The background of the slide depicts a dramatic prehistoric landscape. In the upper left, several pterosaurs are shown in flight against a dark blue sky filled with streaks of light from falling meteors. A large, bright comet-like object is visible on the right side. Below the sky, a massive, billowing white cloud formation dominates the center. In the lower half of the image, more pterosaurs fly over a sea of white clouds. The overall atmosphere is one of a catastrophic event in Earth's history.

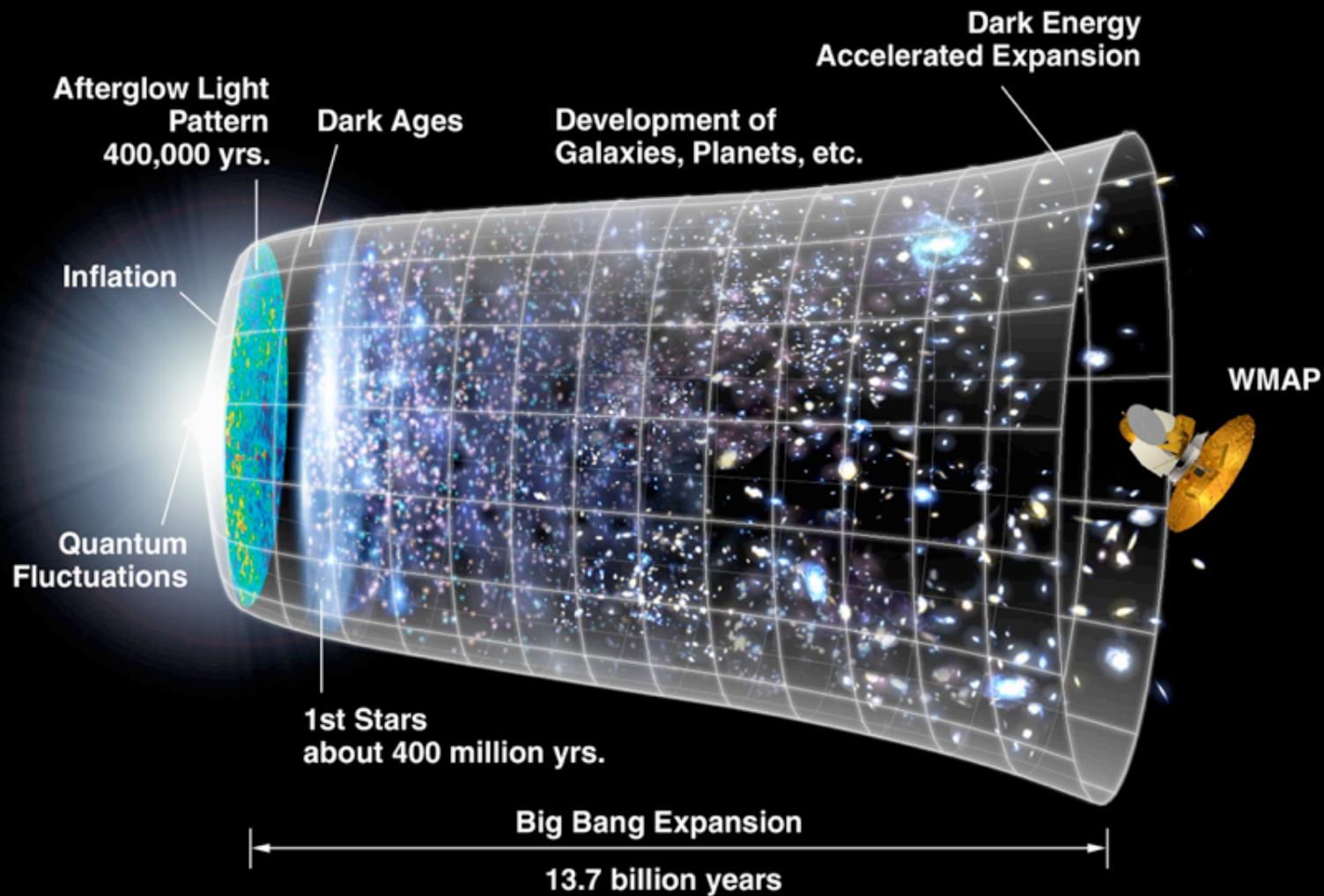
History of Life 1

Brian O'Meara
EEB464 Fall 2019

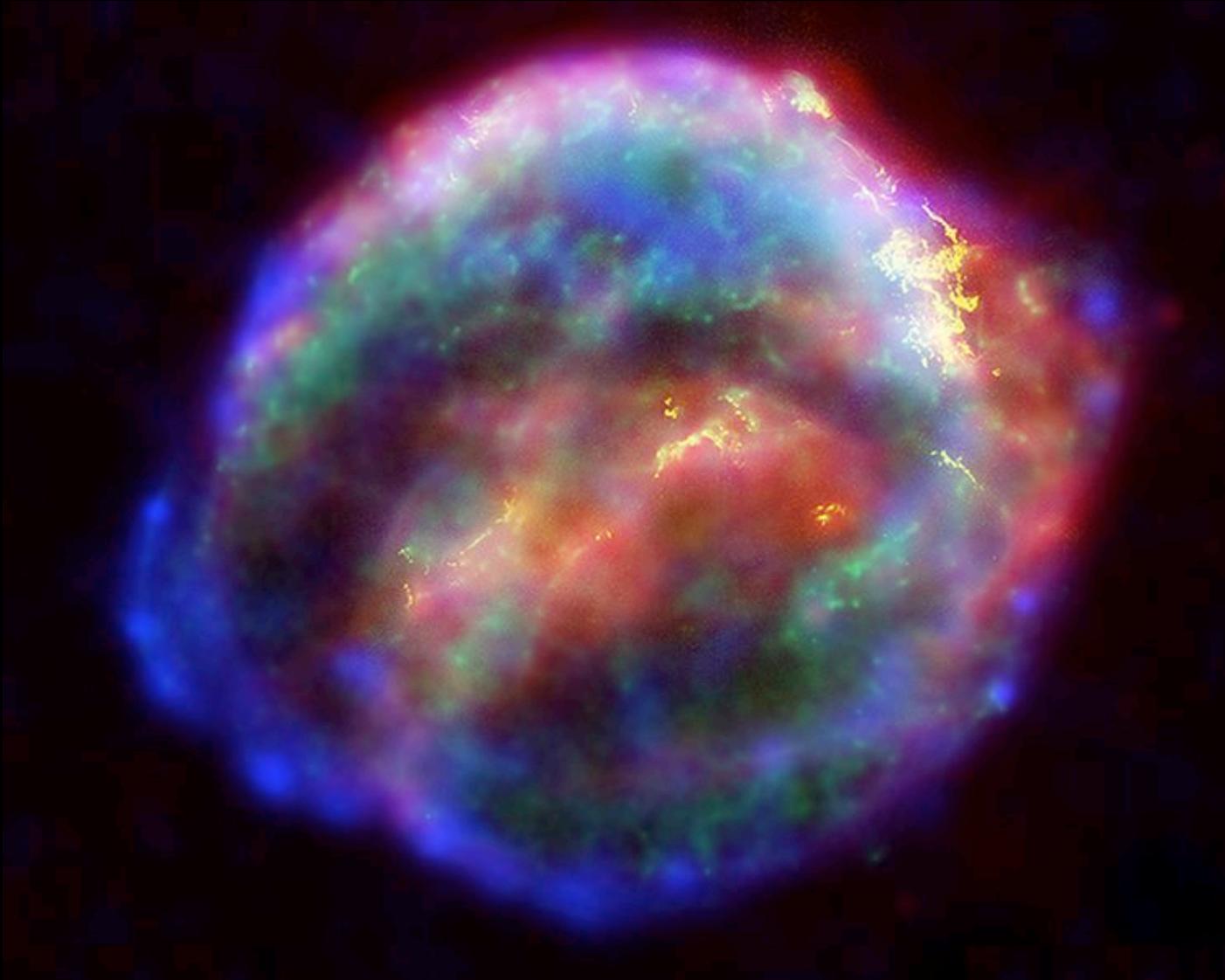
Learning outcomes:

