erations into the processes of technological development without sometimes doing so in science as well.

Both the realities and the conventions separating science, technology, and related management and policy activities must be reexamined. It seems that whenever scientists are involved in the foreign-policy process for whatever reasons, the net effect is increased emphasis upon direct and distinctive contributions of science to foreign policy and on corresponding specifications for institutional arrangements and relevant competences. The proposition that foreign-policy processes may, as a result, come to reflect a distinctively scientific outlook is thereby reinforced. Fortunately, this proposition can be examined more systematically than heretofore because of Skolnikoff's analysis and the prescriptions which follow from it.

In discussing the style of operation of the Office of Science and Technology and in pointing to the need for something comparable in the Department of State, he draws attention to and pretty much accepts the selective approach of that office whereby a few issues or problems are pursued as targets of opportunity to the exclusion of others. This approach may be appropriate in science, but it tends, I think, to encourage the policy maker to overlook the pedestrian or less easily solved problems. Our government does sometimes neglect these in the pursuit of a selected goal, and one of the author's primary concerns is, indeed, that policies tend to be built around technologies which, in turn, derive their character more from scientific advances than from recognized national security or other foreign-policy needs. Nevertheless, it should also be pointed out that these needs have engendered increasing involvement of science on a more regular and comprehensive basis. At least, it is possible so to interpret the creation of science and technology offices for the President, the departments of State and Defense, the Arms Control and Disarmament Agency, and the Agency for International Development, whether or not the offices are yet adequate to the needs.

The same question of the possible influence of science on foreign-policy institutions and accommodations to them is suggested by the prevailing view about the competences required for appreciating the possible interactions between science and foreign policy. Skolnikoff points out that the directorship of the Office of Science and Technology, the directorship of the Office of International Scientific and Technological Affairs in the State Department, the deputy directorship of that office, the position of science attaché and the one of deputy science attaché are each presumed to require quite different qualifications, including varying degrees of recognized scientific eminence. It has not been assumed that an individual might advance from one position to another as he extended his experience and competence in science affairs.

When an occupant of one of these offices has been a disappointment, there is a tendency, one gathers, to attribute this to insufficient authority or personal unsuitability rather than to a mismatch between the position and the trained capacities sought in making the appointment. This is a remarkable situation. Skolnikoff recognizes the reasons for formal emphasis on scientific credentials, but in discussing particular policy issues he notes the need for different kinds of competence involving the social sciences and the imagination to consider the implications of major scientific and technical possibilities. Neither of these is directly correlated with creative scientific ability. He goes further by developing the interesting proposition that science affairs is a new subject, which ought to be studied, and that only if many foreign-affairs officials acquire competence in it will it be possible for the various science offices to contribute effectively to foreign policy.

Skolnikoff's thoughtful observations and discussions on these and many other questions should enhance the prospect that science will be harnessed more effectively to the nation's foreign-policy needs. Indeed, widespread appreciation of his analysis may diminish the importance which he now attaches to involving scientists in foreign-policy making on a more formal basis.

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Gas Dynamics

Physics of Shock Waves and High-Temperature Hydrodynamic Phenomena. Vol. 1. YA. B. ZEL'DOVICH and YU. P. RAIZER. Translated from the Russian by Scripta Technica. Academic Press, New York, 1966. 488 pp., illus. $18.

To our knowledge, this book integrates for the first time the various disciplines pertinent to high-temperature gas dynamics and reentry physics. It is written on three levels: it presents the physical fundamentals with plausible, deeply intuitive derivations; it then adds mathematic precision; and finally, it provides further important results for reference. It therefore should become essential to graduate students, teachers, and researchers in all aspects of this diverse field.

This first volume deals with basic principles. In a clear and logical presentation the fundamentals of hydrodynamics, acoustical disturbances, characteristics, simple waves, and shock waves are treated. Explosion and expansion problems are treated in some detail, but the interaction of a supersonic flow with a body is not. Dimensional and similarity arguments are used throughout. There follow sections on radiative transfer, thermodynamics of high-temperature gases, and line and continuum radiation emission from hot gases. The fundamentals of partially ionized gases are simply and clearly introduced. The book closes with a discussion of relaxation processes in molecular gases.

Occasionally basic physical formulas are introduced without a previous derivation. For the beginning student this may prove a slight hindrance. However, these omissions lead to an economy of presentation which more than compensates for any inconvenience. A few advanced results, such as the coupling of dissociative and vibrational processes are only briefly outlined, but perhaps they will be given more attention in volume 2, which is to deal with more advanced applications.

The most delightful aspect of this book is its style—a tribute to authors and translators. Deep intuitional arguments stimulate the reader's imagination, and simple numerical estimates whet his appetite for the mathematical derivations to follow. Clear motivation, alternative derivations, and simple examples abound. It is written in an almost breezy conversational style. It was a pleasure to review.

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