Letters

African implications

I reacted with alarm to the implications of juxtaposing two articles in the same issue. In "Field tests inch toward EPA approval" (SN: 5/4/85, p. 280), the University of California is asking EPA for approval of the release of genetically altered bacteria "intended to prevent crops from frost damage." In "Climate and Africa: Why the Land Goes Dry" (SN: 5/4/85, p. 282), Russell Schnell has found that "bacteria that live on plants [and] allow frost to form on unprotected crops" supply the nuclei needed to form the ice crystals necessary for rain.

Is it possible that in our quest to extend the life of crops for a few weeks, we may destroy the seeds for the rain needed for the survival of the plants?

Burt E. Kaplan
Valrico, Fla.

If it is true, as "Climate and Africa" implies, that the absence of bacterially produced ice nuclei in the soil is a possible cause of the reduction of rainfall on the overgrazed areas, then how could it possibly rain over the oceans, where there are very wide expanses without these plant nuclei? Is there another possible source of alternative nuclei, such as salt crystals from the oceans?

Ernest Taylor
Tampa, Fla.

As much as 80 percent of all ocean rain may derive from biogenic ice nuclei, according to Schnell. He and others have found these nuclei in abundance over the ocean, in fog banks offshore and even in surface seawater. In the most recent issue of the JOURNAL OF MARINE RESEARCH *(Vol. 43, No. 1), Schnell, along with Ray Fall of the University of Colorado in Boulder, identify for the first time an ocean bacterium capable of producing ice nuclei. Isolated from a marine alga, it is described as a "kissing cousin" of the bacterium pictured on p. 284 of "Climate and Africa."*

As for the remaining 20 percent of ocean rain: Though most individual rain clouds last only 20 minutes to an hour, some survive a day or longer. It is in these that rain can form without ice nucleation. The reason, Schnell explains, is that it takes a very long time for the million or so unnucleated fog or cloud droplets to coalesce into each raindrop. —J. Raloff

The picture on the first page of the most interesting article "Climate and Africa" is unfortunate: Goats in the arganie trees are a common sight in southern Morocco (north of the Sahara), not in want of grass but because they simply like the leaves.

Erik Tetens Nielsen
Fort Pierce, Fla.

While that may be true, several researchers who have worked in sub-Saharan Africa —including the Sahel —told SCIENCE NEWS *they frequently encountered goats driven to trees when overgrazing had eliminated forage grasses. The picture you refer to was in fact collected by geographer Sharon Nicholson of Florida State University in Tallahassee to illustrate just this point.* —J. Raloff

I question some of the meteorology reported in "Climate and Africa." If the air temperature increases, the dew point will not increase unless more moisture is added to the air. Some moisture could be added to the air due to the higher temperature but the relative humidity could be less and thus more lift would be needed for condensation. Further, near-surface heating would tend to increase rather than decrease the air's upward movement.

Finally, the increased albedo of the dry surface would not contribute to near-surface air heating since reflected radiation is still shortwave and the air does not absorb much shortwave radiation, but is heated primarily by longwave reradiation from the surface.

M.P. Woodall
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Peter R. Rowntree of Britain's Meteorological Office responds: *Professor Woodall's first point is of course correct: "Dew point" on p. 284 should be replaced by "saturation mixing ratio." Hence the "reduced chance of rain." I also agree with him that greater near-surface heating tends to increase ascent, not the reverse as attributed to Dennett. However, this increase is confined to low levels in general, and models indicate that the reduced relative humidity and consequent greater lift needed to give rain usually dominate, so that rainfall is decreased.*

On his final point, there is a misunderstanding probably due to conciseness. In more detail: The net radiation absorbed at the ground, less that used to heat the surface, is returned to the atmosphere, partitioned between direct turbulent heating (sensible heat flux) and energy used for evaporation (latent heat flux). With reduced soil moisture, evaporation is reduced, so sensible heat flux is increased, "heating the environment." The longwave effect to which Professor Woodall refers is also relevant here, as the lack of evaporation allows surface temperatures to increase, enhancing longwave heating of the air near the ground; any associated reduction in water vapor content tends to counteract this, however.

'Prehuman' presumption?

Your report on presumed human evolution ("Human Ancestors Make Evolutionary Change," SN: 5/4/85, p. 276) is totally interpretive and entails speculative assumptions rather than facts. There is disagreement and direct contradiction between quoted experts. And the use of the term "prehuman" for *Homo erectus* is misleading in favor of presumed evolution. It is my understanding that the genus *Homo* includes true humans = modern man *(Homo sapiens),* and as a result of scientific classification, species of the same genus share most characteristics. How then could a member classified in the same genus as modern man be "prehuman"?

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We stand corrected: Homo erectus *individuals are better classified as "premodern human," although the phrase is cumbersome. Science, however, is characterized by the interpretation of data and debate among experts. While among most scientists there is little disagreement over whether evolution occurred, there is plenty of dispute over how it occurred.*

—B. Bower