Classification

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Classification

Criteria for classification as reported in an ancient Chinese encyclopedia (Lakoff 1987):

"…it is written that animals are divided into:

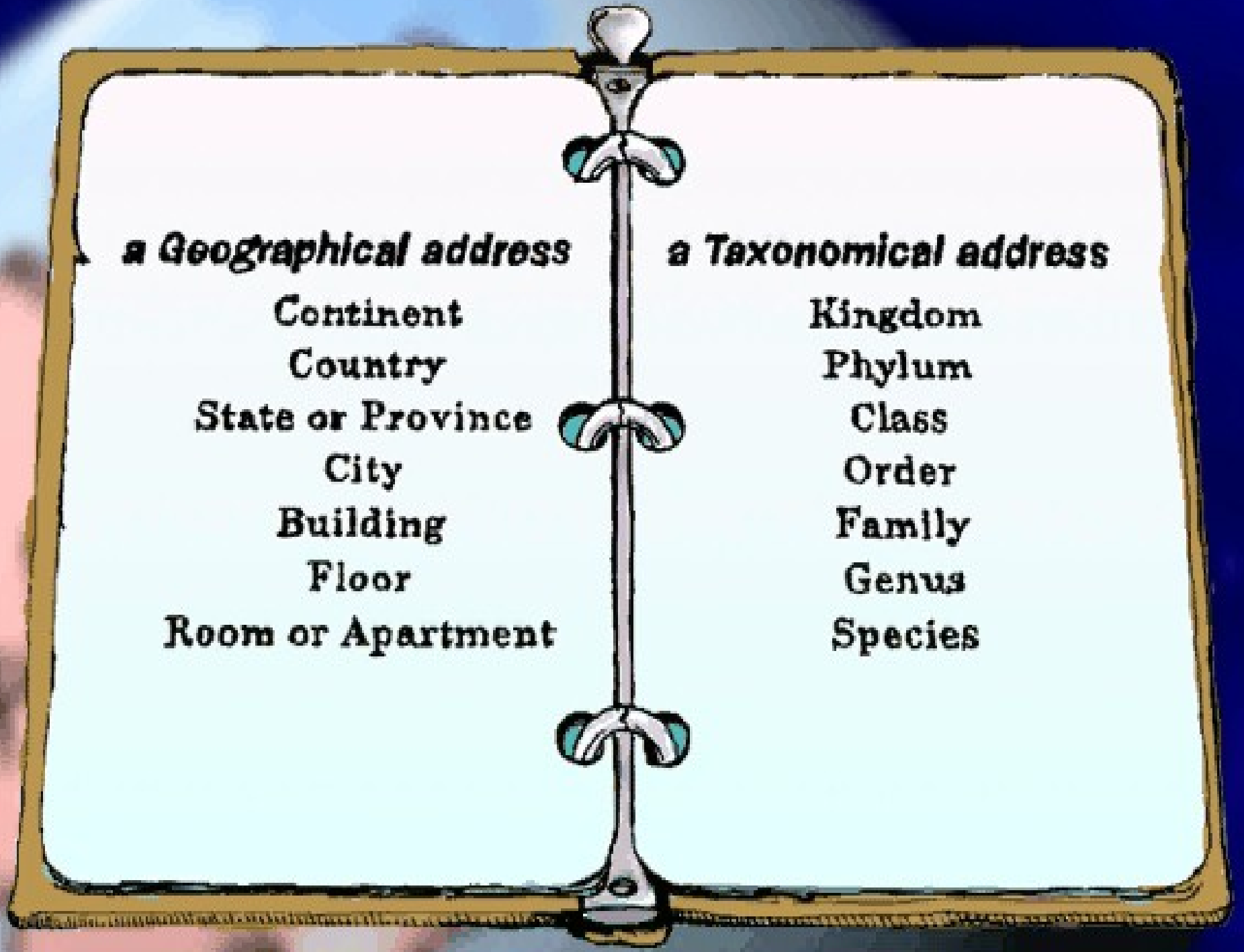
- *those that belong to the Emperor*
- *embalmed ones*
- *those that are trained*
- *suckling pigs*
- *mermaids*
- *fabulous ones*
- *stray dogs*
- *those that tremble as if they were mad*
- *those that have just broken a flower vase*

- **Systematics**- studies diversity of life

  study and classification of organisms with the goal of reconstructing their evolutionary history

- **Taxonomy**- study of classification science of identifying, naming and classifying organisms into groups

