not always be studied and some fundamental intermediates, such as trapped excess electrons, are most readily trapped in glassy solids.

This book deals comprehensively with free radicals formed by ionizing radiation, principally in disordered organic solids. It is thus a useful catalog of data in a wide variety of organic systems. The book covers references only through July 1971, but it still is quite useful because the EPR spectra produced in various organic solid systems are often still incompletely interpreted. The bulk of the book is composed of chapters on small atomic and polyatomic radicals, alkane, alkene, alkyne, and aromatic hydrocarbons, a variety of monofunctional organics, and a few binary mixtures, with a good survey of polymeric radicals produced by ionizing radiation. In addition, one chapter summarizes the basic principles of EPR, and specific radical-formation mechanisms involving ionizing radiation and radical decay mechanisms and kinetic characteristics are discussed in separate chapters.

One of the distinctive features of radical formation by ionizing radiation is spatial nonuniformity. This feature largely reflects the inhomogeneous nature of radiolytic energy deposition, but it also depends upon specific chemical reactions involving radiolytic intermediates. It has been studied by measuring local concentrations of radicals in the vicinity of a radical site and comparing these with sample average concentrations. Local concentrations have been determined by dipolar broadening in a few cases and more generally by absolute or relative measurements of spin-spin relaxation times. It is commendable that this important aspect of the subject is treated in this book but unfortunate that the various experimental methods for determining local concentration, which are probably unfamiliar to the average reader, are not discussed in detail or compared and evaluated. The tabulation of data on local concentration measurements seems incomplete, and the Russian work of Tsvetkov and co-workers utilizing the electron spin echo method to study inhomogeneous spatial distributions is largely neglected.

The treatment of radical decay phenomenology is rather comprehensive, although no generalized theoretical understanding of the decay of radicals produced in disordered solids by ionizing radiation has yet been reached. Useful tables give the temperatures at which radical decay appears to be most rapid in a variety of organic matrices together with some information on matrix transition temperatures for various types of internal motion. In nonpolymeric systems there is generally one temperature region in which most of the radicals decay rather rapidly, whereas in polymeric systems there may often be several such regions. Much of the work on these regions has been done in Russia, and the literature coverage seems quite good. A related question concerns the kinetics of the radical decay. In only a few cases are the kinetics simple first or second order. Usually as the temperature is raised a stepwise decay occurs that can be interpreted as a superposition of a number of independent first-order decay processes.

Overall, this book is a useful compendium of data and references, and the coverage of the Russian literature is comprehensive. There is a useful index of formulas both of compounds that have been irradiated and of radicals that have been produced. This is a book to which researchers in the field should have access.

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Mendelian Genetics of Plants

Genetics of Flowering Plants. VERNE GRANT. Columbia University Press, New York, 1975. xiv, 514 pp., illus. $20.

The second half of the 20th century opened with the discovery that nucleic acids, rather than proteins, are the genetic substance. Soon thereafter, the physical structure of DNA was determined and the field of molecular genetics was born. During the next 15 years molecular geneticists worked out the basic mechanisms of gene action and gene control, discoveries that stand among the most important in biology. One of the keys to their success was the choice of the simple bacteria and viruses as experimental organisms. This had the unfortunate consequence, however, that genetic research, especially the nonmolecular aspects, on the more complex eukaryotic diploid organisms, both plants and animals, was somewhat neglected. Higher organisms present problems of genic and chromosomal organization and of development that cannot be solved solely with insights derived from viruses and bacteria. Furthermore, evolutionists, population geneticists, and population biologists are interested not so much in gene action as in the inheritance of phenotypic characters.

Higher plants are the best experimental material for the investigation of certain genetic phenomena, such as cytoplasmic inheritance or chromosome structure and behavior, and they present unique problems of their own, such as self-incompatibility in hermaphrodite species and polyploidy. The genetics of flowering plants has not been covered comprehensively since Sansome and Philp's *Recent Advances in Plant Genetics* was published in 1939. It also has been slowly crowded out of general genetics textbooks. Whereas, for example, in Sturtevant and Beadle's text of 1937 a third of the space was devoted to the genetics of plants, recent textbooks devote less than a tenth to plants, and that mostly to corn and *Neurospora*. Consequently, the arrival of a work devoted entirely to the genetics of plants will be welcomed by a great variety of plant scientists.

Verne Grant has done a fine job in updating the knowledge of the genetics of flowering plants. The approach of the book is didactic. It starts with a discussion of genes and genetic phenomena related to single genes and works up to functional gene systems, then to chromosomes, and finally to the function of the entire genetic system. Each chapter consists of a description of the phenomena under discussion, the experimental evidence, and a brief theoretical interpretation. A big effort is made to link simple factors with more complex phenomena. Although the book is not intended to be a review of the literature, the most important genetic papers are discussed in detail. Old and new experiments, from Mendel's classic pea experiments on, are blended adroitly, so that the reader acquires a fine sense of the historical development of the field, its ideas, and its personalities as well as a clear impression of its present state and its major problems.

This is not a textbook, and it will be incomprehensible for a total neophyte. However, it does not assume genetic expertise. It will be particularly useful to biologists working in evolution and ecology who want to become acquainted or reacquainted with some or all aspects of plant genetics.

The emphasis of the book is entirely on Mendelian genetics. This is probably the weakest point of the book. For a generation of biologists brought up in the belief that genetics is the most unifying biological subdiscipline, Grant's stated belief that classical—or neoclassical—genetics and molecular genetics are two entirely different fields of endeavor within biology will sound surprising.

Cost considerations in these days of inflation played no doubt the dominant role in the selection of typography and paper. It is nevertheless to be mourned that the publishers could not have come up with a better-made tome.

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