

article by W. R. Bennett, *Applied Optics Supplement*; "Optical Masers," pages 24-61, 1962, figs. 8 and 14, respectively. As it is, the article is listed under bibliography for additional reading. Similar remarks apply to a direct quotation near the top of page 17, taken from page 4 of William A. Shurcliff's *Polarized Light* (Oxford Press, 1962).

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Administering science to society

FORMULATION OF RESEARCH POLICIES. Conf. proc. (Santa Barbara, Calif., Jan.-Feb. 1966) Bruce S. Old, Lawrence W. Bass, eds. 218 pp. American Association for the Advancement of Science, Washington, D. C., 1967. \$7.75, \$6.75 for AAAS members

by David Z. Robinson

A great deal has been written about national science policy as if there exists some magic, single formula or system that can guide decision makers and ensure the wisdom of their actions. The situation looks very different to people involved in the process. The organizers of a 1966 Gordon Research Conference on Formulation of Research Policies brought together people involved in science management in Western Europe, Canada and the US with students of science management and industrial research scientists to see if information exchange in the field would be useful. This collection of papers from that conference indicates not only the absence of magic formulas but the perplexity and universality of problems that must be faced.

The book is divided into three sections. The first includes papers describing national science policies in eight countries: Belgium, Canada, Denmark, France, West Germany, Ireland, England and the Netherlands. It concludes with a useful summary by Frederick Seitz. The second group of papers attempts some comparative analysis, particularly of international and cooperative research programs. The final section deals with research policies of individual organizations: two large European companies (Philips and Montecatini), a government

agency (Air Force Office of Scientific Research) and a discussion of research management in industrial companies by the organizers of the conference, Lawrence Bass and Bruce Old.

There are major differences between the US and other participating countries with regard both to conception and goals of national science management. The US has in the last ten years established an Office of Science and Technology in the Executive Office of the President. The office deals not only with "all" federal technological activity but with the effect of federal actions on nongovernment science activities. In none of the other countries is there a similar overview. The government agencies dealing with science as part of their mission—particularly those concerned with national defense—run their own show. There is little systematic interaction between the government, university and industrial communities.

The goals of national science policies in these seven European countries and Canada center on economic growth and economic return for scientific expenditure. In the US tradition and antitrust have kept government and industry apart except, of course, for defense, atomic energy and space research.

Problems facing countries with ten to 50 million people are also different from problems that face a nation of 200 million. Until recently in the US, Americans had to make few difficult choices. They could afford to do everything. Such is not the case for a small country or an individual firm. International collaboration becomes a necessity rather than a pleasant mechanism for doing research.

Despite those differences in goals and needs between various countries, there are surprising similarities in outlook.

How can state-sponsored research be made to succeed in the marketplace? How can cooperative research be made responsive to the needs of the cooperators? After all, how do we nurture good science? Again and again the same questions come up from different areas and from different people.

The papers on international cooperation provide a most interesting picture of the operation of the Organization for Economic Cooperation and Development (OECD). OECD has been doing fine work in comparative studies of its member nations (West-

ern Europe, Canada, US and Japan). Hopefully it can be a forum for defusing some of the explosive issues now confronting these nations such as the brain drain and the technology gap.

We can be grateful to the Gordon Research Conference trustees for making this exception to their usual policy forbidding publication. No similar material exists on how a number of countries and organizations are trying to "administer" science in a technological society. The frankness of the speakers, particularly Pierre Pigagnol from France and Sir Harry Melville from England, gives us an unusual glimpse into the minds of the policy-makers faced with this demanding task.

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Mathematical virtuosity

MIXED BOUNDARY VALUE PROBLEMS IN POTENTIAL THEORY. By I. N. Sneddon. 282 pp. North-Holland, Amsterdam (Interscience, New York), 1967. \$12.75

by Joseph Gillis

Mixed boundary problems in which the different types of boundary conditions hold on distinct parts of the boundary, separable from one another in terms of a convenient coordinate system, go back at least to Poisson and Fourier. The essence of the problems discussed in this book is that different conditions hold in different regions of the same geometrical part of the boundary.

A number of classical problems of this type are described in the first chapter, including the potential due to an electrified disc, some punch problems in elasticity, and aperture-flow problems in hydrodynamics. In chapter 2 the author has collected a few mathematical tools needed later in the book (some Bessel-function formulas, a little about integral equations, fractional integration and Hankel transforms, Jacob polynomials). Much of this is applied immediately in chapter 3 to a thorough-going discussion of the electrified disc, beginning with Weber's and Beltrami's classical solutions of this problem. The method of oblate spheroidal coordinates, which effectively reduces the problem to one of the simpler type mentioned at the beginning of this review, is also pre-