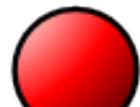
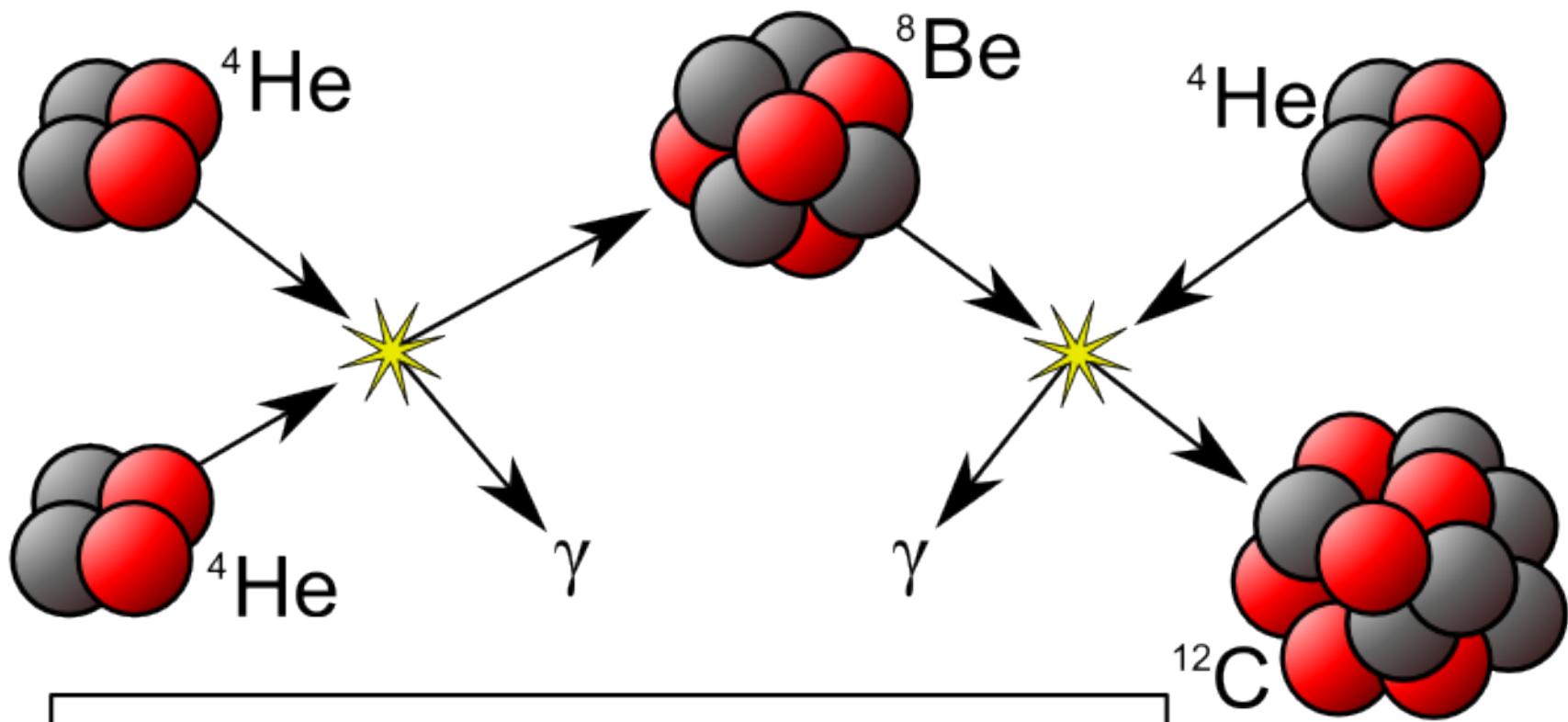
- Get a deep perspective on time
- Understand major events in earth history
- Generate hypotheses regarding what happens after mass extinctions

