Introduction to Biology. Lecture 19

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Outline

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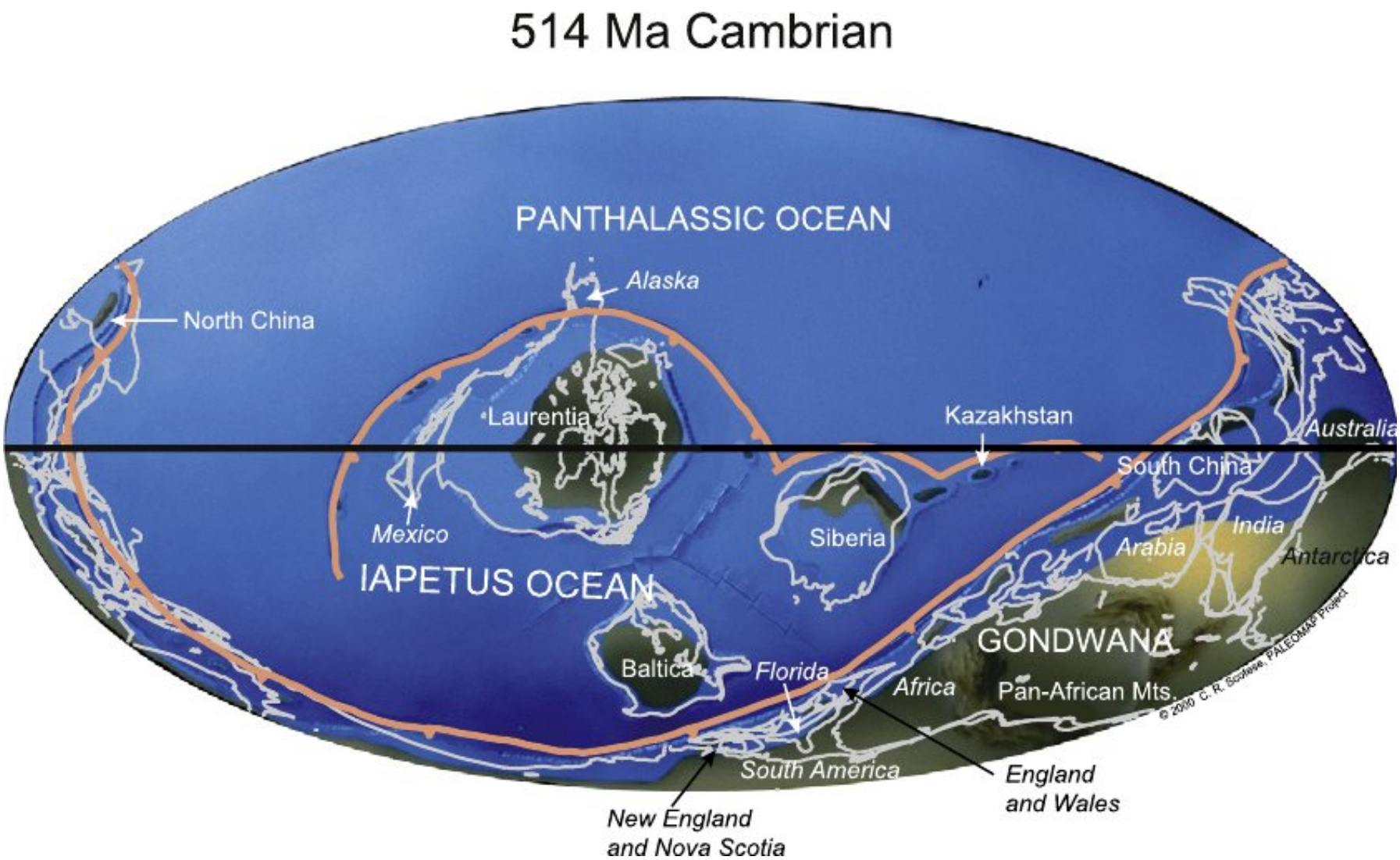
Where we are?
Cambrian life

Timescale of Phanerozoic eon, Paleozoic era

- Phanerozoic eon
  - Paleozoic era
    - Cambrian period: 541 Mya
    - Ordovician period: 485 Mya
    - Silurian period: 443 Mya
    - Devonian period: 419 Mya
    - Carboniferous period: 358 Mya
    - Permian period: 299–252 Mya

Cambrian map



Cambrian explosion

Sudden diversity of animals

Animal phyla in Cambrian

- Porifera
- Cnidaria
- Mollusca
- Brachiopoda
- Arthropoda (including Lobopoda)
- Echinodermata
- Chordata

Theories of Cambrian explosion

- Pellet revolution
- Acquiring the ability of making hard tissues
- Absolute predator

Evolutionary cascade resulted in skeletal revolution

- Muddy water: all dust and microscopic feces is slowly subsiding down
- Plankton arthropods appeared, they are making pellets from dust and excretions
- Water became more transparent, oxygen is not spending for dust oxidation
- More photosynthesis, more oxygen, more organic on bottom
- Animals became more active
- Big predators appeared
- Animals acquire skeleton and other defensive structures

