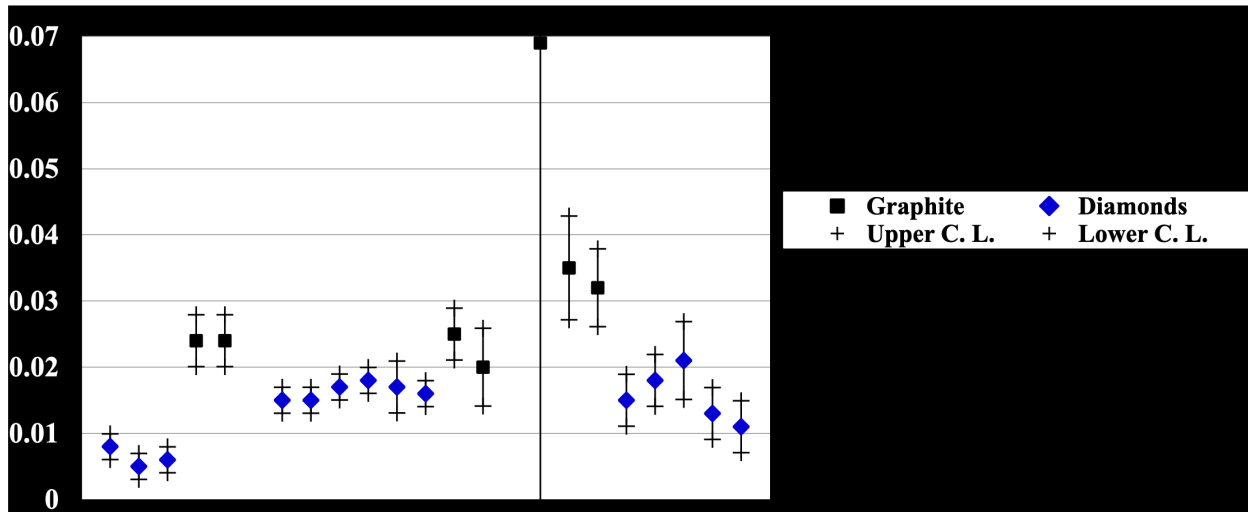


Figure 5

of the first three diamonds (which were not significantly different from each other).¹³ One might claim that the machine was spontaneously having a bad run for the multiply cut diamond, but the graphite controls for the first run were actually slightly (but not statistically) higher than for the multiply cut diamond on the second run. A third run matched the second run as far as the diamond dates go, but this time the graphite controls were somewhat higher, so one should be cautious about drawing conclusions about the third run. Of interest, the second diamond date is the oldest date in the literature for a real sample of which I am aware, 0.05 pMC or 85,000 radiocarbon years.

Since then, carbon-14 has been measured in natural gas wells, the mosasaur data were published,¹⁴ and the Paleo Group presented their data. Since then, there is a report of 505 million year old chitin with measurable carbon-14.¹⁵

¹³ Taylor RE, Southon J, 2007. Use of natural diamonds to monitor ¹⁴C AMS instrument backgrounds. *Nucl. Instr. and Meth. in Phys. Res. B* 259:282–287. Available at <http://www.scribd.com/doc/182086583/Taylor-Southon-NI-M-B-2007-pdf>

¹⁴ Lindgren J *et al.*, 2011. Microspectroscopic Evidence of Cretaceous Bone Proteins. *PLoS ONE* 6:e19445. Available at <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0019445>

¹⁵ Erlich H *et al.*, 2013. Discovery of 505-million-year old chitin in the basal demosponge *Vauxia gracilentia*. *Scientific Reports* 3:3497. Available at <https://www.nature.com/articles/srep03497>

Reactions from Believers in the Standard Model

At first, the reflex response of those believing in the standard geological time scale was to blame it all on laboratory error. And one could make a good case for this. However, with Baumgardner's data, it became impossible for those familiar with the data and the facility to write it all off to laboratory error (some, undoubtedly, of the measured carbon-14 was due to laboratory error, but what was measured was far beyond the limits of laboratory error. Kirk Bertsche, writing at TalkOrigins, said:¹⁶

While this conclusion explains the higher values for the biological samples in general, it does not account for all the details. Some biological samples *do* have radiocarbon levels not explainable by sample chemistry. These samples are mostly coals and biological carbonates, both of which are prone to *in situ* contamination. (his emphasis)

...

