Letters

Science and Technology

In his editorial "The relation of science and technology" (7 Jan., p. 13) Edward E. David, Jr., points out the close coupling between science and technology and remarks that ". . . technology feeds on science, but it has never been made fully clear that science, in turn, feeds on technology. . . ."

It is true that the interaction between science and technology is poorly understood. This may be partly due to the limited validity of a two-element model. Some improvement can be made by singling out the special role of "fundamental" or "basic" science as distinct from science itself. But this modification fails to stress the mutuality.

I have helped my students develop a better understanding of this interaction through the use of a three-element analogy drawn from the phenomenon of symbiosis in the life sciences. Two dissimilar elemental life forms living together in a mutually supportive way may give rise to a combined third form that is unlike either of the elemental forms. A well-known example is that of alga and fungus, which, living together, give rise to the more complex lichen. In the same way, a symbiotic relationship between natural philosophy and technology gives rise to science. In this analogy, science, in full flower, can be seen to be more complex than either of its elements.

Technology is the business of scientists who are not natural philosophers, just as natural philosophy has been the realm of scientists who are not technologists. Yet there is hardly any area of fundamental investigation that does not depend on technology for the tools of experimental study, and there is hardly any technological product that does not depend for its successful development on the laws of natural philosophy.

Science, in this model, can be seen as more than just the sum of natural philosophy and technology, and the scientist can be recognized in the broadest sense as a person who functions in a particular way, who thinks analytically, who observes carefully and critically, and who draws tentative conclusions subject to appropriate verification. For example, a good physician is neither a natural philosopher nor a technologist, but he is certainly a scientist.

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Virtually ignored, although sometimes hinted at, as in David's editorial, is the question of people's acceptance of technical solutions to society's problems. While government and industry are frequently willing to support, with large grants, a technical solution to a problem (pollution, for example), they ignore the basic reason for the solution. We may want to make the world a better place in which to live—but better by whose standards and by whose definition?

I recently showed a film to one of my classes about the problem of the automobile and in it was suggested a way to reduce traffic deaths—the construction of a computerized highway, onto which a person could simply drive, push a button, and let the highway manage the car. I polled my class and discovered that not one student wanted to use such a road. It occurred to me that, unless we are willing to spend money to discover what people will accept, we may spend millions without finding humanly acceptable solutions.

The search for technical solutions to problems should be "socioengineered" so that the solutions are acceptable to the majority of the people (or at least we should find out the extent of the opposition and try to make the solutions *appear* desirable). This would perhaps mean that sociologists, psychologists, and market analysts should be included in the research teams who are working on such projects.

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Sex Discrimination

The report "Inside HEW: Women protest sex discrimination" (News and Comment, 15 Oct. 1971, p. 270) by Judy Chase contains statements that misrepresent federal regulations relating to maternity leave for women employees.

The Citizens' Advisory Council on the Status of Women recently made a study (*1*) of job-related maternity benefits. Nowhere did we find that other public or private employers have as liberal a policy as the federal government.

As a result of our study, the council adopted the view that childbirth and complications of pregnancy are, for all *job-related purposes*, temporary disabilities and should be treated as such under any health insurance, temporary disability insurance, or sick leave plan of an employer.

Government employees are entitled to 13 days of sick leave annually, which can be accumulated for each year of employment. Therefore, for the period women are unable to work because of childbirth, they are entitled to use all accumulated sick leave. An employee who exhausts her sick leave may use annual leave and leave without pay. Federal employees receive 13, 15, or 26 days of annual leave depending on length of service, and annual leave may be accumulated for up to 30 days.

For any period that an employee is on sick leave, annual leave, or leave without pay, she is actually on the rolls of the agency in her position and cannot be removed except for any reason for which she could be removed while on active duty. Reemployment rights are irrelevant under these circumstances.

The council recommended as a result of its study that the Civil Service Commission withdraw "guidelines" for use of maternity leave, which we felt were patronizing to women and unnecessarily restrictive with respect to advancing sick leave for maternity. These guidelines are not mandatory, however, and agencies in some instances follow more liberal practices. Even when the guidelines are followed, the federal government still has a more liberal policy than any private employer of which we have knowledge.

The federal government also makes available to its employees a wide array of health insurance plans at differing costs. All family coverage plans include

maternity coverage. The two most popular plans, in which 80 percent of federal employees are enrolled, have no special limitations on maternity coverage, contrary to the practice in many private plans.

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Reference

1. *Women in 1970* (Citizens' Advisory Council on the Status of Women, Government Printing Office, Washington, D.C., 1971).

Perhaps the Department of Health, Education, and Welfare directives for appointment of fixed numbers of women to advisory jobs described by Judy Chase and Deborah Shapley (15 Oct. 1971, p. 271) will stir a reaction to the patent absurdity of attempts at curing social and cultural evils through discrimination. There may have been some sex discrimination in the assignment of these posts, but, if so, it has not been evident. It certainly cannot be proven by appeals to numbers (women serving in advisory posts versus women in the population at large), nor by arguments ad hominem. However large or small the discrimination has been, it has never been written into practice. Most of the senior staff members I know at the National Institutes of Health (NIH) are blind to race, age, national origin, and sex when they make appointments to the various councils. Quality and competence outweigh all other considerations. Discrimination—compensatory to be sure—is now written into the rule books. To give in quota is to deny in quota.

Some activists may consider seats on advisory boards and study sections as sinecures. If that were the case, then quotas and ratios would be entirely appropriate, since the issue would be one of constituencies, not of competence. However, NIH programs have been successful because of attention to quality alone. Any group of 2000 people will contain a few fools and some prejudice. But the jobs in question are not plums. They are ill-paying or nonpaying, time-consuming, technically demanding activities performed by specialists, who have brought experience and distinction to their work of judgment. If women or members of one or another minority group are underrepresented in these jobs, it is evidence of a profoundly difficult social and cultural problem. Compensatory discrimination is a shabby importation of politics into what are, for some institutes of NIH, matters of life and death. It is about as appropriate as repairing a building foundation with mucilage. Some distinguished women scientists I know would, I daresay, agree.

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