

# The Problems With Carbon Dating

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"The  $C^{14}$  dating method can be applied whenever carbon containing biological remains are involved. Carbon consists of a mixture of isotopes (elements with different atomic weights but identical chemical properties):  $C^{11}$ ,  $C^{12}$ ,  $C^{13}$ , and  $C^{14}$ .  $C^{14}$  is synthesized by the bombardment of nitrogen ( $N^{14}$ ) by slow or thermal neutrons in the upper atmosphere:



As cosmic rays constantly bombard the earth's atmosphere, which contains much  $N^{14}$ ,  $C^{14}$  is continually formed in the upper atmosphere from  $N^{14}$ . Unlike  $C^{12}$ , this  $C^{14}$  is radioactive. When this radioactive  $C^{14}$  combines with oxygen,  $C^{14}O_2$  is formed, which is of course, also radioactive. The radioactive carbon dioxide  $C^{14}O_2$  mixes with the non-radioactive carbon dioxide ( $C^{12}O_2$ ) in the air.

$C^{14}$  decays radioactively. In 5568 years (or 5730 years according to some scientists) half the amount of  $C^{14}$  present in any sample will have decayed. Thus the half-life of  $C^{14}$  is said to be 5568 (5730) years. After this time the radioactivity of any amount of  $C^{14}$  in any sample will have decreased to one half of the original value. After a further 5568 (5730) years the amount of radioactivity will have halved again. After a third half-life, the value will again have halved, etc. When a plant absorbs carbon dioxide from the air and reduces it to sugar and starch during photosynthesis with the aid of sunlight, the entire plant tissue will become just as radioactive as the carbon dioxide in the air: for the plant and the air both contain  $C^{14}$  in a state of equilibrium. Animals and human beings eat the radioactive  $C^{14}$  containing plants, so that their tissues also become radioactive. All forms of life are finally dependent on the (radioactive)  $CO_2$  in the air, and all life is in equilibrium with this radioactive  $CO_2$  in the air. Thus as long as  $C^{14}$  is synthesized at a constant rate from  $N^{14}$  in the air by cosmic bombardment, the level of radioactivity in the air and within the entire living spectrum of biology will remain constant. Biology and the air are in a dynamic state of equilibrium.

The death of an animal or a plant will terminate the equilibrium between the  $C^{14}$  in the *air* and the  $C^{14}$  in the organism's tissue, for in a dead organism the  $C^{14}$  within the tissue is no longer renewed by  $C^{14}$  in the air. The radioactive  $C^{14}$  molecules in the dead tissue now decay without being replaced by new  $C^{14}$  from the air. Consequently, the  $C^{14}$  radioactivity of a dead organism decreases (whereas it remains constant within a living organism, i.e. in equilibrium with the  $C^{14}$  concentration in the air). 5568 (5730) years after the organism's death the radioactivity in the dead tissues is therefore exactly one half of the original value. This process constitutes the basis of the  $C^{14}$  method of dating. The  $C^{14}$  radioactivity of the dead tissue is determined and, using the known half-life, the number of years that have elapsed since the organism's death can be calculated. This procedure is, of course, based on the assumption that the air's  $C^{14}$  radioactivity has remained constant from the organism's time of *death up to the present day*. The reliability of the  $C^{14}$  dating method depends, then, on the following factors.

## $C^{14}$ In The Air

The concentration of  $C^{14}$  in the air must have been identical at the organism's time of death and at the time of dating. If, for example, the  $C^{14}$  level in the air was zero when the organism died, and 1,000 years have passed since its death, then the remains of this organism will appear to be infinitely old today, for at its death it contained no  $C^{14}$  whatsoever; therefore, at any and all times

it will register an infinite age by this method.

However, if the  $C^{14}$  radioactivity of an organism which died 5568 (5730) years ago was exactly twice its present value, modern  $C^{14}$  dating 5568 years later would show that this organism died zero years ago, even though it died 5568 years ago, for just half of its activity at death has disappeared. We must conclude that the reliability of the  $C^{14}$  method of dating depends on a constant rate of  $C^{14}$  synthesis by cosmic radiation in the upper atmosphere, from the time of the death of the organism until the dating.