- **Linnaeus-** 1700's, Swedish physician/botanist
  Developed binomial naming system


a Geographical address
Continent
Country
State or Province
City
Building
Floor
Room or Apartment
a Taxonomical address
Kingdom
Phylum
Class
Order
Family
Genus
Species

Example of Coral Classification

The Mushroom Coral

Fungia scutaria

Kingdom Animalia

Phylum Cnidaria

Class Anthozoa

Order Scleractinia

Family Fungiidae

Genus *Fungia*

Species *scutaria*

Biological Species

Organisms that are genetically similar, and have ability to interbreed and produce viable, fertile offspring

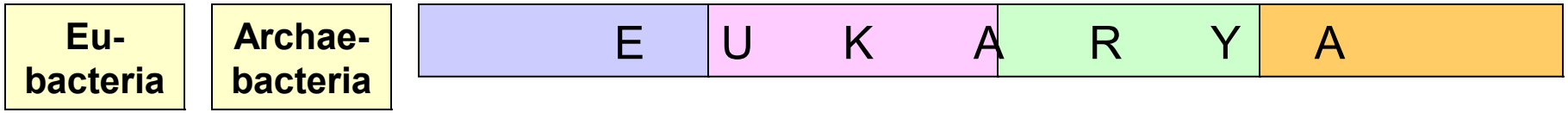
- **Mode of Reproduction**: binary fission, gametes
- **Cell structure**: multi or single celled, nucleus/no nucleus, cell wall/no cell wall, chlorophyll present/not present,
- **Internal/External skeleton**: back bone, bone/cartilage
- **Energy**: autotrophic, heterotrophic, chemotrophic
- **Respiratory system**: gills, lungs, gas exchange across skin/epithelium
- **Circulatory system**: closed/open, # of chambers in a heart

Classification

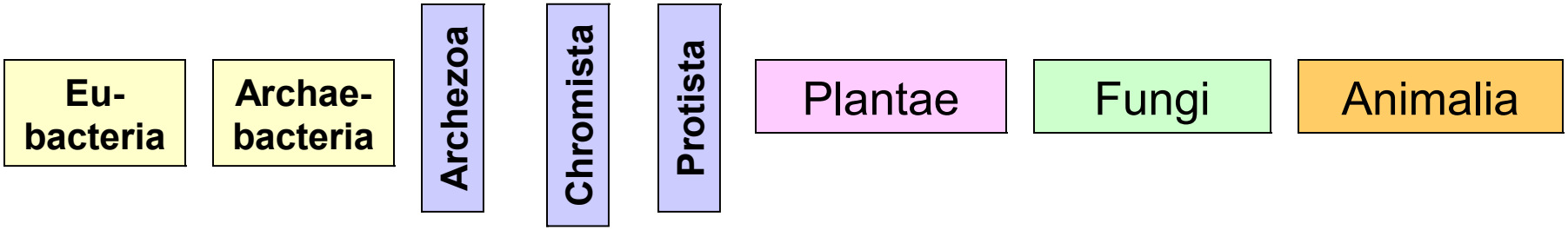
Five kingdom system:

Six kingdom system:

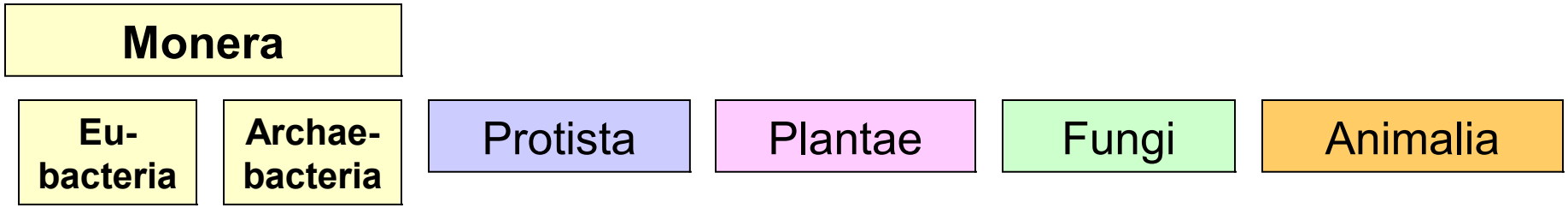
Three domain system:



Eight kingdom system:

