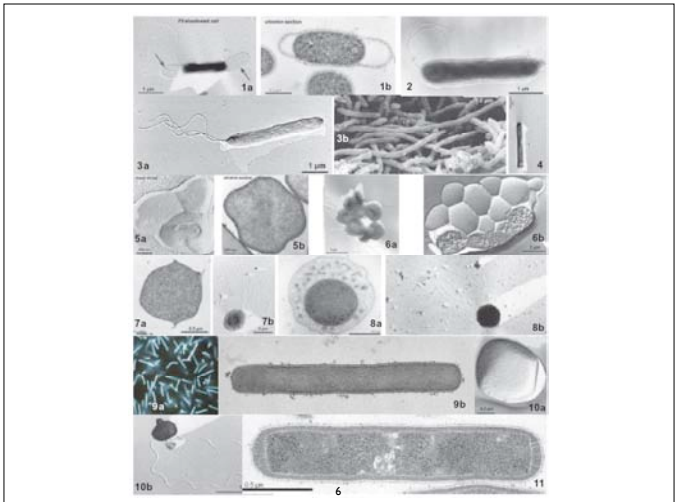
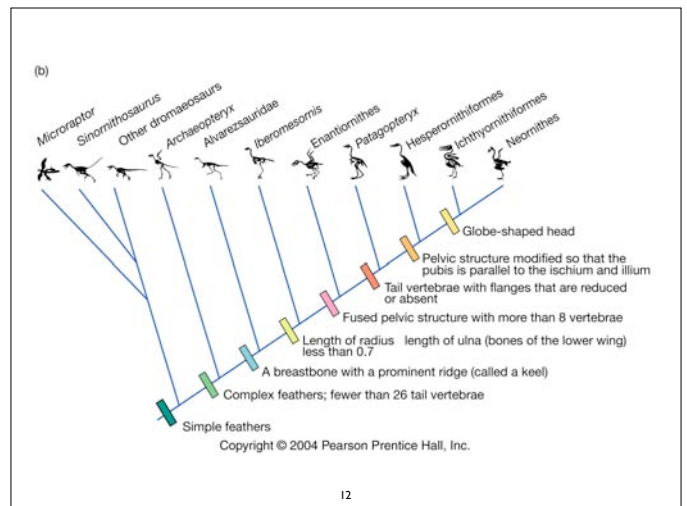
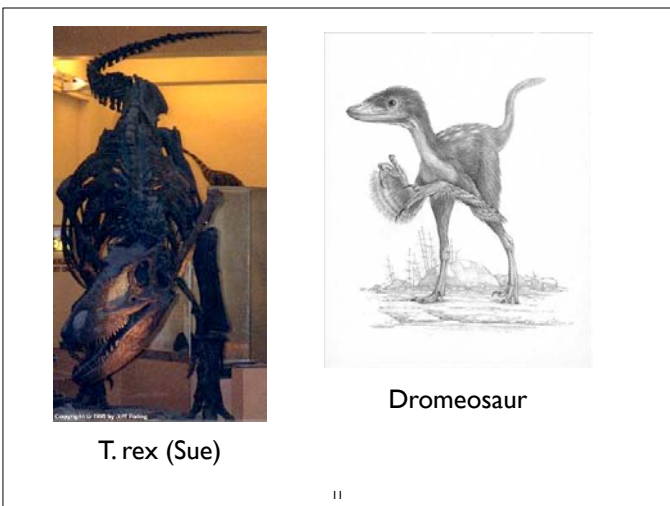
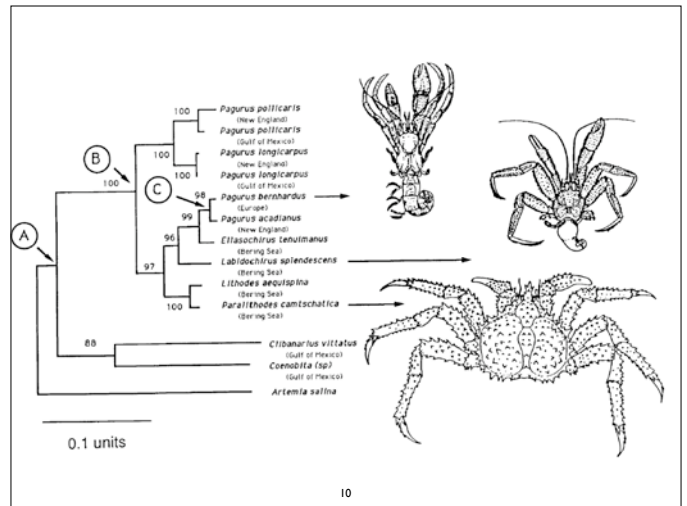
