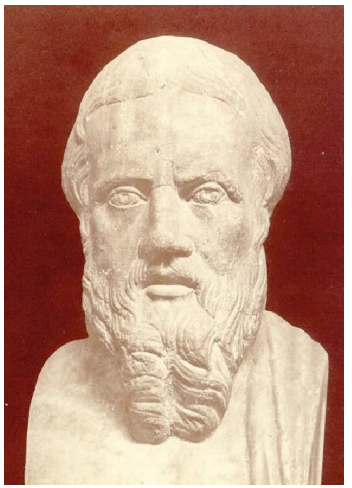
Early attempts to date the age of the Earth

Herodotus - Greek historian, dated the age of the Earth using the rate of growth he observed in the Nile Delta; Earth was several thousand years old.



Archbishop Ussher - 1654

Added up all the generations after Adam, and came up with an age of the Earth as 5,658 years old, having formed in 4004 B.C on October 12rd at 9 am.

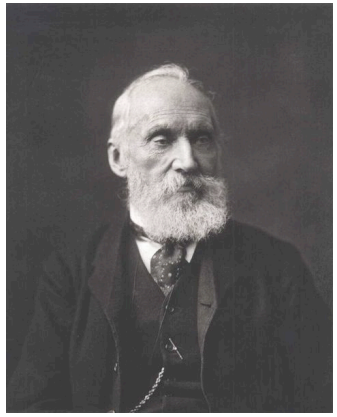
George du Buffon - 1760 - declared that the Earth originated from a collision of the comet with the sun, and it has subsequently cooled to its present condition.

John Joly - 1899 -determined the age of the Earth based on the accumulation of salt in the oceans. Assumed initial "fresh Water" conditions, measured current level of NaCl in oceans and rate of delivery from rivers

total NaCl ~16 x 10^{12} tons/ annual NaCl ~160m tons
100 million years

What do you think the problems are to this approach?

Lord Kelvin 1846-



Quantified Buffon's early ideas of an originally molten Earth which cooled to its present state as a result of the dissipation of heat over time.

a. Rocks melt at ~3,900°C
b. Assumed a geothermal gradient of ~0.56ºC/50 feet depth
c. Derived mathematical estimates for thermal conductivity

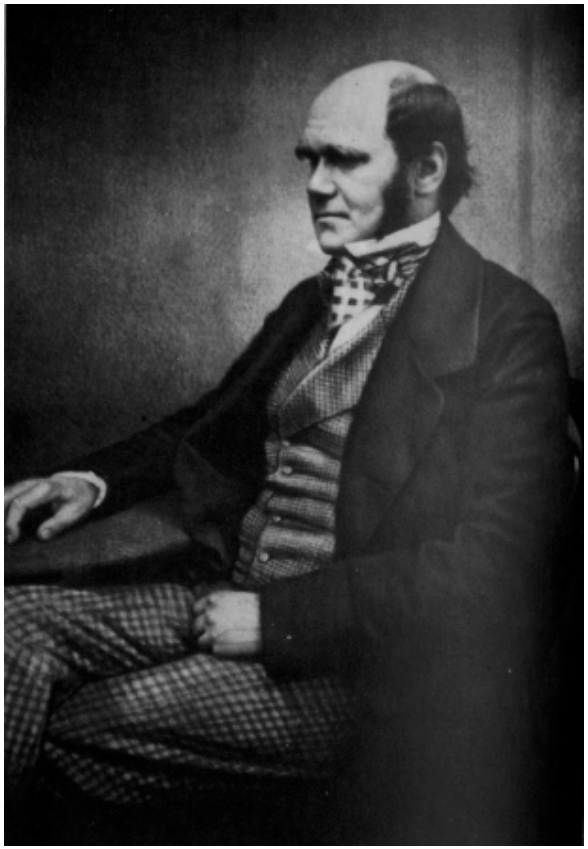
So that….at a depth of 50-100 miles the interior would still be molten (where magma was derived).

He then determined that the geothermal gradient would have changed over time, so that at one point the surface itself would have been molten…at one point it was ~1º/foot!!)

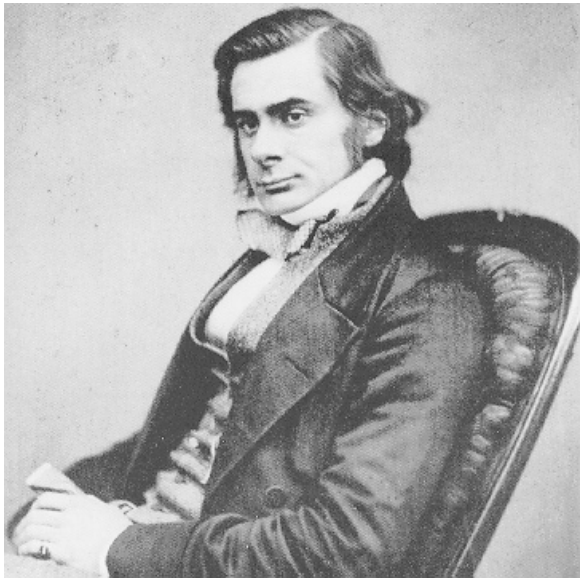
Result: age of Earth 20-400 million years old; later revised to 24-30 Ma Problems with his analysis???

An “old Earth” was incorporated into conceptions about how the Earth “worked” by scientists of the late 1800’s, including Darwin. This was, however NOT what the religious community and prevailing public opinion believed.

Bishop of Oxford Samuel Wilberforce



Darwin in 1859



Biologist T.H. Huxley

I can't stress how huge Darwin's contributions were:

- Historians view Darwin's work not only from the perspective of a major scientific discovery, but also its impact in overturning prevailing views about the nature of science itself (the rise of rational thought) and the integration of humankind ***into*** the natural world, not separate and above it (very threatening to some).