or profit margins to be sought), the allocation of resources, personnel promotions, and so on are shared or could feasibly be shared by all organizational levels in a significant fashion.

In view of these attributes and the concern to maximize productivity, a cynical critic might dismiss this book as Establishment; but I think that would be unfair and neglectful of the constructive and evolutionary directions implicit in this work. I think Likert is helping to develop in this field, particularly among those who are psychologically oriented, greater sensitivity to the significance of group structure and to the necessity of finding ways of institutionalizing innovation and openness. In the evolution of social science, this may well mark the beginning of important breakthroughs, both in our understanding of human action and in the liberation of new energies in society. The turn of the century saw such breakthroughs in the personality sector, particularly with Freudian theory and psychiatry. The '40's and '50's saw similar developments at the small-group level, with sensitivity training and group therapy leading the way. Perhaps the changes occurring these days in the relationship between students and universities or schools and communities signal the beginning of parallel achievements at more collective levels. The work of Likert and his colleagues should provide one suggestive base out of which may come a sound blueprint for the liberation of men within their organizations and society.

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Radiobiology

Actions Chimiques et Biologiques des Radiations (The Chemical and Biological Action of Radiations). 12th series. M. HAÏSSINSKY, Ed. Masson, Paris, 1968. iv + 340 pp., illus. 148 F.

Six contributions from well-known radiation researchers comprise this 12th volume assembled by M. Haïssinsky. As in previous volumes in this series, the topical material is broad.

The papers are arranged roughly in the order of increasing biological complexity. The influence of water in modulating radiation effects, mainly in microbes, is discussed by E. L. Powers and A. Tallentire; H. S. Kaplan deals with radiation-induced inactivation of bacteria and phage; A. H. W. Nias and L. G. Lajtha discuss the influence of radiation on cell kinetics; J. Read reviews repair mechanisms in bacteria and unicellular organisms; J.-F. Duplan analyzes the immunology of radiochimeras; and M. Tubiana and A. Wambersie are concerned with tumor therapy and related radiobiological findings. The book has an international flavor, since the first four contributions are in English and the last two in French.

For a number of years Powers, Tallentire, and their associates studied the dependence of the killing of bacterial spores on the gaseous environment. More recently their studies have been extended to the influence of water content, and along with their own results they review those obtained with vegetative cells such as bacteria and yeasts, and more complex systems such as plant embryos and brine-shrimp eggs. The extent to which O_2-dependent inactivation is influenced by moisture is impressive and indicates that radical formation and quenching play an important role in wet systems. While it is true that the applicability of the approach of these authors is limited to systems which can survive dehydration, the likelihood that their conclusions may have more general applicability should not be overlooked.

Questions of generality also arise in regard to the departure taken by Kaplan. His underlying thesis is that double-strand breaks, in the DNA of bacteria and two-stranded phage, are the principal cause of radiation inactivation and probably of mammalian cell killing as well. Although radiation produces many single-strand breaks, these are lethal only in single-stranded phage and possibly in those bacteria which lack single-break repair systems. A considerable quantity of data in support of this hypothesis is reviewed; in most instances, but not all, the evidence is internally consistent and impressive, particularly as it pertains to bacteria and phage. For more complex cells, such as somatic mammalian cells, the picture is not at all as clear, although in view of the central position, and therefore the biological amplification, available to the genome of a cell, damage registered therein is very likely to be important. Aside from function, differences in the structure, replication, and means of expression of the genetic material of mammalian cells as compared to bacteria and phage may underlie their differences in response to radiation.

An ultimate relevance of questions of mechanisms comes out in the chapter by Tubiana and Wambersie. These authors address themselves to the real life question of cancer treatment, earnestly seeking ways of improving radiotherapy by means of radiobiological studies. They review the principal findings available thus far—findings which in the main were not known 15 years ago—and identify many of the complexities that face the therapist. The chapter on cell kinetics by Nias and Lajtha complements well these considerations. For scientists and physicians more comfortable with French than English, this chapter in French will be of particular value, since most of the studies reviewed were originally published in English.

In the tradition of annual reviews, Haïssinsky's 12th volume is diverse and timely.

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The Uses of Insects

Insects and Physiology. Essays presented to Sir Vincent Wigglesworth on his retirement from the Quick Chair of Biology and Directorship of the Unit of Insect Physiology in the University of Cambridge. J. W. L. BEAMENT and J. E. TREHERNE, Eds. Elsevier, New York, 1968. viii + 378 pp., illus. $25.

Nature in its bountiful goodness has provided more species of insects than of all other animals and plants combined. This great diversity is not without its uses. For every biological problem there is an insect to serve as the ideal experimental animal. Sir Vincent Wigglesworth, early in his career, discovered the endless potential of insects for biological study. This amazing man soon became the father of modern insect physiology. His knack of asking the right questions concerning the physiological problems into which he delved quickly brought respect from his contemporaries. Sir Vincent in one way or another has inspired many men. It seems that those who have been privileged to study under him have been touched in some special way to make great contributions of their own.

Twenty-three of these scientists pay tribute to Sir Vincent by presenting in this volume a series of essays showing that insects are ideal subjects for elucidation of principles of general biology.