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LETTERS

The Taste of Birds: *Pitohui*!

The announcement of a toxic alkaloid in the skin and feathers of three species of New Guinean *Pitohui* (Reports, J. P. Dumbacher *et al.*, "Homobatrachotoxin in the genus *Pitohui*: Chemical defense in birds?," 30 Oct., p. 799) represents the first time that a chemical has been identified that may function to protect birds against predation. But it is not the first evidence for chemical defense in birds. Among European, African, and neotropical birds, the range of palatability of flesh and eggs covers from what humans have described as "ideal" at one end to "inedible" at the other (more than 200 species have been tested) (1). The hierarchy of human palatability rankings is similar to those produced by tests using hedgehogs, rats, ferrets, and cats as tasters. Flesh and eggs of the same species have often had different palatability rankings, and in neither case was palatability related to diet. For both flesh and eggs, however, palatability was correlated with ratings of the vulnerability to predation. Among vulnerable species that are also conspicuous (for example, auks, turacos, hoopoes, kingfishers, starlings, and woodpeckers), the flesh was consistently repugnant. Eggs tasted good, however, in species that escape egg predation by being protected by a cryptically colored parent (for example, many ducks and game birds). The estimated vulnerability to predation was correlated more closely with palatability than with diet, yolk color, egg texture, or taxonomic division. The most common bad taste was bitterness.

The work of Dumbacher *et al.* on the *Pitohui* thus complements strong evidence for chemical defenses against predation in other birds. The discovery of convergence in the chemical armory of *Pitohui* and of *Phyllobates* frogs suggests there will be much of interest to come from an analysis of noxious compounds in other birds.

Richard Wrangham

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The report by J. P. Dumbacher *et al.* that pitohuis, conspicuously patterned black and orange-brown birds from New Guinea, contain a chemical substance that may make them unpalatable to predators reminded me of experiments carried out half a century ago by Hugh B. Cott testing the hypothesis that conspicuous colors and patterns of birds are aposematic (1). While he was stationed in the Middle East and England during World War II, Cott used hornets and domestic cats to assess the palatability of more than 50 species of birds. These trials demonstrated "a general inverse correlation between conspicuousness of the plumage and palatability of the flesh" (1, p. 517). Further, Cott noted that "the sematic colours [blue, red, rufous, white, and black] predominate[d] among the more distasteful species" (1, p. 517). In 1957 and 1958, Cott enlisted "a panel of tasters recruited from the staff of the Department of Game and Tsetse Control, Northern Rhodesia" (2, p. 357) and surveyed 200 species of birds belonging to 57 families. An association of conspicuousness with distastefulness was observed within taxonomic groups as well as across lineages. Cott's data are the basis for suggestions that the similarity in color and pattern of some birds that form mixed-species flocks might represent Batesian and Müllerian mimicry (3).

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Ice Man: Victim of Prehistoric Schnapps?

Horst Seidler *et al.* (Reports, 16 Oct., p. 455) interpret the folded-over left ear of the prehistoric Tyrolean man recently found in an Austrian glacier as evidence that he succumbed to exhaustion and subsequent hypothermia. ("In this state of complete exhaustion the folding of an auricle would have not been consciously experienced.") This is a nice piece of scientific detective work, based on such a seemingly minor

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feature of the corpse, but I propose an alternative hypothesis for the man's demise. My own experience is that the folded-over ear is a common consequence of having had too much to drink (substitute "state of complete inebriation" in the above quotation). Invariably, when one goes to bed in this state, he or she wakes up with a sore auricle. I thus propose that we cannot rule out the possibility that the Tyrolean man's downfall was indirectly attributable not to exhaustion, but to overconsumption of prehistoric schnapps.

George B. McManus

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Response: McManus's hypothesis is not as improbable as it seems. His observations about the "folded-over ear" as a consequence of alcohol abuse have been described extensively (including radial nerve lesions resulting from lying in a nearly unconscious condition). However, our colleagues from the Institute for Alpine History Research at the University of Innsbruck have ascertained that no prehistoric bottle of spirits was found among the ice man's provisions. We therefore consider exhaustion to be a more likely cause of death than exposure to cold caused by intoxication.

McManus does not suggest the use of drugs, but we refer the reader to a paper by R. Pöder et al. (1) discussing pieces of two *Piptoporus betulinus*, an agaric, fastened to a leather band among the possessions of the ice man. These fungi may have been used for spiritual and medicinal purposes. They contain a pharmacologically active substance, agaricine acid, an antibiologically effective agent. To our knowledge, no hallucinogenic effects have been described for *P. betulinus*.

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EMF Research

H. Keith Florig, in his Policy Forum "Containing the costs of the EMF problem" (24 July, p. 468), addresses a segment of a broad problem that besets society today. How should one deal with fears that are not known to be justified? Florig estimates that the avoidance of weak electromagnetic fields (EMFs) now costs the United States about \$1 billion annually, although there is no consensus that these fields, much small-