

LETTERS

"Environmentally" Caused Cancers

Barbara J. Culliton's recent Research News article on toxic substances legislation (29 Sept., p. 1198) contains the statement, "'60-90 percent' of human cancers are 'environmentally' caused." Because this statement is sometimes (not in the present case) misused and misunderstood, its genesis and subsequent transmogrification invite inspection.

The sense of the statement appears to have originated in two World Health Organization reports which stated, first (1), that environmental or extrinsic factors directly or indirectly account for more than three-quarters of human cancers and "that the majority of human cancer is potentially preventable." The second report (2), referencing the first, stated that "More than 75% of human cancers are, at least potentially, preventable." Five years later, Boyland (3) classified the causes of human cancers as chemical, physical, and biological and concluded that "Some 90% of cancer in man is . . . due to chemicals."

One, two, or all three of these papers are frequently cited to support statements such as, "There is now growing recognition that the majority of human cancers are due to chemical carcinogens in the environment" (4).

At times, the sense of the statement is more carefully used, as in (5): "The evidence that 80% of human neoplasms directly or indirectly depend on environmental factors carries important implications . . ." or (6): "Most cancers today appear to be induced by elements originating in man's environment . . ."

The problem with all these variations on the same theme is the confusion sometimes seen among the general public (and others who should know better) about the intended meaning of the word *environmental*; that is, the word is sometimes loosely taken to refer to air, water, and food and not, more correctly, as a classification term meaning extrinsic or exogenous. As environmental problems are commonly considered to be caused by *pollutants*, and pollution is commonly regarded as the intrusive contamination of otherwise pure entities by industrial *chemicals*, the inference for some is that chemicals (that is, some or most of the substances originating in industry) in the environment (air, water, and food) cause most cancers.

Unfortunately, the simplistic gloss given above ignores the fact that "life-style factors" which are difficult to identify and change—such as sunshine, diet, and

cigarettes (6, 7)—are also environmental factors which, like the more easily documented "chemical factors," should be targets for cancer prevention strategies.

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References

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4. S. S. Epstein, *Cancer Res.* **34**, 2425 (1974).
5. J. Higginson, in *Persons at High Risk of Cancer, An Approach to Cancer Etiology and Control*, J. F. Fraumeni, Jr., Ed. (Academic Press, New York, 1975), pp. 385-398.
6. E. L. Wynder, and G. B. Gori, *J. Natl. Cancer Inst.* **58**, 825 (1977).
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NSF and NASA Budgets

An article published in the 1 September issue of *Science* (News and Comment, p. 796) has been interpreted by some in the scientific community to mean that Senator Charles McC. Mathias, Jr. (R-Md.), did not strongly support the National Science Foundation (NSF) and the National Aeronautics and Space Administration (NASA) during the Senate's consideration of their budgets for fiscal year 1979. The article mentions "complex parliamentary maneuvers" on the Senate floor, and that is an accurate characterization. However, these maneuvers resulted in the least harmful and smallest acceptable cut in the NSF and NASA budgets by the Senate. This result was largely due to Senator Mathias' leadership.

The bill, as reported to the Senate by the Appropriations Committee, contained nearly the full amounts requested by NSF and NASA. Senator Mathias, in committee, successfully led the fight to restore cuts made by the House and to oppose cuts proposed in the Senate appropriations subcommittee and full committee.

The day before floor action on the appropriations bill, I joined Senator Mathias and six other senators in a letter to our colleagues opposing a prospective 2 percent across-the-board cut on all agencies covered by the bill, including NASA and NSF. Senator Proxmire (D-Wis.) had indicated he would propose such a cut. This would have meant a reduction of \$87.4 million in NASA's budget and \$17 million in NSF's budget. Another amendment, of even greater impact, also

was to be proposed by Senator Roth (R-Del.).

As the bill was being considered on 4 August, it became apparent that action could not be completed that day and that the vote on the amendments would occur on Monday, 7 August. At that time it was generally believed the 2 percent across-the-board amendment would pass. This reduction would total \$810,205,000. Over the weekend, however, Senator Mathias worked to reconfigure the 2 percent cut amendment and eventually reached agreement with Senator Proxmire and other senators on a substitute amendment. This Proxmire-Mathias substitute, which passed, called for cuts in the NASA and NSF budgets of only \$5 million and \$10 million, respectively, and increased cuts in other parts of the bill in order to keep the total reduction at \$810,205,000.

I hope this helps clarify Senator Mathias' constructive role during congressional consideration of these two major budgets for scientific research and technology.

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National Synchrotron Light Source Project

Two electron storage rings which are to be dedicated exclusively to production of photons for use in experimentation are under construction at Brookhaven National Laboratory (BNL). A 0.7-billion-electron-volt ring, to provide radiation in the wavelength interval between the infrared and ~ 10 angstroms, is scheduled for experimental use by mid-1981; and a 2.5-billion-electron-volt ring, whose spectrum, with beam wiggler magnets, will extend to ~ 0.1 angstrom, should be available for experimental use by the end of 1981 or early 1982, depending on apportionment of project funding by year. The National Synchrotron Light Source (NSLS) project will provide a number of equipped beam lines for general use by researchers from universities and from industrial and government laboratories; in addition, research will be carried on by BNL staff scientists. It is clear, however, that the needs of those who require specialized and unusually complex apparatus will be best met if they, either individually or in collaboration, can take a primary role in the design, construction, and maintenance of such a line. An individual or