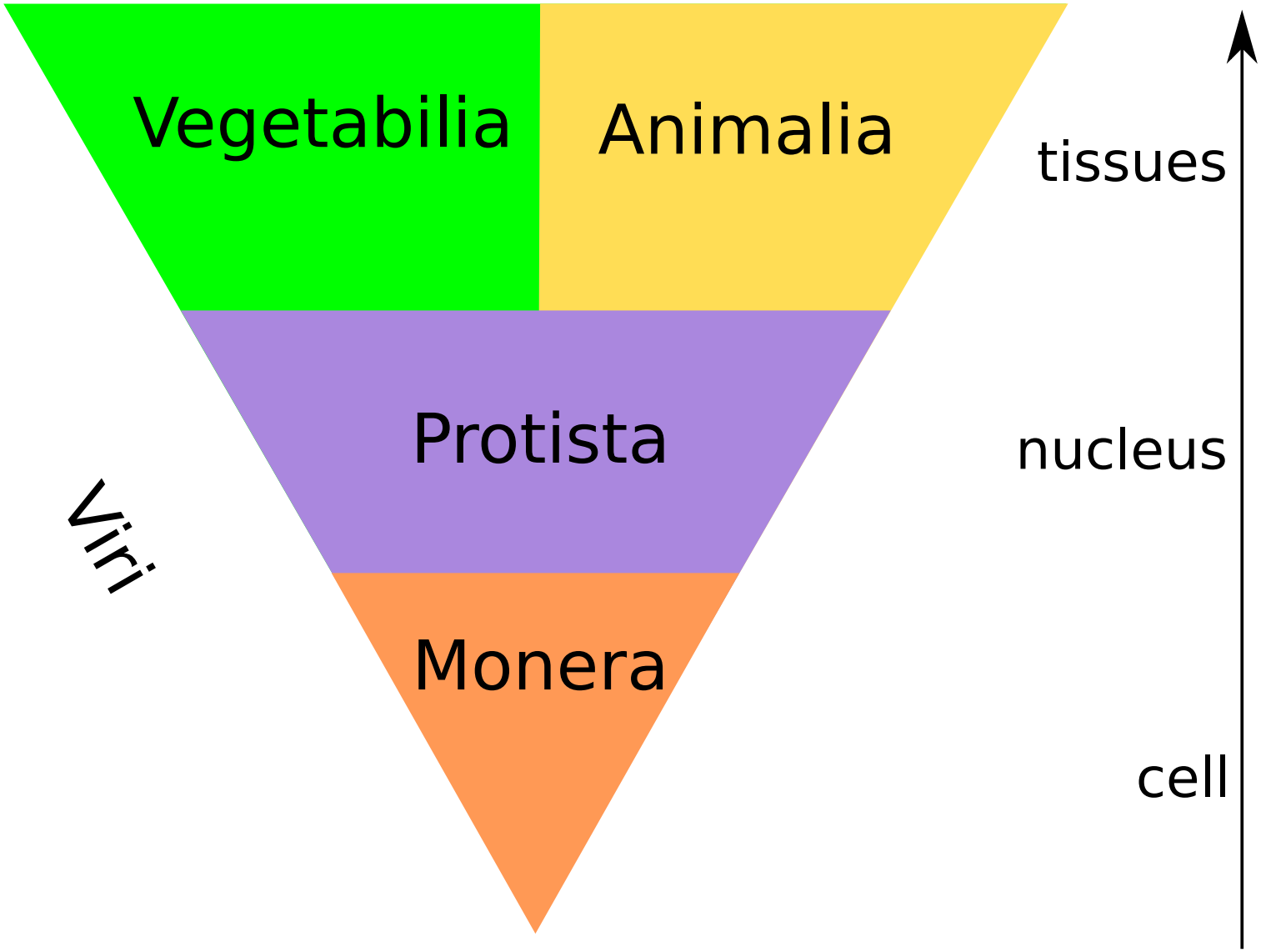
Skeleton

- Internal (endoskeleton): hydrostatic (worms), spicules (sponges), bones and cartilage
- External (exoskeleton): chitinous, shells, skin plates

Since volume grows faster with size than surface, animals with exoskeleton will suffer from the big size more than animals with endoskeleton. This is why arthropods do not reach size of chordates.

Animals
Origin of animals

Cells, tissues and kingdoms



Origin of animals

- Blastaea: not the animal yet. *Volvox*, *Proterospongia*.
- Phagocytella. Two tissues: kinoblast and phagocytoblast. *Trichoplax*.
- Gastraea. Three tissues: ectoderm, entoderm and mesoderm. Closed gut.

Summary

- The main driving force of animal evolution was feeding on bigger and bigger pray.

For Further Reading

Skeleton.
http://en.wikipedia.org/wiki/Skeleton

Animal.
http://en.wikipedia.org/wiki/Animal