

value to the nonexpert. These are the articles on neutron-scattering spectroscopy by J. W. White, the pair potential function approach to the properties of molecular crystals by S. H. Walmsley, spin polarization and spin-lattice relaxation in lowest triplet state of pyrazine by M. A. El-Sayed, L. Hall, A. Armstrong, and W. R. Moomaw, and a discussion of excitons and magnons in antiferromagnetic crystals by D. S. McClure. Many of the remaining articles are also well written but will be comprehensible and of value only to those close to the particular subject they cover.

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Immunity and Development

In Vitro. Vol. 3, Differentiation and Defense Mechanisms in Lower Organisms. A Tissue Culture Association symposium, Philadelphia, 1967. M. MICHAEL SIGEL, Ed. Williams and Wilkins, Baltimore, 1968. xii + 212 pp., illus. \$11.50.

Immune responses may have evolved to control mutated cells that might become neoplastic. This book considers immune systems and therefore may be indirectly concerned with control of abnormal differentiation. Thus, some relevant questions are: Do invertebrates have immune responses and, if so, are the parameters the same as those in vertebrates? Can we observe true neoplasms in invertebrates? On the other hand, in the absence of true neoplasms, can we infer the existence of immune systems functionally equivalent to vertebrate types? Results from several laboratories have shown that immune responses undoubtedly occur in lower species, but we await more convincing demonstrations of specificity and anamnesis in invertebrates, particularly.

This book should appeal to two main audiences, developmental biologists and comparative immunologists. To provide evolutionary perspective, it is divided into three sections, dealing with cell aggregations, methods of culturing tissues from lower invertebrates and plants in vitro, and primitive mechanisms of resistance to infection in invertebrates and poikilotherms (fishes).

Much emphasis is placed on *Hydra* as an experimental animal; yet representative work involving other inverte-

brates could well have been included. The *Hydra* grafting studies reported deal with cell movements; tissue incompatibilities should also be considered. Since cell affinities and disaffinities are real in numerous other phyla, they may be demonstrable in the Coelenterata as well, and if present could well suggest a type of primitive immune response.

Cell aggregation has been crucial in understanding differentiation. In this symposium it was appropriately presented, for what may have been the first time, as an all-important preface to the understanding of primitive mechanisms of resistance (treated in the last section of the volume). Undoubtedly, recognition of the difference between self and not-self was manifested early in ontogeny and phylogeny in the manner in which single, disaggregated cells respond to each other; patterns form as a result of this kind of recognition, which is thus germane to development. Yet, when considered from the viewpoint of immunological competence, specific recognition lies at the foundation of defense reactions. When cells react to surface differences and fail to aggregate, this kind of specificity insures precise morphogenetic interactions in development or antigenic recognition in immunity.

The most important section of the book deals with primitive mechanisms of resistance to infection, evidenced, for example, in the work on cellular immunity in oysters. Rather than specific immunity, nonspecific host-parasite relationships are stressed. Cellular immunity at this level suggests that antigen processing by vertebrate macrophages may have come about early in phylogeny. Using the oyster to search for evidence of humoral immunity, the contributors pose the provocative and basic question of the origin of immunoglobulin chains among the invertebrates. With regard to primary clearance, oysters can, like sharks, clear bacteriophage at the same rate in 24 hours, but after secondary injection no phage was detected in shark serum, which generally was found to contain neutralizing antibody. The enhanced clearance of phage probably occurred via a cell-mediated mechanism. In the oyster a naturally occurring hemagglutinin exists which has physical and chemical properties analogous to molecules in higher forms.

With regard to immune-like phenomena, it is noteworthy that some fishes usually do not synthesize immunoglobu-

lin A or G in response to certain antigens. The capacity to produce interferon as a means of recovery from viral attack may have evolved as an alternative to the ability to synthesize certain classes of immunoglobulins. The gene (or genes) that code for several of the immunoglobulins apparently did not differentiate until later in phylogeny.

Aggregation, cell and tissue culture of plant and animal cells, and evidence of immune phenomena are subjects that have been treated separately elsewhere. This volume fills the great need of uniting the superficially different disciplines of immunology and development. Both can profit by exchange of technical and conceptual approaches, since the disciplines cannot be strictly delineated. Many comparative immunologists were once and maybe still are concerned principally with answering questions in developmental biology.

