ergy physics. We, as outsiders, already see the imminent development of a number of spin-offs of practical importance. But even more important than the technical spin-offs can be the wholly new applications of newly discovered principles such as have accompanied the development of each of the major domains of physics. The corresponding direct benefits of high energy physics are still to come in the future. It was a long time, after all, between the "nonrelevant" A and B coefficients of Einstein and "relevant" lasers, whose great practical importance Abelson notes.

Whatever the future will bring, it is abundantly clear that physics and all of science need high energy physics.

HERMAN FESHBACH
Center for Theoretical Physics, Massachusetts Institute of Technology, Cambridge 02139

JOSEPH WENESER
Brookhaven National Laboratory, Upton, New York 11973

Falling Watermelons

We live in mortal danger of being struck dead by watermelons inadvertently dropped from passing airplanes. Technology is obviously to blame for this hazard to life, because, if technologists had not developed airplanes, we would not have to worry about the danger of falling watermelons. However, when we examine the probability that a person will be struck by a falling watermelon, we must conclude that this environmental danger is not worth worrying about.

It is not easy to compute the probability of rare and unlikely events, such as death from eating mercury in tuna fish, cancers in human beings due to DDT ingestion, or the likelihood that PCB's (polychlorinated biphenyls) will have a deleterious effect on the environment (*1*). But many people prefer to conclude that new methods and new substances "may" be harmful and therefore should be banned until— if ever— they are proved innocuous.

The belief of Mosser *et al.* (Letters, 14 July, p. 119) "that the environmental impact of a chemical should be studied before it is released into the environment" is commendable in theory. More than a million products now result from man's activities (*2*). There are at least 2 million species of fauna and flora on the earth. Assuming that a team of biologists can assess the environmental impact of a man-made product on a species in 1 year's time, it would require some 2 trillion, biologist-person years to complete this worthy evaluation. The approach of Mosser *et al.* would solve the unemployment problem among biologists for some time to come, but the cost to society would be staggering. Jones W. Haun of General Mills, Inc., estimates that it costs his company approximately $75,000 for a 2-year program to merely prove the innocuousness to humans of *one* food additive (*3*). Long-term, low-level toxicity studies would cost many times more.

Mosser *et al.* assert that ". . . we have never subscribed to the theory that DDT (or PCB) usage could diminish the earth's oxygen supply." In a talk (*4*) given at Yale (1970), Wurster said of his laboratory studies on the effect of DDT on algae, "The data indicated that as DDT was added to water, the rate of photosynthesis was decreased. (Photosynthesis is the process whereby green plants absorb carbon dioxide and the energy from sunlight, producing organic nutrients and oxygen. All animal life on earth is dependent on this process.)" Wurster may never have believed that DDT could diminish the earth's oxygen supply, but his juxtaposition of sentences leaves the impression that this is the case. Paul Ehrlich elaborated on and disseminated the story of vanishing oxygen in the September 1969 issue of *Ramparts* (*5*).

Except for a few isolated instances when misuse of PCB's caused concern, the quantities of PCB entering the environment have been relatively minuscule, and the substance itself has a relatively low toxicity. The sole U.S. producer of PCB's has limited its use to sealed systems since the summer of 1971 (News and Comment, 3 Sept. 1971, p. 899). There is no evidence whatsoever that alteration of phytoplanktonic species by PCB's—if the effect is at all at work in nature—would have a deleterious effect on the environment. In the spectrum of realistic problems facing society today, PCB contamination hovers near the bottom of the list.

New ideas and new products are delicate things. One consequence of unrestrained precautionary study of possible environmental hazards of new ideas will be to kill most of them before they are born. No child, no idea is born into this world without the possibility of causing harm as it grows older. Shall we then abort all birth and all innovation for fear of possible environmental damage? That is what some environmentalists would have us do, but such a tack would lead society down the road to sterility.

CYRUS ADLER
Electric Whale Company, 99 Nassau Street, New York 10038

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2. Study of Critical Environmental Problems, *Man's Impact on the Global Environment* (M.I.T. Press, Cambridge, Mass., 1970), p. 22.
3. *Report on Spring Meeting* (National Association of Manufacturers, Environmental Quality Committee, New York, 1972), p. 21.
4. H. E. Helfrich, *Agenda for Survival* (Yale Univ. Press, New Haven, Conn., 1971), p. 44.
5. P. Ehrlich, *Ramparts* **8**, 24 (1969).

DDT in Rainfall

The article by Woodwell, Craig, and Johnson (10 Dec. 1971, p. 1101) "What happens to DDT" has just permeated my environment. I wish to draw attention to an error in the figures quoted for the amount of DDT found in rain in England. In both of the papers cited (*1*), all results are given in parts per 10^{12}, not in parts per million.

JOHN T. HUGHES
Chemistry Division, Department of Scientific and Industrial Research, Private Bag, Petone, New Zealand

Reference

1. K. R. Tarrant and J. O. G. Tatton, *Nature* **219**, 725 (1968); G. A. Wheatley and J. A. Hardman, *ibid.* **207**, 486 (1965).

We are grateful that Hughes calls attention to a typographical error that might prove confusing. In the instance to which Hughes refers, ppm should have been ppt, which we used to indicate parts per 10^{12} parts. The text in the remaining segment of that paragraph and in the following paragraphs should, however, clarify that point for most readers.

We are indebted to Clare Stewart for pointing out a further typographical error in the formula in the section entitled "A model of DDT circulation in the biosphere." The N_i in the second summation should be N_j.

G. M. WOODWELL
Brookhaven National Laboratory, Upton, New York 11973

P. P. CRAIG
National Science Foundation, Washington, D.C. 20550

H. A. JOHNSON
Indiana University Medical Center, Indianapolis 46202