the river's mouth. Old Crow, a village on the Porcupine River in northwestern Yukon Territory, is not far from McDougall Pass (elevation 1200 feet) through the Richardson Mountains, a pass "shorter and . . . lower than any . . . through the western mountains of America"; Old Crow is also not far south of the "northernmost . . . timber in America." Chapters 2, 3, and 4 are annotated lists of the birds found at these three localities, all of which are north of the Arctic Circle in what the author regards as "a well characterized faunal region." The list for Old Crow is surprisingly short on sandpipers, only nine species having been found there, in contrast to 16 species at Kobuk and 18 at Anaktuvuk. The author considers Porcupine Valley "an unimportant migratory path" for shore birds. Virtually all migration observed in this valley in the spring of 1957 moved in an easterly direction.

The three chapters just mentioned are not ordinary annotated lists. References to the Eskimos and Indians are unfailingly interesting. Of the Alaskan (Eskimo) and Yukon (Old Crow Indian) names for the many birds common to the two regions, those for only two species resemble each other at all closely—the onomatopoeic *Ahalik* (Eskimo) and *Ahaluk* (Indian) for the old squaw duck, and the *Nattak* (Eskimo) and *Nastok* (Indian) for the great gray owl. I am not sure that the "resemblance" of the latter two names is real. I cannot, incidentally, account for the absence of the snowy owl from the Kobuk list; the species certainly occurs there, as is evident from the status list on page 247.

Irving is primarily a physiologist. Yet in his first chapter, "The Background," he makes a statement of profound import to taxonomists: "Winter in the Arctic is so much colder than the freezing temperatures at which vital processes slow down to unproductive levels that it is, in a way, surprising to find there many animals and plants which indicate their long arctic establishment by having evolved special arctic forms. On the other hand, it is even more surprising that some arctic species are scarcely distinguishable from closely related populations living in warmer climates." Notable, too, are some of his taxonomic discussions, for example, that dealing with the white-winged scoter (*Melanitta deglandi*), the only species of North American migratory duck "distinguished into eastern and western races." The author's measurements of bills of dried specimens convinced him that eastern birds were not distinguishable from western; while admitting that eastern and western *wintering* populations are discrete, he believes that eastern and western birds mingle before and after nesting with the result that both the wintering and the nesting populations are "genetically mixed."

Basing many of his ideas directly upon findings reported in the annotated lists, Irving proceeds with chapters titled "Status and distribution," "Migrations and origins," "Residence in the Arctic," "Biological aspects of migration and nesting," and "Arctic metabolic economy of warm-blooded animals," gradually focusing less upon Alaska as a faunal region, more upon the problems of living anywhere in the Arctic. The concept of comfort, of well-being, of contentment (admittedly my own somewhat subjective word) runs through even the most abstruse parts of these chapters. This, to my way of thinking, is wholly justifiable. There is, of course, such a thing as being miserable in the cold. Ludwig Kumlien, in his account of the bird life of Cumberland Sound, Baffin Island, tells of the death of large numbers of small birds during a spring storm. A vast amount of writing capitalizes on the idea of being miserable in the Arctic. Yet every careful observer of life in the far north feels in his bones the exhuberance that is part of the long summer days, the swift shifting of the seasons, the brilliance of clear weather in winter, even in what is so often referred to as the "long winter night."

Among the most graphic and thought-provoking paragraphs in the book are those in Chapter 7. Writing of the springtime return to the breeding grounds, Irving says: "The birds arrive in an arctic season changing at a rate which cannot be imagined from experience confined to temperate regions. Daylight becomes continuous in May. In that month, from levels lower than those of the coldest part of winter in temperate regions, the arctic temperature rises to the warmth of summer. The water in the environment changes its physical state from snow and ice to liquid. But in any one year these day to day changes are not orderly, for until early June pleasant warmth, snowfall and bitter cold can succeed each other within a few hours. In these vagaries of the arctic weather . . . the birds arrive, settle, and proceed to nest with such regularity that their behavior sets the steadiest schedule among the natural phenomena."

