analysis by Rosario Mantegna *et al.* (*1*) which suggested that "junk" or noncoding DNA has the structural features of a language. We argue that most of the observations in their analysis, which was based on Zipf's law and Shannon redundancy, have a much simpler origin: In the sequences examined, noncoding DNA had greater variance in nucleotide composition than did coding DNA, a fact which is implicit in figure 3 of their paper (*1*).

For their statistical analysis, Mantegna *et al.* subdivided the DNA sequences into "words" of fixed length, n, and then computed the "word" frequencies. Mantegna *et al.* then show that the Shannon redundancy, $R(n)$, is nonzero in noncoding DNA (as in natural languages) and is significantly larger than that of coding DNA.

The redundancy $R(1)$ of single "letters" A (adenine), C (cytosine), G (guanine), and T (thymine) reflects the nucleotide composition and increases with increasing variance of the distribution. Thus a larger $R(1)$ for noncoding than for coding DNA simply means that nucleotide frequencies are more uneven in noncoding DNA. The increase in $R(n)$ with increasing n observed by Mantegna *et al.* (*1*) is the same in both kinds of DNA [see figure 3 in the paper by Mantegna *et al.* (*1*)] and thus does not serve to discriminate between coding and noncoding DNA.

Unequal nucleotide compositions also go a long way toward explaining the differences in the Zipf plots obtained for noncoding DNA (*2*). Most of the observations made by Mantegna *et al.* (*1*) may thus be trivial consequences of uneven nucleotide frequencies. This explanation does not rule out the existence of a hidden "language" in noncoding DNA, but it removes any superficial evidence for this hypothesis. A more detailed discussion will be published soon in *Physical Review Letters* (*2, 3*).

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Coral Bleaching

A Random Samples item (10 Nov., p. 919) erroneously reports that a "National Science Foundation–sponsored meeting of reef scientists concluded in 1991 that global warming was not the culprit" for the widespread bleaching of reef corals in the Caribbean.

The 1991 interdisciplinary workshop did not exculpate global warming completely. The summary of the report (*1*) produced by the workshop and unanimously endorsed by the participants, states clearly

> With respect to the issue of coral reef "bleaching," the group concluded that recent increases in reported events were indicative of increasing ecosystem stress, and that many of the events appear to be associated with local high temperatures. However, other stresses are also known to cause bleaching, and our knowledge of both coral stress responses and the detailed nature of climate change make it impossible at present to claim that coral bleaching is an early indicator of the global greenhouse effect. This detailed finding was seen as strong reinforcement of the perceived need for systematic monitoring as a basis for research.

In our zeal to observe the phenomenon of coral bleaching and to ascribe a cause to it, we must exercise appropriate scientific caution and base our conclusions on scientifically defensible evidence. The evidence is still not conclusive as to whether we can dismiss or substantiate a role for climate change in that phenomenon.

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Rare Trees

The Florida torreya was described in Random Samples (8 Dec., p. 1573) as "the rarest tree in North America." With a population size of only 1500, it is indeed rare; but several other trees may be more worthy of this title. For example, Franciscan manzanita (*Arctostaphylos hookeri* ssp. *franciscana*) is presumed extinct in its native habitat on the San Francisco Peninsula, and only occurs in cultivation (*1*). Another possible candidate is the Presidio manzanita (*Arctostaphylos hookeri* ssp. *ravenii*), also native to the San Francisco Bay area, which appears to have a single clone (*1*). If full species status is required to be North America's rarest tree, I nominate the Catalina Island Mountain Mahogany (*Cercocarpus traskiae*), whose population size has dwindled to six adult trees (*2*). This distinctive species is restricted to a gully on the southwest side of Santa Catalina Island off the coast of California. When the population was first discovered in 1897, it consisted of more than 40 trees, but it has declined rapidly over the past century because of overgrazing by introduced herbivores. Fortunately, it appears to be making a rapid recovery as a result of the recent construction of a fence around two of the remaining trees. More than 70 seedlings have been observed in the fenced area (*2*).

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Italian Academic Turnover

Susan Biggin (News & Comment, 10 Nov., p. 909) is to be congratulated for the clarity of her description of the conundrum of national competitions for university appointments in Italy. Retirement mechanisms are another peculiarity of Italian academic life that are difficult to explain to the international scientific community. Although full professors retire at age 77, at age 72 they officially abandon their chair and enter a special category ("*fuori ruolo*"), which implies relief from conventional academic duties, but allows them to retain full salary and the right of sitting—and voting—in faculty councils. In the past, chairs could be immediately open for a new appointment. However, because of recent financial constraints in Italy, new appointments for existing chairs now require the availability of ad hoc financial coverage, which in fact is precluded by the simulta-