

From a creation perspective, God, during the Creation week, predetermined the initial conditions of our solar system to provide a habitable Earth. We know from Genesis 1:31, that at the end of Creation week God's creation was 'very good'. It is hard to imagine that gas-giant planets orbiting near the Earth and gravitationally interacting with it would fit the description of 'very good'. Such interaction would cause the Earth to become as volcanically active as Jupiter's moon Io, even if the orbits were stable.

Thus, the gas giant planets were created in the outer orbits of the solar system and the smaller rocky planets in the inner orbits. This has ensured that the Earth has remained stable and habitable because, as explained in Isaiah 45:18, the Creator formed the Earth to be inhabited. Because of its naturalistic evolutionary philosophy, modern science does not want to recognise that our solar system is specially created, and so it has problems explaining the data for exoplanets, which show that our solar system is special, and young.

### References

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3. Masses and orbital characteristics of extrasolar planets, <exoplanets.org/almanacframe.html>, 24 September 2002, maintains a growing database on extrasolar planets.
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## Large and systematic regional-scale errors in Middle Eastern carbon-14 dating

John Woodmorappe

Recent issues of the *TJ* have featured a debate between the relationship of Biblical chronologies and secular ones. Down<sup>1,2</sup> has favored a reduction in the Egyptian chronologies in order to reconcile them with the Biblical ones. Montgomery has suggested a non-chronological interpretation of certain OT chronologies to escape the impasse. Wood<sup>3</sup> has claimed that the Egyptian chronology is too solid to be compressed. He has emphasized the agreements which do exist between Biblical chronologies and the currently accepted extra-Biblical ones.

A recent bombshell<sup>4</sup> has exploded across the Middle East. It is a scientific, not a military one:

'Many archaeologists studying the Ancient Near East have claimed (or complained) that radiocarbon dates are earlier than archaeological dates for the early historical period: for Egypt ... Sumer ... Israel-Palestine ... Italy ... and the Aegean ... among others ... Too-early <sup>14</sup>C dates occur from the earliest historical times until the mid second millennium BC. Disparities vary between about one and three centuries, depending on the historical period and location. The <sup>14</sup>C dates are from a variety of samples (many short-lived) and have been processed by numerous researchers; although there is scatter, the problem remains prevalent.'<sup>5</sup>

Keenan<sup>5</sup> also cites a number of Middle Eastern researchers who have become quite skeptical of C-14 dating as a consequence of the foregoing problems. In addition, some of these researchers have openly indicated an acceptance of particular <sup>14</sup>C dates only if they do not contradict archaeological chronologies, or complained that

<sup>14</sup>C dates are being selectively accepted and rejected based upon their support or confutation of a favored hypothesis. Still others have attempted to publish <sup>14</sup>C results that contradict archaeological chronologies, only to see their papers rejected.

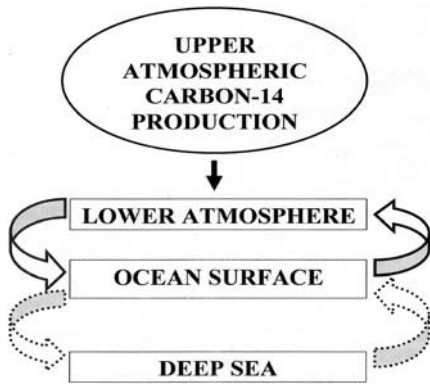
As for the Egyptian chronology, Keenan<sup>5</sup> offers the following opinion:

'Of course, it might be that there are errors in the archaeological chronologies of the Ancient Near East. All such chronologies ultimately derive from (archaeo-historical synchronisms with) Egypt [Refs]. Hence, if there are errors in Ancient Near Eastern chronologies, then their genesis lies in Egyptian chronology. In fact, Egyptian chronology does not have secure foundations (Cryer 1995; Rohl 1995; Hagens 1996) [Note, per the earlier *TJ* debate, that Rohl is not the only scholar to question the Egyptian chronology]—and some workers have argued for revising it. Arguments have been made for both earlier and later dates.'

### Fundamental C-14 dating assumptions violated

In order to understand Keenan's provocative hypothesis, the reader must first understand some basic assumptions of <sup>14</sup>C dating. Cosmic radiation is constantly striking nitrogen atoms in the upper atmosphere, and converting some of them into <sup>14</sup>C. The latter radioactive isotope becomes mixed, vertically and horizontally, throughout the atmosphere. The <sup>14</sup>C also works itself into the surface water of the oceans and, to a lesser extent, into deep waters. The whole process is illustrated in Figure 1.