Resident (that is, nonmigratory) birds of the far north adapt themselves to a warming of the air as spring advances; migrating birds, on the other hand, must adjust to increased chilling as they move northward. A given day may be warmer than the preceding to the resident form, much colder to the migrant form, yet both take the change in their stride—evidence of their ability to use such thermoregulators as feathers. It is known that arctic warm-blooded animals can keep their bodies some 80° warmer than the air by production of metabolic heat and by conservation of heat through natural insulation. Irving and his associates have ascertained that in winter "at −45°C and in warm summer the mean body temperature of 15 arctic and subarctic resident species of birds averaged 41.3°C." Mean body temperature among these species differ to about the same degree as those among birds in temperate regions. "Body temperatures of homoiothermic species are phylogenetically differentiated, but the differentiation shows no common regard for geographical range, and their temperatures are more stable than the climates of the earth, which have changed appreciably, while the temperatures of the birds that inhabit them apparently have remained fixed."

This is a sample. The discussions of critical temperature, of the stability of the basal metabolic rate, of variability in insulation, of heat loss through the extremities, and notably of the reproductive success of birds, despite the brevity of the arctic summer, make this volume invaluable to ornithologist and physiologist alike.

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Plant Pathology. An advanced treatise. vol. 3, *The Diseased Population*. J. G. Horsfall and A. E. Dimond, Eds. Academic Press, New York, 1960. xiii + 675 pp. Illus. $22.

In contrast with the two previous volumes which treat the diseased plant and the pathogen as individuals, the present and concluding volume of this series deals with populations of plants in relation to diseases and their control. It gives detailed consideration to the vital concept of inoculum potential de-

fined as "the number of infective particles present in the environment of the uninfected host." On the intensity of this factor depends the frequency of infection and the severity of the resulting disease occurrence.

Following the usual introductory chapter in which the editors outline the theme of the volume, S. D. Garrett presents a well worked out chapter on the mechanism of the inoculum potential and the importance of the living host plant as an inoculating agent. The dispersal of inoculum, including fungi, bacteria, and viruses, is considered at length in chapters written by recognized specialists; the following topics are discussed: autonomous dispersal; dispersal of inoculum by insects and other animals; and dispersal by air and water, including the "take-off" and the "flight and landing" of infective material.

J. E. van der Plank contributes a chapter on the analysis of epidemics, and Paul E. Waggoner discusses that intriguing topic, the forecasting of plant epidemics, a subject much in the limelight of current phytopathological activity. Quarantines are considered by Ernst Gram with a thought-provoking evaluation of the plant quarantine system.

Finally, there is a series of chapters on certain general methods of controlling or preventing plant diseases from the points of view of cultural practices in disease control, soil treatment, performance of fungicides, and biological interference with epidemics. Stakman and Christensen conclude the volume with a detailed account of the past, present, and future of the problem of breeding disease-resistant varieties.

The editors and their collaborators have succeeded admirably in bringing together available information in the field of plant pathology, with special reference to modern trends.

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Information and Decision Processes. Robert E. Machol, Ed. McGraw-Hill, New York, 1960. ix + 185 pp. Illus. $5.95.

This is a collection of papers presented at a symposium held at Purdue University in 1959. The papers range from informal and easily readable accounts of recent research to highly technical accounts. In the former category are papers by Brown and Doob on the role of computation in decision problems and the consistency of stochastic models. In the latter category is a résumé of recent work on Markov chains by Rosenblatt and on the lower bounds for the expected sample size of a sequential test by Hoeffding. There are also papers on information theory, subjective probability, and testing methods.

On the whole this is an interesting collection, but the small print renders the book almost unreadable.

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New Books

Biological and Medical Sciences

Beecher, Henry K., Ed. *Disease and the Advancement of Basic Science.* Harvard Univ. Press, Cambridge, Mass., 1960. 427 pp. $12.50. The purpose of this volume, which developed out of the Lowell lectures of 1958, is to show that some kinds of fundamental advances in science can be made only from study of disease. Among the 21 contributors who discuss this proposition from the vantage points of their own knowledge and work are Paul Weiss, C. F. Cori, Ralph W. Gerard, and René J. Dubos.

Breckenridge, Marian E., and E. Lee Vincent. *Child Development.* Saunders, Philadelphia, Pa., ed. 4, 1960. 661 pp.

Compendium of Plant Diseases. Rohm and Haas, Philadelphia, Pa., 1960. 264 pp. A collection of colored illustrations showing diseased plants.

Heftmann, Erich, and Erich Mosettig. *Biochemistry of Steroids.* Reinhold, New York; Chapman and Hall, London, 1960. 242 pp. Text, $5.75; trade, $6.90.