### **Rate of $C^{14}$ Decay**

The rate of  $C^{14}$  decay must remain constant under all environmental conditions, i.e. absolute half life constancy must be certain under all environmental conditions. In certain specialist circles doubts have arisen on this point.

### **Exchange of $C^{12}$ and $C^{14}$ Within the fossils**

After the organism's death absolutely no further exchange of  $C^{14}$  and  $C^{12}$  between the environment and the organic remains may take place. If for example fresh  $C^{14}$  in the form of carbonate or bicarbonate diffuses into the sample which is to be dated, obviously the remains will appear to be younger than they really are. Conversely, if  $C^{14}$  is washed out in the form of a carbonate or bicarbonate and replaced by  $C^{12}$ , then the remains will appear older than their true age. It cannot always be guaranteed that no  $C^{12}/C^{14}$  exchange of this sort has ever occurred between death and dating.

The above conditions all affect the reliability of Libby's  $C^{14}$  method. On them depends any and all reliable dating by this method. Libby himself pointed out the possibilities of such uncertainties in his method and warned against excessively high expectations as to reliability from the same.

### **Constancy of the $C^{14}$ Concentration In the Atmosphere**

As we have seen, if the  $C^{14}$  method of dating is to provide us with useful reliable results, the  $C^{14}$  concentration in the air must have remained constant for between 5,000 and 60,000 years. This means that  $C^{14}$  synthesis by cosmic ray bombardment in the upper atmosphere must have remained constant for thousands of years. In other words, bombardment of  $N^{14}$  by cosmic rays must be equally intense now as at the time the biological remains which are to be dated died. Can we guarantee this constancy of cosmic ray bombardment in the upper atmosphere?

Although we are by no means sure, the experts are of the opinion that the source of these cosmic rays has probably remained constant over long ages. But questions concerning the concentration and intensity of the rays reaching the upper atmosphere remain unanswered. Both depend on various factors including the strength of the earth's own magnetic field. The stronger the earth's magnetic field, the weaker will be the concentration of cosmic rays actually reaching the upper atmosphere. Conversely, the weaker the earth's magnetic field, the stronger the cosmic radiation reaching the upper atmosphere. Thus during periods of a stronger magnetic field the earth will be subject to less cosmic radiation than during periods of a weak magnetic field. Thus atmospheric  $C^{14}$  concentration depends to a large extent on the strength of the earth's magnetic field. But, as we have already discovered, the  $C^{14}$  method depends on a constant synthesis of  $C^{14}$  by cosmic rays. Thus the  $C^{14}$  method of dating finally depends on a constant magnetic field surrounding the earth. Let us consider this constant magnetic field from a practical point of view.

## The Influence of the Earth's Magnetic Field on C<sup>14</sup> Synthesis

It is generally known that the earth's magnetic field is subject to large variations. One hundred and forty-five years ago Gauss began to measure the earth's magnetic field and in the year 1835 he obtained a value of  $85.6 \times 10^{21}$  Ampere/m<sup>2</sup>. Today, under the same conditions we obtain a value of  $80.1 \times 10^{21}$  Ampere/m<sup>2</sup>. Thus the magnetic field has fallen by  $5.5 \times 10^{21}$  Ampere/m<sup>2</sup> over a period of 145 years.

The earth's magnetic field is, to a large extent, independent of the magnetic ores in the earth's surface, for it originates from the electric currents in the earth's crust. Metals cannot be magnetized at a temperature higher than the Curie temperature (for iron approx. 7500). Approx. 25 km below the crust of the earth the temperature reaches the Curie value, so that at this depth iron cannot be the cause of the magnetic field. The same, of course, applies to other magnetic metals. If the Curie temperature is reached at a depth of 25 km and if the earth's radius measures 6370 km, then the Curie temperature for all substances is certainly surpassed in the earth's interior. Hence the earth's magnetism must be due to electromagnetism and our planet is not a permanent, but an electromagnet. Electric currents within the crust develop the magnetic field, and as soon as these are eliminated or die out the magnetic field vanishes.

