Book Reviews

E. W. R. Steacie and Science in Canada

Science in Canada: Selections from the Speeches of E. W. R. Steacie (University of Toronto Press, Toronto, Canada, 1965. 208 pp., $5.95), edited by J. D. Babbitt, presents only one phase of Steacie's contributions to science—that of his leadership in the administration of science in Canada and in international areas. Of necessity such a compilation must omit a review of his contributions to basic science, but these contributions have been more fully covered in other vitae concerned with his various honors and awards. All too often the scientist's vita involves only an abbreviated summation of his technical papers and books, and seldom does one have such a clear presentation of a leading scientific administrator's philosophy and of his objectives in the coordination of science with political and social orders as that which Babbitt presents in this volume.

Steacie's accomplishments as a physical-organic chemist are well recognized and documented in his approximately 200 technical articles and several books dealing with atomic and free-radical reactions, photochemistry, thermal decomposition, and photosensitive reactions. It is most useful to have this other side of Steacie's activities collected into a compact and easily accessible form. The parameters of administrative and social concepts with regard to science are less well defined than Steacie's purely scientific contributions, so many readers may find that they are not in full agreement with all of his positions, but one must admire his consistency with respect to a position, combined with his ability to adjust to the situation at hand.

We admire his ability to preserve the scientists' "freedom," while remaining an employee in a governmental laboratory. At the same time we observe with regret that, all too often in the United States, our solution to this problem has been to transfer the government laboratories and personnel to universities and industry on the grounds that civil service does not provide the proper atmosphere for free research. In neither case has the "solution" really effected an improvement of civil service which permits this research freedom, although the way in which Steacie, as president of the National Research Council of Canada, treated the problem is a close approach to the satisfactory solution.

Babbitt and his associates have made an excellent selection of many parts of Steacie's speeches and papers so that they present a coherent narrative of his ideas and of his philosophy. Scientists in Canada, like those in the Scandanavian or Benelux areas, do not have to be concerned about a quantitative superiority in numbers or amount of money spent, but rather can be oriented toward a quality program. It is obvious from his writings that Steacie enjoyed being able to demonstrate that limited size in science provides for efficiency of operation. In many cases, the methods of organizing and directing science which he and his associates have successfully devised and put into practice have been urged as a possibility for use in other major areas of science, but they have been rejected as involving too great a risk to allow one to experiment with them or to try them out.

His approaches to the equivalent of a national department of science—that of coordinating university grants, fellowships, and government-sponsored research—have shown the practical success of such a philosophy. One might take issue, however, with his philosophy that research should be free and nonobjective to the extent of denying the funding agency the right to determine the amount to be expended, the groups with whom the work should be coordinated, or the area of science in which the work is to be done.

Steacie's views on approaching ceilings in the supply of scientists and engineers, the need for a quality improvement program in scientific education, and the disproportionate emphasis on physics compared with chemistry are similar to the positions of other scientists today.

After reading these selections from his speeches and writings, those who knew Ned Steacie during his lifetime (1900–1962) will feel that they know him even better. The carefully selected passages or complete speeches present a sequence of viewpoints that leads to a well organized discussion on science in relation to public policy and society. It is, in fact, of considerable interest to note that science in Canada has had to face many of the problems that we in the United States are facing today and that in many cases differing solutions have been tried with equally differing degrees of success.

At times we have considered that owing to its gigantic size our scientific nation required a treatment different from that suitable for smaller scientific groups, but Steacie's experience would indicate that one might extrapolate within our tenfold difference or that we might treat the problem in many of our states as separate units of a larger combination.

Steacie's close relationship with the International Council of Scientific Unions (he was elected president in 1961) and with the United States and many other nations gives a more international flavor and attitude to his philosophy. The final papers in this volume are concerned with the problems of international science. These provide a fitting conclusion to a review of the administrative phase of a most influential career in science.

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Alkaloid Chemistry

According to the author's preface, this sequel to part 1, which was published in 1957, was prepared partly as a rebuttal to a review in which Wenkert criticized the omission of several groups of alkaloids [*J. Am. Chem. Soc.* **80**, 2030 (1958)]; and mainly because he wanted to incorporate newly elucidated structural data to complete the earlier volume. In this book, **The Alkaloids**, part 2

[Interscience (Wiley), New York, 1965. 267 pp., $6.75], K. W. Bentley considers the basic chemistry, and within each group the structural interrelationships, of imidazole, quinazoline, pyrrolizidine, amaryllidaceae, steroid, lycopodium, and diterpene alkaloids. More recent advances in the chemistry of the indole group are also outlined.

