The Cambrian Explosion: Evidence for Creation, Challenge for Evolution

Fazale (Fuz) R. Rana

Lecture 1

Introduction

- A fossil record conundrum
  - Darwin on the origin of animals
  - Conway Morris on the origin of animals
- The Cambrian explosion
  - Key Cambrian sites
  - The Cambrian explosion in the context of life's history

How dramatic was the Cambrian explosion?

- The origin of phyla
  - What is a phylum?
- Disparity throughout life's history
- The origin of skeletal designs
- The origin of multicellularity
  - What is required for multicellularity?
  - Explosive gene duplication and diversification
- The ecology of the Cambrian

The Cambrian explosion and creation

- Richard Dawkins' description of the Cambrian explosion
- Genesis 1:21

The Cambrian explosion and the challenge to evolution

- Too short a period of time
  - Darwin's concern
- Evolutionary 'lawn,' not an evolutionary 'tree'
  - Darwin's concern
  - Origins of deuterostome
  - Three Cambrian explosions, not one
- Body plans can't evolve
  - Overview of the development process
  - Developmental genes
  - Effects of mutations on the developmental process

Was the Cambrian explosion a real event?

- Incompleteness of the fossil record
  - The Lägerstätten effect
- Ediacaran fauna as ancestors to Cambrian animals
- Fossil embryos

- Trace fossils
- Molecular clock analysis

Cambrian Explosion in the Scientific Record

Hugh Ross

Lecture 2

Changing solar system, changing life
- Solar flaring variability
- Solar luminosity variability
- Tidal breaking variability
- Rotation period variability
- Radioactivity variability

Life's sensitivity to physical changes

Compensating for environmental changes
- Erosion of silicates
- Burial of organic carbon
- Alteration of atmospheric chemistry
- Alteration of cloud cover and precipitation
- Changing Earth's reflectivity

Unicellular life prepares Earth for animals
- Oxygenation of atmosphere and oceans
- Transformation of poisons into nutrients
- Preparation of soils
- Recycling of phosphorus by giant sulfur bacteria
- Recycling of essential nutrients

Cambrian animals
- Immediate appearance upon completion of preparation
- Symbiosis in place
- Great abundance and diversity

Cambrian animals prepare Earth for humans
- Ongoing oxygenation of atmosphere and oceans
- Production and storage of biofuels
- Production and storage of carbonates
- Production and storage of sands

Cambrian animals and the Creator
- Potent evidence for a creation model
- Evidence of the Creator's power and purposeful plan

The Eyes Have It: On the Origin and Design of Vision

Fazale (Fuz) R. Rana

Lecture 3

Introduction

- The eye: An "organ of extreme perfection"
    - Darwin on the origin of the eye
- Darwin's solution
- Examples of "transitional intermediates" for the camera eye
    - Light perception Vs vision
    - Ocelli
    - Flat Vs curved surfaces
    - Retina

Eye designs

- Simple
    - Pinhole eye
    - Mirror eye
    - Camera eye
- Compound
    - Apposition
    - Superposition

Origin of eyes

- Cambrian explosion and the origin of vision
    - Eye designs among the Cambrian fauna
- How long does it take for the camera eye to evolve?

Is the vertebrate eye a bad design?

- Richard Dawkins on the vertebrate retina
- Trevor Lamb on the vertebrate retina
- The inverted retina: a good design
    - The need for sufficient blood supply
    - Role of the retina pigmented epithelium
    - Role of Müeller cells

Convergence of camera eyes

- Darwin and convergence
- Historical contingency
    - Stephen Jay Gould
    - Evidence for historical contingency
    - A test for evolution
- Convergence of the camera eye

- Convergence and design

Human designs and biological designs

- Pinhole eye
- Mirror eye
- Camera eye

Insect eyes inspire human designs

- Compound eyes inspire digital camera designs

Cambrian Explosion in the Bible

Hugh Ross

Lecture 4

Cambrian explosion and Genesis 1

- Light for photosynthesis
- Water cycle
- Step-by-step transformation of Earth's atmosphere
- Continental buildup
- Time markers for regulating Cambrian animals' clocks

Cambrian explosion and Psalm 104

- A habitat-rich Earth
- As much life as possible
- Cycles of mass extinction and mass speciation
- Designs that serve the specific needs of humans

Fine-tuned timing

- Time between unicellular life and Cambrian animals
- Time between continental plants and Cambrian animals
- Time between the Cambrian explosion and humans
- Peak fossil fuel time windows
- Peak carbonate deposit time windows

Cambrian animals and the Great Commission

- Needed resources for humans
- Crucial evidence for God's existence and love