As, in fact, the earth's magnetic field is rapidly decreasing according to experimental data, the current within the earth's crust is obviously declining. The cause and origin of these currents have been the object of much speculation. Lamb is of the opinion that we are dealing with free currents, the remains of past geological and cosmic events. Currents of this sort would, of course, decrease with time, so that the magnetic field must diminish, as far as we can see. In addition we know that in the geological past the magnetic field has fluctuated. However we know of no evidence permitting us to assume that the decline of this field by normal known processes during historical times could be transformed into an increase of the same. Restoration of the current within the earth's crust by means of geological or cosmic events during the last 20,000 years would thus seem to be out of the question. The half life of the earth's magnetic field, as determined today, lies at approximately 1400 years, if the rate of decay has remained constant. This signifies a halving of the earth's magnetic field within 1400 years. Consequently, the magnetic field will have diminished to 1/32 of its original value after 7000 years (five half life periods of 1400 years each). The present strength of the field must therefore be approximately 37 % of its strength at the time of Christ. These observations have important consequences:

a. Relatively recently from a geological point of view the earth manifested a magnetic field significantly greater than that it possesses today. The stronger the earth's magnetic field, the weaker the cosmic radiation reaching the upper atmosphere and consequently the feebler the synthesis of C<sup>14</sup>. Thus the progressive decline of the magnetic field serves to progressively increase C<sup>14</sup> synthesis. The stronger the field, the more repressed the C<sup>14</sup> synthesis

b. The above considerations concerning the magnetic field levels of the earth can be summarized as follows:

|           |                             |
|-----------|-----------------------------|
| 4000 B.C. | The field measured 12 Gauss |
| 5000B.C.  | 20Gauss                     |
| 6000B.C.  | 35Gauss                     |
| 8000B.C.  | 98Gauss                     |
| 1970 A.D. | 0.62 Gauss                  |

C. Hence approximately 10,000 years ago very little C<sup>14</sup> may have been in the air if the decay of the magnetic field proceeded at a constant rate, for the reaction  $N^{14} + n = C^{14} + H^1$  could have been practically completely inhibited due to lack of cosmic radiation.

d. Biological remains deposited 10,000 years ago will have contained little C<sup>14</sup> at their

death, if the above surmises are correct, so that today they automatically must appear to be far older than they really are when dated by the  $C^{14}$  method. If petroleum and coal were formed in those times under the above conditions, they will already have been radioactively "dead" when they were deposited. Thus from the  $C^{14}$  dating point of view they will appear to be extraordinarily old. Could the apparent great age of petroleum and coal according to  $C^{14}$  dating be attributed to the above propositions?

C. A further important point emerges on the following consideration: Under the protection of a strong magnetic field, not only the  $C^{14}$  radioactivity in the air would be reduced, but all ionizing radiation of cosmic origin would also be reduced on the earth's surface. Thus the earth's surface would be less radioactive than it is today under the influence of the earth's declining magnetic field.

It is a well known fact that increased amounts of ionizing radiation reduce the life span of all biological organisms and impair their vitality. Simultaneously, biological mutations will increase. Thus, if a period of significantly reduced ionizing irradiation of the earth's surface ever existed, all biological organisms would at that time have tended to live longer and to undergo fewer mutations than today. They would also have possessed more vitality. The earth's carboniferous layers bear witness to an immense vitality within the plant kingdom. The gigantism among plants and animals of previous ages indicates vitality of the same sort. No doubt higher temperatures also contributed to this increased vitality. During certain periods of time in the past the climate was certainly warmer and more favorable to life than today. Yet temperature differences alone would hardly provide a sufficient explanation for the luxuriant growth of the carboniferous period with the gigantism it exhibited in plants and in animals.

We would thus expect the rapid decay of the earth's magnetic field to exert a great influence on the biological kingdom. If the rate of decline of the earth's magnetic field has remained constant, then life on the earth 10,000 years ago could have shown a significantly *raised vitality*, as well as having been longer living than today. Harmful mutations, due to ionizing rays would not yet have accumulated within the genes of animals and plants. For this reason unbiased biologists will read with a certain satisfaction that Adam lived for 930 years, Methuselah for 969 years, and Noah for 950 years. Only after great geological changes, which probably further impaired the magnetic field, did man's life span sink to 120 years, later to become reduced to 70 years. Conceivably the great dying and extinction of the largest species among land animals and plants commenced for similar reasons. This might certainly at least partly be attributed to decreasing protection of the earth's surface against ionizing radiation. The earth's magnetic field is generally thought to wax and to wane. The earth's magnetic poles have also been reversed from time to time. Thus the question arises whether these fluctuations of the magnetic field were connected with the extinction of various species in geological time. Robert J. Uffen suggested that the decreasing magnetic field permitted cosmic irradiation of the earth's surface to such an extent that organisms inhabiting shallow water were destroyed-or that their mutation rate became so high that evolution was thus accelerated.