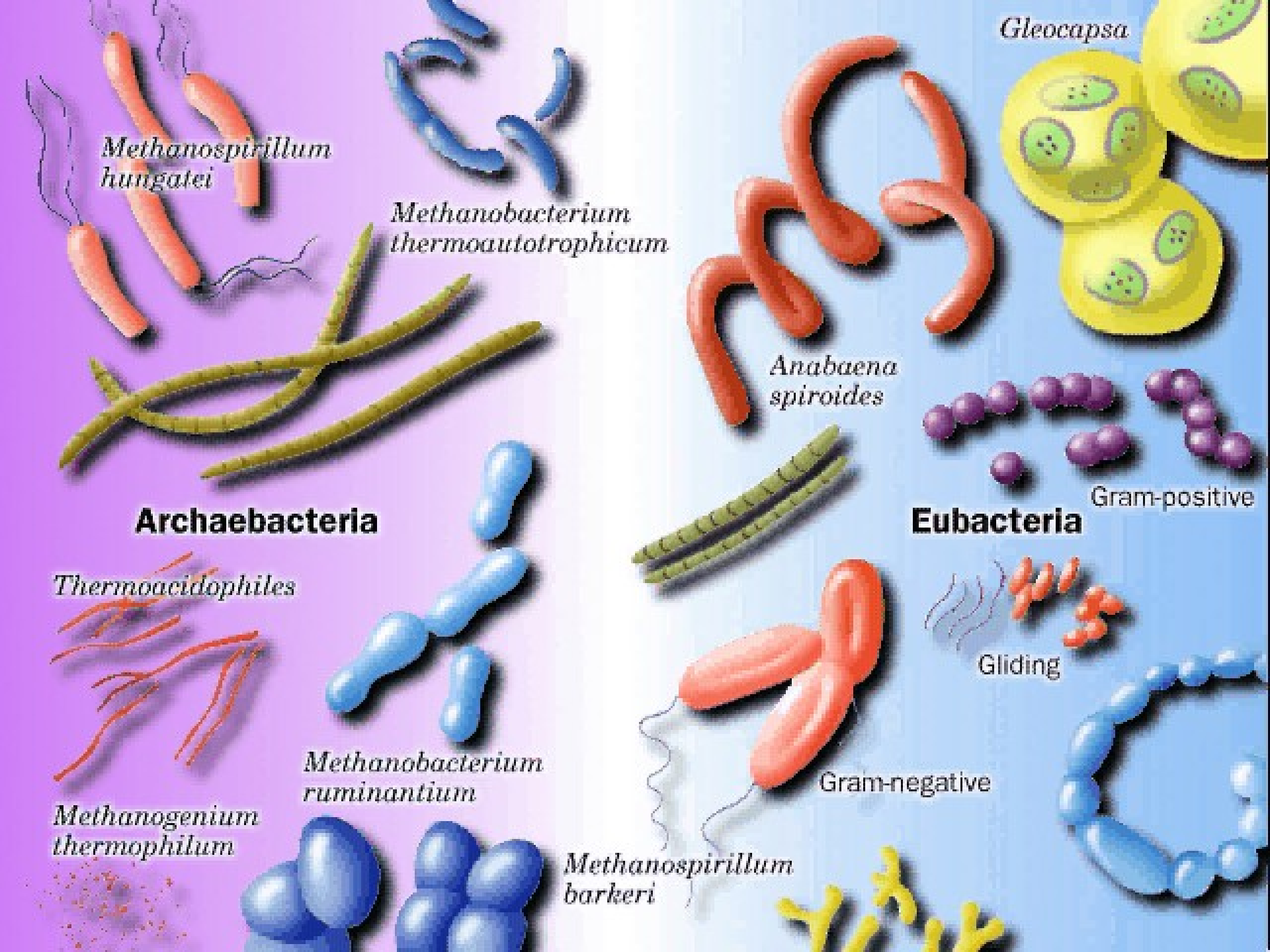


Six kingdom system:



Kingdoms Archaebacteria & Eubacteria (Monera)

- Prokaryotic, single-celled organisms.
- Heterotrophic, photoautotrophic, and chemoautotrophic species.
  - Purple sulfur bacteria- chemoautotrophic
  - Blue-green algae (cyano)- photoautotrophic
  - *E. coli*- heterotrophic
- Some with cell walls, but cell walls composed of peptidoglycan, not cellulose (as in higher plants).