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Books Received

Abstracts of Theses 1964-1965. Accepted in Partial Fulfillment of the Requirements for the Degrees of Doctor of Philosophy and Doctor of Science during the Academic Year 1964-1965. Prepared by Eleanor L. Bartlett and M.I.T. Press. M.I.T. Press, Cambridge, 1969. viii + 328 pp. Paper, \$6.95.

Advances in Ecological Research. Vol. 5. J. B. Cragg, Ed. Academic Press, New York, 1968. xii + 284 pp., illus. \$13.

Advances in Insect Physiology. Vol. 5. J. W. L. Beament, J. E. Treherne, and V. B. Wigglesworth, Eds. Academic Press, New York, 1968. x + 362 pp., illus. \$15.

Analytical Applications of 1,10-Phenanthroline and Related Compounds. Alfred A. Schilt. Pergamon, New York, 1969. viii + 196 pp., illus. \$9. International Series of Monographs in Analytical Chemistry, vol. 32.

Bighorn Canyon Archeology. Wilfred M. Husted. Jerome E. Petsche, Ed. Museum of Natural History, Smithsonian Institution, Washington, D.C., 1969. vi + 138 pp., illus. Paper. Smithsonian Institution-River Basin Surveys Publications in Salvage Archeology, No. 12.

Biochemical Methods in Red Cell Genetics. Jorge J. Yunis, Ed. Academic Press, New York, 1969. xiv + 530 pp., illus. \$25.

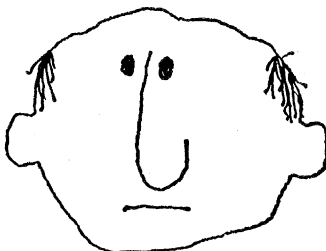
Biologische Onderzoekingen op Pathologische Prostaatweefsels. En Hun Betekenis Voor de Differentiele Diagnose der Prostaataandoeningen. K. van Camp. Arscia Uitgaven, Brussels; Presses Académiques Européennes, Brussels, 1968. 272 pp., illus. Paper, 540 F.

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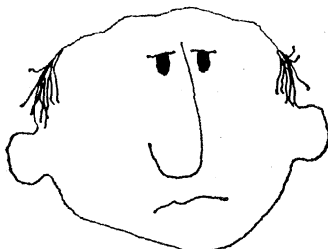
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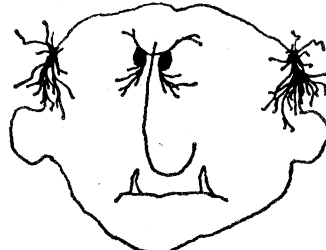
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BOOKS RECEIVED

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Biopathology of Pattern Alopecia. Proceedings of an international symposium, Rapallo, Italy, 1967. Aldo Baccaredda-Boy, Giuseppe Moretti, and Johann Rudolf Frey, Eds. Karger, Basel, 1968 (U.S. distributor, Phiebig, White Plains, N.Y.). x + 222 pp., illus. \$14.15.

Biology and Man. George Gaylord Simpson. Harcourt, Brace and World, New York, 1969. xii + 180 pp. \$5.95.

Boundary Value Problems of Mathematical Physics and Related Aspects of Function Theory. Part 1. V. P. Il'in, Ed. Translated from the Russian edition (Leningrad, 1967). Consultants Bureau, New York, 1969. viii + 96 pp. Paper, \$15. Seminars in Mathematics, vol. 5.

The Climatic Physiology of the Pig. L. E. Mount. Williams and Wilkins, Baltimore, 1968. x + 274 pp., illus. \$14.50. Monographs of the Physiological Society, No. 18.

Clinical Vitaminology. Methods and Interpretation. Herman Baker and Oscar Frank. Interscience (Wiley), New York, 1969. xii + 244 pp., illus. \$13.95.

Coal and Coal-Bearing Strata. Based on the 13th Inter-University Geological Congress, Newcastle upon Tyne, England, 1965. Duncan Murchison and T. Stanley Westoll, Eds. Elsevier, New York, 1968. xii + 420 pp., illus. + 42 plates. \$28.50.

Community Fact Book for Washington Heights, New York City. 1965-1966 and 1960-1961. Jack Elinson, Paul W. Haberman, and Cyrille Gell. School of Public Health and Administrative Medicine, Columbia University, New York, 1968. vi + 102 pp., illus. Paper, \$5.

Dosage Non Destructif de la Composante Minérale du Tissu Osseux par Densitométrie Radiographique. W. Mouvet. Editions Arscia, Brussels; Librairie Maloine, Paris, 1968. 184 pp., illus. Paper, 360 F.B. Collection "Médico Monographies d'Angrégés."

