Letters

Statistical Morality

Although few would question the need for strict penalties to deter irresponsible behavior that indisciminately threatens life and limb, Daniel E. Koshland, Jr., in his editorial "Drunk driving and statistical morality" (5 May, p. 513), does not adequately address some important principles and distinctions. Koshland defines "statistical morality" as "the precept that a given course of action that may cause some harm to individuals now will result in greater benefit to more individuals in the future." The implication appears to be that it is morally correct to impose harm on some individuals so that greater benefits accrue to a greater number of individuals. This precept, however, is in dramatic conflict with notions of personal freedom and with basic philosophical principles about interpersonal transfers of utility.

In the case of drug tests, Koshland correctly mentions that volunteers are used, but even then, patients continue getting placebos only as long as the efficacy of the alternative therapeutic substance is in doubt. Where an effective drug is already in use, that drug—rather than a placebo—is what is administered to the control group of volunteers. Drug trials are designed specifically so that if convincing results emerge during the course of the trial, the trial is terminated. Thus, volunteers are not treated as guinea pigs, potentially being harmed for the benefit of other individuals in the future.

Koshland blames apparently lenient judicial decisions in drunk driving cases on a lack of understanding of statistics. No one would challenge the need for any judicial or public policy decision to adequately consider the potential impact on "statistical life," but to consider it to be on the same ethical plane as the impact on a living, breathing individual is not consistent with the way society behaves or with what many believe.

Consider the effort by certain state and county health officials to set priorities for the allocation of limited resources for health services. Because expanded prenatal care holds the promise of saving more lives, funds that might have been used for organ transplantation have been diverted to primary care. While no one argued that this decision would not save more lives, many have found it ethically unacceptable to deny those few identifiable transplant candidates needed care now for the statistical benefit of saving more babies in the future. Although Koshland may support the decision of the public officials, one cannot characterize the opposing view as either ignorant or unsophisticated. Morality is much more than a numbers game.

MELVIN KRASNER
United Hospital Fund,
55 Fifth Avenue,
New York, NY 10003-4392

To highlight the magnitude of the yearly traffic accident toll of about 50,000 deaths, Koshland states that "motor vehicle accidents . . . kill more people each year than were killed during all of the Vietnam War." While about 56,000 American soldiers died in that war between 1962 and 1975, also killed were 220,000 South Vietnamese soldiers and 5,000 allied soldiers; 666,000 (estimate) Viet Cong soldiers and North Vietnamese soldiers; and 287,000 South Vietnamese civilians and 65,000 North Vietnamese civilians, as well as countless Cambodian civilians (*1*). The total—more than 1,300,000 deaths—is the equivalent of about 26 years of U.S. motor vehicle fatalities.

These overlooked deaths illustrate the point of the editorial—it is easy to forget those who are distantly affected by decisions. Decisions to go to war are made by civil authorities, who receive both civilian and military advice. It is natural for the military to count its own past losses and estimate its future losses. Equally important in such considerations is an estimate of civilian losses, which are tragic in themselves and can have a great effect on future U.S. interests, for example, in terms of lost economic markets or interrupted international cooperation. Especially important to science has been the loss of the scientific infrastructure in such countries as Vietnam, Afghanistan, Iran, and El Salvador.

ROBERT M. HAMM
Senior National Research Council Fellow,
U.S. Army Research Institute for the Behavioral and Social Sciences,
Fort Leavenworth Field Unit,
Fort Leavenworth, KS 66027-0347

REFERENCES

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The Superconductivity Party

My answer to Robert Pool's question, "Superconductivity: Is the party over?" (Research News, 26 May, p. 914) is, "No; the party has just begun."

The intellectual challenge of high-temperature superconductivity (HTS) is so unusual and its technological promise is so great that serious students in the field cannot afford to stop working on it. Magnetic flux melting is nothing more than just a bump in the long road to full-scale application of HTS. Any realistic person would realize that only steady, hard work with vision ultimately bears fruit; the field of HTS is no exception to this. On the other hand, the progress made in only 2.5 years of HTS research is unprecedented for such a short period of time. This includes the attainment of a critical current density (J_c) at 77 K of 5×10^6 A/cm^2 in Y-123 film by Siemens (*1*), 75×10^3 A/cm^2 in bulk Y-123 by our laboratory (*2*), 15×10^3 A/cm^2 in silver-clad multifilament wire of Y-123 by Sumitomo (*3*), the successful development of HTS SQUIDs operating at 77 K by IBM (*4*), the direct observation of flux melting in high-temperature superconductors by AT&T Bell (*5*), the lowering of the processing temperature to below 600°C for HTS thin films (*6*), the use of inexpensive silicon as a substrate material (*7*), and a wide variety of developments in many other labs.

Magnetic flux creeping, which limits J_c, is a problem common to all superconductors, conventional or new. Solutions have been found for the conventional low-temperature superconductors by the introduction of pinning centers. Recent experiments at Tohoku (*8*) showed the absence of flux creeping, even in HTS materials, when it is in the thin film form. Therefore, in the same way that J_c is an extrinsic property of a superconductor, the flux creeping problem in bulk HTS is extrinsic in nature and should be surmountable by means of ingenious material processing and engineering methods. In fact, preliminary data from Karlsruhe and our laboratory (*9*) show the absence of flux creeping at 77 K in melted textured bulk Y-123 in a magnetic field up to 1 tesla, and those from Nippon Steel (*10*) show a pinning potential in a bulk Y-123 sample prepared by a partial-melting technique comparable to that in the conventional low temperature superconductors at 4.2 K.

While I took comfort in the fact that a question mark instead of an exclamation mark was used in the title "Superconductivity: Is the party over?", I am still puzzled at the sense of impatience and short-sightedness conveyed by the article. The media appeared to take this view rather seriously, as evidenced by the many articles that subsequently appeared in newspapers. Where is the perseverance that we in the scientific community have been telling the public is the decisive factor in dictating the future economic welfare of this nation?

Being scientists, we have to be honest and recognize and admit all the problems related to a subject. However, a good scientist tends