Since the publication of Uffen's work, other researchers have reported that the increased cosmic irradiation resulting from a reduced magnetic field would be too weak to produce noticeable biological effects. Conversely, other researchers have shown that entire biological families became extinct during magnetic reversal. The recent Deep Sea Drilling Project has discovered a connection between the dying out of various Foraminifera and field reversal.

Alan V. Cox developed these ideas further. If the dipole determining four-fifths or more of the magnetic flux disappears completely, protection of the earth's surface against cosmic irradiation would not decrease by more than 10% - 12%, for the main protection is not provided by the magnetic field, but by the atmosphere itself. Cox then suggests that at times of decreasing magnetic field strength, the protection provided by the atmosphere against cosmic rays also decreases. The mechanism weakening the atmospheric protection operates as follows:

Lack of a magnetic field surrounding the earth would permit freer access to protons from solar activity. These protons penetrating the atmosphere during a period of decreased magnetic flux catalytically destroy the ozone layer of the upper atmosphere by producing nitrogenmonoxide (NO). It is well known that NO catalytically destroys ozone. Destruction of the ozone layer would permit passage of ultra violet rays which can be fatal to living organisms. Thus a decreasing field would permit more protons from solar activity to pass, which would then form NO. NO would destroy the ozone layer protecting life from destructive ultra violet rays. In this manner the earth's

magnetic field would, after all, strongly influence the life of terrestrial biological organisms.

The basis of the  $C^{14}$  dating method presupposes a constant magnetic field. But a constant decay of the above type could be assumed if the magnetism inducing current originated from one great unique geological event. Minor later events with current-producing or current-destroying effects would affect the magnitude of the current and impair the constancy of decay. As, however, we are not yet acquainted with the original source of current, one can only for the time being speculate in this area." Taken from Dr. A.E. Wilder Smith's book The Natural Sciences Know Nothing of Evolution pp 109-118.(1981)

## **Annomalies and Conclusions**

### **New Finds in the Paluxy River Bed, Glen Rose, Texas. USA**

"The dinosaur tracks in the *Paluxy* River, Glen Rose region of Texas, are well known to geologists and others. R. T. Bird of the Smithsonian Institute investigated them many years ago. Recently further important finds of a revolutionary nature have been uncovered in the Paluxy River Bed. Professor W. Fields, Dr. Frederick P. Beierle, and others discovered in August, 1978, a new find about 200 m. below the dinosaur tracks at Mack's Farm. At that time the water level of the river was very low indeed because of the dry summer, and due to this fact, a carbonized tree branch had been partly uncovered. It had been laid bare by the erosion of carbon dioxide containing water. This carbonized branch was lying embedded in the chalk-a portion had been exposed by erosion. Its diameter was about two inches and its length about seven feet. The fact that the branch had been carbonized to charcoal and not burned to wood ash demonstrated that it had smoldered after falling burning into the chalk slime, and there smoldering in the absence of atmospheric oxygen. Many small spherical bodies surrounded the charcoal showing that bubble formation had occurred in the surrounding slime due to the heat of the smoldering. The various tracks to be seen in this cretaceous formation at Glen Rose must have been formed contemporaneously with the burying of the burning branch-namely while the slime was soft, for the latter will have solidified but once.

Three samples of charcoal were taken for dating by the  $C^{14}$  method. Independent laboratories carried out this work. A date of approximately 12,800 years was found.

The carbonized branch was not a root which had grown into the chalk later after it had solidified and then been carbonized. The bubbles and the lack of oxygen during burning both testify to this conclusion.