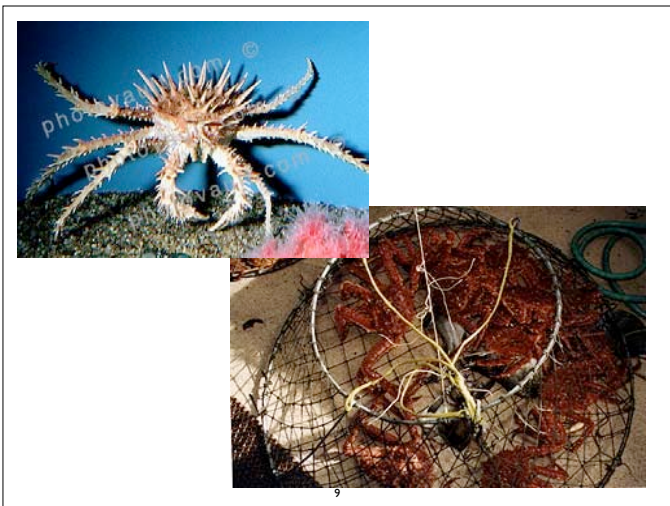
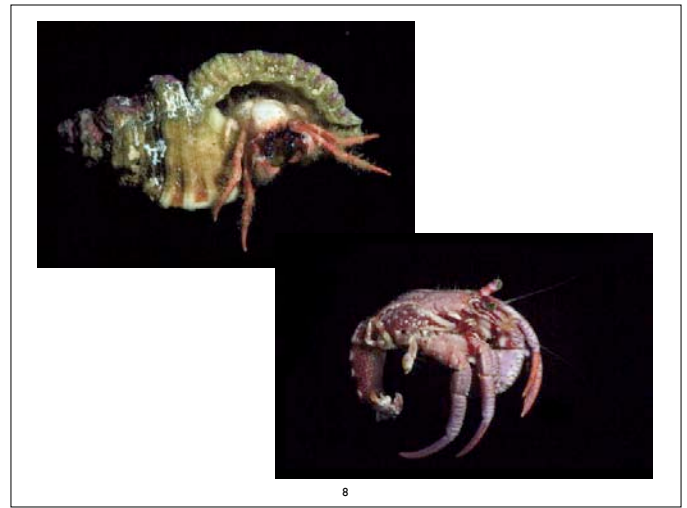
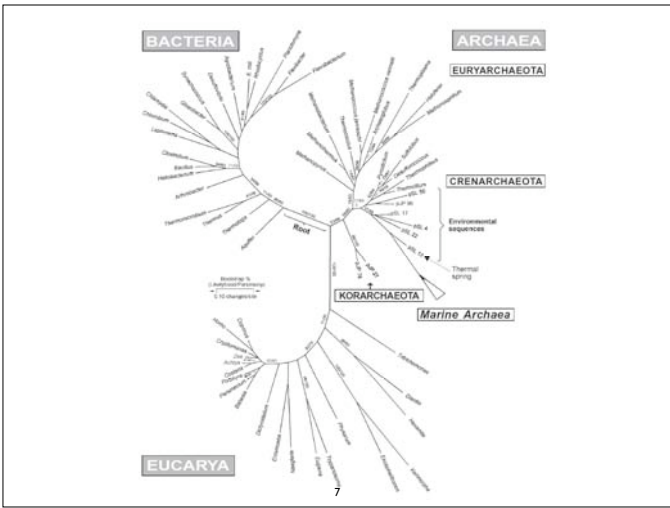