Big Bang 13.73 BYA

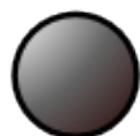


First stars produce more complex elements, then (some) explode





Proton

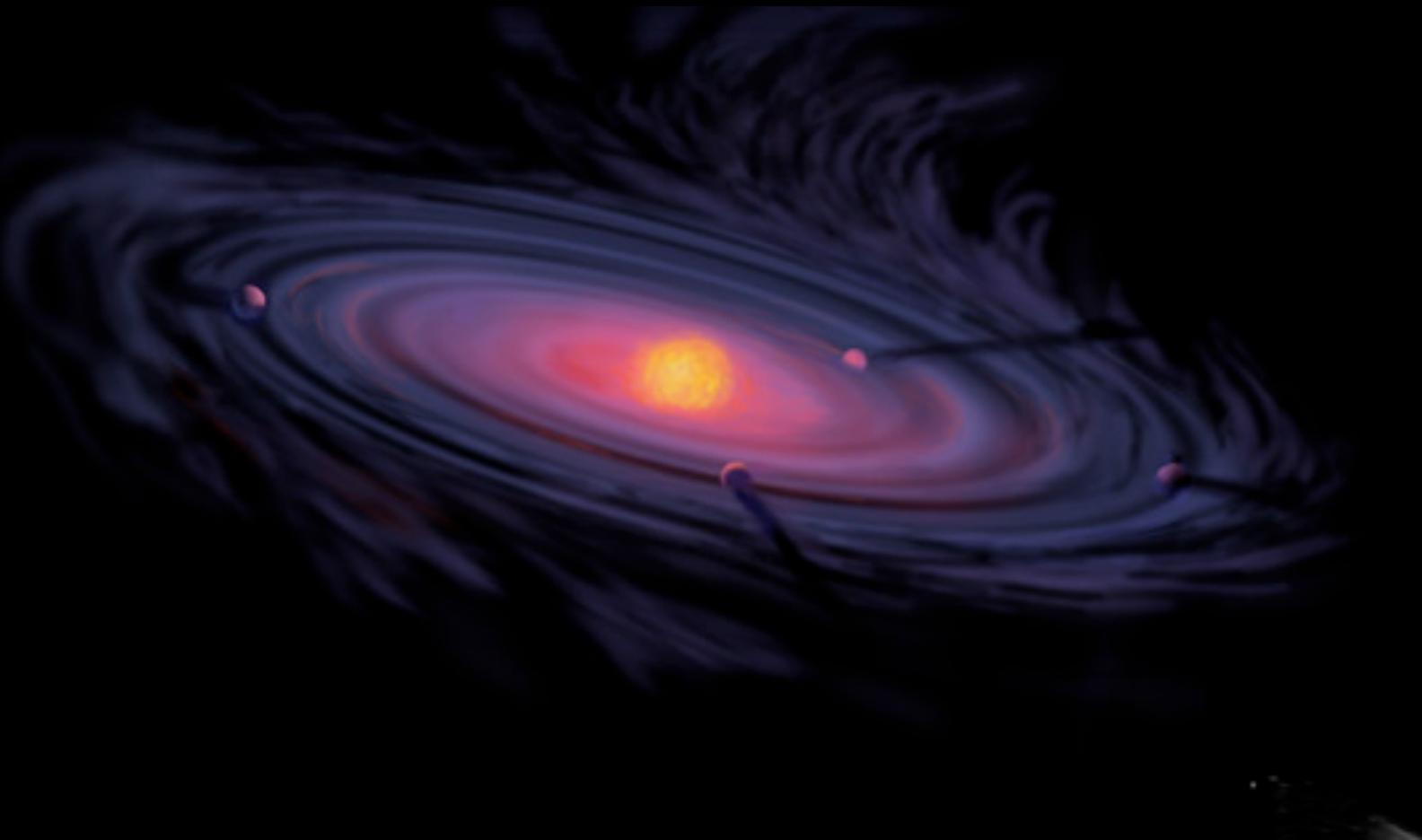


Neutron

γ

Gamma Ray

Solar system (sun, planets) form
4.6 BYA



Moon broken off from Earth, 4.53 BYA



