Book Reviews

Government and Science: Their dynamic relation in American democracy. Don K. Price. New York Univ. Press, New York, 1954. ix + 203 pp. $3.75.

Stimulating, thought provoking, full of good common sense and uncommon insight, Price's lectures are a forceful and challenging discussion of the problems and dilemmas on the one hand, and the administrative and legislative solutions and practices on the other, that have been created by the inevitable intermeshing of science and public policy. Price astutely diagnoses the fundamental problem of the new relationship of science to government in terms of the reconciliation of basic freedom with responsible authority.

Recognizing the reciprocal nature of this relationship, Price begins with an intriguing, albeit speculative, excursion into the sociology of knowledge as applied to American political history. He attempts to show that the philosophical scientists of the 18th century paved the way for our republican revolution. He also maintains that the scientific research programs and thought patterns of the 19th and 20th centuries laid the foundation for the development of government services, the extension of governmental powers, and the creation of those forms of organization and systems of personnel that, in practice, determine the workings of governmental authority. He then reviews the World War II developments, with particular emphasis on the Office of Scientific Research and Development and the dangers of political interference with science. His own conviction is that science is best protected against political interference if it is given "a direct and effective relationship with the responsible executives, as well as the support of well-organized groups of advisers from the leading private institutions of the nation."

Both respect and concern are revealed in the author's critical analysis of the contract system, the various advisory mechanisms, and the special difficulties arising from security considerations and congressional investigations. There is admiration for the ingenuity and patriotic fervor which created administrative mechanisms sufficiently flexible and adaptive to make the best use of the potentialities of science in furthering public policies. At the same time, there is anxiety lest the pressure of events and the development of technology outrun our administrative capabilities. One of Price's major concerns is the need of scientists to develop sharper understandings of their own roles as advisers to government administrators and deeper appreciation of the extrascientific considerations that the latter must weigh in the execution of their policy responsibilities. As recent events clearly show, the scientist-administrator relationship is a difficult one to create, nurture, and maintain, and yet it is essential to our national well-being.

To insure the progressive development of both free science and free government is the difficult task we face in mid-century. For scientists, legislators, and administrators, in fact for all who are concerned with reconciling the responsibilities of democratic government with the requirements of intellectual freedom, *Government and Science* is an indispensable source of insights, knowledge, and clearly defined issues. The author quite properly admits that he does not have all the answers, but he is certainly an expert in asking the important questions.

Vannevar Bush, commenting in the *New York Times Magazine* (13 June 1954) on the effective working partnership developed during World War II between professional men and officers of government, remarked that "This partnership, so essential to our future safety, has been gravely damaged and is being gradually destroyed." We are, apparently, in urgent need of more Don Prices to help us acquire, before it is too late, the political genius and administrative wisdom to recreate on firm foundations the effective and essential partnership of free science and free government in a democratic society.

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Proceedings of the Second International Congress on Rheology. V. G. W. Harrison, Ed. Academic Press, New York; Butterworths, London, 1954. ix + 451 pp. Illus. $10.

The many interesting papers contained in this excellent volume defy any unified description. Perhaps the best a reviewer can do is to quote from the presidential address by G. I. Taylor.

> When I was asked to preside at this congress of rheologists my immediate reaction was that I am so ignorant of the details of your work that I should feel like a sheep in a lion's den if I accepted; but when I considered the immense field covered by the term "rheology," I realized that many of you must be in much the same condition as myself. Rheologists who study creep and plasticity in metals for instance might well fail to pass with any credit an examination in the properties of non-Newtonian fluids.

Six general lectures are included: "Sur l'effet electrovisqueux qui se manifeste dans les suspensions colloidales" by A. Dobry, "Rheological problems in the fabrication of plastics" by R. S. Spencer, "Rheology and applied mechanics" by R. N. J. Saal, "Rheologisches Verhalten und molekulare Platzwechselmechanismen" by F. H. Müller, "Water association and hydrogels" by E. Forslind, and "Some rheological problems in biology" by P. Eggleton. These are followed by 22 papers on high polymers, 19 on viscosity and plasticity, three on biology, and five on oils and greases. A mere listing of the titles would more than consume the space available for a review. The general comments that can be offered are few indeed. One is that

metals do not receive sufficient attention; only two papers have the word metal in their title, and only a few of the other papers are relevant to a study of metals. Another comment is that there is strong evidence in this book of the tendency among rheologists to adopt broader points of view instead of solving very specialized problems with special techniques. For this reason all rheologists will gain by a perusal of all sections of the volume.

