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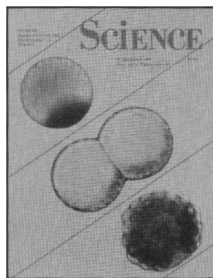
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**COVER** Three stages in the embryogenesis of the ascidian *Boltenia villosa*. Upper left: fertilized egg, 30 minutes after sperm penetration. The endogenous orange pigment, which was uniformly distributed in the unfertilized egg, has formed a cap at the vegetal pole. Center: two-cell stage, 120 minutes after fertilization. Lower right: gastrula, 13 hours after fertilization. The pigment has segregated into muscle-lineage cells, which line the posterior rim of the blastopore. See page 1572. [L. Simoncini, M. L. Block, W. J. Moody, Department of Zoology, University of Washington, Seattle, WA 98195]

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## Science Advice to the President

In a little-heralded speech on 25 October 1988, George Bush, now President-elect of the United States, announced that he would upgrade the office of science adviser, appoint a committee on science and technology, and see that the science adviser had access to him personally (see *News & Comment*, 4 Nov., p. 665). Most of the press, busy berating the candidates for not discussing the issues, ignored this speech. Yet it is a policy speech, the portents of which are good for the nation and good for science.

So much has been written and said about a science adviser to the President, including nostalgic and myopic glances back into history, that one fears to tread on too well-trodden paths. Yet several aspects of the situation facing a science adviser in 1988 are different from those of earlier eras. The most important is that the budget has become an issue of great political importance and that science today accounts for a much bigger percentage of the budget than before. Thus a science adviser will need to have a broad vision, not only to evaluate the relative values of an array of scientific projects but also to defend the merits of scientific projects in comparison with other parts of the budget.

Access of the science adviser to the President has been much discussed. But there is a second requirement: access of scientists to the science adviser. Scientists have always enjoyed the pluralism with which science is funded. A proposal that does not engender the enthusiasm of one department may find a sympathetic ear in another. An autocratic czar, too committed to tidiness and unfriendly to disciplines outside his own, could actually damage science more than help it. The science adviser, therefore, must be a person of wide contacts in the scientific community and must have a reputation for being a good listener as well as a forceful advocate.

Perhaps the most important contribution of the science adviser will be his vision of the future. Science is inevitably tilted toward future gain. The adjudication of priorities in the present, important as that is, pales in significance compared to projects that affect lives into future generations. As pollution becomes an increasing problem, a much heavier research orientation in the Environmental Protection Agency may be needed, and the science adviser should be able to be persuasive in new directions of this sort. The greenhouse effect, whether it has arrived already or is many years in the future, is sufficiently serious, together with a dwindling supply of oil, that energy efficiency and use must be policy matters of major interest to this generation as well as to future generations. Only utopians can believe that the problems of energy consumption will be solved by a U.S. president advocating a lower standard of living, or a Chinese premier saying we should stick to bicycles because the developed countries have already saturated the atmosphere with CO<sub>2</sub>. The solutions will have to be scientific, such as biosynthetic approaches to CO<sub>2</sub> fixation, solar power, organisms that biodegrade pollutants, and cleverer uses of water resources and urban transportation. The science adviser should be an intellectual leader in this effort.

These criteria should not in any way diminish the classical role of the science adviser, who also must advise the President on numerous appointments to scientific bodies, such as the National Science Foundation, the EPA, the Commerce Department, and so on. It is to be hoped that the science adviser will be appointed soon, so that he or she will have a major role in selecting the most appropriate individuals for those many positions. And it is to be hoped that the generally observed tradition of making science policy appointments on the basis of merit, not as part of the spoils system, will be preserved.

Perhaps the obscurity with which George Bush's statements in regard to a science adviser were treated by the press will serve to allay one doubt in regard to the advisability of appointing a strong individual widely supported by the scientific community: the downgrading of the science adviser office was frequently interpreted as a fear that the science adviser might resign in some dramatic disagreement, such as General MacArthur did under Truman. Those risks seem slight. The resignation of a science adviser might compete with the announcement of a new quarterback for the Washington Redskins in terms of national news. However, those who care about the welfare of this country will watch closely as the President chooses and will support the selection of a science adviser who has the independence, vision, and wide contacts that allow him or her to rise to the enormous challenges that must be faced.—DANIEL E. KOSHLAND, JR.