Letters

Unesco and Nongovernmental Organizations

I was perturbed by P. H. Abelson's editorial "Unesco's tarnished image" (26 Nov., p. 897). Having just returned from the Unesco General Conference in Nairobi, I would like to offer some comments that diverge from his views.

I readily agree that it is unfortunate that Unesco's noble objectives have been clouded by political overtones. However, this political fallout, which becomes starkly visible only once every 2 years, is not a true reflection of the valuable work that goes on day after day at Unesco *without* political overtones during the periods between General Conferences. The peasant in a less-developed country who gets instructed by television on how to increase his meager harvest or, for that matter, the scientist engaged in a cooperative project developed under Unesco auspices, could not care less about the political rhetoric.

The resolution sponsored by the People's Republic of China that Abelson quotes is nothing new, having been adopted in almost identical, if not harsher form, 2 years ago. Unesco has learned to live with this kind of resolution and will not abandon its support for nongovernmental organizations, most notably the International Council of Scientific Unions, because of it.

There will be moments in any international forum when the actions taken are contrary to our views and interests, as there will be times when things go our way. As children, we could pick up our marbles and go home when things did not go our way. Perhaps we could even get our way in international organizations some years ago by threatening to do so, but many of our old arguments have been worn out. A better approach is to continue to work toward reform and improvement within the system, for how can we otherwise influence the course of events?

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I would like to commend Philip H. Abelson for his editorial of 26 November. I agree wholeheartedly that the time has come when alternative avenues for fostering international science must be explored. Major sectors of the scientific community may consider themselves to be immune to the deterioration of Unesco, but it would be foolhardy to expect free exchange of science and scientists to flourish under auspices which have become so politicized.

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Metabolic Precursors of a Known Human Carcinogen

The National Institute for Occupational Safety and Health (NIOSH) has recently learned that both *N*-phenyl-β-naphthylamine (PBNA) (a widely used rubber antioxidant) and 2-nitronaphthalene (a by-product of α-naphthylamine production) are metabolized to the known carcinogen, β-naphthylamine (BNA). We are writing to highlight the potential problem of the metabolic conversion of materials believed to be relatively innocuous into known human carcinogens.

In a recent study, the B. F. Goodrich Company found 3 to 4 micrograms of BNA in 24-hour samples of urine from two volunteers who had ingested 50 milligrams of PBNA (contamination, 0.7 μg BNA) and from workers (unspecified number) estimated to have inhaled 30 mg PBNA (*1*). These findings indicate that PBNA is at least partially metabolized by the human body to BNA and confirm an earlier study by Shell Nederland (*2*).

An estimated 15,000 workers are at risk of exposure to PBNA during its manufacture and use. The majority of these exposures occur in the rubber industry. PBNA is used as a rubber antioxidant and also as an antioxidant for greases and oils, as a stabilizer during the manufacture of synthetic rubber, and as an intermediate in the synthesis of dyes as well as other antioxidants.

E. I. du Pont de Nemours and Company has informed NIOSH of unpublished studies regarding another compound which can be metabolized to BNA (*3*). 2-Nitronaphthalene (an unmarketed by-product produced during the commercial preparation of α-naphthylamine) is metabolized in laboratory dogs to BNA. However, there are no reports concerning the metabolic fate of 2-nitronaphthalene in man.

The fact that certain substances, as illustrated by PBNA and 2-nitronaphthalene, can be metabolized to known carcinogens lends a new perspective to the control of hazards in the workplace. NIOSH therefore recommends the following.

- More consideration should be given to the assessment of metabolic pathways of chemical agents found in the workplace.
- Materials which can be metabolized by the human body to known carcinogens should be handled in the same manner as carcinogens.
- Industrial hygiene practices should be followed to minimize exposure to PBNA in the workplace. Suggested industrial hygiene practices to minimize exposure to PBNA are available from the Technical Evaluation and Review Branch, NIOSH, upon request.
- Alternative antioxidants to PBNA should be fully evaluated with regard to possible human effects.

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References

1. M. N. Johnson, B. F. Goodrich Company, personal communication.
2. R. Kummer and W. F. Tordoir, *Tijdschr. Soc. Geneesk.* **53**, 415 (1975).
3. B. C. McKusick, E. I. du Pont de Nemours and Company, Incorporated, personal communication.

Radiation-Induced Health Effects

Further comment is in order regarding the letters from Bertram Wolfe and Frank von Hippel (29 Oct. 1976, pp. 478 and 479). Wolfe questions the validity of criticisms by the study group of the American Physical Society (APS) of the early drafts of the Rasmussen report (leading to a number of revisions and corrections) and objects to the 11 June