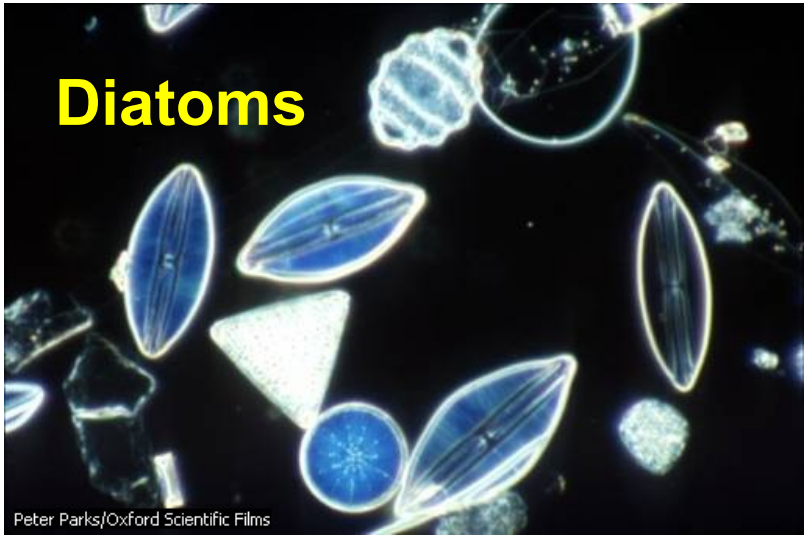

Methanospirillum hungatei
Methanobacterium thermoautotrophicum
Gleocapsa
Anabaena spiroides
Gram-positive
Archaebacteria
Eubacteria
Thermoacidophiles
Methanobacterium ruminantium
Gliding
Methanogenium thermophilum
Gram-negative
Methanospirillum barkeri

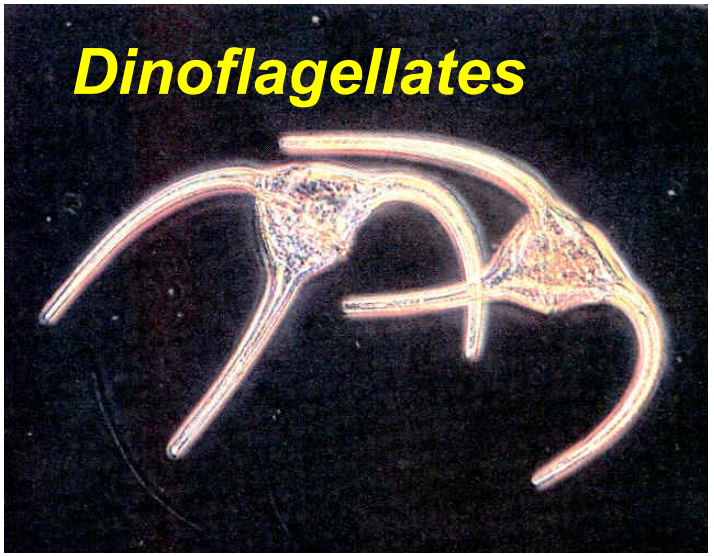
Kingdom Protista

- Eukaryotic, generally single-celled, organisms.
- If multicellular, then cells not well-oganized into tissues and organs (more colonies of cells).
- A very heterogeneous group include both heterotrophic and photoautotrophic forms.
- Includes protozoa (e.g., *Paramecium*, *Amoeba*, & *Euglena*, etc.) and algae (e.g., diatoms, dinoflagellates, *Volvox*, & most seaweed groups).