LIFE GROUPS	DESCRIBED SPECIES	NUMBER OF ESTIMATED SPECIES		ACCURACY
		HIGH	LOW	
Viruses	4,000	1,000,000	50,000	Very Poor
Prokaryotes	4,000	3,000,000	50,000	Very Poor
Fungi	72,000	2,700,000	200,000	Moderate
Protozoa	40,000	200,000	60,000	Very Poor
Algae	40,000	1,000,000	150,000	Very Poor
Plants	270,000	500,000	300,000	Good
Nematodes	25,000	1,000,000	100,000	Poor
Crustaceans	40,000	200,000	75,000	Moderate
Arachnids	75,000	1,000,000	300,000	Moderate
Insects	950,000	100,000,000	2,000,000	Moderate
Molluscs	70,000	200,000	100,000	Moderate
Vertebrates	45,000	55,000	50,000	Good
others	115,000	800,000	200,000	Moderate
TOTALS	1,750,000	111,655,000	3,635,000	Very Poor





- **Synapomorphy:** A shared derived characteristic
- **Homoplasy:** A character that evolves more than once on a tree

13

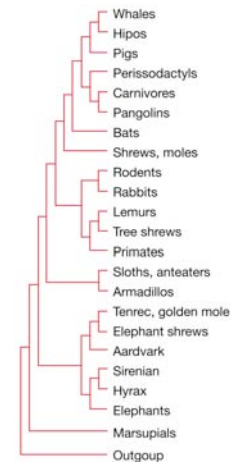
Synapomorphies

- Ornithodira: Advanced mesotarsal ankle
- Dinosauria: three or more sacral vertebrae, perforate acetabulum, reduced fibulae, three or few phalanges in the fourth digit of the hand
- Ornithischia: at least five sacral vertebrae, predeantary bone
- Sauropodomorpha: at least 10 cervical vertebrae, femur longer than tibia
- Theropoda: metatarsal I reduced, hollow bones
- Tetanurae: furcula (fused clavicles)
- Maniraptora: semilunate carpal bone, pubis turned posterior (as in ornithischians)
- Avialae: presence of feathers
- Aves: loss of teeth

14



15



Copyright © 2004 Pearson Prentice Hall, Inc.

