

'I don't think we shall ever have any access to any form of tree of life which we can call factual'

in nature defined by an absence of characteristics Hennig called paraphyletic.

By calling attention to the paraphyletic traits, Hennig helped revive the rigor taxonomy once prided itself on. Colin Patterson and other transformed cladists have moved on to examine—and call into question—the crucial role that paraphyletic groups and species play in evolutionary theory. In his 1981 talk at the Museum of Natural History, for example, Patterson touched on the subject of invertebrates. Invertebrates make up one of the two general categories of animals. The grouping comprises a huge and often bewildering diversity of animals, from the simplest single-cell protozoan to insects, clams, worms, and crabs. Every schoolchild learns that what brings this wide array of creatures under one heading is their shared lack of a backbone. Cladists like Patterson have asked: *Why* group them this way? What function does it serve? The problem they have is this: the term *invertebrate* does not serve a scientific function; it is too nebulous, too inexact for that. (It also accurately describes strawberries and chairs.) What the term *invertebrate* does serve, the cladists maintain, is a rhetorical function: it makes possible the claim, found in many textbooks, that “vertebrates evolved from invertebrates.” According to the cladistic reading, the last two words of the four-word statement do not contain any information that is not asserted as factual by the first two words: “vertebrates evolved” simply means that the first vertebrate had parents without backbones. The transformed cladists claim that “vertebrates evolved from invertebrates” is a disguised tautology.

In his museum talk, Patterson said that groups defined only by negative traits have “no existence in nature, and they cannot possibly convey knowledge, though they appear to when you first hear them.” Evolutionary biologists maintain that negatively defined groups make sense and serve a purpose; they tend to accuse the cladists, as one writer recently did in the magazine *Science*, of engaging in “verbal legerdemain.” But Patterson and his colleagues point their fingers back at the evolutionists. Patterson for one has called the paraphyletic groups “voids.”

What evolutionary theory does, the cladists say, is make claims about something that cannot be demonstrated by studying fossils. They say that the “tree of life,” with its paraphyletic branches, is nothing more than a hypothesis, a reasonable guess.

Nor do they believe it will ever be anything more than that. When asked about this in an interview, Patterson said: “I don't think we shall ever have any access to any form of tree

which we can call factual.” He was then asked: “Do you believe it to be, then, no reality?” He replied: “Well, isn't it strange that this is what it comes to, that you have to ask me whether I believe it, as if it mattered whether I believe it or not. Yes, I do believe it. But in saying that, it is obvious it is faith.”

Cladists do not spend their time on the lecture circuit drumming up sentiment against Darwin. Some of them would like it if all the talk about evolution just quietly went away. Evolution is not important to the work they do. That work involves finding the positive and verifiable characteristics of the various species and determining how all these species fit together in the animal kingdom—what patterns exist in nature. Their interest is the here and now, not how it all came to be.

I recently spent some time with two cladists on the staff of the Museum of Natural History. I first met with Gareth Nelson, who in 1982 was named chairman of the department of ichthyology. Nelson graduated from the University of Hawaii in 1966 and he joined the museum staff a year later. The walls of Nelson's office were lined with boxes of articles from scientific journals, and a large table was covered with papers and jars stuffed with small, silvery fish preserved in alcohol: anchovies. Nelson is just about the world's expert on anchovies, although he told me that the number of people studying them (three or four) is much smaller than the number of anchovy species (there are 150 known species, and Nelson believes there are many more). This disparity between the magnitude of the scientific “problem” and the number of people working on it is a commonplace in biology. Most laymen think that the experts have pretty exhaustively studied the earth's biota, when they have barely scratched the surface.

Nelson put the issue of evolution this way: in order to understand what we actually know, we must first look at what it is that the evolutionists claim to know for certain. He said that if you turn to a widely used college text like Alfred Romer's *Vertebrate Paleontology*, published by the University of Chicago Press in 1966 and now in its third edition, you will find such statements as “mammals evolved from reptiles,” and “birds are descended from reptiles.” (Very rarely, at least in the current literature, will you find the claim that a given species evolved from another given species.) The trouble with general statements like “mammals evolved from reptiles,” Nelson said, is that the “ancestral groups are taxonomic artifacts.” These groups “do not have any characters that are unique,” he said. “They do not have defining characters, and therefore they are not real groups.” I asked Nel-