Unlike the literature values, Baumgardner's coal samples *do* show significant radiocarbon above background, inviting explanation. (his emphasis)

Note that the point is conceded that laboratory contamination is not adequate to account for the carbon-14 in the samples. His explanation for the carbon-14 contamination is that it got into the coal as the coal was sitting underground. That may or may not be a good explanation, but it is at least partly a testable one, and should be tested.

The other expert I know of who is intimately familiar with the data is Harry Gove. He was apparently asked about the presence of carbon-14 in coal, and according to Kathleen Hunt, again on TalkOrigins,¹⁷ he indicated,

The short version: the ¹⁴C in coal is probably produced *de novo* by radioactive decay of the uranium-thorium isotope series that is naturally found in rocks (and which is found in varying concentrations in different rocks, hence the variation in ¹⁴C content in different coals). Research is ongoing at this very moment.

This was stated around 2004, and yet it does not appear that the research has been published yet. No calculations are given to show that this is a feasible way to get carbon-14 into coal, although some calculations¹⁸ suggest that the number of neutrons available is orders of magnitude too small under present conditions.

¹⁶ <http://www.talkorigins.org/faqs/rate-critique.html>

¹⁷ <http://www.talkorigins.org/faqs/c14.html>

¹⁸ See Giem, see note 7, and Baumgardner, see note 12

It is interesting to note that both replies are in the polemic internet literature. One can only speculate as to why those attempting to answer the question of why fossil carbon contains carbon-14 from a standard perspective do not do so in the standard peer-reviewed literature.

The problem has, however, garnered attention in the teaching literature.¹⁹ I am not sure how careful a job of treating the subject is done here. However, it is encouraging that at least the problem has made it into the peer-reviewed literature, albeit the education literature.

Summary and Conclusions

Carbon-14 is consistently measured in fossil carbon. Machine error can be eliminated, and in some cases laboratory contamination can be eliminated as a complete explanation. *In situ* contamination and nuclear synthesis underground are unlikely, but testable possibilities. I think that comparison between fossil carbon and some other standard should be undertaken, as well as correlation between carbon-14 and underground streams that might contaminate coal, and/or correlation between the nitrogen content and/or calculated or observed neutron flux and carbon-14 content of coal should be attempted. However, it seems to me that the most reasonable hypothesis at present is that there is indeed residual carbon-14 in fossil carbon, and that it is therefore not as old as the standard geological time scale would predict.

Don't expect this to get into the peer-reviewed literature. There are four classes of short-age creationist research. First, those that make short-age creationism harder to maintain. These can easily be published in the peer-reviewed literature. Second, those that are neutral can be published with little difficulty. Third, those that solve problems for creationism but do not seriously challenge the current scientific consensus. These can be published if one is very careful, and particularly avoids unpopular conclusions. But those that strike at the heart of atheism, either by showing the need for an intelligent designer or by presenting a strong argument for short age, are not getting into the peer-reviewed literature unless someone, probably more than one person, does not realize the stakes involved.

One does not have to be venal and cynical to oppose such research being published. One only has to "know" that the opposition can't possibly be right, so there must be some flaw in the research, and that this research will be "unfairly" damaging if published (and besides, one's opposition, at least according to the stereotype, resists the truth and is dishonest). Some on the creationist side do this also, so we need to temper our criticism of evolutionists who do it

¹⁹ Senter PJ, 2020. Radiocarbon in Dinosaur Fossils: Compatibility with an Age of Millions of Years. *The American Biology Teacher*, 82(2):72-79. DOI: 10.1525/abt.2020.82.2.72. Available at <https://abt.ucpress.edu/content/82/2/72>

The Paleo Group has been told that they cannot get any more of their samples dated. The University of Georgia sent them a letter²⁰ saying that the lab was “no longer able to provide radiocarbon services in support of your anti-scientific agenda.” So they tried a commercial lab, which should solve the problem, right? You pay them the money, and they give you the date. It wasn’t that simple. The Paleo Group got a letter declining to do any dates for them from Beta Analytic.²¹ The declination letter read in part,

We wish you well in your research method but must choose to opt-out of the analysis. Since you have identified it as T-Rex, and these are known to be extinct for 50 million years, it is beyond the limit of our dating. If a “recent” result was derived it would be universally challenged with possible risks of poor result claims for our laboratory.