A volume that was published almost simultaneously, volume 8 of R. H. F. Manske's series, *The Indole Alkaloids* [reviewed in *Science* **151**, 317 (1966)] covers much of the same ground as Bentley's book. However, despite this overlap, the second part of *The Alkaloids* is a most welcome addition to the pedagogical armamentarium in alkaloid chemistry, particularly because, in this part as in part 1, the author strikes to the heart of the degradative and synthetic stages which were employed in the structural determinations of these natural products. This book will therefore be most useful to graduate students in chemistry, to biochemists, and to other nonspecialists in the art of alkaloid chemistry who wish to obtain a rapid insight into the structures and reactions of representative members of the foregoing groups. In conjunction with this clear and purposely nondetailed delineation of alkaloid chemistry, hand-drawn formulas are used throughout the book. This unusual presentation, which was also used in the previously published volumes of this particular series, makes the assimilation of natural-product chemistry much easier and actually prolongs the attention-span of the reader.

A final chapter, concerned with the biogenesis of alkaloids, completes the text. The author continues largely to ignore the considerable body of isotopic tracer work that has been carried out. Hence this chapter looms as a disappointment to the chemist who is seeking a résumé of this field. Fundamental experimental studies on gramine, ajmaline, ibogaine, and morphine biosynthesis from smaller labeled precursors, and the polyacetate route to coniine, for example, are excluded in favor of considerable "graphite-cellulose" chemistry with formaldehyde, prephenic acid, dopa, and tryptophan. Thus, the opportunity to modernize the Schöpf-Robinson approach of the comparable chapter of part 1 has been missed, and the content of this particular chapter mars an otherwise excellent up-to-date teaching text.

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Wheat: A Comprehensive Treatment

Wheat: Botany, Cultivation, and Utilization [Leonard Hill, London; Interscience (Wiley), New York, 1965. 448 pp., $16], by R. F. Peterson, covers almost everything having to do with wheat. To do this in fewer than 400 pages of actual text is no small achievement, considering the fact that wheat is, with the possible exception of rice, the most important plant in the world. Of necessity the coverage is not exhaustive, but it is adequate.

To understand the botanical portion, which includes taxonomy, morphology, physiology, cytology, genetics, and evolution, the reader is not required to have a background in botany. The author even explains what chromosomes and genes are and how radiocarbon dating is accomplished. Although emphasis is placed on recent findings, a conservative viewpoint is maintained. For example, the still controversial proposal to include all the wheats in just three species, according to chromosome number, is discussed favorably but not followed. I noted only one significant error—the speltoid effect is attributed to the gene Q rather than to its allele q and the locus is assigned to chromosome 5D instead of to 5A.

In the section on production (including also diseases and breeding), the types and varieties of wheat, the methods of production, and the conditions affecting production are given for all the wheat-growing countries of the world. In an interesting aside, the author discusses Lysenkoism and the detrimental effect it has had on wheat breeding in Russia.

Under utilization are treated storage, nutritional aspects, milling, and marketing. As in the other sections, there are many excellent illustrations, mostly photographs, well chosen and well reproduced. A concluding chapter very briefly summarizes the book and calls attention to the anomaly of bothersome wheat surpluses in some countries and hungry people in others, with suggestions for alleviating this unhappy situation.

This book is well organized, well written, and authoritative. It should be of value to general readers and students, and particularly to wheat specialists who wish to round out their knowledge of the plant with which they work.

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Cultural Anthropology

The 24 essays collected in **Culture and Society** (University of Pittsburgh Press, Pittsburgh, Pa., 1965. 388 pp., $7), by George Peter Murdock, are a distillate of the research and theory of a major figure in contemporary American anthropology. Trained initially as a sociologist in the Sumner-Keller tradition at Yale, Murdock brought to anthropology a strong commitment to the comparative method, an insatiable curiosity about the wide range of patterned human behavior, and a keen sense of problem. The articles presented here evidence these characteristics and, perhaps even more, the theoretical stimulation achieved through the author's participation in the interdisciplinary atmosphere of the Yale Institute of Human Relations. As a consequence of the latter experience, Murdock came to consider himself a behavioral scientist with a specialization in anthropology; this orientation is reflected in much of his research on social organization and the dynamics of culture change.

The six sections into which the book is divided provide a roughly accurate classification of the problem areas of concern to the author. The sections are Anthropology and its Sister Disciplines; The Nature of Culture; Dynamics of Cultural Change; Social Organization; Religion, Ceremonial, and Recreation; and Cross-Cultural Comparison. A partial list of the topics discussed in particular papers illustrates Murdock's breadth of interest: waging baseball on Truk; anthropology and public health; political moieties among southeastern American Indians and North African Berbers and in modern democratic states; universal features of culture;