Kingdom Protista

- Diatoms
- Dinoflagellates
- Green algae
- Brown Algae
- Red algae





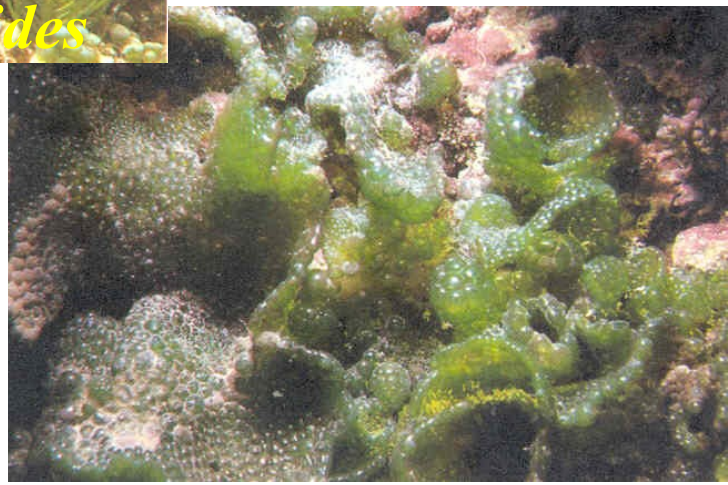
Chlorophyta: Green Algae

Codium edule

Caulerpa sertularioides

Halimeda opuntia

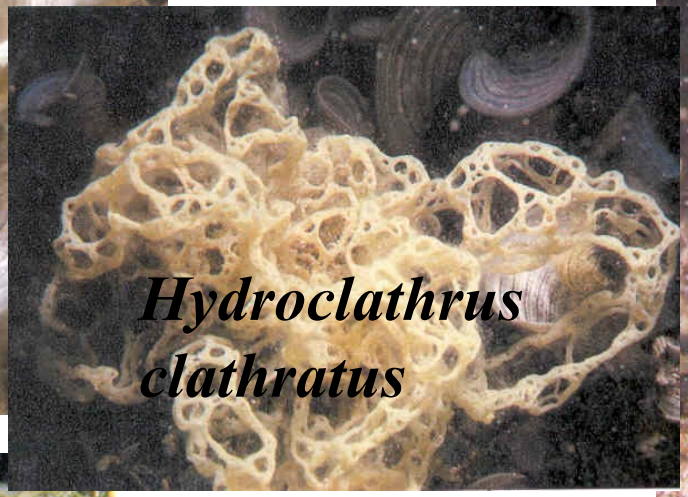
Caulerpa racemosa



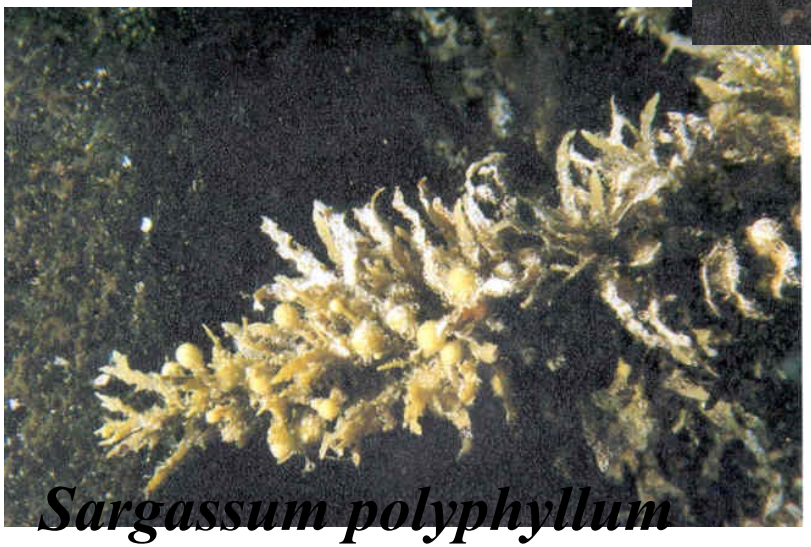
Dictyosphaeria cavernosa

Phaeophyta: Brown Algae


Padina japonica


Hydroclathrus clathratus


Turbinaria ornata

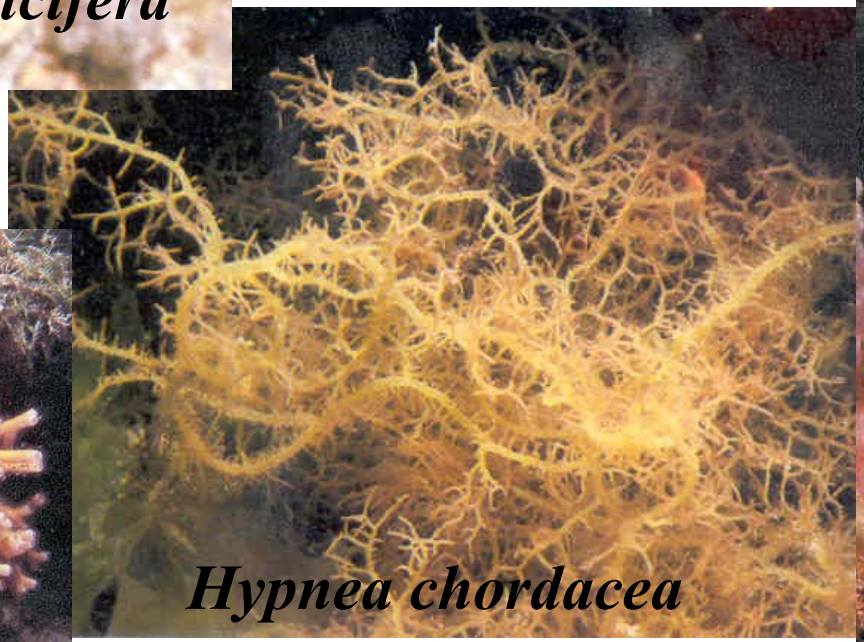

Sargassum polyphyllum


Sargassum echinocarpum

