

## JAWS FROM THE PAST

Paleontological records can tell scientists much about life-forms from the past. Most is known about ancient animals whose bodies contained hard parts that were resistant to decay and that were more likely to fossilize. The fossil record for fishes that contained substantial quantities of bone is fairly complete. Records of fishes that lack bone are usually harder to find.

In spite of the cartilaginous skeletons of sharks, knowledge of ancient sharks, although not perfect, is more complete than might be expected. Much of what is known of ancient sharks comes from discoveries made in Ohio. Sharks in Ohio may seem surprising at first, but during the upper Devonian (about 350 million years ago), the sea extended southwest from the St. Lawrence River region, across the Great Lakes, and down to Arkansas. The floor of this ocean, in the region now known as Ohio, was made of soft, deep sediments—ideal for fossilization. Some elasmobranch specimens are so well preserved that details of gill structures, and of muscle organization, and even remains of a last meal are sometimes found intact.

Discoveries such as these provide a wealth of information about ancient sharks. The body form of ancient sharks allowed them to become efficient predators, and most modern sharks retain

that basic form. The shape of fossilized teeth sometimes identifies the kind of shark they came from. Mineral deposits build up on teeth as they rest on the ocean floor. If mineral deposits accumulate at a constant rate, it is possible to determine how long teeth have been resting on the ocean floor. Assuming that a ratio between tooth size and body size is constant for a given species, scientists can estimate the length of a shark from a fossilized tooth. A specimen (*Carcharocles megalodon*) on display in the Smithsonian's National Museum of Natural History in Washington, DC is estimated to have been about 15 m long.

Reconstruction of ancient sharks from all available evidence is the job of some museum scientists. The reconstruction in figure 1 is of an ancient shark found in a North Carolina quarry. (Because too few teeth were found to fill out the entire jaw, false teeth were constructed from hard rubber.) They are the teeth of a 30-million-year-old *Carcharocles megalodon*. The largest tooth of this specimen was about 15 cm long. Because 2 cm of tooth equals about 3 m of shark, this specimen was estimated to be 15 m long! The model shown in figure 1 is on display in the Smithsonian's National Museum of Natural History in Washington, DC.