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Review: Michael Denton, *Fire-Maker: How Humans Were Designed to Harness Fire and Transform Our Planet*, Discovery Institute, Seattle, WA, 2016

Pages: 75

Foundations of Fire

This is an intriguing look at an icon of supposed evolutionary anthropology; man's making of fire.

What is taken for granted in modern times is easily appreciated when out in the wild with only basic materials like flint and wood. However, the real miracle is the myriad atmospheric, chemical, and biological factors needed in combination for fire to occur on earth and enable the great technological advances.

The related discussion on water transportation in trees (i.e. the intense-heat charcoal source) is equally astonishing in showcasing intelligent design.

Unfortunately, there are heavy doses of 'deep-time' dogma which detract from what is clear evidence of a creator God behind fire, indeed all life, as He is revealed in the Bible:

"*Is* not my word like as a fire?"
Jeremiah 23.29a, Authorized Version

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I) Fire (pp. 9-20)

Pottery was perhaps the earliest product using fire, followed by the 'Age of Metal'.

Copper melts are ~1200^{O}C but iron much higher, requiring more advanced technology.

Charcoal also strips metal ore of its oxides (ordinary wood is not suitable as kiln fuel). When combined with a pressurised air draft and due to oxygen reducing ability of CO produced in the combustion, iron smelting became possible.

II) The Right Planet (pp. 21-37)

The rate of flame spread is correlated to atmospheric specific heat capacity per oxygen mole (at 50Cal per degree per O_2 mole combustion is impossible).

The atmospheric concentration of O_2 is 21%. In the absence of higher pressure, at 12% life is impossible (1.7 atmospheres is sufficient to make this work).

Gravity dictates maximum terrestrial organism size.

Metal ductility and conductivity is critical to facilitating the electrical age.

Cu conductivity is ten times better at $100^{O}C$ than at $600^{O}C$.

Forced inert gas injection into a container can extinguish fire without damage or injury. Conversely, hyperbaric containers with the same atmospheric O_2 and N_2 concentrations.

III) The Right Fuel (pp. 38-47)

Coal, charcoal, or coke are required to generate fires with sufficient heat to smelt metal. These would not exist if it weren't for large trees. This in turn depends on both photosynthesis (which may involve quantum tunnelling), and the lignin molecule (to build strong trees).

Liquid surface tension is inversely proportional to tube diameter (e.g. nanotubes could transport water 3km high), however, this is negatively affected by viscosity. Tree conduits range from 0.03 to 0.3mm in diameter.

Trees use the basic law of hydraulics that in a closed system pressure in one part is universally transported to all others, so when water in the system evaporates a negative pressure is created sucking all water

molecules in the system upwards and drawing up water from the roots. The network doesn't 'break' due to water's tensile strength (only ten-times less than steel).

Trees are the masters of microfluids.

IV) The Fire-Maker (pp. 48-64)

Bone cross section only increases by the square of any growth length, whereas the volume by cube (i.e. muscle and frame must support ten times the weight of any new growth). This rule also works in reverse to explain why insects with their muscles can lift many times their own body weight.

Sliding actin and myosin actions create muscle filament strength ('myosin motors').

Maximum mammal nerve speed is 120m/s.

Each muscle is innervated by thousands of axons.

The optic nerve diameter is 3mm.

Infrequent myelin openings of a few mm are called nodes.

V) Conclusions (pp. 65-69)