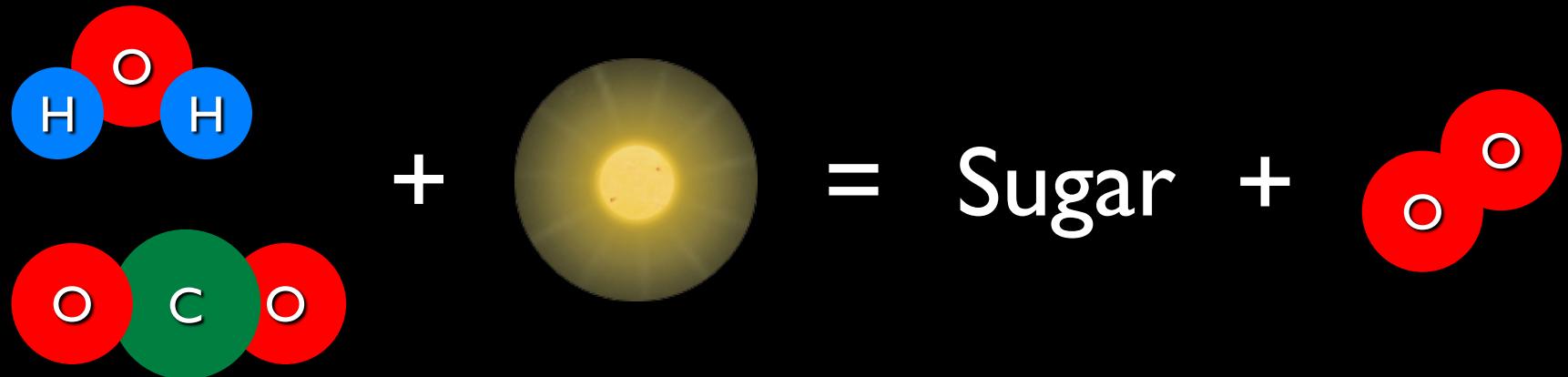
Heavy bombardment, 4.1 - 3.8 BYA



Life evolves ~3.8 BYA

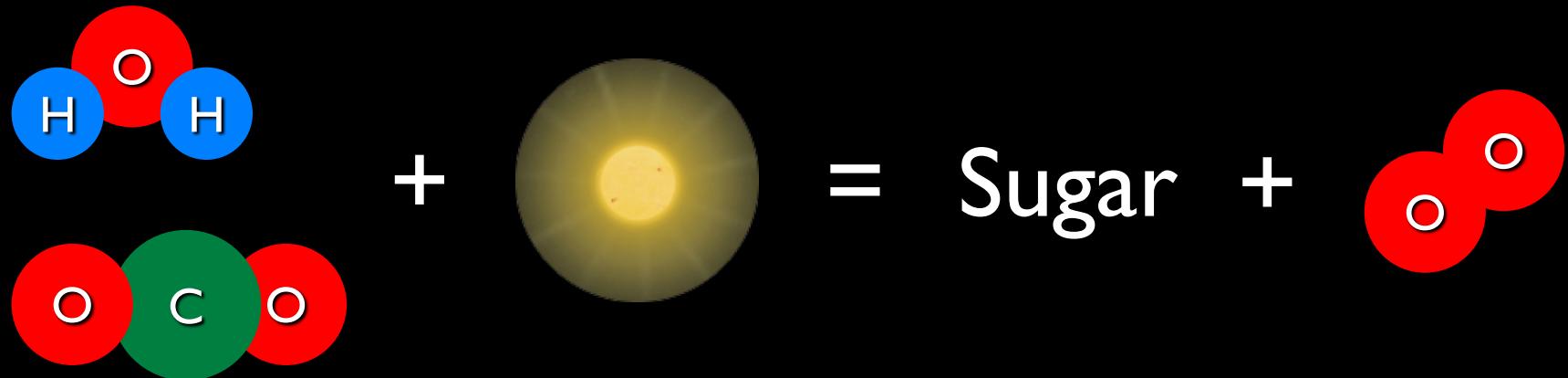


Photosynthesis evolves somewhere 3.5 - 2.8 BYA



Great oxidation event

2.45 - 2.22 BYA



