Zoonosis

Rabies. Proceedings of a conference, Tokyo, Oct. 1970. YASUITI NAGANO and FRED M. DAVENPORT, Eds. University Park Press, Baltimore, 1972. x, 406 pp., illus. $18.50.

The breadth of the conference whose proceedings are published in this volume is notable, its contents ranging from presentation of the history of rabies in Asia to discussion of related viruses from Africa. Immunization of animals and man is discussed, with emphasis on the newest concepts of vaccines and techniques for production, and diagnosis, epizootiology, and control also receive attention. The pertinent discussions of the various papers are included and add depth to the proceedings. Many of the recognized authorities on rabies from North America were among the participants.

To single out papers for favorable comment is difficult. The majority are excellent. Tierkel's historical review tracing rabies in Asia from the 23rd century B.C. to the present is an example and sets the pace for those that follow. Ishii's chapter on diagnosis by complement fixation test is thought-provoking, since this test is not commonly used in North America. H. N. Johnson's discussion of the epizootiology of rabies documents many interesting episodes that illuminate the cycle of the disease in wild animals. His accounts of rabies events in the 19th century in America are of particular interest. These emphasize the role of the mustelids (skunks) in the epidemiology of rabies in wild species in the western part of the United States and their importance as sources of human infections. Humphrey's paper "Field control of animal rabies" presents in detail the development and results of a good state control program and discusses the various pitfalls encountered along the way, illustrating the problems of canine rabies control in adjacent areas under different jurisdictions and the problems of wildlife control. Sikes's data on dog vaccines documents the efficacy of the modified live virus vaccine grown in tissue culture.

I detected only a few typographical errors, and the editors have been able to maintain a very readable style throughout.

This volume is essential for all veterinarians, especially those with official public health responsibilities, and for all others interested in one of the most dreaded of the zoonoses. It is "one of a kind" on the subject of rabies in recent years, and this alone makes it a significant contribution, but the content is sufficiently good that it may be highly recommended on its intrinsic merit.

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Grasshopper Research

Proceedings of the International Study Conference on the Current and Future Problems of Acridology. London, July 1970. C. F. HEMMING and T. H C. TAYLOR, Eds. Centre for Overseas Pest Research, London, 1972. xvi, 534 pp., illus. £9.50.

The history of locust pests is a long one, dating back at least to biblical times. Although a great deal has been learned about these insects in recent decades, predicting the location of outbreak areas remains exceedingly difficult and understanding of environmental conditions which promote development of migrating swarms is rudimentary. Fifty years ago the renowned grasshopper systematist and ecologist Sir Boris Uvarov founded a locust control and eradication center in London which was known until recently as the Anti-Locust Research Centre. From its inception the ALRC was instrumental in initiating and encouraging a wide spectrum of research on grasshoppers and allied taxa and in integrating international cooperation in antilocust activities. Recently this organization merged with several similar British pest research organizations (Tropical Pesticide Research Unit, Tropical Research Headquarters, and Termite Research Unit) to form the Centre for Overseas Pest Research. The COPR continues to carry out research on locusts. On the theory that an effective control program demands more than a superficial understanding of the biology of pest species, all aspects of pest biology (including population structure, migration, polymorphisms, reproductive physiology, behavior, and systematics) have been under investigation.

Periodically, international conferences on locust control are held, sometimes under the sponsorship of the Food and Agriculture Organization of the United Nations. The latest of these conferences was convened to mark the Silver Jubilee of the ALRC and has resulted in the book which is the subject of this review. Unlike previous conferences, this one is characterized by wide coverage of locust biology and by the inclusion of papers which may seem only remotely relevant to control of pest species. A number of papers are presented by biologists who would probably consider themselves to be problem biologists rather than grasshopper specialists. Consequently, this book will be of interest to a wide variety of insect biologists, but especially to those working in insect physiology, behavior, and ecology.

The papers are arranged into six major sections: taxonomy, physiology and behavior, acridids as pests, population studies, chemical and biological control, and organizational problems.

The participants of the conference have recognized the fundamental importance of taxonomy and the shortage of specialists capable of making faunal surveys, especially of taxonomically neglected areas of the world. They recommend that tropical and subtropical areas undergoing rapid agricultural development be given priority in the preparation of taxonomic lists, since the extinction of diverse and evolutionarily interesting species would be most likely to occur there. No recommendations are made, however, on how the number of specialists is to be increased. A listing is given by Descamps of areas of the world and grasshopper taxa that are poorly known systematically and that are believed to deserve greater attention by specialists. Curiously, three of the five speakers in the section on taxonomy fail to appreciate the value of examining ethological isolating mechanisms in differentiating between confusingly similar species, a problem that continues to plague acridid taxonomists. The other two speakers scarcely mention the use of behavior and ecology in taxonomy. This situation seems rather archaic in view of the proven usefulness (in some cases necessity) of examining premating isolating mechanisms in alpha-taxonomy.

The chapters on reproductive physiology and behavior, especially as they relate to phase polymorphism, are reasonably extensive. The matters discussed in this section include locomotory activity, food selection, pheromones, and hormones. Several participants recommend increasing the integration of laboratory and field studies, perhaps by interdisciplinary teams, and call for more detailed analyses of behavior and for longer-term studies of field behavior in order to build up a comprehensive

picture of acridid behavior and the underlying mechanisms involved. Integration of this kind is probably rarely achieved by teamwork. Perhaps the most we can hope for is the emergence of another Sir Boris Uvarov.