Rhodophyta: Red Algae

Acanthophora spicifera

Ahnfeltia concinna



Hypnea chordacea

Asparagopsis taxiformis

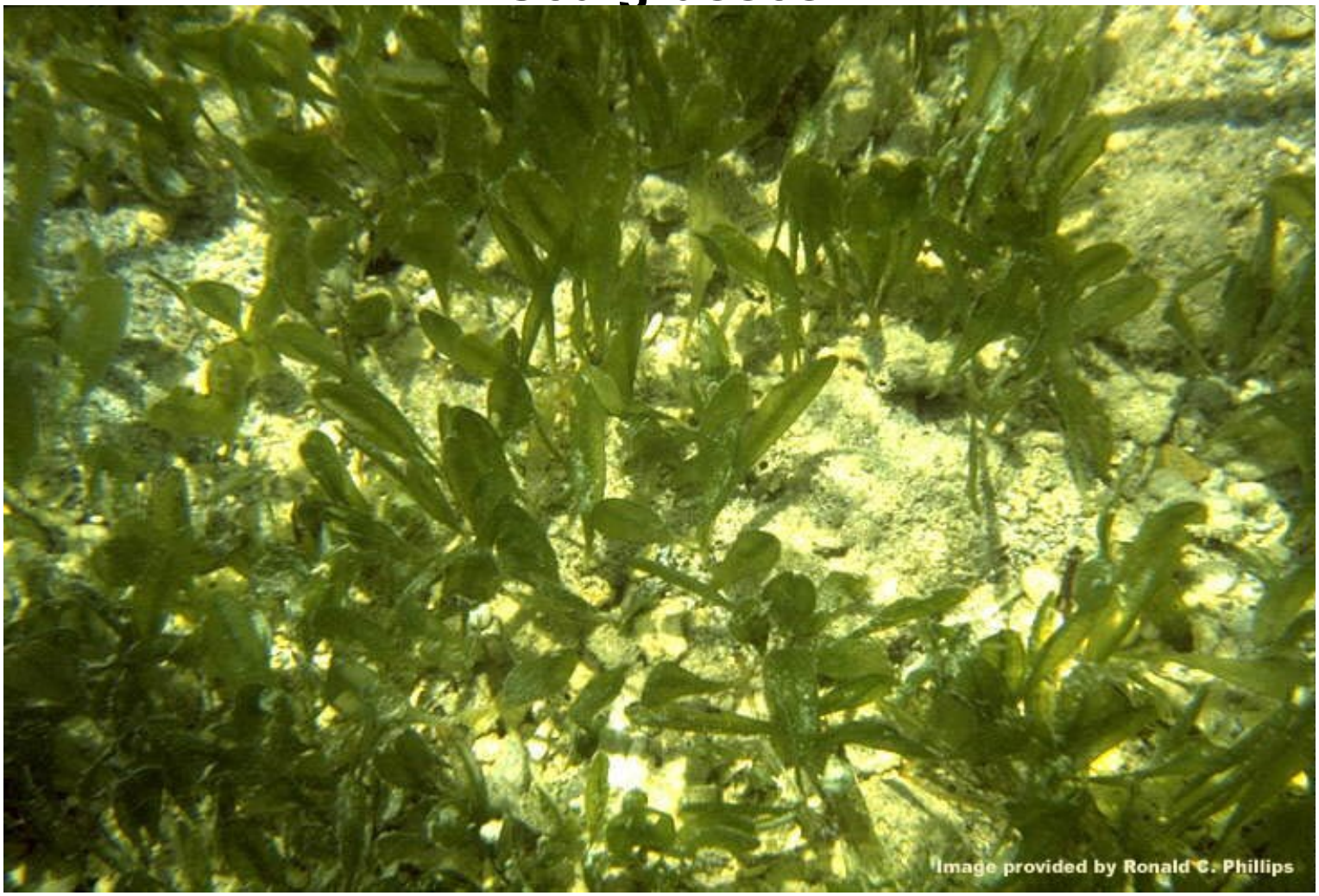
Galaxaura fastigiata

Kingdom Plantae

- Eukaryotic, multicellular organisms with cells organized into distinct tissues.
- Photoautotrophic nutrition.
- Most adapted for a terrestrial existence and possessing vascular tissues.
- Cells with chloroplasts and cellulose cell walls.
- Includes mosses, ferns, pine trees, cycads, ginkgos, and flowering plants.