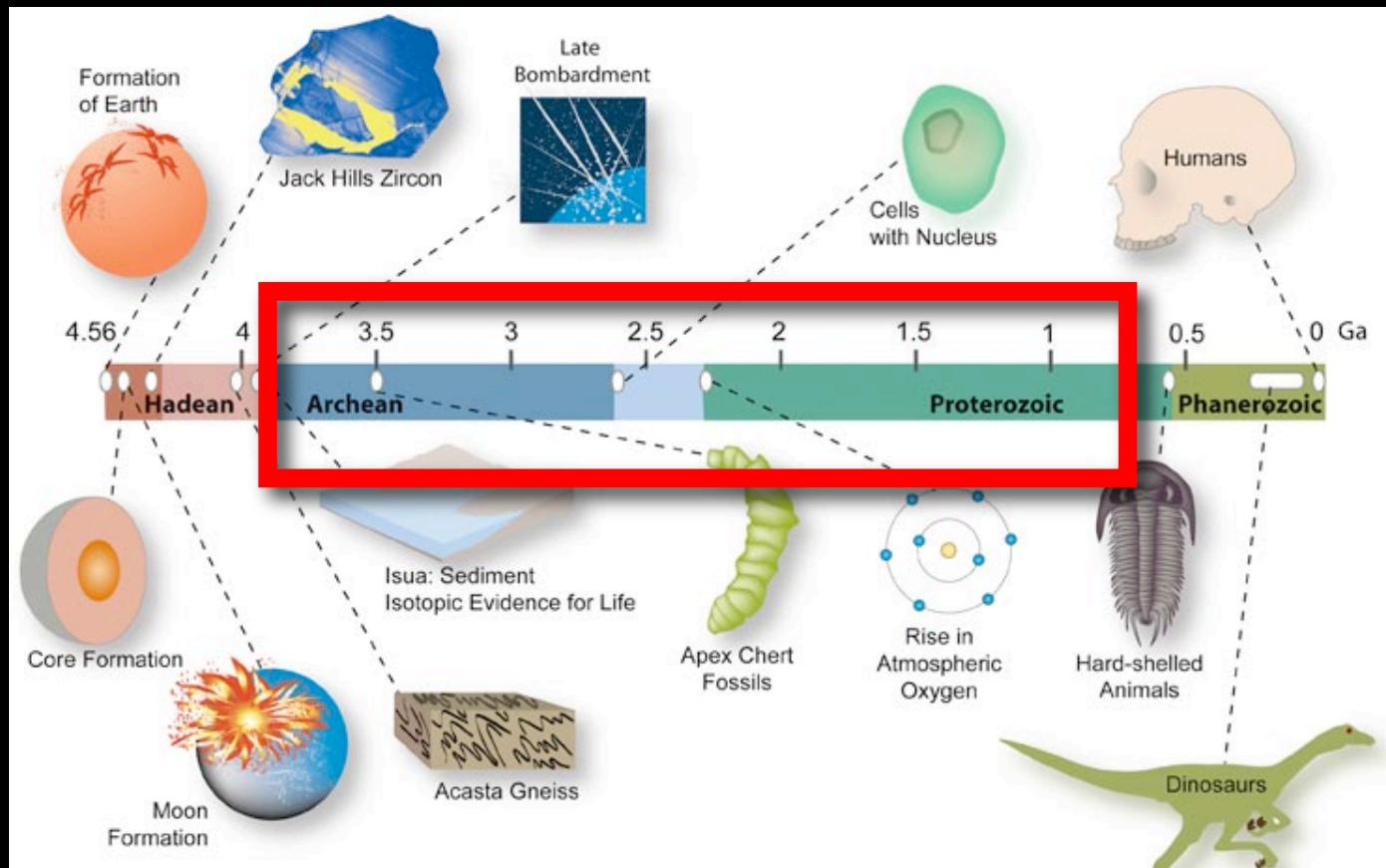
Huronian glaciation

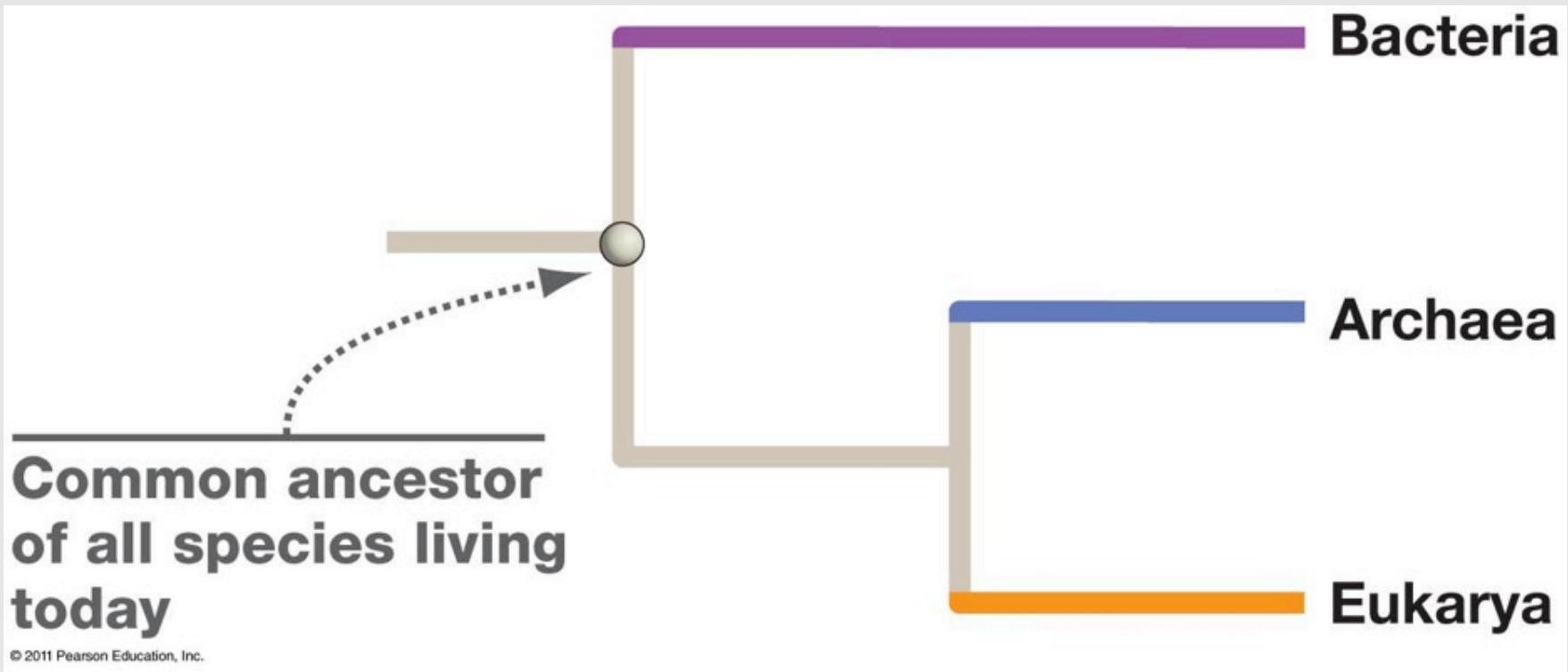
3.2 - 2.4 BYA

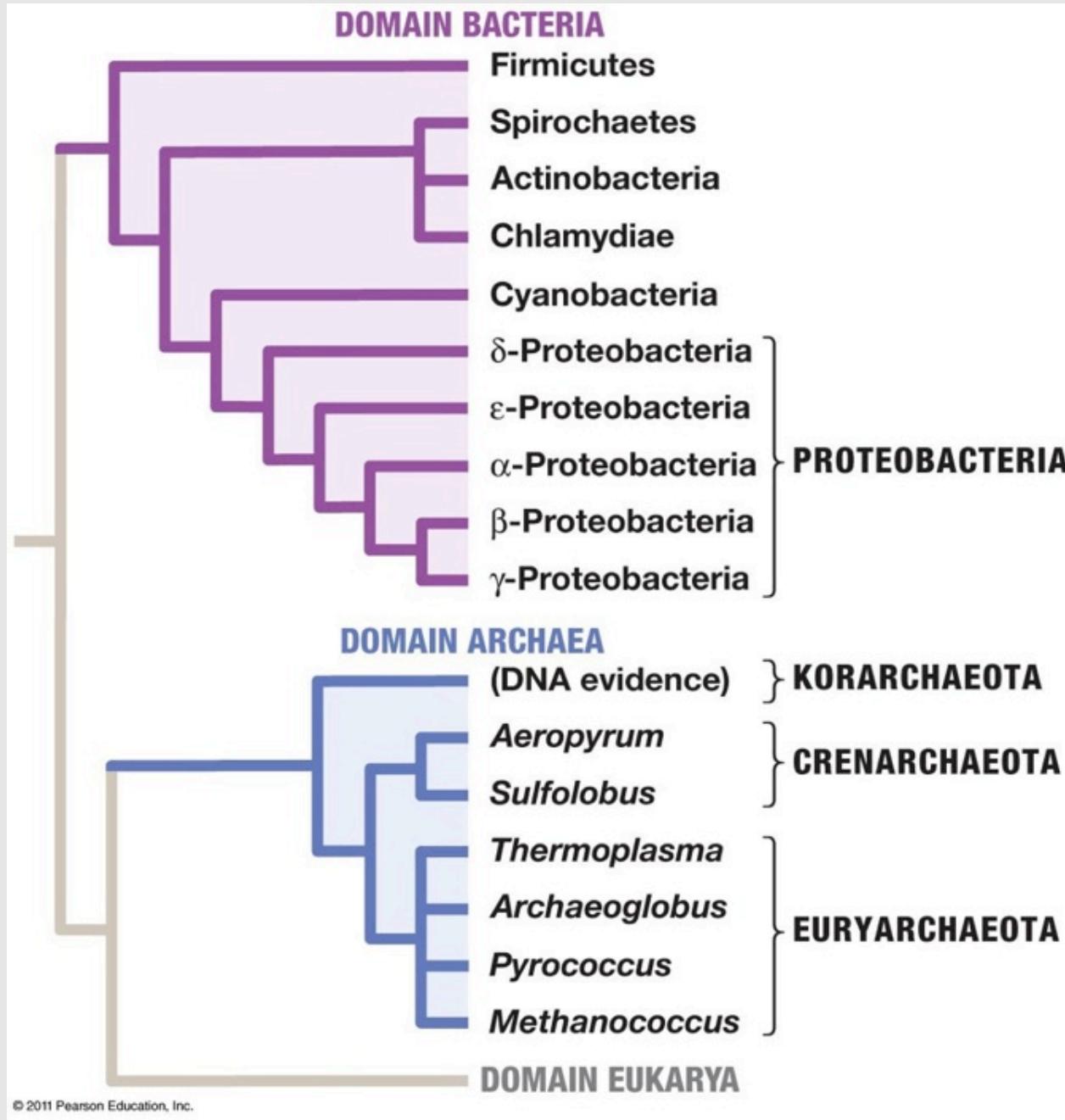


a long time passes

Archaea+Eukaryotes and Eubacteria diverge
Eukaryotes diverge from Archaea
Life is still single-celled