Heller, John H., Ed. *Reticuloendothelial Structure and Function.* Ronald, New York, 1960. 483 pp. $12. Contains the papers presented at the 3rd International Symposium of the International Society for Research on the Reticuloendothelial System held in Rapallo, Italy, in August 1958.

Kalmus, H., and S. J. Hubbard. *The Chemical Senses in Health and Disease.* Thomas, Springfield, Ill., 1960. 102 pp. $3.75.

Lewis, Lena A. *Electrophoresis in Physiology.* With a chapter on "Immunoelectrophoresis" by M. D. Poulik. Thomas, Springfield, Ill., ed. 2, 1960. 120 pp. $5.50.

Mallette, M. Frank, Paul M. Althouse, and Carl O. Clagett. *Biochemistry of Plants and Animals.* Wiley, New York, 1960. 565 pp. $8.50.

Schade, Rudolf Otto Karl. *Gastric Cytology.* Arnold, London; Williams and Wilkins, Baltimore, Md., 1960. 89 pp. $8.

Schudel, Lydia. *Manual of Blood Morphology.* Lippincott, Philadelphia, Pa., ed. 9, 1960. 53 pp. $4.50.

Simon, Harold J. *Attenuated Infection. The germ theory in contemporary perspective.* Lippincott, Philadelphia, Pa., 1960. 365 pp. $10.

Skutch, Alexander F. *Life Histories of Central American Birds.* vol. 2, *Families Vireonidae, Sylviidae, Turdidae, Troglodytidae, Paridae, Corvidae, Hirundinidae, and Tyrannidae.* Cooper Ornithological Society, Berkeley, Calif., 1960.

Symposium der Deutschen Arbeitsgemeinschaft für Neuropsychopharmakologie. vol. 2, No. 2, of *Medicina Experimentalis.* Karger, Basel, Switzerland, 1960 (order from A. J. Phiebig, P.O. Box 352, White Plains, N.Y.). 238 pp. $9.50.

Unbreit, Wayne W. *Advances in Applied Microbiology.* vol. 2. Academic Press, New York, 1960. 396 pp. $12.

Watson, J. M. *Medical Helminthology.* Bailliere, Tindall and Cox, London; Williams and Wilkins, Baltimore, Md., 1960. 498 pp. $15.50.

Whitfield, I. C. *An Introduction to Electronics for Physiological Workers.* Macmillan, London; St. Martin's Press, New York, ed. 2, 1960. 274 pp.

Wiedling, Sten. *Xylocaine.* The pharmacological basis of its clinical use. Almquist and Wiksell, Stockholm, Sweden, 1960. 146 pp. Kr. 20.

Willmer, E. N. *Cytology and Evolution.* Academic Press, New York, 1960. 440 pp. $10.

Woolmer, Ronald F., Ed. *A Symposium on pH and Blood Gas Measurement.* Methods and interpretation. Little, Brown, Boston, 1959. Contains the report (10 papers) of the symposium held 2–3 December 1958; 25 participants attended the conference.

Zeisler, Ernest Bloomfield. *Electrocardiography: Principles and Practice.* Login Brothers, Chicago, Ill., 1960. 374 pp.

Zinseer: Microbiology. David T. Smith *et al.* Appleton-Century-Crofts, New York, ed. 12, 1960. 1040 pp.

Reprints

Bartlett, M. S. *An Introduction to Stochastic Processes.* With special reference to methods and applications. Cambridge Univ. Press, New York, 1960. 321 pp. $2.95.

Coxeter, H. S. M. *The Real Projective Plane.* Cambridge Univ. Press, New York, ed. 2, 1960. 226 pp. $3.75.

Graham, L. A. *Ingenious Mathematical Problems and Methods.* Dover, New York, 1960. 244 pp. Paper, $1.45.

Landau, Edmund. *Grundlagen der Analysis* (Das Rechnen mit Ganzen, Rationalen, Irrationalen, Komplexen Zahlen). Chelsea, New York, ed. 3, 1960. $1.95. In this edition the prefaces have been translated by F. Steinhardt and a German-English vocabulary has been appended.

Rawcliffe, D. H. *Illusions and Delusions of the Supernatural and the Occult.* Dover, New York, 1959. 551 pp. $2. Originally published as *The Psychology of the Occult.*

Thiel, Rudolf. *And There Was Light.* The discovery of the universe. Translated from the German by Richard and Clara Winston. New American Library, New York, 1960. 384 pp. $0.75.