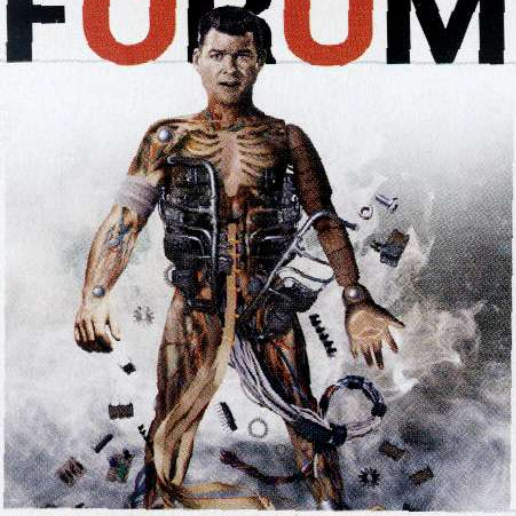
FORUM



"Biology had a part in forming reliability theory. It's nice to see the redundancy equations developed by reliability engineers returning the favor"
—Anthony Coppola

FULL CIRCLE

I enjoyed "Why We Fall Apart" [September], though I must point out that the fit of reliability engineering theory to biology is not merely because it is "so general in scope." I was a reliability engineer in the 1960s and exposed to the founding works, among which was the development of the "bathtub curve" from human mortality data. It was hypothesized that this human data could apply to machines. So biology had a part in forming reliability theory. It's nice to see the redundancy equations developed by reliability engineers returning the favor.

Anthony Coppola
Rochester, N.Y.

AMPED BUT UNREADY

"Amped Up and Ready to Go" [September] says that opposition in the United States to broadband communications over power lines (BPL) comes mostly from ham radio operators. Certainly, many hams have filed their concerns over interference by BPL with the U.S. Federal Communications Commission.

Not mentioned, however, are identical concerns filed by others, including IEEE-USA. Users of the frequencies between 2 and 80 megahertz are at risk from any interference BPL may cause.

Though using power lines for broadband communications may appear attractive, the idea presents several problems for reliable communications.

Power lines act as long antennas, picking up external noise. In bad weather, noise increases because of coronas that are caused by the ionization of air at the surfaces of power line conductors. A lightning strike on or close to the power lines can induce voltages high enough to fry the electronic equipment. Faults and the operation of circuit breakers produce dangerous switching surges. Step-down transformers in the power lines would need to be bypassed. And, finally, capacitors in the power lines would need expensive high-frequency chokes.

Scott Townley
Gilbert, Ariz.

Syed M. Peeran
Marlborough, Mass.

SHOW ME THE DATA

"Computing the Cosmos" [August] assembles a fine overview of simulations to model change in the universe. But any hope for definitive answers regarding origins (using simulations to extrapolate from present observations to past processes) overlooks the fundamental distinction between "operational science" and "origins science."

Operational science deals with phenomena that are observable, testable, and repeatable. Origins science deals with speculation regarding past events. These events are not repeatable, nor testable, nor observable. Conclusions drawn are influenced by assuming boundary conditions that are unverifiable.

To quote three former colleagues of mine: "Computers can take you farther than you really are." "Simulations are not data." "In God we trust. All others must supply data."

Walter Opyd
San Jose, Calif.

POWER OUTAGES

If blackouts are likely to continue ["The Unruly Power Grid," August], what is being done to reduce their impact in terms of extent, intensity, and duration? Once the initiating faults are cleared, frequency rise and decay are arrested automatically by load rejection, load shedding, isolation schemes, and controlled islanding. The success rate of these automatic schemes, according to surveys done by the IEEE Power Engineering Society, has been better than 50 percent.

The challenge is to coordinate the control and protective systems between the generating plants and the electrical system, which have differences of up to two orders of magnitude in response. During power restoration, plant operators working with system operators attempt to maintain a balance between load and generation by using the initial sources of power to supply critical loads.

With the power industry's breakup, however, automatic and manual coordination may no longer receive attention, resulting in a great blackout impact. Industry members must cooperate on solutions that fit the industry's new market structures.

Mike Adibi (LF)
Bethesda, Md.

IT'S NOT A SHIP

Some corrections are in order to your description of the Royal Navy submarine, HMS *Tireless* [Photo Essay, September]. "Fin" is the correct term on a UK boat; "sail" is American usage. And the "cone-shaped top" of the search periscope does not hold a radar-warning antenna.

Though I'm not a sonar engineer, I can tell that the "matte-looking patch on the side of the ship's hull" is a fender—the flank arrays are hidden below the casing (the actual hull is not visible—and a submarine is properly referred to as a boat, not a ship). You also missed the clearly visible sonar array on the upper leading edge of the fin. As for antenna systems, the communications mast was not mentioned and the mast for RF intercept facilities cannot be described as "an oversize beehive" and has no "oddly shaped appendages."

Paul Reeves
Templecombe, England

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