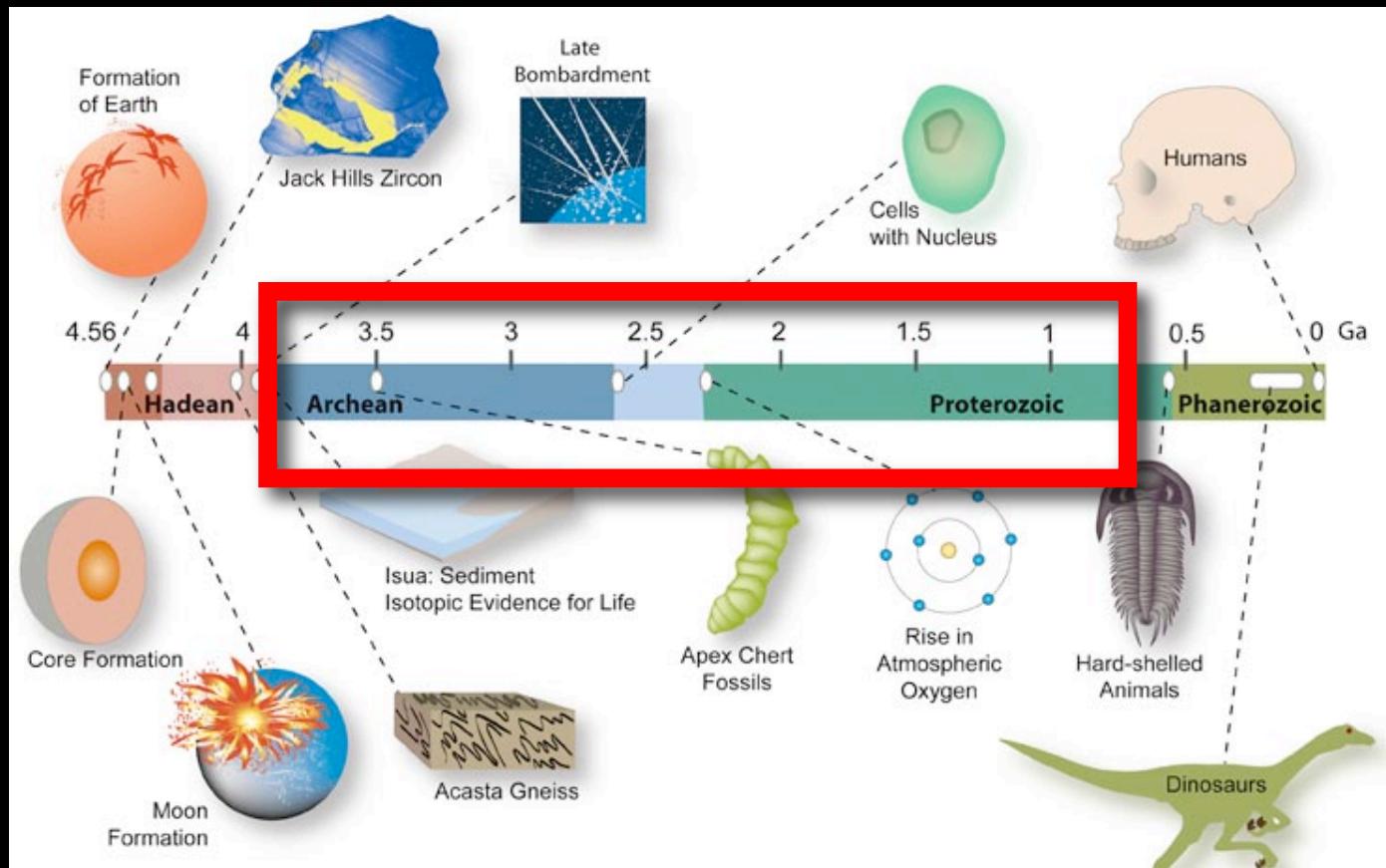




	Bacteria	Archaea	Eukarya
Circular chromosome	Y	Y	N
Histones with DNA	N	Y	Y
Flagella	Spinning	Spinning	Waving
Unicellular	Y	Y	Varies
Organelles	~N	N	Y

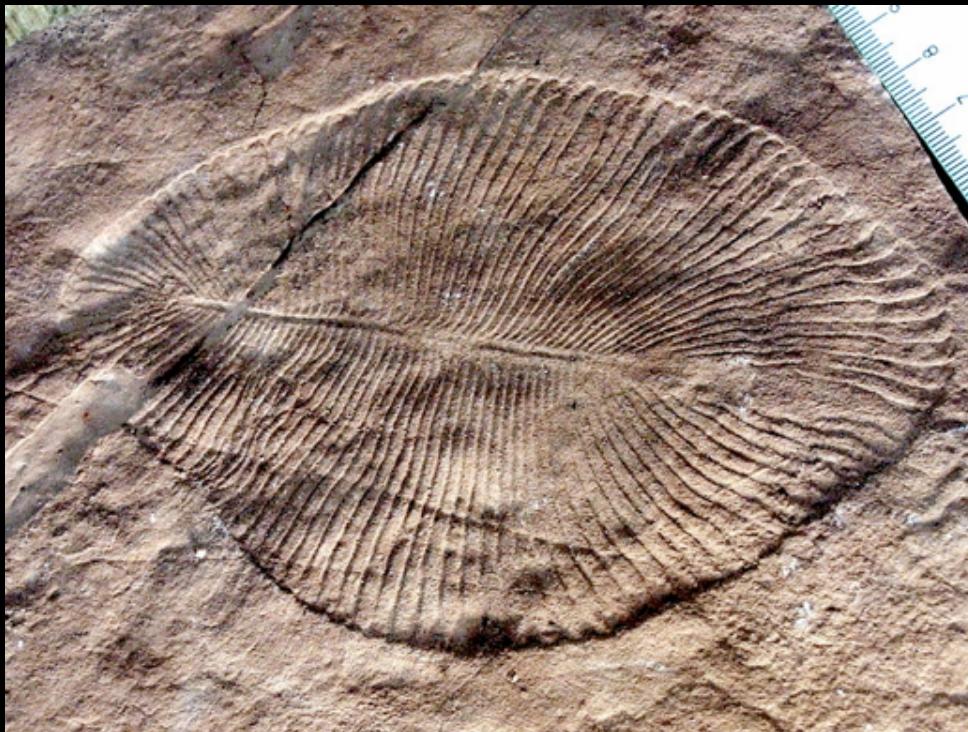
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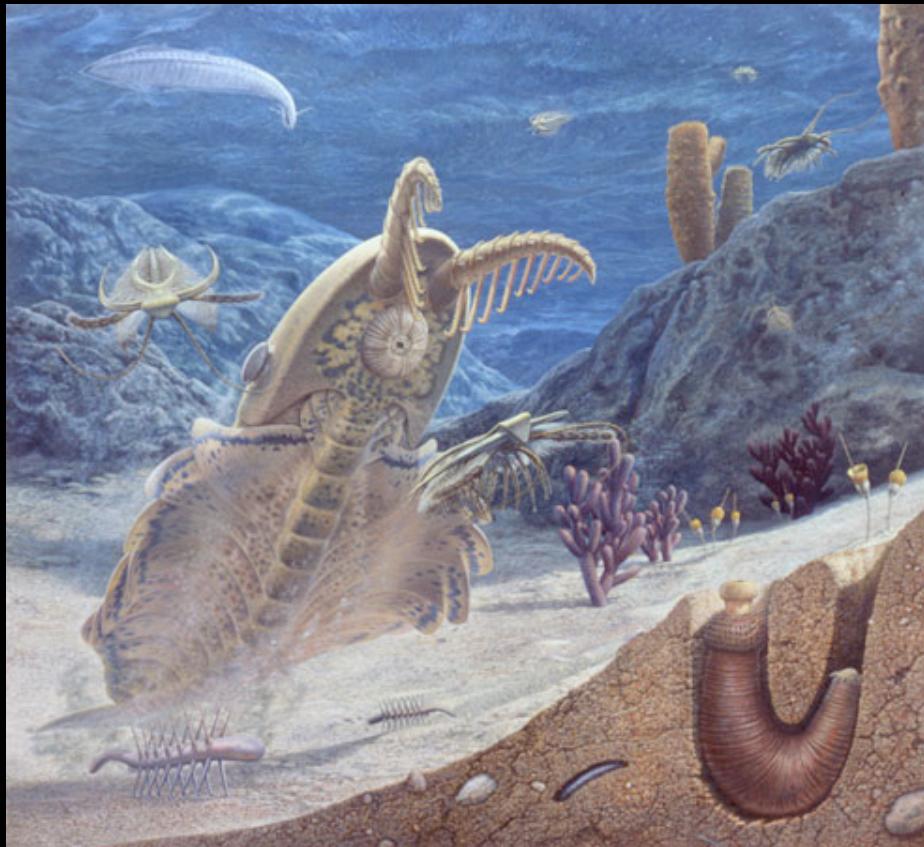
Ediacaran fauna

