

than fur as insulation. Only the penguin can withstand temperatures of 40° below zero on the Antarctic ice caps.

The true purpose and beauty of feathers is for flight. In addition to being exquisite examples of aerodynamic design, the wings of birds are driven by the powerful engines of the breast muscles. This capability for true flight was a significant advancement. Before birds appeared, it is thought that the reptiles with leathery membranes for wings may have been climbers that used their wings for descent or gliding to the next tree or bush. The presence of front feet is indicated by fossil footprints, and these reptiles may also have been able to run or walk fast to gather speed for takeoff. Because the fossil remains of these flying reptiles lack signs of attachments for powerful wing muscles, it is doubtful that they were efficient flyers. They were probably more adept at gliding.

FIGURE 8.5.

The flying reptiles called *Pterosaurs*. The *Dimorphodon*, *left*, is thought to have lived 150 million years ago. It had a wingspan of two to three feet. The giant *Pteranodon* appears somewhat later in the fossil record and measures 27 feet from wingtip to wingtip/

Current scientific theory holds that birds began their transition from reptiles 140 million years ago. A possible transitional form which has both the bird characteristic of feathers and the reptile characteristic of teeth is known as the *archaeopteryx* or "ancient bird" (see figure 8.8). The discovery of slightly younger avian or bird-type bones has led some scientists to question whether this "feathered reptile" or reptilian bird is a link between reptiles and birds. However, there is growing evidence that a form of two-legged dinosaur

