

# REACTIONS

*Readers are invited to submit their reactions to the articles in our journal. Please address contributions to: ORIGINS, Geoscience Research Institute, 11060 Campus St., Loma Linda, California 92350 USA.*

## **Re: Brown: The Upper Limit of C-14 Age? (ORIGINS 15:39-43)**

Dr. R.H. Brown noted reports by AMS (accelerator [or atomic] mass spectrometry) laboratories of measurable  $^{14}\text{C}$  activity in samples such as anthracite coal. His statement that such results were “unexpected” suggests that he perhaps does not fully understand the history and nature of low-level  $^{14}\text{C}$  counting technology and therefore may have misunderstood the major point of these reports. In an earlier draft of this response, I had provided a brief explanation of the basic principles of  $^{14}\text{C}$  counting instrumentation and how the development of AMS technology relates to conventional approaches. However, the editor has requested a much-shortened comment. For those interested in a more complete explanation, there is a large literature, a small portion of which has been listed in the bibliography of a recent volume on radiocarbon dating<sup>1</sup> which was reviewed by Dr. Brown in a previous issue of ORIGINS.

When AMS technology was introduced a little more than 10 years ago, there was a hope expressed by several early AMS researchers that the new technology would permit the relatively quick extension of the  $^{14}\text{C}$  time frame out to as much as 100,000 years. In theory, detection efficiencies with AMS systems should permit such ages to be inferred and those of a more optimistic nature hoped that sample preparation techniques could be developed that would quickly permit these detection efficiencies to be exploited. At the same time, several more cautious experimentalists immediately pointed out that modern contamination exclusion at the level of several hundred parts per million level and below would be required to accomplish such measurements and questioned the possibility of achieving this level of contamination exclusion. The predictions of the more cautious workers has, until now, been demonstrated to be correct. It has turned out to be very difficult to prepare AMS samples in the range of a few milligrams to a few hundred micrograms of carbon that excludes modern contamination below a few tenths of a percent. This is primarily due to the fact that current technology requires that samples be converted to graphite to be used in the ion source of the accelerator.

All early researchers expected to see some activity in their background blanks attributed to sample preparation contamination. However, some hoped that they could prepare blanks with activities which would immediately permit routine measurements out to 70,000 and 80,000 years. In fact, as reported in the

sources cited by Dr. Brown, the level of contamination actually measured is such that the maximum ages resolvable in most spectrometers with natural samples requiring conversions of CO<sub>2</sub> to graphite currently ranges between 40,000 to 50,000 years. In the published literature, the oldest natural organic sample dated by AMS <sup>14</sup>C analysis is a specially prepared sample of natural geological graphite — i.e., graphite *not* prepared from CO<sub>2</sub> — which yielded a value of 69,030±1700 <sup>14</sup>C years.<sup>2</sup> Many investigators are currently looking toward the development of a CO<sub>2</sub> ion source for <sup>14</sup>C AMS applications as a means of eliminating contamination introduced during the graphitization step which is currently required. Others are investigating the design of an accelerator which would totally eliminate the use of hydrocarbon compounds in various components, i.e., vacuum pumps, seals, etc. Experiments are continuing to further reduce sample preparation contamination and move back the <sup>14</sup>C time frame into the 70,000-80,000 range.

A reader familiar with the general <sup>14</sup>C literature but not aware of Dr. Brown's philosophical or theological orientation would certainly have been puzzled by the tenor of the first four paragraphs of his discussion. However, any confusion would probably be resolved when one reads the first sentence in the next paragraph. Dr. Brown states that he is writing these comments for those "individuals who are looking for models that relate the historical data in the Bible and modern scientific observations." According to Dr. Brown, these individuals believe that Genesis 6-8 "describe a universal catastrophe that reasonably may be expected to have produced most of the coal and shell fossil material...." According to Dr. Brown, that "universal catastrophe" occurred "within the range 2500-3500 BC." That this view totally and completely contradicts well-established conclusions of a whole range of scientific disciplines — not to mention historical and archaeological data — apparently does not disturb Dr. Brown. It is my understanding that the majority of theologians holding academic credentials in the study of Hebrew language and literature in his own denomination views the Genesis creation narratives as theological rather than historical statements. I would therefore submit that the appropriate place to look for models that explain the apparent discrepancy that Dr. Brown sees between the scientifically well-established conclusion that organic life on earth is millions of years old and his interpretation of the early chapters of Genesis is not to be found in the scientific literature.

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## ENDNOTES

1. Taylor RE. 1987. Radiocarbon dating, an archaeological perspective. Orlando: Academic Press.
2. Schmidt FH, et al. 1987. Nuclear instruments and methods in Physics Research B29:97-99.

### Brown's reply:

I was not attempting to explain a discrepancy between views widely held in the scientific community and a view that accepts the original manuscript of Genesis 1-11 as an accurate historical account. I only endeavored to show how the C-14 age data and the historical data in Genesis 1-11 might be combined in a logical and consistent overview. Readers of Dr. Taylor's comments should reread my ORIGINS 15:39-43 paper, carefully noting my choice of words. His statements concerning residual and contaminant  $^{14}\text{C}$  should be compared with those made by David C. Lowe in *Radiocarbon* 31(2):117-120 (1989). Lowe asks: "How is it ... that a material, which should show a  $^{14}\text{C}$  age indistinguishable from that produced by a combination of machine background and contamination during careful sample preparation, routinely produces a finite  $^{14}\text{C}$  age?"

I am well aware that the majority-at-large of professional theologians consider the first eleven chapters of Genesis to be a fable that conveys theological truth, rather than a reliable historical record (that also conveys vital theological truth). I must base my appraisal of the Bible on what the Bible tells me, not on what theologians tell me about the Bible. There would be no Christian church if everyone had accepted the prevailing views of theologians in the first-century Mediterranean world in preference to the views expressed by the New Testament writers. Dr. Taylor may be acquainted with some individuals who are classified as Seventh-day Adventists (SDA), are recognized as "theologians", and do not support the historical testimony of Genesis 1-11. My broad acquaintance among SDA scholars indicates that such individuals should in no way be considered representative of the majority.

Other than what I have stated in the preceding two paragraphs, I have little disagreement with Dr. Taylor's comments. In his fourth paragraph I would prefer "widely accepted" to "well established", and emphasis on *interpretations* of historical and archaeological data, rather than on the data themselves. If "historical" designates material which has a firm and precise chronological classification, the debate should be limited to interpretations of legends and archaeological data.

R. H. Brown