Letters

Affordability of Science

While it is laudatory that Daniel E. Koshland, Jr. (Editorial, 29 June, p. 1593), calls upon scientists to advocate the full funding of science, the issue cannot be helped by his comparing the affordability of the scientific enterprise to that of the savings and loan (S&L) fiasco. Perhaps we are a "country that can squander hundreds of billions of dollars" on an S&L bailout in the sense that we were able to create the climate that unexpectedly encouraged this white collar crime. However, the implication that the citizens of this country are wealthy enough to throw money away or that they planned for this debacle in the manner that they plan science budgets is illogical and insulting to the citizens' support of scientific research. Certainly, in the last decade, we have achieved the *appearance* of unlimited wealth by routinely forwarding our bills to those yet unborn. I certainly hope that Koshland, by including the funding of science in the same sentence as the insuring of the S&L industry, does not mean to imply that we should send the science bills to future generations as well.

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"Purposeful" Evolution

While reading Marcia Barinaga's summary article on cone snail toxins entitled "Science digests the secrets of various killer snails" (Research News, 20 July, p. 250), I encountered phrasing concerning the evolution of the snails that I feel compelled to address.

The problem is one that occurs repeatedly in both the technical and popular literature, that is, discussions of evolution that cast it in terms that make the process appear as if it were purposeful. In this instance the article states, "the great variety of toxins in the venoms of the cone snails are due to the intense evolutionary pressure on the snails to stop their prey quickly, since they can't chase it down." That language implies that some real pressure is driving the snails to develop the toxins, but that isn't how evolution works. The reality is that those snails that produced toxins that immobilized their prey rapidly tended to obtain food more often than those possessing slower-acting or no toxins, and thus over time the population of cone snails became dominated by those possessing the fast-acting agents. There was no pressure!

Use of language that fosters the notion that organic evolution proceeds in a purposeful manner leads to confusion among both the public and the majority of scientists. Further, it can provide an apparently legitimate avenue of attack upon evolution by the creationist element. It needs to be understood by all that evolutionary developments simply occur as slight to significant differences among organisms, and as a result of natural selection those features that confer greater survivability and concomitant reproductive success are the ones perpetuated into future generations. In the vernacular, "If it works, it works; and if it don't, it don't."

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The Old Puritanism?

Daniel E. Koshland, Jr.'s editorial "The new Puritanism" (1 June, p. 1057) hits the mark, but the problem goes beyond ethical arrogance and has ancient precedents.

Since time immemorial a few have realized that fear is the cheapest commodity to fabricate and the easiest to sell at great profit. It could be argued that manufacturers, wholesalers, and retailers of fear have been the major impediment to the enlightenment of the human race throughout history. That this perverse tradition continues unabated today is obvious, although the ascendance of science and a possibly growing respect for rational thinking give promise that it may be eventually conquered.

With regard to contemporary specifics, it is astonishing that we have given public regulators a blank check for the exercise of prudence on our behalf. Excessive prudence can be dangerous and definitely costly, and yet we have not defined thresholds or ceilings that public officials should not exceed. Under the cricumstances, can anyone be surprised about the current regulatory scenario?

Most regulatory issues in health and safety are concerned with whether potential insults cause injury. Sometimes the determination of causality is straightforward, as in the case of infectious agents, acute poisons, and the like. More often, causality is blurred in a maze of multifactorial conditions, and the indictment of any specific factor is a matter of judgment. This is where most controversy and abuse arise. That regulation should proceed even in the face of imperfect knowledge is axiomatic, but as a minimum it should first be established that the risk is significant and the attribution is justified.

The significance of risk is determined by comparison with risks that are accepted by social tradition, while attribution is justified after competing causal hypotheses are tested, rejected, or used to assign fractional responsibilities. All this implies policies that consider the global situation rather than the expedient, ad hoc, and reductionist approaches now fashionable. Until something along these lines enters our statutes, fearmongers will continue to have the day.

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Electricity Use

The discussion in Briefings of "Growth without new energy" (22 June, p. 1486) correctly points out that our total use of energy has grown very little for almost 20 years while our gross national product (GNP) has increased substantially. However, the conclusion that this information contradicts "support for the next generation of nuclear power plants" or other electrical generation is incorrect. Although overall energy use has indeed remained constant over this period, the use of *electricity* has grown almost lockstep with GNP. Since 1973 GNP has grown 51%, accompanied by a growth in the use of electricity of 54%.

The correct conclusion to be drawn from the data is that, for the reasons the Office of Technology Assessment points out, we are more energy efficient but this is translating into a significantly growing demand for electricity. Economic growth could require as much as 200,000 megawatts of new generating capacity by the year 2000. Yet utilities are planning on adding less than one-third of that capacity.

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"Life" in an Abstract World

Richard Sullivan ("Feelings . . .," Letters, 13 July, p. 111) expresses surprise that Robert Pool (Research News, 1 June, p. 1076) would say that an atom can "feel" an