0.63 BYA = 630 MYA

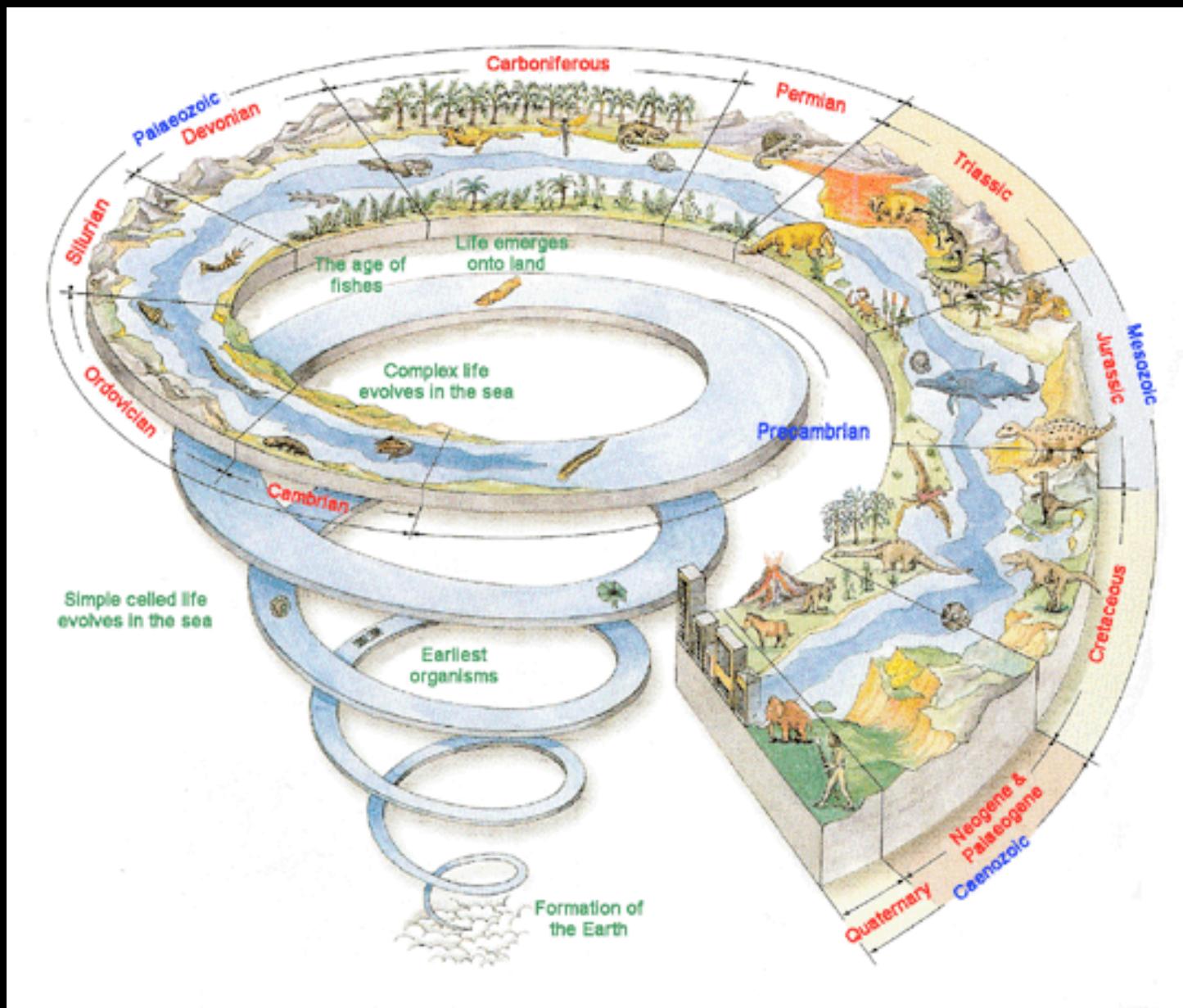


Cambrian

542 MYA

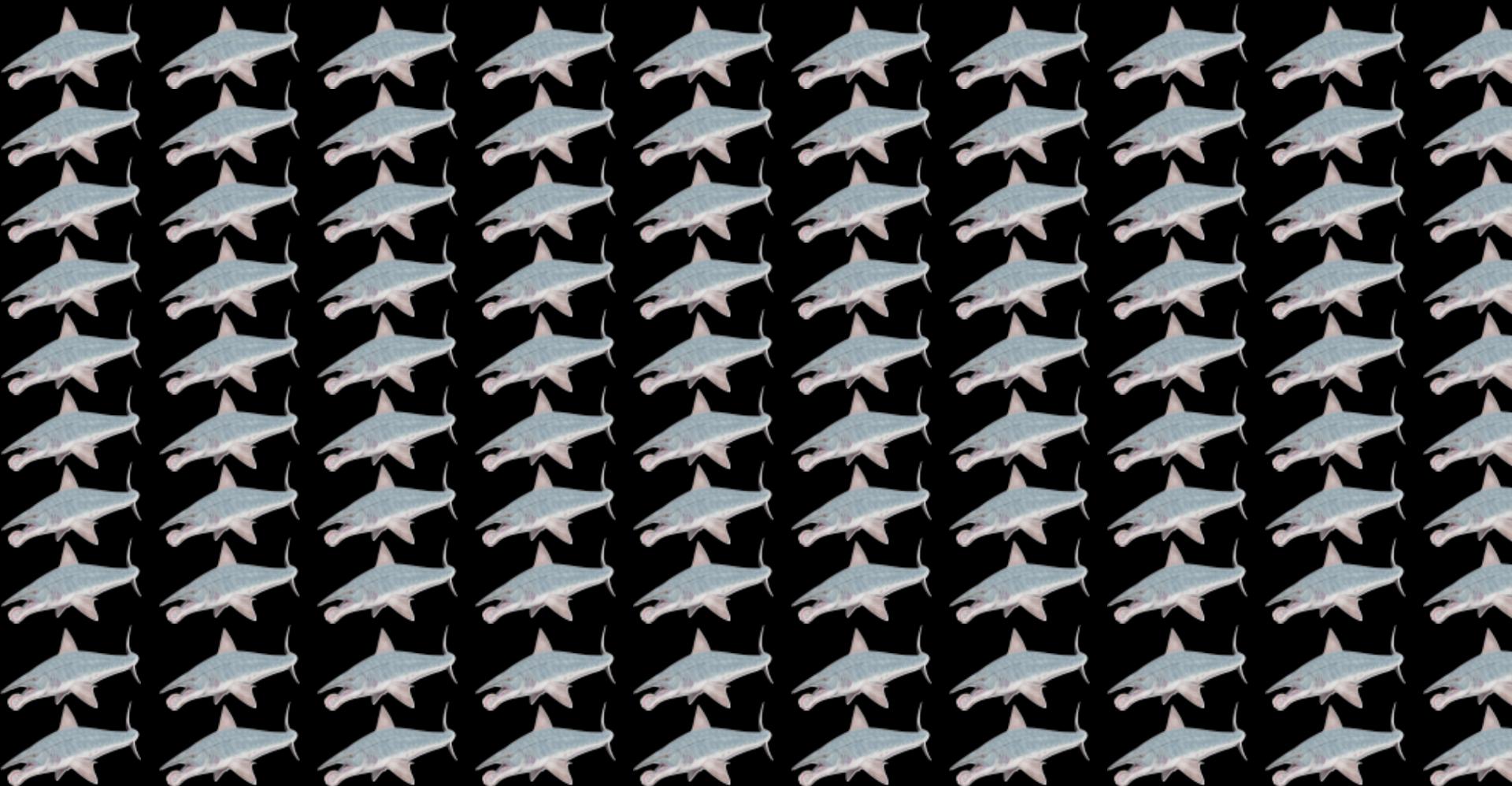


John Sibbick



Permian-Triassic extinction

251 MYA



Permian-Triassic extinction

251 MYA



Permian-Triassic extinction