Endosymbiosis hypothesis for the origin of organelles

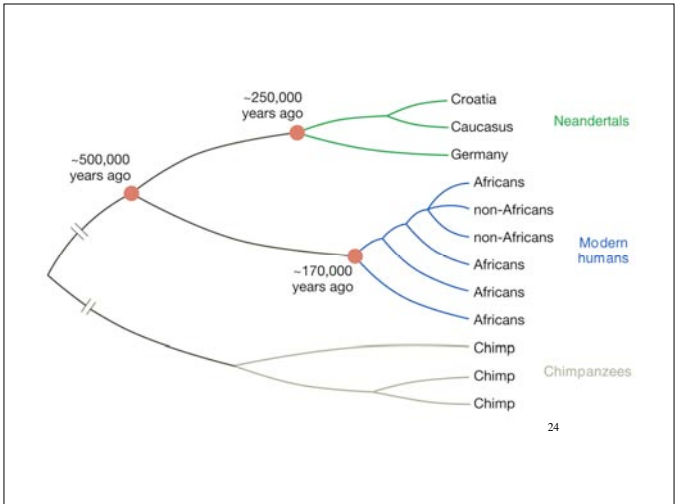
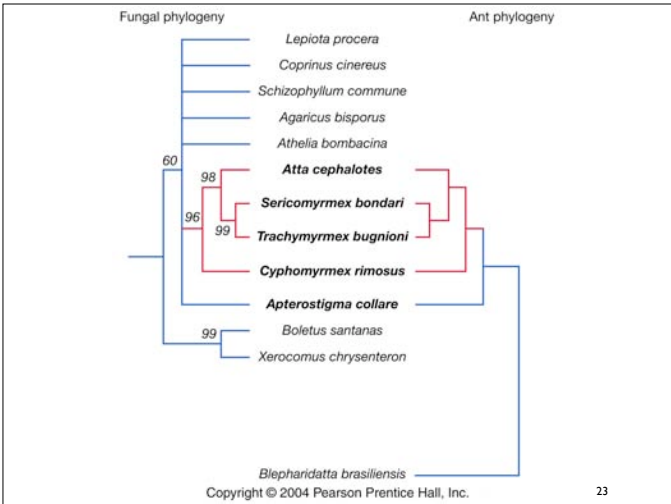
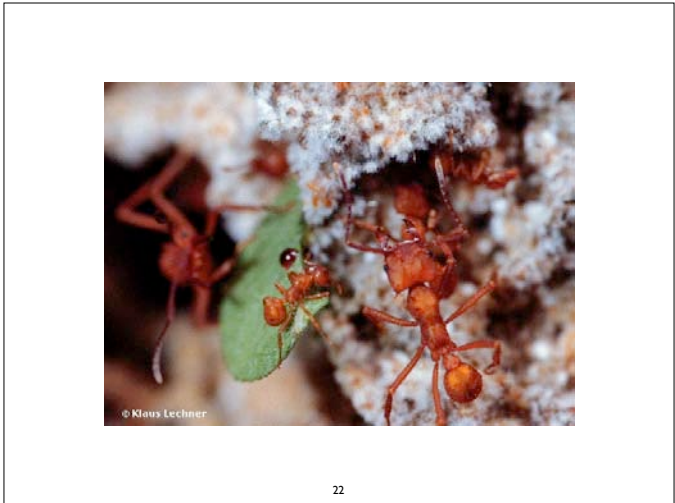
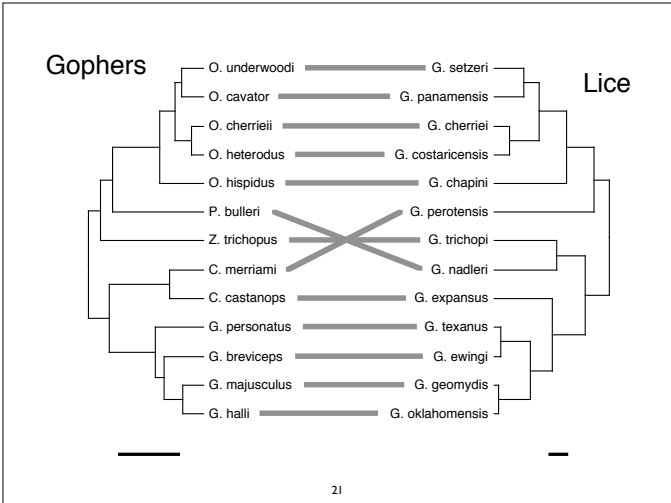
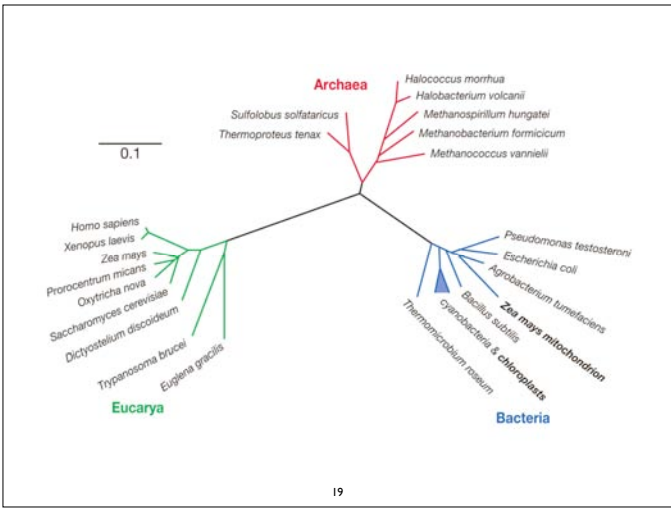
- Organelles originated in symbiotic union of ancestral prokaryotes