It is well nigh impossible to avoid the following conclusions as a result of these findings: (1) The branch fell burning into the chalk slime where it was carbonized under oxygen exclusion. (2) This event happened at the time when the slime was soft and capable of (a) receiving tracks and (b) burying burning branches under the exclusion of oxygen to yield charcoal. (3) The fossilized bubbles testify to the soft nature of the slime and to the presence of boiling water in slime to produce steam. (4) Once the slime (chalk slime) had solidified, it would not have become soft again for a second time without losing the already imprinted tracks, so that the formation of the tracks and the burying of the burning branch occurred contemporaneously. Any saurier and/or man tracks in the chalk will, therefore, have been made at the time the burning branch was engulfed by the chalky slime. The  $C^{14}$  dating method has shown that these events occurred approximately 12,800 years before the present.

From these results we conclude that any man or saurier tracks found in the cretaceous formation at Glen Rose were made about 12,800 years ago, and that the generally recognized genuine saurier tracks are in fact of about that  $C^{14}$  age. Further, any man tracks in those formations will bear the same age and that, if genuine, man and the sauriers lived contemporaneously." From Dr..A.E. Wilder Smith's book **The Natural Sciences Know Nothing of Evolution** pp. 160-162

"Carbon 14 dating over the past few years has hit the theory of evolution with the devastating impact of an atomic bomb. The evolutionists, however, are still clinging to their crumbling theory. They are still publishing charts of hairy ape men in various alleged states of development and indicating that these creatures were the predecessors of man. They are still assigning the usual ages of hundreds of thousands and even millions of years to this prehistoric line of development, even though Carbon 14 dating of the actual fossil bones has now shown these creatures to be only a few thousand years old.

For example, in one of the popular picture charts issued within the last three years, early *Homo sapiens* is shown as 200,000 to 300,000 years old. Carbon 14 dating of the Keilor skull, believed to be one of the oldest remains of *Homo sapiens*, shows an actual age of only 8,500 years. In this same chart *Austyalopithecus* is shown to be one million to two million years old, yet Carbon 14 dating of mammal bones from the Omo River valley in Ethiopia in the same locality where *Australopithecus* was found, shows an age of only 15,500 years. Mammoth bones from the Olduvai Gorge in Kenya, Africa from the same locality where *Zinjanthropus* was found, and reported to be two million years old - show an actual age of only 10,100 years.

You do not need to take our word for these Carbon 14 datings. You can go to any university library and ask at the science desk for the journal *Radiocarbon* and look up these datings yourself. You will be absolutely amazed at the date and the findings given in this journal. Carbon 14 dates of so-called prehistoric fossil bones by the hundreds are given, including Neanderthal, Cromagnon, and Broken Hill man, Mammoth, Mastodon, Saber-toothed tiger and other extinct animals, as well as dates for fossil trees, coal, wood, oil, and natural gas, all shown to be only a few thousand years old.

In spite of these *definite* Carbon 14 dates: showing coal and oil to be only a few thousand years old, evolutionary textbooks, as we all know, still report coal and oil as being millions of years old." By Earl Hallock in Bible Science Newsletter Sept 1970

### **A Carbon- 14 Increase 4500 Years**

#### **Ago**

"The professional journals, when speaking about the lack of equilibrium, also noted that there is an apparent huge increase of carbon-14 production about 4500 years ago. Dr. Brown suggests that this may be due to the drastic atmospheric changes and possible loss of a vapor canopy above the atmosphere, which occurred at the time of the great flood. How great this increase was is indicated by readings from burial situations which seem to be near the date of the flood.

For example, the Cherkurovka mammoth hair was dated at 26,000 years, but the peat under which it was partially buried was dated at 5,610 years, according to *Radiocarbon*, the professional journal of radiocarbon dating. The Fairbanks Creek Musk Ox was dated in parts. The fore-scalp muscle tissue was dated at 24,000 years, while the hair was dated at 17,200 years! The Union Pacific mammoth was dated at 11,300 years for the most recently formed ivory, but the wood fragments in the surrounding gravel were dated at 5000 years. Other similarly inconsistent readings are also reported in various issues of *Radiocarbon*.

Additional evidence of the great increase in carbon- 14 production is to be found in the carbon- 14 age profiles developed for ancient sediment and peat formations. These profiles provide a sampling for carbon-14 age readings ranging from the present to the theoretical range of this dating method. The readings indicate that there was much less initial carbon- 14 concentration in the earlier sediments and peat growth. These findings are further supported by profiles done on animal dung found in Rampart Cave, which give the same results. In fact, *Radiocarbon* has published this information on over 280 peat and sediment features over a period of ten years, which multiplies the number of evidences for a greatly decreased production of carbon- 14 about 15,000 years ago, as determined by carbon-14 dating methods.