The C-14 dating method thus assumes that virtually all living things are in equilibrium with the <sup>14</sup>C of the upper atmosphere. At any one instant of time, the <sup>14</sup>C content of the atmosphere, land areas, and upper ocean surfaces are assumed to be (and always have been) in mutual equilibrium. Whenever a living object exists on Earth, it should



**Figure 1.** The movement of  $^{14}\text{C}$  from its origins in the upper atmosphere, through the lower atmosphere, ocean surfaces, and (sometimes) into the ocean depths.

thus maintain a C-14 date of zero. The moment a living thing dies anywhere on Earth,  $^{14}\text{C}$  stops entering the object, and so the C-14 ‘clock’ is turned on. Based on radioactive decay, along with the aforementioned assumed zero-age starting conditions (and, of course, assuming closed systems), a C-14 date can be calculated for the time since the object’s death.

Deviations from equilibrium are believed to be negligibly small, and certainly lost within the analytical error of dating an object that is a few thousand years old. There are, of course, exceptions, but these are currently localized. One example is the emanation of ‘infinitely old’ carbon dioxide from subterranean sources, such as volcanoes. Any living thing close to such a subterranean source will imbibe some of the ‘infinitely old’ carbon dioxide, and thus acquire a fictitiously high C-14 date. Elsewhere<sup>6</sup> it is suggested that, soon after the Flood, these point sources where the rule, and not the exception, all over the Earth’s surface. As a result, most of the living things from the immediate post-Flood period have been yielding unrealistically high C-14 apparent ages.

The succeeding discussion describes a different mechanism whereby living things can acquire a fictitiously high age. The magnitude of the ‘ageing’ is much less. It occurs on a regional scale from the source. Its effects do not occur in the period immediately after the Flood, but mostly

in the second millennium BC, notably at the time of the Exodus with its previously discussed controversial dating relative to secular chronologies.

### The once-stagnant Mediterranean Sea

At present, the atmosphere, land, and ocean surfaces undergo a rapid and thorough exchange of  $^{14}\text{C}$  (Figure 1, top). By contrast, ocean bottoms sometimes are convectively decoupled from the ocean surfaces (Figure 1, imagine no arrows instead of dotted arrows), preventing the free admixture of surface and deep waters. In such situations, ocean bottoms are virtually closed systems, unable to be ‘refreshed’ by the new  $^{14}\text{C}$  that is being continually produced in the upper atmosphere, and freely delivered to the lower atmosphere, land areas, and ocean surfaces. Any  $^{14}\text{C}$  already locked up at the ocean bottom, even if originally delivered there from a hypothesized earlier period of mixing with near-surface waters, undergoes depletion due to radioactive decay.

As a consequence of all this, organisms living on the bottoms of certain oceans end up acquiring a high built-in apparent C-14 age. Keenan<sup>4</sup> suggests that the above sequence of events is exactly what took place in the Mediterranean Sea, starting about 4500 BC, according to the conventional time scale. (Of course, it is possible that, going back to the time of the Flood, the Mediterranean Sea bottom had *never* been convectively ‘connected’ to the post-Flood buildup of C-14 that took place, and was instead primarily a relict of the ‘infinitely old’ carbon world of the pre-Flood period. However, this consideration is beyond the scope of the present article).

Let us continue the exposition of Keenan’s uniformitarian hypothesis. He suggests that the outpouring of originally fresh water from the Black Sea was responsible for suppressing vertical convection, creating a sea that was considerably more stratified than its modern counterpart. The convective decoupling of the sea bottom became

pronounced. It was during this time that organic materials on the Mediterranean Sea bottom became ‘aged’ by  $^{14}\text{C}$  decay combined with the lack of access to replacing  $^{14}\text{C}$ . Modern-type Mediterranean circulation did not fully develop until about the time of Christ, or even a few centuries later. As normal vertical circulation gradually became re-established, the stagnation ended, and the Mediterranean Sea bottom then participated in the atmosphere-ocean convective ‘loop’ (Figure 1, dotted arrows).

Owing to the fact that the Mediterranean seafloor was now ‘reconnected’ to the upper atmosphere and its continuous  $^{14}\text{C}$  production, the ‘aged’ carbon from the sea bottom organic materials could now be convectively transported to the surface in appreciable amounts. The ‘aged’,  $^{14}\text{C}$ -deficient carbon from the seafloor diluted the ‘zero age’  $^{14}\text{C}$  content of the sea surface.

Some of the carbon involved in this whole process was in the form of carbon dioxide, and this gas eventually became part of the lower atmospheric circulation that blows landward from the Mediterranean Sea. Any living thing downwind from the Mediterranean Sea was now exposed to a regional atmosphere that was measurably impoverished in  $^{14}\text{C}$ . Consequently, upon death, these living things possessed a built-in C-14 ‘age’ of a few centuries instead of the zero C-14 age that they would have had, commensurate with standard C-14 dating assumptions, had they been in equilibrium with the  $^{14}\text{C}$  of the global atmosphere.