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Vapor Pressure of Organic Compounds. T. Earl Jordan. Interscience, New York–London, 1954. ix + 266 pp. Plates. $14.50.

The chemical engineer will find this huge compilation of vapor pressure data useful since it is possible to read the vapor pressures of 1492 organic and organometallic compounds to about ±1 percent from 168 well printed charts that constitute the heart of the book. These charts are supported either by equations or by references to 1145 tables of vapor pressure-temperature points. Unfortunately the book will not be of much value to physical chemists or to engineers who desire to make their own evaluations. There is no indication whether the tables of values refer to calculated or observed values although most of them contain calculated or smoothed results; and since the author has relied on secondary references to a major extent, his book does not provide a guide to the original literature.

The one page of text and a short preface emphasize that fact that the book is a summary of data, in fact, largely a summary of summaries, but no criterions of judgment are mentioned except graphical examination.

Comparison with D. R. Stull's compilation [*Ind. Eng. Chem.* 39, 517 (1947), reprinted in alphabetical order in *Chemical Engineers' Handbook,* J. H. Perry, Ed. (McGraw-Hill, New York, 1950)] of the evaluated vapor pressure data on over 1200 organic compounds and about 300 inorganic compounds is inevitable because Stull's collection is easily available and Jordan has reproduced 908 of Stull's tables verbatim. This is unfortunate because these values contain noticeable errors just below the normal boiling point, owing to a flaw in Stull's original chart; it would have been better if the basic data had been reworked or at least checked before such an extensive reprinting.

It is impossible to make more than spot checks on the values themselves. However, for 1,2-dibromoethane between 0° and 50°C we have a choice of two equations and the chart, but no two of them agree or even cross. At 10°, one equation gives 4.7 mm, the other 5.9 mm, and the chart 6.6 mm. At 50°, the three values are 42.3, 43.4, and 46.0 mm, respectively. The chart for tetraethyl lead (pl. 3, not 2) is said to be based on the work of Buckler and Norrish (0.056 to 6.3 mm) and on Stull's calculated values based on the same experiments. However the chart line does not correspond to Buckler and Norrish's equation but has a much smaller slope, and their experimental points lie 12 to 25 percent below the chart line. The author also missed the four points at 10, 13, 19, and 290.5 mm by W. J. Jones *et al.* [*J. Chem. Soc.* (London, 1935), p. 39].

Several other examples of this essentially noncritical treatment were evident on close examination of the tables and charts. Since the ordinate scales of the charts are linear with the logarithm of pressure and the abscissa scales are linear with reciprocal absolute temperature, a gentle curavature is expected for the plots of all but very low boiling point compounds. Instead, there are one or more straight lines per compound, sometimes with a disconcerting change of slope (for example, benzene at 100 mm on pl. 7).

In conclusion. I feel that the book has little utility, for the physical chemist and chemical engineer are better served by existing compilations, and the organic chemist dealing with relatively unknown materials will profit by the use of Dreisbach's book [*P-V-T Relationships of Organic Compounds* (Handbook Publ., Sandusky, 1952)] of vapor pressure estimates rather than by attempts to interpolate estimates based on Jordan's charts.

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Tissue Culture as Applied. Especially within bacteriology and immunology. Ren Kimura. Munksgaard, Copenhagen, Denmark, 1953. 273 pp. Illus. Danish Kr. 14.

This review is designed to summarize some 260 papers published by Kimura and his associates from the Microbiological Institute of Kyoto University. The procedure is to cite first the pertinent literature available prior to World War II, and then the findings in Kimura's laboratory. The broad range of subjects includes: culture mediums and techniques; pure cultures of tissue cells, cultures from various organisms and from malignant tumors; morphology, metabolism, vital staining and phagocytosis; and bacteriological and immunological studies.

Two general areas (factors influencing growth and immunological studies) encompass the major work of this laboratory. The factors studied for their influence on growth were temperature, desiccation, osmotic pressure, ionic concentrations, chemotherapeutic compounds, antibiotics, radiation, homologous and heterologous blood plasma, organ extracts and hormones, and vitamins. Immunological observations include the effects on cells of bacterial toxins, venoms, viruses, Rickettsiae, and cytotoxins. Antibody production has also been studied. Kimura's encyclopedic assembly of observations serves to point out topics on which experiments have been conducted but does not attempt to evaluate the implications of the findings.

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