Dr. Thomas Barnes has demonstrated that the earth's magnetic field has been weakening over the years. If the earth's magnetic field was as strong 5000 years ago as he calculates, this, too, would have had a dramatic effect on the atmospheric generation of carbon-14. Since the magnetic field protects the earth from radiation, the stronger it is, the less cosmic radiation there would be to strike the atmosphere and generate carbon -14. Again, this would have the effect of inflating age readings in direct proportion to an object's real age. The older it really was, the greater the age inflation.

What this boils down to is that since the initial carbon-14 concentrations are demonstrably less as one goes back in time, and since the greater age readings depend on the current presence of less carbon 14, if there was less to start with, the great ages calculated could easily be the result of the demonstrated lower initial

levels of carbon-14. And if, as the evidence suggests, carbon-14 was never in equilibrium, the illusion of age would be further amplified."

Taken From Bible Science Newsletter

## How accurate is Carbon-14 dating?

"Carbon, that black substance in charred wood, comes in several forms. One less-common form has atoms which are 14 times as heavy as hydrogen atoms. It is called carbon-14, or C14 for short. Unlike common carbon (C12), carbon-14 disintegrates or "falls to pieces" relatively easily. This instability makes it radioactive. Many people are concerned that C14 proves the Biblical time-scale of history to be inaccurate. However, the C14 clock is in full accord with the Biblical picture of earth's past.

Carbon-14, or radiocarbon as it is often called, is manufactured in the upper atmosphere by the action of cosmic rays. Ordinary nitrogen (N14) is converted into C14. Ordinary carbon (C12) is found in the carbon dioxide in the air we breathe, which, of course, is cycled by plants and animals throughout nature, so that your body, or the leaf of a tree, or even a piece of wooden furniture, contains carbon. When C14 has been formed, it behaves just like ordinary carbon (C12), combining with oxygen to give carbon dioxide (C14O<sub>2</sub>), and also gets freely cycled through the cells of all plants and animals. The difference is this: once C14 has been formed, it begins to decay radioactively back to N14, at a rate of change which can be measured. If we take a sample of air, and measure how many C12 atoms there are for every C14 atom, this is called the C14/C12 ratio. Because C14 is so well mixed up with the C12, we expect to find that this ratio is the same if we sample a leaf from a tree, or a part of your body.

Think of it as a teaspoon of cocoa mixed into a cake dough: after a while, the ratio of cocoa to flour particles would be roughly the same, no matter which part of the cake you sampled. The fact that the C14 atoms are changing back to N14 doesn't matter in a living thing. Because it is constantly exchanging carbon with its surroundings, the mixture will be the same as in the atmosphere and in all living things.

### How the "Carbon Clock" Works

As soon as a plant or animal dies, however, the C14 atoms which decay are no longer replaced by new ones from outside, so the amount of C14 in that once-living thing gets smaller and smaller as time goes on. Another way of saying it is that the C14/C12 ratio gets smaller. In other words, we have a clock which starts ticking at the moment something dies.

Obviously, this works only for things which once contained carbon - it can't be used to date rocks and minerals, for example. We know how quickly C14 decays, and so it becomes possible to measure how long it has been since the plant or animal died.

### The Key Assumption Behind the Method

But wait - how do we know what the C14/C12 ratio was to start with? We obviously need to know this to be able to work out at what point the clock began to tick. We've seen that it would have been the same as in the atmosphere at the time the specimen died, so how do we know what that was? Do scientists assume that it was the same in the past as it is now? Well, not exactly. It is well known that the industrial revolution, with its burning of huge masses of coal, etc., has upset the natural carbon balance by releasing huge quantities of C12 into the air, for example. Tree-ring studies can tell us what the C14/C12 ratio was like before the industrial revolution, and all radiocarbon dating is made with this in mind. How do we know what the ratio was before then, though - say, thousands of years ago? It is assumed that the ratio has been constant for a very long time before the industrial revolution. Is this assumption correct (for on it hangs the whole validity of the system)? Why did W. F. Libby, the brilliant discoverer of this method, assume this? We know that C14 is continually entering the atmosphere (and hence the carbon cycle), and that C14 is continually leaving the system by its decay back to N14. The more you have of a radioactive substance, the more there is to decay—that is, as more enters a system, the rate of leaving the system increases.