Regardless of the actual cause of the Mediterranean Sea bottom’s high apparent age (whether Diluvian or uniformitarian), archaeological objects from the Middle East became systematically forced to give implausibly old C-14 dates.

### Supportive evidence for regional-scale C-14 anomalies

Certain C-14 specialists discount *a priori* any regional-scale  $^{14}\text{C}$  anomaly as described above. Their thinking centres on the belief, based on gas-

eous diffusion rates, that any ‘aged’ carbon dioxide would intermix with the conventional ‘zero age’ carbon dioxide so rapidly and completely that no significant <sup>14</sup>C anomaly could occur at any appreciable downwind distance from the source of the anomaly. As evidence, they cite the rapidity with which <sup>14</sup>C concentrations, emanating from nuclear power stations, become homogenized with the much-lower <sup>14</sup>C concentrations of the surrounding atmosphere. However, such reasoning is not applicable to geographically large sources of ‘aged’ <sup>14</sup>C, if only for the following reason:

‘Note that nuclear power stations are essentially continuous point sources. In contrast, a large sea area is essentially a continuous line source, for an adjacent land mass. Simple geometry implies that gas concentration downwind from line sources declines much more slowly than gas concentration from point sources. Degassing seas would thus be expected to induce large gas concentrations at substantial distance.’<sup>7</sup>

To further substantiate his hypothesis, Keenan<sup>8</sup> provides several recent examples of ‘aged’ deep-sea carbon dioxide being brought to the ocean surface, and inducing notable <sup>14</sup>C anomalies over downwind land areas. These include a surface atmosphere built-in ‘age’ of 350 years, measured 250 km inland in Equator, probably caused by the upwelling of deep Pacific water and its <sup>14</sup>C-deficient carbon dioxide. Other examples include C-14 dates centuries older than tree ring dates in California and in Thailand, the latter believed caused by exceptionally-intense monsoonal upwelling of deep, ‘aged’ water. Still other examples are cited from various locations on Earth.

### Conclusions

Questions about the historicity of the Mosaic accounts turn out to be much more fundamental than such issues as the veracity or otherwise of the standard Egyptian chronology. The systematic distortion of past Middle Eastern C-14 dates, caused by the hy-

pothesized degassing of ‘old’ carbon dioxide from the Mediterranean sea floor (regardless of its exact cause), is an astonishing development that has, in effect, ‘thrown a monkey wrench’ into the archaeological sciences:

‘In conclusion, the hypothesis is plausible, and further research is required to verify or refute it. It would be ironic if the “cradle of civilization” turned out to be in just the right place and time to make its <sup>14</sup>C dates erroneous, but that might be the case.’<sup>9</sup>

It is not just a question of how inaccurate most currently-accepted C-14 dates are, but also how many perfectly valid C-14 dates have never seen the light of publication because they were incorrectly deemed erroneous. A top-to-bottom re-examination of *all* the raw C-14 dates is necessary before we are in a position to even begin to entertain questions related to Middle Eastern chronologies of the second millennium BC. For the Bible believer, as well as the honest skeptic, it is necessary to withhold judgment about the correlations of Biblical and secular history, from the indicated time period, at least until the top-to-bottom re-examination actually takes place.

### References

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## Revised datings for ‘Little Foot’ and other Sterkfontein fossil hominoid remains

Greg Beasley

In September of this year *Reuters*<sup>1</sup> reported that the famed South African fossil site at Sterkfontein may be a million years younger than previously thought.

The Sterkfontein caves are rich in fossiliferous material. Over many decades the site has become synonymous with many famous fossil hominine finds, including *Australopithecus africanus* (e.g. Sts 5) and *Homo habilis* (Stw-53).

### The discovery of ‘Little Foot’

In 1995, palaeoanthropologists Ronald Clarke and Philip Tobias, of the University of Witwatersrand, announced the discovery of four fossilised hominid foot bones from material extracted from Dump 20 at Sterkfontein Cave in 1980.<sup>2</sup> The material derived from Member 2 of the six-member Sterkfontein formation. The fossils became affectionately known as ‘Little Foot’ (Stw 573a-d), because of their small size. They also revealed that their owner—a gracile australopithecine (*Australopithecus* aff. *africanus*)—was adept at climbing trees. The bones revealed a curious mix of human and ape traits.<sup>3</sup> The four bones comprised:

- A left talus (ankle bone) (Stw 573a), which was described as resembling the human condition;
- A left navicular (a concave wrist or foot bone) (Stw 573b), which was said to comprise a curious mix of human and ape traits;
- A left medial cuneiform (wedge shaped bone in the ankle) (Stw 573c), which featured a substantially ape-like morphology, and
- A left first metatarsal (instep bone)(Stw 573d), which, when locked into position against the