The study is estimated to cost in toto about $200,000, most of it for travel expenses of Task Force members (none receives any salary or fees). We have received about $78,000 from The John D. and Catherine T. MacArthur Foundation for expenses of the chairman's office in Santa Cruz, $18,000 from the Italian Consiglio Nazionale delle Ricerche, plus a small get-organized grant from the University of California. Proposals for substantial grants submitted to appropriate authorities in several other nations, including the United States, have been denied or (it seems) shelved indefinitely.

Our difficulty in obtaining funding appears to be related to a lack of appreciation of research by officials with responsibility to destroy chemical warfare agents. The prevailing attitude is "let's just do it, not study it." The U.S. Army decided in 1982 that incineration was the way to do it and promptly ceased research on chemical demilitarization, as they call it. Now, 12 years later, only a small fraction of the U.S. stockpile has been destroyed. The program is stalled by public opposition to incineration so effective that Congress has put on hold the building of incinerator plants beyond two major ones that now exist. The Army had no fall-back plan. A major European nation declined support for the task force, saying "we have no need for research." The Chemical Weapons Convention, the multinational treaty that will require destruction of all chemical weapons by signatory countries within 10 years, makes no provision for research on how to accomplish destruction.

Some prosperous nations have on-going programs to destroy miscellaneous munitions left over from battles decades ago. The methods used are expensive on a cost per unit basis. Little effort has been made to find ways to convert the agents into materials that may be useful in civilian life. Those cost and utility angles may be desperately important to less prosperous nations. As one expert has said, they may be faced with choices between destroying their chemical weapons by expensive technologies or supplying their people with enough food to avoid starvation.

No doubt the task force's difficulties are complicated by the fact that it doesn't fit the standard categories. There are programs to support research by national groups, but none to support study by an international group of what kinds of research are needed.

Obviously I hope that this disclosure of the situation may stimulate funding of our study. Apart from that, our experience may be of general significance with regard to research policy.

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Lung Cancer Risk for Female Smokers

Gary Taubes, in his Research News article of 26 November (p. 1375) about the possibility that female cigarette smokers may be at higher risk of lung cancer than male smokers, states that a higher absolute risk of lung cancer for male nonsmokers compared with female nonsmokers may account for our findings (*1*), and that there are insufficient data to compare, with any degree of statistical precision, these baseline nonsmoking risks. We agree that some of the difference in relative risk between males and females may be attributable to differing baseline risks. The nine studies to date with baseline risk data demonstrate that the

difference in baseline risk between male and female nonsmokers is small, however, and therefore cannot explain the two- to threefold higher relative risks seen for females. The studies are the British Physicians Study (2) which showed age-adjusted lung cancer mortality rates among male nonsmokers of 10 per 100,000 per year and among females of 7 per 100,000 per year (ratio, 0.70); a small Swedish study, with incidence rates of 19.5 and 15.5 (same units) for male and female nonsmokers, respectively (ratio, 0.79) (3); the 10% U.S. National Mortality study, with rates of 12.5 and 9.4, respectively (ratio, 0.75) (4); the American Cancer Society CPS-I study, with mortality rates of 15.6 and 13.3, respectively (ratio, 0.85) (5); the American Cancer Society CPS-II study, with mortality rates of 15.2 and 12.6, respectively (ratio, 0.83) (6); a small Kaiser-Permanente study, with incidence rates of 16.7 and 8.0, respectively (ratio, 0.48) (7); a larger Kaiser-Permanente study, with incidence rates of 18.6 and 12.6, respectively (ratio, 0.68) (8); the Japanese Six-Prefecture Study, with mortality rates of 24.1 and 18.4, respectively (ratio, 0.76) (9); and a small Canadian study, with mortality rates of 16.6 and 12.8, respectively (ratio, 0.77) (*10*). These nine studies identified 998 lung cancer cases among nonsmoking males and 1778 among nonsmoking females. A combined precision-weighted estimate of the common female-to-male ratio of absolute age-adjusted rates from these nine studies is 0.78 (95% confidence interval, 0.71 to 0.86). Even conservatively using a value for this ratio equal to the lower 95% limit, the highest relative risk solely attributable to differing baseline risks is $0.71^{-1} = 1.40$. Thus, two- to threefold higher relative risks for female smokers compared with male smokers still suggest that female smokers are at higher absolute risk than male smokers, at the levels of cigarette smoking where these two- to threefold relative risks occur. These levels are not very great, starting at less than five pack-years (*1*) or 5 kg of tar (*11*).

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Indirect Costs of Pesticide Use

A discussion of the pros and cons of pesticide use was initiated by Philip H. Abelson in his editorial of 26 February 1992 "Pesticides and food" (p. 1235). The strongest argument against pesticides was raised by David and Marcia Pimentel, who offered impressive figures concerning their impact on human health and environment (Letters, 4 June, p. 1409). Some of these figures were contested by Abelson in his response to the Pimentels (4 June, p. 1410). However, the most important figure, Pimentel *et al.*'s estimate of the total indirect cost of pesticide use as being $8 billion per year in the United States (*1*), was not challenged by Abelson.

Because this estimate is the only one available, it will likely continue to be cited in the continuing debate to support the view that pesticide use causes significant harm. However, the figure is highly questionable. The study in which it is presented (*1*) is based primarily on citations of 20 personal communications, the reliability of which is difficult to assess; arbitrarily chosen values are assumed (for example, the value of a human life is set at $2 million). The largest component in the $8-billion sum is the cost of bird loss ($2.1 billion). Pimentel *et al.* state that 160 million hectares (ha) per year receive *heavy* pesticide doses (*1*), but cite 148 million ha as the *total* area treated (*2*). They assume, without statistical support, that 10% of all birds inhabiting this area are killed by pesticides. When one considers that most modern pesticides do not seem to have an adverse effect on bird populations (*3*, p. 93), the figure seems highly exaggerated. The inclusion of these questionable numbers together with an arbitrarily chosen value of $30 per bird result in the meaningless figure of $2 billion.

It seems clear that the $8-billion estimate put forth by Pimentel *et al.* (*1*) as indirect pesticide cost should not be used in serious debate regarding future pesticide policy.

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