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## Managers of Science

Scientific research and its applications are becoming more management-intensive, and this trend will probably continue. The predicted increase in state government involvement, emphasis upon problems of societal concern for which the basic knowledge is weak, and federal government insistence on accountability and performance all point in this direction. As a signal of the trend, the RANN (Research Applied to National Needs) program of the National Science Foundation has twice the manager-to-dollar ratio that the research division has.

Most managers of science were not specifically trained for managerial roles, but were converted from earlier specialization in science, engineering, or something else. As this conversion becomes more frequent, a question arises: Should scientists and engineers be given special training as they move from the laboratory bench to a managerial office? Intensive interviews with some 500 NIH and NASA scientists and engineers at different levels of organizational responsibility convinced Bayton and Chapman\* that management training was both wanted and needed. The transition requires some change of motivation, new skills must be learned, and one's scope and view must be expanded. Senior managers give little attention to these needs; typically, they made the transition successfully and long enough ago to have outgrown the difficulties they felt at the time. Much of the management training that is offered was judged by Bayton and Chapman to be poorly related to the problems involved. Thus the new manager is usually left to find his own way, sometimes painfully for himself and unhappily for his colleagues.

A committee of the National Association of Schools of Public Affairs and Administration† has recently proposed one solution—special educational programs in university schools of public affairs or public administration "to augment the educational background of mid-career scientists and engineers to prepare for leadership positions." Already some programs of this type are being offered, and the number may increase. The committee study was financed by NSF, and the staff of the Council of State Governments is supporting its recommendations.

Emphasis on the mid-career stage is sound, but the content and conduct of the proposed programs still remain uncertain. So far, most of the thinking comes from people with a management point of view. They can make important contributions, for organizational knowledge and skill in budget and personnel management often need strengthening. But these are not the only gaps to be filled; education and experience in a specialty seldom provide adequate understanding of the values, history, and structure of science and science policy. Yet scientific organizations appear to have given little organized attention to this matter. The prospective training programs would be better received and supported by scientists and engineers if some of their colleagues were involved in the planning. Moreover, although there are generalized management skills and techniques, managers are not completely fungible, and the scientists and engineers turned managers might be more effective if they had a better understanding of the broader aspects of science and science policy as well as greater skill in the arts of management.

—DAEL WOLFLE, *University of Washington, Seattle 98195*

\*J. A. Bayton and R. L. Chapman, *Transformation of Scientists and Engineers into Managers* (NASA SP-291, National Aeronautics and Space Administration, Washington, D.C., 1972). †A. H. Rosenthal, R. F. Wilcox, F. Marini, *Science Leadership for Tomorrow* (National Association of Schools of Public Affairs and Administration, Washington, D.C., 1973).