LETTERS

Defense Options

R. Jeffrey Smith (News and Comment, 6 Apr., p. 32) attributes to the "Hoffman panel" enthusiasm for "the attractions of limited systems designed expressly for the defense of weapons, not people." Defending weapons rather than people is not a choice we considered. The issue that gave rise to our panel (and to the Fletcher panel) was a redirection of the research and development (R&D) program on ballistic missile defense to take advantage of emerging technologies. We in the policy group considered the long-term consequences of exercising future defense deployment options that might result from such a program. Until R&D clarifies the technical possibilities, those options cannot be specified in detail; and Smith notes that we did not do so. A general attribute of the systems we considered, however, was their ability to provide a geographically widespread defense. Even the terminal layer of the defenses under consideration would afford broader coverage than systems we have pursued in the past. It would be quite different from the various "hard point" defense systems discussed in connection with Minuteman and MX defense, for example.

The technologies under consideration offer the prospect of protection for either population or military installations (and may allow the defender considerable latitude at the time of an attack to choose the combination to be protected). Therefore, we do not now face a sharp choice between defending weapons and defending people. The relevant question is whether and how future defense systems can contribute to our various national security objectives, including both the deterrence of war and the protection of our people in the event of war.

Smith correctly attributes to the panel the view that substantially less-than-leakproof defenses can contribute to deterrence. He refers to our conclusion that superimposing vulnerable or easily saturated defenses on vulnerable offensive systems may undermine stability. But he neglects our parallel conclusion that *appropriately* designed defenses could increase stability by reducing the vulnerability of our offensive systems and otherwise diminishing the incentives to preemption. In reaching this conclusion, we rejected the notion often espoused by critics of defenses that movement away from total vulnerability of the U.S. population is necessarily destabilizing. As noted by Smith, I believe history refutes the view that paranoia about U.S. attack has dominated Soviet policy. Soviets willing to risk the various crises they fomented during the period of U.S. nuclear superiority (including the Berlin blockades and the Berlin Wall demarche) are unlikely to believe that any reduction in the current vulnerability of our people will predispose the United States to nuclear attack in a crisis.

Smith also notes my personal skepticism that we can count on defenses working well enough to preclude vast destruction of people in the event that the Soviets devote the bulk of their force to the destruction of people. Such a fixation on a strategy of mutual suicide, while a theme of Soviet propaganda, seems distant from Soviet military thinking and practice. Against more likely Soviet attack objectives, strong (but far from leakproof) defenses could both enhance deterrence of war and provide a substantial measure of protection for our people in the event of attack. The potential contribution by future defenses to each of these objectives will depend on the outcome of the R&D program. That outcome should be not prejudged in terms of a presumed conflict between defending weapons and defending people or the improbable feasibility of a strawman "leakproof defense."

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Hoffman states that his panel never considered the choice of defending weapons, not people. This does not square with the panel's written report. A 12-page official summary recommends three ballistic missile defense options, each involving the defense of military assets—not people. Nowhere does the report list the virtues of protecting cities. In fact, it states that even a highly effective missile defense would permit "catastrophic damage" of cities and explicitly contrasts this with the limited damage that would result from an attack on defended weapons. The report explicitly states that "in combination with other measures, defenses can contribute to reducing the prelaunch vulnerability of our offensive forces," and repeats this statement several times. It also clearly distinguishes between weapon and city defense, noting that a defense of weapons would force the Soviets to concentrate their assault, thereby "diverting weapons that might otherwise be directed against cities." During several long conversations, Hoffman stressed these points to me and argued then, as he does above, that a Soviet attack on cities was in any event highly unlikely.

—R. JEFFREY SMITH

Smoking and Longevity

The Miller-Gerstein study (*1*) of the longevity of nonsmoking men and women was discussed in a News and Comment article by Constance Holden last year (9 Sept., p. 1034). After talking with a number of those commenting on our study and reviewing their reports, we remain convinced of our conclusion; most of the male-female longevity difference (MFLD) among adults age 30 and over (after removal of the slight effect of traumatic deaths) can be accounted for by smoking.

Two major studies (*2, 3*) reported a smaller effect of smoking on MFLD in the past decade. The State Mutual Life Assurance Company study (*2*) included former smokers in the nonsmoking category and nonsmokers, former smokers, and smokers in the smoking category (*4*). The National Center for Health Statistics study (*3*) made use of the National Mortality Study Questionnaire, which did not identify former smokers. Thus, it is very likely that former smokers were placed in the nonsmoking category in both studies. These differences in classifications could easily explain the 3- to 4-year difference between our estimates of MFLD and theirs, as an overlap of the smoking and nonsmoking categories tends to reduce the apparent variation in longevity due to smoking.