The Economic Effect of Declining Fertility in Less Developed Countries. Gavin W. Jones. Population Council, New York, 1969. iv + 32 pp., illus. Paper.

Effects of Pesticides on Fruit and Vegetable Physiology. Subcommittee on Chemicals Affecting Fruit and Vegetable Physiology, Committee on Plant and Animal Pests, National Research Council. National Academy of Sciences, Washington, D.C., 1968. x + 90 pp. Paper, \$3.25. Principles of Plant and Animal Pest Control, vol. 6. NAS Publication 1698.

Elektronische Bauelemente und Netzwerke I. Physikalische Grundlagen der Bauelemente. H.-G. Unger and W. Schultz. Vieweg, Braunschweig, 1968. xvi + 208 pp., illus. Paper, DM 16.80. Unitexte.

Fetal Homeostasis. Vol. 3, Proceedings of the Third Conference, Princeton, N.J., 1967. Ralph M. Wynn, Ed. Appleton-Century-Crofts, New York, 1968. xiv + 306 pp., illus. \$12.75.

Fluidization Engineering. Daizo Kunii and Octave Levenspiel. Wiley, New York, 1969. xxii + 538 pp., illus. \$14.95.

The Fossil Flora of the Drywood Formation of Southwestern Missouri. Philip W. Basson. University of Missouri Press,

Columbia, 1969. x + 174 pp., illus. \$4.50. University of Missouri Studies, vol. 44.

Heredity and Environment in the Functional Psychoses. Case Histories. Einar Kringle. Universitetsforlaget, Boston, 1968. viii + 278 pp. Paper, \$8. Norwegian Monographs on Medical Science.

Intracranial Aneurysms and Subarachnoid Hemorrhage. A Cooperative Study. Adolph L. Sahs, George E. Perret, Herbert B. Locksley, and Hiro Nishioka, Eds. Lipincott, Philadelphia, 1969. xii + 302 pp., illus. \$10. Reprinted from the *Journal of Neurosurgery* 1966, vols. 24 and 25.

An Introduction to Mathematical Logic. Gerson B. Robison. Prentice-Hall, Englewood Cliffs, N.J., 1969. xii + 212 pp., illus. \$5.95.

Lecture Notes on the Use of the Microscope. R. Barer. Davis, Philadelphia, ed. 3, 1968. viii + 84 pp., illus. Paper, \$1.75.

Linear Ferrite Devices for Microwave Applications. Wilhelm H. von Aulock and Clifford E. Fay. Academic Press, New York, 1968. xiv + 226 pp., illus. \$12. Advances in Electronics and Electron Physics, Supplement 5.

The Machining of Metals. E. J. A. Armarego and R. H. Brown. Prentice-Hall, Englewood Cliffs, N.J., 1969. x + 438 pp., illus. \$13.95.

The Motivated Working Adult. Ray C. Hackman. American Management Association, New York, 1969. 208 pp., illus. \$13.

The Nation's Water Resources. The First National Assessment of the Water Resources Council. Water Resources Council, Washington, D.C., 1968 (available from the Superintendent of Documents, Washington, D.C.). xvi + 450 pp., illus. Paper, \$4.25.

The Nation's Water Resources Summary Report. The First National Assessment of the Water Resources Council. Water Resources Council, Washington, D.C., 1968 (available from the Superintendent of Documents, Washington, D.C.). xvi + 32 pp., illus. Paper, 65¢.

Natural Proteinase Inhibitors. Rosmarie Vogel, Ivar Trautschold, and Eugen Werle. Translated from the German edition (Stuttgart, 1966) by Express Translation Service. Academic Press, New York, 1968. xiv + 162 pp., illus. \$10.

Organic Syntheses. An Annual Publication of Satisfactory Methods for the Preparation of Organic Chemicals. Vol. 48, 1968. Peter Yates, Ed. Wiley, New York, 1969. x + 166 pp., illus. \$6.95.

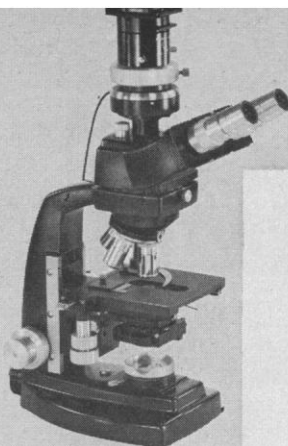
Organozinc Coordination Chemistry. J. Boersma and J. G. Noltes. International Lead Zinc Research Organization, New York, 1968. 120 pp., illus. Paper, \$2.