Several particularly interesting aspects of physiology and development are presented in this section. Ellis, for example, summarizes the evidence that phase transformation in *Schistocerca gregaria* requires several generations; since the eggs of crowded females are larger than those of solitary females, and since the rearing conditions of the fathers are immaterial, one assumes that the phase transformation is mediated in part through cytoplasmic inheritance. However, N. J. Nolte has shown that rearing conditions have genotypic effects as well. He presents data showing that chiasma frequency in *Locusta pardalina* males is appreciably higher in individuals raised under crowded conditions and undergoing phase transformation. He suggests that since it is just such individuals that migrate and encounter unpredictable conditions for egg-laying, physiological or developmental control of chiasma frequency by individual locusts may be an evolved mechanism for increasing variability in the offspring.

The largest section of this book deals with population studies and is divided into four subsections treating factors affecting distributions and population fluctuations and the detection and prediction of population increases. Since, in species displaying phase variation, it is the gregarious, migratory morphs that are economic pests, much attention is given to determining which aspects of the environment influence the transition from solitary to gregarious phase and to detecting incipient swarms.

The sections devoted to an evaluation of the economic impact of grasshoppers on range and crop lands stress the fact that these insects continue to be economically important even though major outbreaks have not occurred in the last five or six years. Since the factors resulting in reduced populations and swarming behavior are not understood, there is at present no way to recognize and modify outbreak conditions should they recur. P. T. Haskell, present director of COPR, therefore urges international and national control organizations to devote more resources to long-term ecological research than to short-term, stopgap control research.

This is an important contribution to the study of grasshopper biology. The book will be useful in both basic and applied insect research and should be of interest to a wide variety of insect biologists.

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Atomic Processes

Hyperfine Interactions in Excited Nuclei. Proceedings of a conference, Rehovot and Jerusalem, Israel, Sept. 1970. GVIROL GOLDRING and RAFAEL KALISH, Eds. Gordon and Breach, New York, 1971. In four volumes. Vol. 1, xxviii pp. + pp. 1–360, illus.; vol. 2, xxviii pp. + pp. 361–732, illus.; vol. 3, xxvii pp. + pp. 733–984, illus.; vol. 4, xxviii pp. + pp. 985–1354, illus. $27.50 each.

The origin of the name "hyperfine interaction" dates back about 75 years to the time when Michelson and others first looked at atomic spectral lines with the high resolution of their newly developed interferometers. They discovered that many spectral lines possess a structure much finer still than the usual fine structure, and hence the name hyperfine structure. At that time the nucleus had not yet been discovered. Subsequent developments have shown that this structure is attributable to the influence of the nucleus on its surrounding electrons. From these delicate and remote beginnings the study of hyperfine interactions has indeed blossomed, especially in recent years, to the point where the proceedings of the recent Rehovot Conference on the subject is a four-volume work.

What are the reasons for this surge of activity? Of course the Mössbauer effect continues to play a prominent and fruitful role in this field. However, in reading through these volumes I was especially impressed by two things: the great usefulness of heavy-ion beams from accelerators, and the remarkable interaction of a diversity of disciplines. The present and potential usefulness of heavy-ion beams is reflected in the proceedings by the inclusion of such papers as an account of radiation damage from ion implantation (D. Dautreppe), a lucid discussion of the use of channeling phenomena to discover the location of impurity atoms in crystals (B. Deutch), and a comprehensive review of the static quadrupole moment of the 2+ state in ^{114}Cd by the Coulomb excitation reorientation effect (U. Smilansky).

The diversity of disciplines contributing to this field is recognized by the participants themselves, and the salutary result is a number of papers of high pedagogical quality. Some examples are the review of mesic atoms (S. Devons), the evaluation of isomer shifts (G. Kalvius), and the review of spin-rotation, stroboscopy, and dynamic perturbations (E. Rechnagel).

The alluring feature of heavy-ion beams is the possibility of simultaneously exciting the nucleus and its atomic electrons. The large linear momentum imparted to the residual atom in such a collision can literally tear the atom apart. A large number of the electrons are completely removed from the atom, and those that remain may be put into unusual states of excitation involving high angular momenta and simultaneous excitation of several electrons. One can then study the interaction of this strongly perturbed atom with its excited nucleus. Another useful parameter is the lifetime of the excited nucleus. The lifetime can be varied from seconds to subpicoseconds. Finally, the large momentum makes it possible to implant the atom into a solid where one can study solid state effects. The proceedings cover a number of possibilities; recoil into vacuum (R. Nordhagen), recoil into gases (G. Sprouse), recoil into ferromagnetic materials (R. Borchers), and recoil into nonmagnetic metals (B. Herskind).

In the last volume there are several valuable tables summarizing what is known about changes in nuclear radius, values of hyperfine fields, and nuclear moments (about 700 references). This volume also presents an interesting discussion by I. Talmi on the subject of the theoretical implications, especially from a nuclear-shell-model point of view, of this substantial collection of values for nuclear moments of ground and excited states.

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Books Received

Abstract Automata. Peter H. Starke. Translated from the German edition (Berlin, 1969). North-Holland, Amsterdam; Elsevier, New York, 1972. 420 pp., illus. Cloth, $28.75; paper, $17.95.

Adolescence. A Psychological Perspective. Dorothy Rogers. Brooks/Cole, Monterey, Calif., 1972. x, 238 pp., illus. Paper, $4.50.

Advances in Gerontological Research. Vol. 4. Bernard L. Strehler, Ed. Academic

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