in both the preface and the summary. Central to the problem of implementation is the shortage of pest management personnel who can work effectively with growers. Both a formal presentation and a panel discussion were addressed to the task of training such people, but the only concrete proposal presented was a program designed to produce more specialists with advanced degrees in pest management. An advanced degree should not be a requisite for doing practical work in this field, and there should be no insurmountable problems in training people at the baccalaureate level to be field advisers who can sell pest management programs as effectively as salesmen for agricultural companies sell pesticides. Until such people are trained and working in the field, the pest management movement, at least in this country, will unfortunately remain in its present position as a topic of theoretical research rather than a practical and widely used alternative to broadcast spray programs.

PETER F. BRUSSARD
Section of Ecology and Systematics, Cornell University, Ithaca, New York

A Chemical View

Chemistry of Pesticides. N. N. MELNIKOV. Translated from the Russian by Ruth L. Busbey. Frances A. Gunther and Jane Davies Gunther, Eds. Springer-Verlag, New York, 1971. xii, 480 pp., illus. $19.80.

It is evident that Russian and European traditions are similar in one way that differs importantly from the American: they have supported a breed of "pesticide chemists" who are a subculture of the "agricultural chemists." Neither group is common in the United States, where specialization in individual domains such as "insecticides" or "herbicides" is common, and where at the biological end of training specialization is universal: a phytopathologist who understands insecticides is a rare bird indeed. In the American chemical world there is somewhat more catholicity, especially where the needs of industrial chemistry drive individuals to know something of the synthetic aspects of more than one group of pesticides.

For these reasons, the obvious comparison to make (dealing only with the literature in English) is with Hubert Martin's famous book *The Scientific Principles of Crop Protection*. Melnikov's editors say in their preface that the book "represents a thoroughly modern but concise summary of the basic principles of practical pest control by chemical means" and in this way suggest a strong comparison with Martin's book. But Martin (who is a chemist) dealt rather extensively with the actual use of the pesticides in practical agricultural problems, and also gave a great deal of information about the mode of action of the agents. Melnikov's book is uncompromisingly chemical, and its title is highly accurate. For instance, the organization of the book is almost exclusively chemical: 29 of the 31 chapter headings are of the type "Derivatives of urea and thiourea" or "Halogen derivatives of aromatic hydrocarbons," so that DDT is rather humbly relegated to six pages (in a 480-page book) in the latter chapter. The two other chapters are a very general introductory chapter and a good chapter on pesticide formulation.

Because of this stress upon chemistry, the questions of biochemical action and of metabolism are touched on very lightly. Thus in the pages on DDT, its metabolism is not mentioned and nothing is said about the mode of action except that it "has not been determined" (which may be an accurate summary, but which ignores the considerable amount that we do know about the way it acts), but a half page is given to a table of the solubility of DDT in 27 different solvents. Similarly, the many organophosphates described individually (in a 62-page chapter) have their synthesis and physical properties given in detail, but their metabolism mentioned seldom, and then without discussion of the relative importance of the several routes indicated. By contrast, the discussions of the empirically observed variations of potency with structure are often quite extensive and useful. Toxicity data are given with useful frequency, but quite often important facts are omitted, such as the route of administration or the organism employed.

It is very unfortunate that references are omitted entirely except for "general references" following each chapter. Sometimes (as in "Organic mercury compounds") these are all Russian references, of small use to English readers. Happily the subject index is extensive (31 pages) and reliable. The translation is immaculate.

In summary, this really is a book for chemists, and provides a valuable and encyclopedic reference about the chemistry of all the major pesticides used in the world. The coverage is virtually total. It will therefore be an excellent reference book for all chemists dealing with any aspect of pesticides. It is not a book that one sits down to read for general interest, and the translators cannot be serious when they suggest its use for "the beginner who needs a 'comprehensive survey.'"

R. D. O'BRIEN
Division of Biological Sciences, Cornell University, Ithaca, New York

Growth and Morphogenesis

Regeneration. Key to Understanding Normal and Abnormal Growth and Development. S. MERYL ROSE. Appleton-Century-Crofts, New York, 1971. xii, 264 pp., illus. $7.95.

"This book is in a sense a synopsis of the science of polarized control of growth and morphogenesis," the author writes. Using as a basis lessons learned from the study of regeneration, he develops several themes relating to the initiation and control of developmental processes. Predominant among these is the concept of a hierarchy of differentiation in which the first structure to appear in a developing system inhibits the subsequent differentiation of like structures along well-defined lines of polarized control. Rose supports this concept with examples of repression of the regeneration of normally dominant or apical structures such as the lens in the newt and hydranth primordia in *Tubularia* by material extracted from the adult structure. Rose has also extended this concept to embryonic development, and along with describing the inhibition of differentiation of specific structures by products taken from their adult homologues, he offers an alternative explanation, based upon inhibition, to the results of Spemann's transplants of the dorsal lip of the blastopore and to much of embryonic induction in general.

Inhibition and the eventual morphogenetic equilibrium must be constantly communicated to the organism as a whole, and throughout the book Rose describes systems in which pathways of inhibitory communication have been demonstrated. In several chapters dealing with regeneration of worms and the amphibian limb and with morphogenesis in Protozoa and plants he points out how the initiation and cessation of sec-