A Pictorial Guide to the Identification of Fusarium Species According to the Taxonomic System of Snyder and Hansen. T. A. Toussoun and Paul E. Nelson. Pennsylvania State University Press, University Park, 1968. 52 pp., illus. Spiral bound, \$5.95.

Prague's 200 Days. The Struggle for Democracy in Czechoslovakia. Harry Schwartz. Praeger, New York, 1969. x + 278 pp. \$5.95.

Prenatal and Postnatal Mortality in Cattle. Subcommittee on Prenatal and Postnatal Mortality in Bovines, Committee on Animal Health, National Research Council. National Academy of Sciences,

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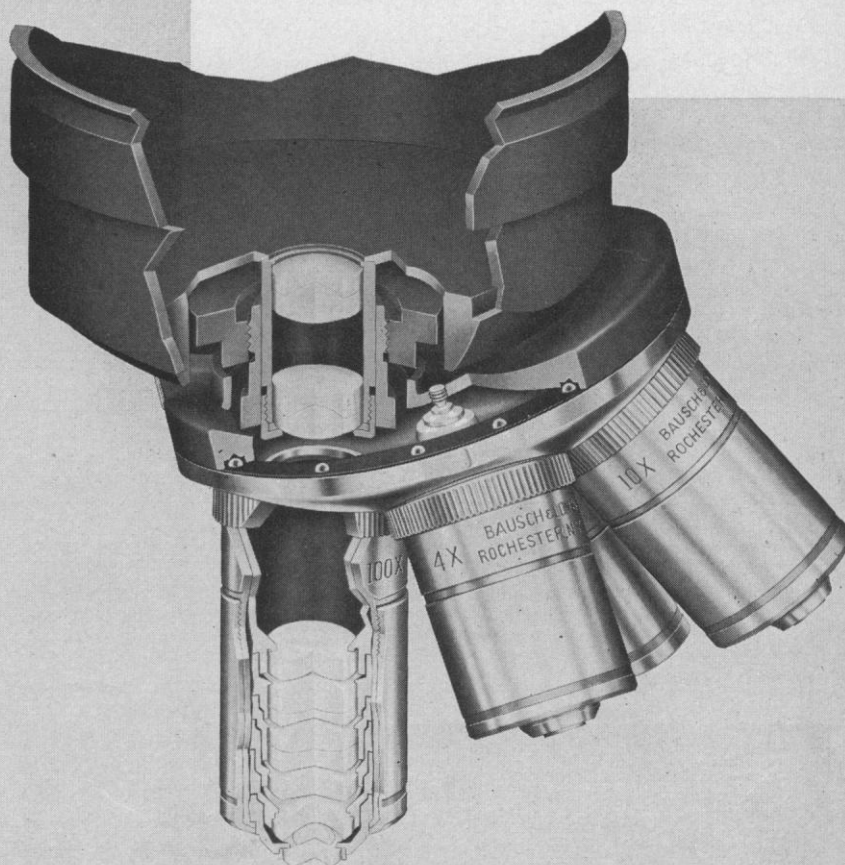


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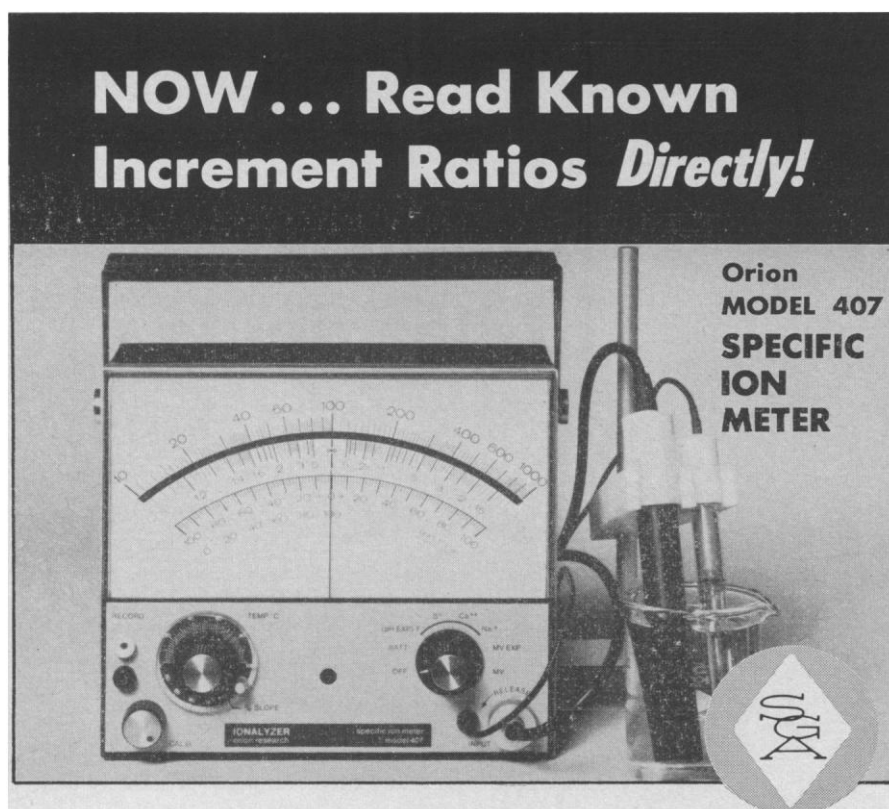
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Washington, D.C., 1968. vi + 130 pp. Paper, \$3.25. NAS Publication 1685.

