

son to name some of these allegedly "unreal" groups. He replied: invertebrates, fishes, reptiles, apes. According to Nelson, this does not by any means exhaust the list of negatively defined groups. Statements imputing ancestry to such groups have no real meaning, he said.

I asked Nelson about the fossil record. Don't we know that evolutionary theory is true from the fossils? Like most people, I thought the natural history museums had pretty well worked out the fossil sequences, much as in an automobile museum you can find the "ancestors" of contemporary cars lined up in sequence: Thunderbird back to Model T.

"Usually with fossils all you find are a few nuts and bolts," Nelson said. "An odd piston ring, maybe, or different pieces of a carburetor that are spread out or piled on top of one another, but not in their correct arrangement."

He maintained that too much importance has been attached to fossils. "And it's easy to understand why," he said. "You put in all this effort studying them, and you get out a little bit. Therefore you are persuaded that that little bit must be very important. I can get ten times more information per unit with recent fishes. So if you put in all that effort on fossils, you are inclined to say that the information you get is worth ten times as much."

Nelson said it was quite common for paleontologists to go to all the trouble of digging up fossils without realizing that the animals in question were still walking about. (Think of spending months hunting for a book in used-book stores without realizing it was still in print.) "Say you dig up a 50-million-year-old beetle," he said. "It looks like it belongs to a certain family, but there may be 30,000 species in the family. What do you do? Go through all 30,000? No, you just give it an appropriate-sounding name, *Eocoleoptera*, say. If it is a species that has been in existence for 50 million years, somebody else will have to find that out, because you don't have enough time. You're out digging in the rocks, not poking through beetle collections in museums."

I asked him about anchovy fossils. How far back do they go? "Well," he said, "Lance Grande, who was a student here recently, studied that, and it turns out that all the fossils previously described as anchovies are not anchovies at all." (Grande is now an assistant curator in the department of geology at the Field Museum of Natural History in Chicago.) "In other words," Nelson said, "the people who described them did not do a very good job. So the fossil record of anchovies was reduced to zero. However, there was something in the British Museum that I think Colin Patterson told Grande about, something from the Mio-

cene in Cyprus; maybe 10 million years old. And it turned out to be an anchovy—the only known fossil. It has not yet been described in detail, but there is information suggesting it is the same kind of animal we find inhabiting the Mediterranean today."

A week or two after I met with Nelson I spoke to Norman Platnick, a curator in the museum's entomology department and an expert on spiders. On my way to see him on the fifth floor, I was joined in the elevator by a couple of lab assistants who were wheeling on a cart what looked like a dinosaur head. (I was reminded that for a long time the museum had the wrong head on its brontosaurus. One of the few bits of conventional wisdom about paleontology is that entire animals can be reconstructed from scraps of bone. Paleontologists now repudiate the idea, first enunciated by the French anatomist Baron Cuvier in the early 1800s. Steve Farris, a professor in the department of ecology and evolution at the State University of New York at Stony Brook and the president of the Hennig Society, told me that Cuvier erected a monument to his own error in the form of a cement statue of an iguanodon, now at the Crystal Palace outside London. "The animal that Cuvier imagined was four-footed and resembled a rhinoceros," Farris said. "The complete skeleton of the iguanodon is now known—the animal was bipedal, with a long tail." As for the idea that the relationship of early animals to present-day ones is well established, Farris said: "When they are writing for a general audience, a lot of paleontologists do try to give that impression.")

Not far from the elevator I found Platnick's orderly office: spiders (dead) inside little labeled bottles; book-filled shelves; journal articles neatly stacked. It would seem that professional biologists spend at least as much time studying each other's work as they do the world around them.

Platnick, who is rather square-shaped and bearded, told me that when he was an undergraduate at a small Appalachian college, he would go along with his wife when she collected millipedes. "But I was a wretched millipede collector," he said. "When we arrived home, all I would have in my jars would be spiders." So he started to study them. Today he has a Ph.D. from Harvard, and he and Nelson are co-authors of a book recently published by Columbia University Press entitled *Systematics and Biogeography: Cladistics and Vicariance*.

Spiders, which go back to the Devonian period, 400 million years ago, belong to the class Arachnida and the phylum Arthropoda. They are among the "invertebrates," in other words, and are not well preserved in the fossil record.

*'Usually with fossils all you find are a few nuts and bolts—different pieces spread out or piled on top of one another, but not in their correct arrangement'*