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## Letters

### Quirky bird

Ornithologist Stuart D. Strahl's description of a quirky bird ("Alimentary, My Dear Hoatzin," SN: 10/21/89, p.269) may partially answer the question: Where have the dinosaurs gone? In this remarkable jungle discovery we seem to have the feathered remnants of those huge, lumbering beasts that ate, digested, nested, clawed, swam and hissed like hoatzins but were, in fact, plain old dinosaurs.

John Heinerman  
Director, Anthropological Research Center  
Salt Lake City, Utah

Even though the hoatzin's sedentary nature, poor flying ability and wing claws suggest a primitive stage of avian evolution, Strahl believes the bird is actually highly specialized, having adapted its entire lifestyle to a low-energy diet of leaves. The young hoatzin's slow growth rate, long flightless periods and habit of swimming to escape predators most likely evolved because of its diet rather than repre-

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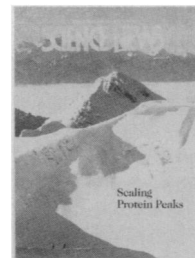
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Cover: For some scientists, the Alpine landscape offers insights into biological evolution and may even suggest ways to harness the process. In their analogy, treks up and down the slopes correspond to mutations leading to adaptive or maladaptive traits. By mathematically charting mountainous landscapes whose points signify proteins of varying levels of capability, researchers hope to discern which of a protein's many possible evolutionary paths would lead to a useful improvement, such as speedier binding of target molecules. (Photo: Courtesy Swiss National Tourist Office)



### Departments

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senting a case of arrested development, Strahl contends.

He and others do note some striking similarities between the hoatzin and Archaeopteryx, the oldest known bird, which lived about 140 million years ago. This creature had three claws on each wing and apparently used them when climbing in trees. Artists, in fancifully depicting Archaeopteryx with the same coloration as the hoatzin and even the same spiky crest, may have biased ornithologists in hinting that the hoatzin is the missing link between birds and reptiles, Strahl suggests. Nonetheless, he says, the hoatzin is no closer relative of Archaeopteryx than any other member of the cuckoo family. — R. Cowen

### Signals, symbols and scent

I cannot let your designation of honeybee signaling as "symbolic" communication go unchallenged ("New Dancer in the Hive," SN: 10/28/89, p.282). Denotation is not sufficient criterion to label a signal a symbol. The relationship between the signal's form and what it denotes must be noniconic.

Honeybee signaling, however complex, still exhibits a necessary identity between the activity constituting the signal (body wagging and orientation) and what it denotes (food-source distance and direction). Therefore, it can only be considered an iconic, or nonsymbolic, form of communication.

John Rhoades  
Associate Professor of Anthropology  
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**Do bees have a language?** "New Dancer in the Hive" provides only one more episode in this centuries-old puzzle.

Proponents of Karl von Frisch's dance language hypothesis have largely focused on supportive evidence, with several executing experiments over the past two decades in further attempts to "prove" the hypothesis true. Curiously, each new attempt was claimed as "finally conclusive," and only then did these researchers concede that earlier

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