

## **E. Late Paleozoic life/fossils (pp. 358, 360-371)**

### **1. Ocean invertebrates**

**a. Lots of crinoids in the Mississippian**

**b. Ammonoids**

**c. Reefs (not well developed in general)**

**Reef-builders: algae, sponges, bryozoans, brachiopods**

### **2. Land invertebrates - Insects**

**a. 1<sup>st</sup> are wingless (Devonian)**

**b. No Mississippian insects found yet**

**c. Lots of winged insects in Pennsylvanian**

**d. Most Pennsylvanian insect fossils are just wings**

**e. 1st winged insects had fixed wings**

**f. Insects with folding wings**

**g. Some Pennsylvanian dragonflies had wingspans ~4 feet across**

**h. Advantages of flight for insects**

**i. Exploitation of new food sources**

**ii. Ability to escape crawling predators**

### **3. Vertebrates - Amphibians**

#### **4. Vertebrates - Reptiles**

**a. 1<sup>st</sup> are Miss.; evolve quickly in Penn.; are abundant on land in Perm.**

**b. Lots of transitional fossils**

**c. Key characteristics of reptiles**

**i. Amniotic egg**

**ii. No tadpole stage**

**iii. Protective vertebrae & enlarged, stronger pelvic and shoulder girdles**

**iv. Eardrum & dry, scaly skin**

**d. Cotylosaurs**

**e. Pelycosaurs (Pennsylvanian-Permian)**

**i. Not dinosaurs**

**ii. Differentiated teeth; powerful jaws; some had dorsal sails  
(Exs: *Dimetrodon*, *Edaphosaurus*)**

**iii. Most lived in & near swamp facies**

**iv. Cold-blooded; were the top predators (carnivores) in land environments (terrestrial facies)**

**f. Eosuchia (Permian-Triassic) (included the 1<sup>st</sup> flying vertebrates)**

**g. Therapsids (evolved from pelycosaurs; “mammal-like reptiles”; gave rise to mammals later)**

**5. Land plants**

**a. Vast coal swamp forests in Penn. - lots of plant varieties**

**b. *Glossopteris* flora in Gondwana in the Permian**

**6. Lagerstätten**