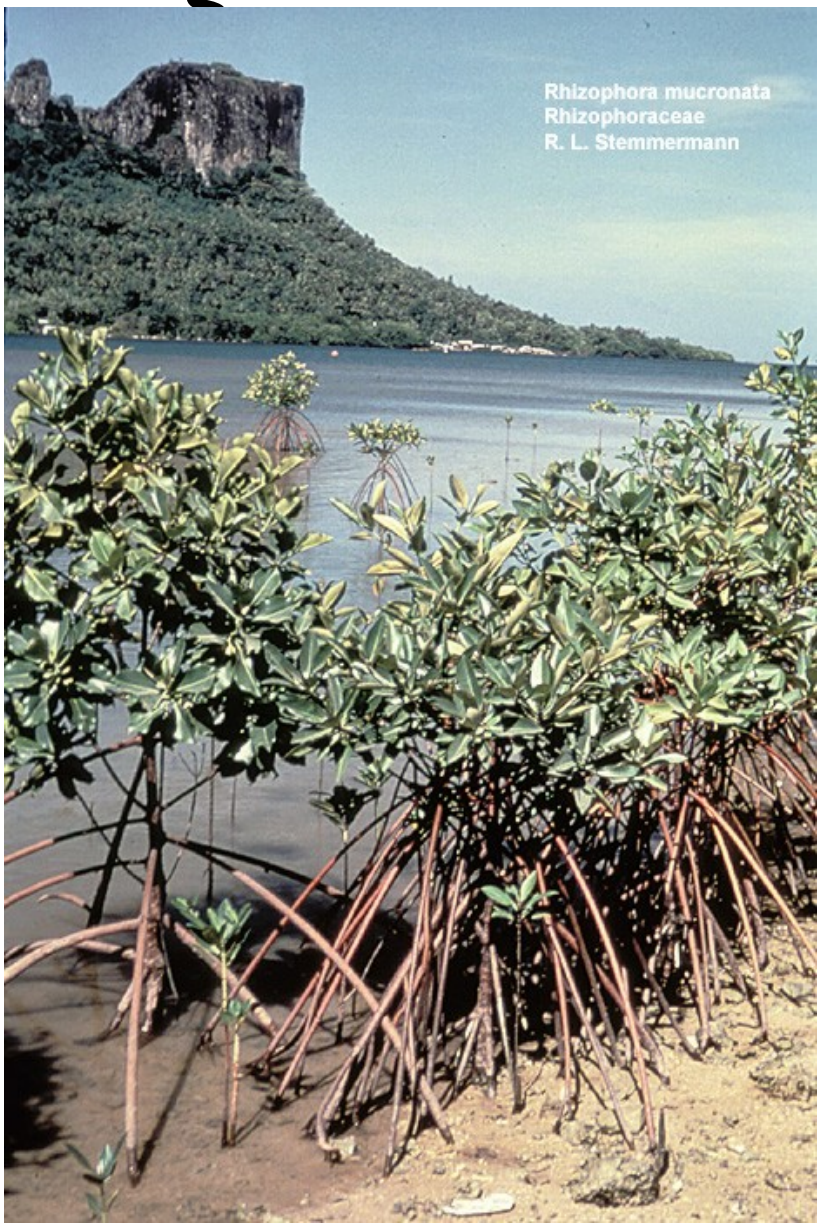
Kingdom Plantae

Sea grasses



Halophilia hawaiiana- only form of seagrass in Hawaii

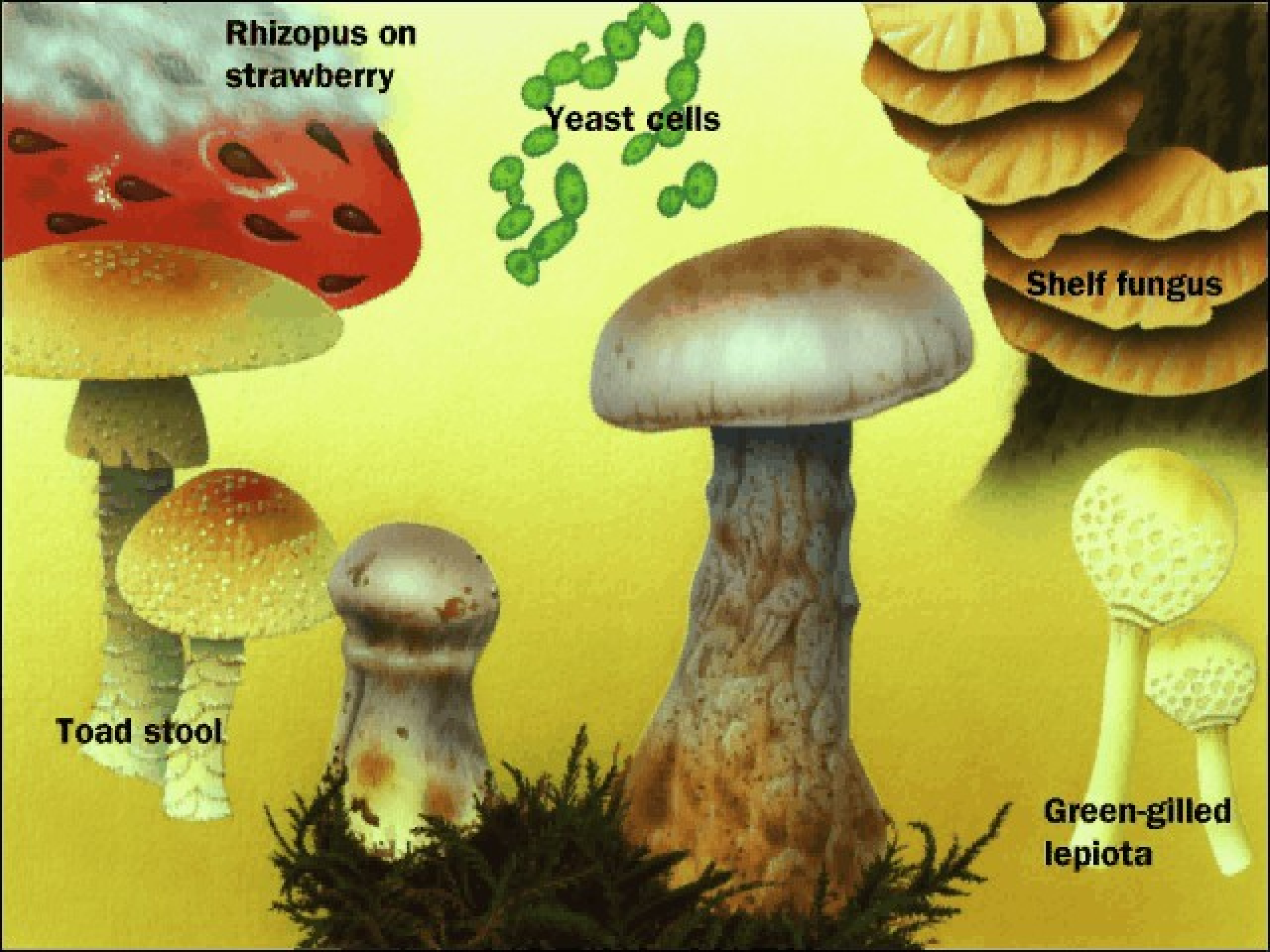
Mangroves



Kingdom Fungi

- marine fungi

- Eukaryotic, generally multicellular, organisms (a few species, e.g., yeast are unicellular).
- Heterotrophic, saprophytic (absorptive) nutrition.
- Most with cell walls (usually composed of chitin) and complex life histories.
- Includes molds, yeasts, rusts, and mushrooms.


Rhizopus on strawberry
Yeast cells
Shelf fungus
Toad stool
Green-gilled lepiota

Kingdom Animalia

- Eukaryotic, multicellular organisms with cells organized into distinct tissues.
- Heterotrophic nutrition
- Most exhibit significant capacity for locomotion.
- Cells not surrounded by cell walls.
- Includes sponges, sea anemones, snails, insects, sea stars, fish, reptiles, birds, and human beings.

Phylogentic Relationships of Animals