251 MYA



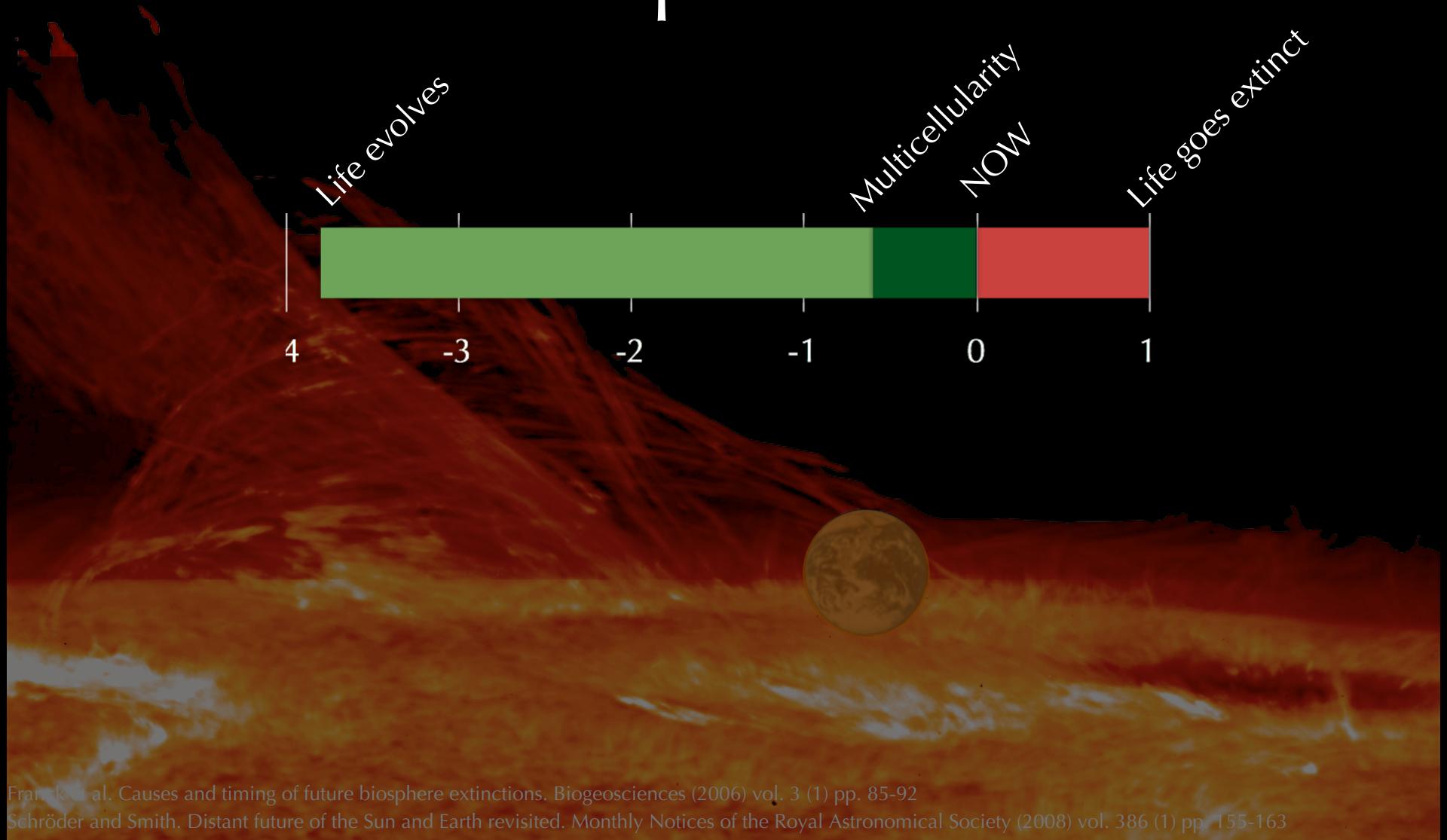
KT (Cretaceous-Tertiary) extinction

65.5 MYA



Brian Franczak

Sun eventually becomes red giant, expands



Discussion: how might a major extinction like the one at the end of the Permian affect life?