posed occupational exposure level, lasting 30 minutes, may justify severe restriction or elimination of all benzene-containing products from the consumer market.

While I hold absolutely no brief for benzene products, it seems rash to push for such a step on the evidence provided. To start with, it would have to be shown that *occasional* consumer exposure to high concentrations would lead to health effects comparable to those from *continuous* exposure to lower concentrations over a 40-hour working week that might result in an equivalent cumulative intake. Such effects of acute exposure would depend on normal elimination rates, and one would clearly need to distinguish between regulating commercial operations and occasional short-term uses by the general public. In addition, one would have to show that replacement compounds, for example, for paint strippers, would themselves not result in equally bad or worse effects than the banned materials.

None of these remarks should be construed as arguing against the desirability of reducing unnecessary exposures to benzene or of exploring possibly less harmful alternatives. However, we have seen too many other cases where the public has been misled by discussions of supposed health hazards when high-level short-term exposures were extended, with little or no qualification, to cases of long-term, continuous exposures, be it to chemicals, food additives, or radiation.

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Energy Costs: Nuclear Versus Oil

President Carter quoted some interesting figures at the opening of the international Nuclear Fuel Cycle Evaluation (INFCE) meeting about the capital requirements of various energy resources, per "barrel of oil per day [bpd], or its equivalent derived at the ultimate site of use." The figures were: zero to $3500 for conservation, $10,000 for North Sea oil, $20,000 for Alaskan oil, and $200,000 to $300,000 for nuclear power. The President concluded that "there is a tremendous cost" for the use of nuclear power.

This argument derives directly from Amory Lovins' recent writings (*1*). Aside from the inappropriateness of judging the cost of an energy source by its capital requirements alone, the num-

bers themselves are three times too low for Alaskan oil and three to five times too high for nuclear power. Apparently Lovins equates a kilowatt of oil thermal energy with a kilowatt of nuclear electric energy, ignoring thermodynamic losses and the cost of an oil-fired power plant. The interim replacement of short-lived oil field investments is also ignored. On the nuclear side, Lovins used very high costs for nuclear power plants and electric grids, an extremely low capacity factor, and an additional 43 percent "miscellaneous" category, to reach a total of $5000/kW. A more realistic calculation (*2*) gives $1650/kW in 1976 dollars, including fuel cycle facilities and electric grids. Transferring to Lovins' oil base at 0.0324 bpd/kW (the oil requirements of a new, combined-cycle, oil-fired plant), the capital requirements are $56,700/bpd for nuclear power and $66,100/bpd for oil.

Even more important than these costs is that to produce oil one must own, or capture, the land that has the oil under it. Many of the countries participating in INFCE do not have the option of an Alaskan oil investment, because their territories do not contain oil deposits. Presumably they might acquire oil-producing territory by aggression, but such a strategy would surely be costly.

The energy experts attending the INFCE meeting must surely have noticed the use of Lovins' soft numbers by President Carter. It would seem desirable for the President to ask for a less extreme viewpoint from his speechwriters if the United States is to have a useful impact on world energy policies.

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The Sociobiology Debate

The controversy on the human nature-nurture issue that ensued at the AAAS annual meeting (12–17 February 1978) in the symposium entitled "Sociobiology: Beyond Nature-Nurture" tended to obscure any rational dialogue within the symposium's stated topic. Apparently some individuals would repress scientific discourse and research solely on the grounds that it might be misunderstood or misused by the wrong people. Sociobiology and its concepts are in their infancy. There are no claims to date by authentic sociobiologists as to *definite* race or sex differences in either human behavior or human cognition. There are only theories and preliminary evidence.

The groups and individuals who argue against research or discussion of sociobiology appear not to understand the most basic, underlying concept of sociobiology and behavioral genetics: $P = G + E + (G \times E)$, where P is the measured value for some character of an individual (behavior or otherwise), G is the value conferred upon the individual by its genotype, E is the environmental deviation resulting from all nongenetic causes, and $(G \times E)$ is the deviation resulting from genotype-environment interactions or the differential response of different genotypes to different environments (*1*). Therefore, it is apparent that the analysis of any phenotype is applicable only to that particular set of genotypes and environments in which it has been studied.

The implications of the above statement are quite straightforward. The study of sociobiology may not only help us understand better the causes of our behaviors and other characters but also help us direct our efforts toward restructuring our society in the ways we desire. Environmental engineering occurs not only in man, but in other life forms; genetic engineering has just begun. Both may suit our purposes. If, in researching a particular behavior, we find that most of the population variance is due to genotype, it may be that we have not studied enough existing environments or that we have not yet modified our environment sufficiently to increase the environmental variance. Closed minds on either side of the nature-nurture controversy will only continue its existence as a political juggernaut. There does not exist an either-or answer to this artificial dialectic. The real answer for human behavior and cognition analysis lies somewhere between and beyond nature-nurture. Sociobiology, beyond nature-nurture, contains the elements of our future. Let us get on with the work.

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