Letters

Genetics of Small Populations

Like George B. Rabb and Robert Lacy (Letters, 10 Aug., p. 612), I too have been concerned about overly simplistic assertions on the subject of the genetics of small populations.

Recent surprising data and theoretical calculations (*1, 2*) suggest that small single population bottlenecks, from which a sexual population rapidly rebuilds size after one or two generations, may be important in evolutionary change. Such a bottleneck appears to be accompanied by release, to the action of natural selection, of new recombinational genetic variability. Novel character change may result over a moderate number of immediately ensuing generations. Judging a sexual population to be genetically invariable from quasineutral loci (detected by DNA analysis or electrophoresis) can be mistaken. A more sensitive measure is the pattern of genetic variation in quantitative characters that underlie Darwinian fitness.

With regard to measures to save endangered species, the bottom line is the prevention of serial bottlenecks that extend over five or more generations. Maximal opportunity must be provided for natural and sexual selection to operate in the populations of the species, whether in the wild, in captivity, or in the garden plot. Intervention by genetic engineering should be confined to the most serious cases, in which loss of variability in quantitative traits affecting reproductive capacity has occurred and depression due to inbreeding is already present.

HAMPTON L. CARSON
Department of Genetics and Molecular Biology, John A. Burns School of Medicine, University of Hawaii, Honolulu, HI 96822

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Venus Phenomena

In his Research News article "Catching Venus in the act" (17 Aug., p. 742) Richard A. Kerr states, "an increasing mass of data . . . has most [planetary scientists] convinced that the planet [Venus] has active volcanoes that erupted on a massive scale as recently as the 1970s." He then quotes Larry Esposito of the University of Colorado as saying: "It's absolutely well established. There are not only active volcanoes but also volcanoes with enough heat energy output to drive the gas into the upper atmosphere." What is established is a temporal variation in sulfur dioxide above the cloud tops. This variation may or may not be related to current volcanic activity, but there is no mention in Kerr's article of the fact that many members of the scientific community believe that atmospheric dynamics is a much more plausible mechanism for the sulfur dioxide variations. Among the several significant arguments against explosive volcanism being responsible for variations in the upper atmosphere are the extremely high surface density and temperature (making even a large volcano's heat output unlikely to produce the convection to high altitude) and the observed relative scarcity of solid particulates in the Venus atmosphere expected to be produced by copious volcanism (*1*).

The radio noise attributed by Fred Scarf and Chris Russell to Venus lightning and said by them to be topographically clustered over volcanic highlands consisted of transient events seen only in the lowest frequency (100 hz) channel of Scarf's instrument. Harry Taylor and I, using Scarf's own data set, found in 1985 that these data showed no topographic clustering, while Russell was still strongly defending that position. The argument that these signals were ionospheric in origin was based on their spatial coincidence with ionospheric troughs and their peak occurrence near 170 km altitude. We did not attribute these signals to telemetry noise. In 1986, Russell, working with R. N. Singh, changed the definition of Venus "lightning," stating that simultaneous bursts at all frequencies was the correct signature of lightning events (*2*). When Taylor and I examined the corresponding data set, we found that Singh and Russell had mistakenly tabulated telemetry interference spikes as real events. Our comment (*3*) was published without a reply from Singh and Russell. Subsequently, Russell has undertaken to analyze broadband events, which he continues to call "Venus lightning," stating, as Kerr indicates, that these events show temporal clustering in the late afternoon and evening. However, these signals are highly improbable as an indicator of lightning in the atmosphere of Venus, since they exhibit zero dispersion and hence must be produced very close to the spacecraft. It has recently shown (*4*) that such signals have been seen in earth orbit, not related to terrestrial lightning, and presumably produced very near the spacecraft.

The arrival of Magellan at Venus is certainly a newsworthy event, and *Science*'s coverage has undoubtedly reached a wide audience. Unfortunately, Kerr's article lends undeserved credibility to controversial claims.

PAUL A. CLOUTIER*
Department of Space Physics and Astronomy, Rice University, Houston, TX 77251–1892

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*Principal Investigator, Pioneer-Venus Orbiter Ion Mass Spectrometer.

Response: My article does not address the credibility of Russell's claim of detecting Venusian lightning. It merely points out that, as Cloutier must agree, no one is any longer claiming a connection between Venusian lightning and volcanoes. The quote from Esposito—"It's absolutely well established"—refers to the preceding discussion of a decrease in atmospheric sulfur but was inappropriately juxtaposed with the following quote about volcanoes.

—RICHARD A. KERR

Snail Toxins

A recent pair of articles by Marcia Barinaga (Research News, 20 July, p. 250) was concerned with the toxins that are used in predation by "voracious killer snails" and the possible significance of those conal toxins for medicine and other disciplines.

The exotic cone snails are generally distributed in tropical or warmer subtropical environments and represent a rather unique group of marine gastropods. There are smaller snails that are distantly related to *Conus* that also use neurotoxins for hunting small temperate water invertebrate animals such as spionid polychaete worms. Their feeding behaviors are every bit as dramatic as those shown by the *Conus* spp., but since the boreal members of the Turridae are smaller and less brilliant in pattern and coloration, they are not frequently noticed or studied.

Some years ago I investigated *Lora trevelliana*, a small circumboreal turrid, in Danish and Scottish waters (*1*). How they located and approached their prey is similar to the behavior of many of the cone shells. The final thrust of the "dart" was also similar, as was the fate of the prey. Since *Lora* and