To understand this, let us use the example of a rainwater tank, representing the system, with evenly spaced holes in the sides. Let's switch on a tap at the top, representing the formation of C14, entering the system at a constant rate (a). At first, the rate of entry will be far greater than the rate of exit, allowing the water (C14) to build up. The more it accumulates, however, the more the rate of exit, until the amount pouring in is the same as the amount pouring out (b). That is, from the moment of switching-on, the C14 level will build up, rapidly at first, then gradually taper off until it reaches the steady state. Libby, along with almost all the scientists of his day, assumed that this steady state had been reached long ago, and that C14 would now be entering and leaving the system at the same rate. Why? Because calculations show that it would take only 30,000 years from switch-on (the first time cosmic rays began to bombard the atmosphere) for this to happen, and of course geologists and others

had by then long since persuaded most people that the earth was much, much older than that. In other words, C14 would have been in a steady state for many millions of years already, if the earth were that old.

### **What Do Measurements Show?**

Was Libby right? In his day, measurements of which he was aware showed that C14 was entering the system some 12 per cent or more faster than it was leaving. This would indicate that the system was less than 30,000 years old, since equilibrium had not yet been reached. But the discrepancy was within Libby's estimates of experimental error, and so could be ignored. (Some have suggested that the preconceived idea that it had to be in equilibrium ensured that the given error margins were big enough to encompass the actual result, but this may be unfair.)

What about modern, more sophisticated measurements? Unfortunately for the old earth advocates, these continue to support a real difference between the rate of production and the rate of disintegration. For instance, the following figures quoted from nuclear chemists Fairhall and Young suggest that it is as much as 50 per cent out of balance.

"We note in passing that the total natural C14 inventory of  $2.16 \times 10^{30}$  atoms . . . corresponds to a C14 decay rate of  $1.63 \times 10^4$  disintegrations/m2s of the earth, considerably below the estimated production rate of C14 atoms averaged over the last 10 solar cycles (111 years) of  $2.5 \times 10^4$  ( $+ 0.5 \times 10^4$ ) atoms/m2s. . . . The source of the discrepancy is . . . unknown unless the present day production rate is indeed significantly higher than the average production rate . . ." (Fairhall, A. W. and Young, J. A., 1970. "Radionuclides in the Environment", *Advances in Chemistry*, vol. 93, p. 402.)

However, there are many complexities and inaccuracies in these measurements. Some have used a new, non-uniform model based on an average imbalance of some 35 percent, to establish a recalibration scale which would mean that the older dates have to be more greatly reduced than later ones. This seems in order at first glance, as does the use of the imbalance data to establish an upper limit to the age of the earth's atmosphere of some 7,000-10,000 years. However, one must proceed with great caution before stating this dogmatically, as the model may be too simplistic. For instance, how do we know that the "mixing of cake dough" was really complete? Is the carbon in the top of the ocean in balance with that in the bottom? What are the possible errors in estimates of influx/outflow rates of C14? And so on. Historic dates and tree-ring data suggest that the overall issues are more complex than may at first be thought.

### **Other Factors**

We need to consider three other possible effects:

1. If, as most creationists propose, there was a vast water vapor canopy around the earth before the Flood, this would have shielded the atmosphere from some of the cosmic radiation. Therefore, the amount of C14 in the pre-Flood world would have been significantly smaller than at present. So, a specimen from before the Flood could appear to be very old, or even of infinite age, because it had so little C14 in it, making it look as if it had been decaying for tens of thousands of years. Most coal is vegetation that grew pre-Flood and was buried by the Flood, so it would therefore not be surprising to find that coal and oil, for example, would have virtually no radiocarbon activity to be measured.
2. The measured exponential decay of the earth's magnetic field as described by Dr. Thomas Barnes suggests that as you go back in history, the strength of the field increases rapidly. A stronger magnetic field would mean more protection against cosmic rays, therefore, again, much less C14 produced, and, again, this gives artificially old ages the more you go back in time.
3. Some recent, though controversial, research has raised the interesting suggestion that  $c$  (the speed of light) has decreased in historical times. During the 1930s and 1940s, the measurements seemed to be so consistently dropping that a controversy about declining  $c$  took place in the scientific literature for some. If it is correct, then radioactive decay rates would automatically be affected, and would show artificially high ages.

