tion, but its proceedings do not. This monograph will appeal mainly to those interested in radiochemical processes either because they themselves are specialists in one or another aspect of radiochemistry or because as biologists they are willing to make the considerable effort required to develop an overview of present-day radiochemical research. To both groups, the biology may be of interest, but there is not enough of it to justify the price of admission.

Among the principal chemical topics taken up, the solvated electron quite reasonably occupies a considerable amount of space. Since the demonstration of its existence by Boag and Hart some six years ago, research involving this short-lived species has led to renewed vigor in chemical studies directed toward biological questions. Reviewed as well are studies of organic semiconductors, radiation transformation of organic compounds, irradiation-produced thermoluminescence, mechanisms of energy transfer in and between molecules, radiolysis of dyes, and radiation effects in carbohydrates and cellulose. The biological topics include damage and repair mechanisms related to replication in phage and bacteria and effects of radiation in connective tissue, blood vessels, heart muscle, and the eye. Significant degenerative changes in the condition and functioning of these structures after moderate doses of radiation are reported.

One might suppose, from the title *Energetics and Mechanisms in Radiation Biology,* that the contributors to this volume have identified and discussed those specific radiochemical processes that are responsible for at least an appreciable number of biological effects. Titles, by their nature, are often too brief to be adequately informative, but still it should be noted that this one implies a state of understanding that does not as yet exist. To be sure, many of the reactions and processes reviewed very likely do play a role in a number of biological effects. But regrettably it is also true that mechanisms of fundamental and general importance remain unidentified—a fact which reflects how numerous the reactions attendant upon the initial absorption of radiant energy are.

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Regeneration

Principles of Regeneration. RICHARD J. GOSS. Illustrated by Louise Russell. Academic Press, New York, 1969. xii + 292 pp. $11.50.

This book deals with regeneration of missing parts of organisms. General principles are sought as the author leads one through the best-studied cases. The cases range from replacement of major parts of the cell in single-celled plants and animals through replacement of major parts of the body in certain invertebrates to replacement of such things as lenses, jaws, parts of the brain, and appendages in fishes and amphibians. The final case is that of regeneration of horns and antlers. In many animals any part can be regenerated provided its removal does not kill before regeneration can occur.

Most of the book is devoted to experiments on regenerates. For example, in attempts to learn what information passes from a salamander's limb stump to a regenerate arising from it, various structures have been added to or subtracted from the stump. If a hand and a longitudinal half of the limb stump are removed, so that only half of a stump is left, the regenerate is usually only half of a hand. However, if half of the internal structure of the stump is removed but the skin is left whole the regenerate will be a complete hand. By such manipulations at the tissue level a considerable amount has been learned about the operation of fields of regeneration. The experiments and the results are clearly described. One gets a clear picture of the status of the problems, and many readers will be able to think of further experiments that might improve our understanding.

One thesis pervades the book. Regeneration is a fundamental property of life. The ability to regenerate has been lost in many parts of many organisms. In the course of evolution it has often been of survival value to acquire some physiological advantage which precludes regeneration. Whether the ability can be restored in a particular case will depend on our knowledge of the physiological change.

This book should appeal to many who want an introduction to the subject. To others it would be of value as a refresher because it covers the most modern as well as the older work.

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(Continued on page 474)