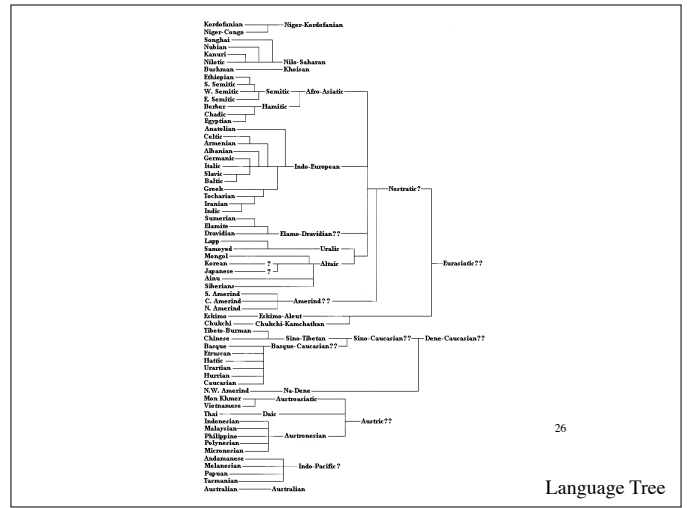
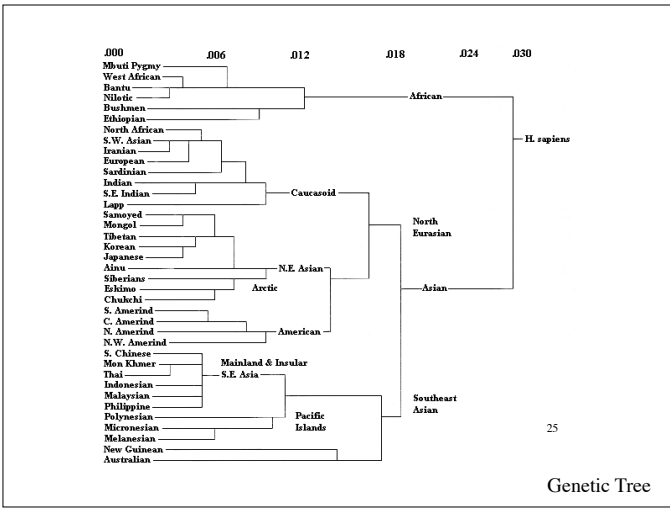
17

Evidence

- Mitochondria and chloroplasts are superficially like bacteria
- Circular DNA molecules with no associated histones (similar to those of bacteria)
- Chloroplasts and mitochondria both have their own replication machinery, which more closely resembles that of prokaryotes
 - first aa of transcripts is fMet (not Met as in eukaryotes; the amino group of the Met tRNA is modified by the addition of a formyl group)
 - antibiotics, such as streptomycin, block protein synthesis in mitochondria, just as they do in bacteria
 - inhibitors of protein synthesis in eukaryotes (e.g., diphtheria toxin) don't block synthesis in mitochondria
 - rifampicin, which inhibits RNA polymerase in bacteria also inhibits RNA polymerase in mitochondria (does not affect eukaryotic nucleus)

18





Cognates

English	is
German	ist
French	est
Latin	est
Greek	esti
Sanskrit	asti
Persian	ast

27