Principles of Demography. Donald J. Bogue. Wiley, New York, 1969. xiv + 930 pp., illus. \$16.50.

Psychological Problems in Mental Deficiency. Seymour B. Sarason and John Doris, with chapters by Frances Kaplan and M. Michael Klaber. Harper and Row, New York, ed. 4, 1968. xii + 500 pp. \$9.95.

A Revised Check-List of the Birds of the Maltese Islands. C. De Lucca. Clascsey, Hampton, Middlesex, England, 1969. 96 pp. Paper, \$2.

Science and Civic Life in the Italian Renaissance. Eugenio Garin. Translated from the Italian by Peter Munz. Anchor (Doubleday), Garden City, N.Y., 1969. xxiv + 176 pp. Paper, \$1.25.

The Science of Culture. A Study of Man and Civilization. Leslie A. White. Farrar, Straus and Giroux, New York, 1969. xxxvi + 444 pp. Paper, \$2.85. Revised edition with a new preface by the author.

Selected Bibliography on Algae. No. 9. Nova Scotia Research Foundation, Halifax, 1968. xiv + 166 pp. Paper, \$5.

Semantic Information Processing. Marvin Minsky, Ed. MIT Press, Cambridge, 1968. viii + 440 pp., illus. \$15.

Semiconductor Nuclear-Particle Detectors and Circuits. Proceedings of a conference, Gatlinburg, Tenn., 1967. W. L. Brown, W. A. Higinbotham, G. L. Miller, and R. L. Chase, Eds. National Academy of Sciences, Washington, D.C., 1969. xviii + 798 pp., illus. \$25. Nuclear Science Series Report No. 44. NAS Publication 1593.

Symposium on Radioecology. Proceedings of the 2nd National Symposium, Ann Arbor, 1967. Daniel J. Nelson and Francis C. Evans *et al.*, Eds. U.S. Atomic Energy Commission, Oak Ridge, Tenn., 1969 (available from Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.). xii + 774 pp., illus. Paper, \$3. CONF-670503, Biology and Medicine. TID-4500.

The Talented Student. A Validation of the Creativity-Intelligence Distinction. Michael A. Wallach and Cliff W. Wing, Jr. Holt, Rinehart and Winston, New York, 1969. xiv + 146 pp. Paper, \$3.95.

Vertebrate Adaptations. Readings from *Scientific American*. Introduction by Norman K. Wessells. Freeman, San Francisco, 1969. viii + 368 pp., illus. Cloth, \$10; paper, \$5.45.

Violent Men. An Inquiry into the Psychology of Violence. Hans Toch. Aldine, Chicago, 1969. xviii + 270 pp. \$7.50.

Weather and Health. An Introduction to Biometeorology. Helmut E. Landsberg. Anchor (Doubleday), Garden City, N.Y., 1969. xii + 148 pp., illus. Cloth, \$4.95; paper, \$1.25. Science Study Series.

Wildlife in Danger. James Fisher, Noel Simon, Jack Vincent, *et al.* Viking, New York, 1969. 368 pp., illus. \$12.95. Studio Book.

William Whewell's Theory of Scientific Method. Robert E. Butts, Ed. University of Pittsburgh Press, Pittsburgh, 1969. xii + 360 pp. \$8.95.

The World as Teacher. Harold Taylor. Doubleday, Garden City, N.Y., 1969. xii + 324 pp. \$6.95.