



Lord Kelvin revisited on the young age of the earth

John Woodmorappe

A century ago, Lord Kelvin calculated an upper limit for the age of the Earth. By estimating how long it would take an earth-sized molten sphere to cool to today's temperatures, he obtained a maximum age near 100 million years. Some of his contemporaries argued for a maximum age as low as 10 million years.¹ It is not difficult to see why these values were distastefully low for both evolutionists in biology as well as uniformitarians in geology.

But, we are told, Kelvin's calculations went out the window as soon as radioactivity was discovered. Typical of this attitude is the work of Burchfield. When discussing the discovery of radioactivity, his subchapter reads: 'Kelvin Overthrown'?

But has this been established, or has it been supposed? As a matter of fact, it is freely acknowledged that radio-

active heat sources within the earth do **not** account for its present internal temperatures if the earth had really existed for 4.5 Ga (1 Ga = 10^9 years):

*'Heatflow from the Earth's interior is 4×10^{13} W. The energy of the decay of radioactive elements (^{235}U , ^{238}U , ^{232}Th , and ^{40}K) is of the same order of magnitude (2.4×10^{13} W) as that of the heat flow...'*³

If the earth really were 4.5 Ga old, these two numbers should agree exactly. Galimov discusses possible causes for the difference (1.6×10^{13} W), such as lack of knowledge about the amount of radioactive material in the earth's crust. In spite of the fact that some would argue that the amount of radioactivity at depth is little more than guesswork, Galimov believes that geochemical constraints make it unlikely that the amount of radioactive materials at depth has been appreciably underestimated. He concludes:

*This indicates that the difference between the observed value of heat flow (4.0×10^{13} W) and its fraction due to radioactive decay (2.4×10^{13} W) is presumably significant and requires explanation.'*³

Other earth-interior processes also fail to account for the 'missing'

heat (missing, that is, if the earth is really 4.5 billion years old):

*'Calculations show that the contribution of such heat sources as phase transformations in the mantle (for example, olivine-spinel transition, etc.), tidal interaction with the Moon, and crystallization of the inner core, is low and does not exceed 0.1×10^{13} W.'*³

So how is the old-earthier to cope with this problem? Galimov suggests that the 'missing' heat can be supplied by the gradual change of mantle to core:

*'Hence, a core growth of only 170 km (one-twentieth fraction of its radius) during all geologic history provides energy sufficient to account for the observed deficiency (if, for simplification, the flow is assumed to be constant)'*³ (emphasis added).

Wait a minute! This argument openly begs the question. It **assumes** what it sets out to prove: the great age of the earth. The 'solution' to the problem cannot work if the earth is not old. And, of course, such a model can only be speculative to begin with. At best, uniformitarians can 'rescue' an old earth by appealing to unproven (and unproveable) inner-earth chemical processes. By contrast, scientific creationists can face the evidence directly and straightforwardly without any questionable assumptions. Let us put speculative models aside and look squarely at the facts. The empirical evidence supports the view that the Earth is much younger than 4.5 billion years.

References

1. Burchfield, J. D. 1975. *Lord Kelvin and the Age of the Earth*. Science History Publications, New York, p. 110.
2. Burchfield, Ref. 1, p. 166.
3. Galimov, E. M., 1998. Growth of the Earth's core as a source of its internal energy and a factor of mantle redox evolution. *Geochemistry International*, 36(8):673-675.