### **In summary then:**

1. The C14 on earth is not in a steady state, but is building up. This is not in accord with predictions based upon belief in a very old atmosphere.

2. On the basis of the presently available evidence, the oldest radiocarbon dates have to be adjusted from the apparently incorrect uniform model which is still in use today, and when this is done there is a shrinking in these dates. The older the date, the greater the reduction.
3. The protective water vapor canopy and the greater magnetic field before the Flood could mean that C14 levels in the past were significantly smaller than at present, thus causing erroneous results.
4. Any systematic change in atomic constants (e.g., a faster  $c$  at any time in the past) would also effectively reduce radioactive ages.

### **Embarrassment From Young Dates:**

In any case, even the incorrect uniform model has given, in many cases, serious embarrassment to the evolutionist by giving ages which are much younger than those he expects in terms of his model of earth history. Consider this: if a specimen is older than 50,000 years, it has been calculated that it would have such a small amount of C14 that for practical purposes it would show an infinite radiocarbon age. So it was expected that most deposits such as coal, gas, etc. would be undatable by this method. In fact, of thousands of dates in the journals *Radiocarbon* and *Science* to 1968, only a handful were classed "undatable" - most were of the sort which should have been in this category. This is especially remarkable with samples of coal and gas supposedly produced in the Carboniferous period 300 million years ago! Some examples of dates which contradict orthodox (evolutionary) views:

Coal from Russia from the "Pennsylvanian," supposedly 300 million years old, was dated at 1,680 years. (*Radiocarbon*, vol. 8, 1966).

Natural gas from Alabama and Mississippi (Cretaceous and Eocene, respectively) should have been 50 million to 135 million years old, yet C14 gave dates of 30,000 to 34,000 years, respectively. (*Radiocarbon*, vol. 8, 1966. Many of the earlier radiocarbon dates on objects such as coal and gas, which should be undatable, have been attributed to contamination from, for example, workers' fingerprints, creationist researchers are currently working on the construction of an apparatus, using existing technology, to look for very low levels of C14 activity in, for example, coal after excluding contamination. Such low-level activity would not be expected on the basis of old earth theory, and so is not looked for at present.)

Bones of a sabre-toothed tiger from the LaBrea tar pits (near Los Angeles), supposedly 100,000-one million years old, gave a date of 28,000 years. (*Radiocarbon*, vol. 10, 1968)

### **Other C14 "Clangers":**

In addition to the above effects, which are more or less systematic, there are other possible sources of error in C14 dating. In the light of all this, it would be foolhardy indeed to insist that a C14 date represents absolute truth, especially if it contradicts the clear teaching of Scripture. Consider these examples of C14 results:

A freshly killed seal dated by C14 showed it had died 1300 years ago. (*Antarctic Journal*, vol. 6, [September-October 1971], p. 211.)

Living mollusk shells were dated at up to 2,300 years old. (*Science*, vol. 141, 1963, pp. 634-637.)

Living snails' shells showed they had died 27,000 years ago. (*Science*, vol. 224, 1984, pp. 58-61.)

We hasten to add that one can usually retrospectively find out the reasons for these sorts of anomalous results, for example, the C14 activity in dissolved carbonates in the water, etc. But when testing a sample of unknown age from a largely unknown environment at the time of its death, how can we exclude similar sorts of effects?

A quotation from a respected anthropological journal highlights the nature of the problem:

"The troubles of the radiocarbon dating method are undeniably deep and serious ... It should be no surprise, then, that fully half of the dates are rejected. The wonder is, surely, that the remaining half come to be accepted." (Lee, R. E., *Radiocarbon*, "Ages in Error", *Anthropological Journal of Canada*, 1981, vol. 19, No. 3, p. 9)

In overview, we see that the radiocarbon dating method is certainly no embarrassment to the Biblical creationist who believes in a young earth. In fact, when fully understood in accord with modern data, it seems to give support to this position."

excerpt from *The Answers Book*, by Ken Ham, Andrew Snelling, Carl Wieland  
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