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Cover: On July 17, one of the most deadly tsunamis of the century swept the north shore of Papua New Guinea, carrying away almost all traces of habitation from this beach. The four posts leaning in the foreground are all that remain of a house destroyed by the waves. In the background, a pail hangs in a tree, showing that water reached at least 7 meters above sea level. **Page 221** (Photo: Costas Synolakis)

Letters

Still more faces of entropy

"Another Face of Entropy" (SN: 8/15/98, p. 108) was the best explanation of entropy that I have ever read. I have always wondered if the compressed matter in a black hole is at a very low state of entropy. If so, could the creation and growth of very large numbers of black holes overcome the laws of thermodynamics?

Donald C. Wilfong
San Ramon, Calif.

Black holes actually contain the most entropy possible in a given space, theorists say. Jacob Bekenstein and Steven Hawking concluded in the mid-1970s that the entropy of a black hole is proportional to the area of a disk surrounding it from within which matter or energy cannot escape. According to physicist Lee Smolin, in his book The Life of the Cosmos *(1997, Oxford University Press), a consequence of that finding is that the maximum entropy of a given region of space is the entropy of the largest black hole that can fit into it.*

—P. Weiss

In some entropic self-assembly experiments, virus particles were used; however, it is not stated that such particles carry electric charge. Thus, the result is not a pure entropy effect associated with the geometry and kinetics of the particles involved.

Frank Meno
Pittsburgh, Pa.

To minimize the influence of electrostatic forces among the viruses and other colloidal particles, experimenters add salts to their suspensions. Salt ions form clouds around each colloidal particle that cause the particles to appear neutrally charged within a limited range of distance from each other.

—P. Weiss

Have any of the "entropy force" researchers considered the implications of their work for cosmology? The "uniform" soup that cosmologists assume for the first instants of the universe is obviously a low-entropy, highly unstable situation. As soon as the first phase transition—the separation of photons and solid matter—occurs, entropy takes over. Photons, being smaller than the resultant helium atoms, will start shoving the atoms around until they coalesce and expand into the soap bubble structures we see in the universe today.

Tim LeGore
West Richland, Wash.

Would this view of entropy explain the self-organization of the early universe? It occurs to me that in the time between the inflation of the universe and the phase change when the energy density dropped to the point of transparency, the environment was perfect for the kind of "organization by entropy" that this article discusses. If the principles and behavior apply at the appropriate scale, then this phenomenon could provide the impetus to define the structure that we now see in the universe.

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CORRECTIONS

Due to a typesetting error, pages 180 to 183 of the September 19 issue were mislabeled September 12.

In "The Color of Honey" (SN: 9/12/98, p. 170), a milligram, not milliliter, of buckwheat honey contains 4.32×10^{-3} microequivalents of antioxidant activity.