This is a project much better suited for a collaboration with a university laboratory.

Like who? The University of Georgia?

The fear that seems evident in the Beta Analytic letter is not unreasonable. When the RATE Group got their samples dated, there was an agreement with the laboratory that the lab would never be identified. However, I was able to identify the lab easily (it was one of the ones I recommended to the RATE Group), and others were able to identify the lab also, and the lab saw its funding dry up. The lab eventually went out of business, and decommissioned their AMS machine. This was in spite of the fact that they were a pioneer in the use of AMS for carbon-14 dating, and one of the best labs out there.

I have found it harder to get my own samples dated, and am currently effectively frozen out of getting any dates done. Yet there is plenty of good research waiting to be done; just not necessarily the kind that those committed to the standard geological time scale feel comfortable doing. Short-age creationists may have to have our own lab.

²⁰ See Appendix, Figure 2.

²¹ See Appendix, Figure 3.

Appendix

Figure 1. Letter from AOGS program chairs to the Paleo Group:



Asia Oceania Geosciences Society
www.asiaoceania.org

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1 Commonwealth Lane, Singapore 149544
Email: info@asiaoceania.org

Hugh Miller, Consulting Chemist
Paleo Group, USA
Email: hugoc14@aol.com

Dear Mr. Miller,

Presentation: BG02-D3-PM2-Leo2-005: A Comparison of $\delta^{13}C$ & pMC Values for Ten Cretaceous-jurassic Dinosaur Bones from Texas to Alaska, USA, China and Europe

As a result of comments from attendees at the recent AOGS-AGU (WPGM) meeting in Singapore we have examined your abstract which was delivered in session BG-02.

The interpretation which you present in your abstract is that the age of various dinosaurs, previously interpreted as being Mesozoic in age, are less than -50,000 years. Your report that these ages were calculated using C-14 methods. There is obviously an error in these data. The abstract was apparently not reviewed properly and was accepted in error. For this reason we have exercised our authority as program chairs and rescinded the abstract. The abstract will no longer appear on the AOGS web site.

Program Chairs,
Minhan Dai, Xiamen University
Peter Swart, University of Miami

Figure 2. Letter from the University of Georgia radiocarbon laboratory to the Paleo Group

Jeff Speakman

From: Jeff Speakman
Sent: Monday, July 21, 2014 12:28 PM
To: 'HugoC14@aol.com'
Subject: Radiocarbon Dating

Dear Mr. Miller,

I have recently become aware of the work that you and your team have been conducting with respect to radiocarbon dating of bone. The scientists at CAIS and I are dismayed by the claims that you and your team have made with respect to the age of the Earth and the validity of biological evolution. Consequently, we are no longer able to provide radiocarbon services in support of your anti-scientific agenda. I have instructed the Radiocarbon Laboratory to return your recent samples to you and to not accept any future samples for analysis.

Sincerely,
Jeff Speakman

Jeff Speakman, Ph.D.
Director, Center for Applied Isotope Studies
University of Georgia
120 Riverbend Rd.
Athens GA 30602-4702

Figure 3. Letter from Beta Analytic to the Paleo Group. Note that the University of Georgia had turned the Paleo Group down.

Bernadett Limgenco
Operations Manager - Australia and Southeast Asia
Beta Analytic Inc. 4985 SW 74 Court Miami, Florida 33155 USA

Thanks for considering our service in this project.
We wish you well in your research but must choose to opt-out of the analysis.
Since you have identified it as T-rex, and these are known to be extinct for 50 million years, it is beyond the limit of our dating. If a "recent" result was derived it would be universally challenged with possible risks of poor result claims for our laboratory.

This is a project much better suited for collaboration with a university laboratory.

Regards,
Bernadett

Radiocarbon Dating Results that Withstand the Test of Time

BETA is an Accredited ISO/IEC 17025:2005 testing laboratory operating in conformance with ISO 9001:2008 management system requirements. It has demonstrated both the technical competency and management system requirements necessary to consistently deliver technically valid test results. These standards are universally recognized as the highest level of quality attainable by a testing laboratory.