to also retain the patent rights for any inventions arising from it.

Early in the next Congress, Senator Robert Dole (R-Kan.) and I again will lead the bipartisan effort to pass this legislation. I realize that getting the most out of our R & D money and the problem of our slumping rate of technological innovation are extremely complex areas. This bill would be an important first step in turning this situation around.

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Nitrite in Cured Meats

Philip E. Hartman (Letters, 20 Oct. 1978, p. 260) responds to the article by R. Jeffrey Smith (News and Comment, 8 Sept. 1978, p. 887), which says researchers have estimated that less than 20 percent of the nitrite entering the human stomach is derived from cured meats. Hartman cites a publication by White (*1*) giving a figure of 21.2 percent and considers this the best currently available information. On the basis of White's estimate that cured meats contribute 9.4 percent of ingested nitrate and other evidence that some of the dietary nitrate is absorbed by the body, secreted in the saliva, and then reduced to nitrite in the oral cavity, Hartman suggests that the nitrate in cured meats may "possibly contribute an additional 6.8 percent of gastric nitrite." Adding this figure to White's value of 21.2 percent, Hartman obtains a total of 28 percent.

Hartman's estimate appears to be too high. The data on which it is based overestimate the current exposure to nitrite and nitrate in cured meats because they are based on analyses of cured meat samples taken years ago. Nitrite and nitrate residues in cured meats are now reduced because of recent changes in manufacturing practices.

S. R. Tannenbaum *et al.* (Reports, 30 June 1978, p. 1487) found that nitrite and nitrate are formed in the human intestinal tract. Hence, the human body as a whole is exposed to more nitrite- and nitrate-nitrogen than enters the stomach from the oral cavity. On the basis of the data by White and Tannenbaum *et al.*, I estimated (*2*) that as much as 2 percent of the exposure of humans to nitrite in the United States is a consequence of consumption of meats cured with nitrite. The remaining 98 percent of the exposure is from other sources, which seem to be almost exclusively dietary nitrogenous substances other than nitrite that undergo transformation in the digestive tract with production of some ni-

trite. I pointed out that the very small reduction in total hazard from nitrite that could be achieved by eliminating its use in meat curing must be balanced against (i) the increase in hazard from botulism, should the meat continue to be handled as at present, (ii) the increase in cost if all the meat now containing nitrite were to be handled as fresh meat, and (iii) the loss of value to consumers who would be unable to purchase the cured meats they desire.

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References

1. J. W. White, Jr., *J. Agric. Food Chem.* **24**, 202 (1976).
2. C. A. Black, "COMMENTS from CAST" (1978-8, Council for Agricultural Science and Technology, Ames, Iowa, 1978).

OSHA Carcinogen Regulations

Philip H. Abelson, in his editorial "Regulating exposure to carcinogens" (13 Oct. 1978, p. 139), argues that regulations recently proposed by the Occupational Safety and Health Administration (OSHA) "invite ridicule, contempt, and noncompliance" by including laboratory workers along with production workers within their scope. "Professional scientists who have only occasional exposure to chemicals," he maintains, "must comply with rules designed for untrained workers exposed chronically."

Ignoring, for the moment, the content of the regulations to which Abelson objects, we question the validity of the position he represents. Our cumulative experience in both academic and private laboratories has demonstrated the ubiquity of chemical hazards in such environments. In one workplace of recent experience we were expected to work continuously over open containers of benzene, tetrahydrofuran, carbon tetrachloride, and other dangerous and volatile solvents. This laboratory, like most in the institution, did not have a ventilation hood that met federal requirements. Another situation involved having to work alongside a fellow employee handling explosive ethers while he smoked cigarettes. In this case management considered the employee's skills too valuable to risk taking measures to prevent his behavior. A final example is that of the increasing use of ethidium bromide in DNA research despite evidence that it is a potent animal carcinogen. We wonder who the "100,000" workers are, "whose most serious laboratory exposure is to ethyl alcohol."

Statistical studies support our view that scientific laboratories are legitimate targets for OSHA regulations. Some evidence was presented by *Science* itself in a News and Comment article of 3 November 1978. As these results, indicating elevated cancer incidence among chemists, probably can be generalized only to "principal investigators," one wonders what the incidence is among bench-workers.

This question brings up what we consider to be another fault in Abelson's argument. He seems to regard the laboratory as a temporary habitat where the highly trained principal investigator occasionally travels to test his theories. In reality, however, a research laboratory today is a production line at which teams of workers, including high school dropouts and Ph.D.'s, work under considerable pressure and supervision to "produce results" for research directors who spend a small fraction, at best, of their own time in the laboratory.

What is more, these research workers are rarely organized into unions. Frequently students in transit, sometimes Ph.D.'s who believe professionalism is incompatible with collective bargaining, they are without a means of self-protection.

We also disagree with Abelson's characterization of the specifics of the proposed OSHA rules. Quarterly monitoring of a workplace is minimal procedure when one is dealing with potential carcinogens; some facilities should be monitored hourly. Protective clothing is also a token precaution, as it does nothing to alter the unsafe environment and frequently imposes discomfort upon the worker. Since we are now all aware that some carcinogens act over a time frame of 30 years, it should not be difficult to understand the need to maintain records for 40 years.

There is no doubt that OSHA, understaffed and underfunded, is capable of producing some unacceptably crude guidelines. These are frequently promulgated as tentative, giving affected parties ample opportunity to lobby the agency. In fact, the "tentative" nature of the regulations may be viewed as a loophole designed for manufacturers' and other institutions' objections. In any case, Abelson's insinuation that, because the Secretary of Labor must approve all changes, these regulations are not in fact tentative is unfounded. Procedurally, all departmental authority is vested in the Secretary. Thus, while the *Federal Register* may refer to him as the final authority, most responsibility is delegated to his staff or agencies within the Department of Labor. This particular aspect