The Framingham study (*5*) and the Kaiser-Permanente study (*6*), also mentioned in the article, used sampling techniques and analysis that were different from ours. Therefore, comparisons with our study are inappropriate. These studies also have the same type of classification problems as the studies noted above.

Greater credence should be given to the two studies noted in our report which deal with nonsmoking populations [the Irish in Sleive Loughner, Ireland (*7*), and the Amish in Lancaster County, Pennsylvania (*8*)]. These are ideal populations in which to examine MFLD without the confounding factor of smoking. Both studies in these purely nonsmoking populations show that the men tend to live as long or longer than the women.

Health specialists are aware of the

devastating effect of smoking on male longevity (various reports show smoking costs men from 5 to 12 years of life). They also know that the number of smoking years of men is much greater than that of women. Therefore, we find it strange that some professionals should not accept a negligible MFLD among nonsmoking men and women.

At present we need more studies to determine the longevity of nonsmoking men and women. These studies should carefully classify lifetime nonsmokers, former smokers, and current smokers. With these classifications clearly delineated, more precise estimates of life expectancy can be determined for each classification.

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Computers, Intelligence, and Emotion

In his 27 April article on attempts to program computers so that they will truly understand language and can translate it properly, M. Mitchell Waldrop (Research News, p. 372) does not indicate the ultimate roadblock: to truly understand what is said or written by humans about humans one must feel human emotions. A grasp of words, idioms, grammar, and context may suffice in understanding and translating sentences dealing solely with objective matters such as coal mining or automobile repair. But man's most important sentences—human-interest sentences—are rich in metaphor drawn from decades of hoping and fearing, loving and hating, laughing and crying. Could any computer, or any person who lacks emotions, fully understand: "The paths of glory lead but to the grave"?

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Leptospirosis in Laboratory Mice

The occurrence of *Leptospira interrogans* serovar *ballum* infections in laboratory mice has been reported by several laboratories in the United States (*1–3*) and in other countries (*4–7*). These findings were reported primarily by researchers who were familiar with this disease and its occurrence in animals. Leptospirosis in laboratory rodents is unlikely to be considered by the many physiologists, pharmacologists, psychologists, biochemists, microbiologists, and other scientists who handle these animals. Such was the case in this institution when leptospirosis was detected in a large white mouse colony being used for biochemical studies. The examination for leptospirosis was prompted because of the planned introduction into the same room of the animal facility of mice from a different source for use in a leptospirosis study. It was therefore important to rule out any possibility of cross-infections.

Leptospires were demonstrated in six of six ICR Swiss white mice from a colony of 1200 by microscopic or cultural examinations. Isolates from four of these six mice were identified as members of the Ballum serogroup of *Leptospira interrogans*. The identification was confirmed at the Leptospirosis Reference Laboratory, Centers for Disease Control, Atlanta, Georgia.

The leptospiral infection may have been introduced by mice provided by any one of several vendors or by a house mouse or field mouse that gained access to the colony. The high prevalence of leptospirosis, especially serovar *ballum* infections, in feral mice has been repeatedly demonstrated (*2, 5, 8*). The *ballum* serovar is well adapted to the mouse, in which infection can be established without signs of disease. Once introduced, serovar *ballum* infection spreads among cagemates and possibly between animals in different cages via shared water bottles. The organisms nest in the kidneys and are shed in the urine apparently for the remainder of the animal's life (*4, 6*). Leptospires are transmitted by contact with infective urine or waters contaminated with such urine. Organisms enter hosts through abrasions of the skin or mucosal surfaces of mouth, nasopharynx, eye, or esophagus (*9*). Transmission by coitus can also occur.

The clinical manifestations of serovar *ballum* infections in humans are not pathognomonic and may be mistaken for influenza or other common ailments (*10*). The disease is usually mild and not accompanied by jaundice, but severe infections with a protracted 3- to 4-week period of convalescence may occur (*6, 11*). An associated orchitis has been reported by several investigators (*3, 6, 11*).

Rowen (*12*) estimates that approximately 45 million laboratory mice are used annually in the United States. Awareness of leptospirosis in mice deserves broader recognition in view of the thousands of individuals handling mice and the possibility that research findings with infected mice may be compromised. Cultural and serological procedures are available for monitoring animal colonies and for serological diagnosis of infection (*9*). For workmen's compensation claims, it would be advisable to maintain a reference serum sample from all personnel handling mice or other animals. The serum would serve as a baseline for any subsequent demonstrable antibody titer associated with leptospirosis or any other disease episode related to handling animals. Although leptospirosis in personnel handling laboratory animals has been primarily associated with mice, infections in rats, other laboratory rodents, dogs, and nonhuman primates are known to occur and may pose similar infection hazards (*5, 13*).

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Erratum: The obituary for William A. Altemeier, Jr. (4 May, p. 525), was incorrect. Dr. Altemeier was chairman of the Department of Surgery at the University of Cincinnati.