blue in the same cell. He tells in brief form the exact method of handling silver impregnation *in the dark,* a crucial point of DaFano's technique that nobody ever seems to tell except DaFano.

Sections of fluorescence microscopy and smear preparations are excellent. There is a valuable appendix, giving formulas of fixatives and stains, refractive indices of various agents, saturation solutions of reagents, and solubility of dyes. The index is very good.

The table of contents serves as a kind of index that is cross-referenced with the final index. This book ought to gain wide popularity with investigators, technicians, and students. Many new procedures are described and old ones are refreshed. The author should try his expert hand at simplifying the use of phase contrast microscopy and microincineration in future editions.

ROSS C. MACCARDLE

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Chemical Physiology of Contraction in Body and Heart Muscle. A. Szent-Györgyi. Academic Press, New York, 1953. 135 pp. Illus. $4.80.

For the nonspecialist, this book contains both a very readable and a very personal account of recent researches into the mechanisms of muscle contraction. In many ways Szent-Györgyi's book serves as an object lesson in what is to be expected, as present-day experimental biology continues its advances. The way the muscle proteins actin and myosin interact continues to become a more and more complex subject. At the same time, the membrane emerges as a more and more concrete entity, and a good part of this short book is devoted to the description of effects that must be ascribed to membranes. The problems of muscle physiology thus appear to be divided into: a physicochemical study of muscle proteins, the membrane, and the nature of the conection between membrane processes and contraction. The author has something to say about all these problems, and while many of the suggestions advanced are quite speculative, others are certainly the best that can be done in the way of interpretation at present.

L. J. MULLINS

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Sample Survey Methods and Theory, Vols. I and II. Morris H. Hansen, William N. Hurwitz, and William G. Madow. Wiley, New York; Chapman & Hall, London, 1953. Vol. I, 638 pp., $8. Vol. II, 332 pp., $7.

The appearance of the two volumes on *Sample Survey Methods and Theory* fulfills a long-felt need in the field of sampling theory and application.

The authors have spent more than a decade in the development of sampling theory and its application to actual survey problems. The scope of the surveys conducted under their direction has probably been the most comprehensive ever conducted by any government or private organization. As a consequence, these books are not merely a restatement of theory and methods already published but are comprehensive discussions of real survey problems, alternative methods of solution, and the fundamental thinking processes that lead to new designs. The separation of the work into two volumes, *Methods and Applications* and *Theory,* enables the reader who is not concerned with development of theory to use the first volume. Anyone concerned primarily with theory and its development can concentrate on the second volume.

One of the principal features of these volumes is the method of presentation. Problems are presented in the same manner in which they evolved for the authors, available data are examined, and the questions asked are "How do we proceed to design a sample survey which can be conducted at minimum cost for a given error?" or "How do we plan a survey that can be designed for a given cost with a minimum error?" The various possible solutions are discussed and the most appropriate one is indicated.

In addition, the practitioner is given numerous rules of thumb which can be used in making a number of decisions in the design of sample surveys. These two volumes will probably be classics in the field of sampling for many years to come and are a must for any person who is involved in the conduct or analysis of any survey.

SAMUEL WEISS

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Elements of Statistics. H. C. Fryer. Wiley, New York; Chapman & Hall, London, 1954. viii + 262 pp. Illus. $4.75.

This little book is well bound and printed on good paper. It reflects the author's training and his years of experience in teaching and consultation at Kansas Experiment Station. It has benefited by passing through processed versions before going into print. It is not a book planned for experimenters in need of help in design and analysis but rather a textbook for students in probability, elementary statistical methods, and sampling. The preface states that college algebra is a prerequisite for courses based on the text.

A brief chapter on the history of the subject is followed by a chapter on summarizing data, central tendencies and dispersion, which includes calculation of the standard deviation. Chapters follow on elementary probability and on binomial and normal distributions. The uses of confidence limits and chi-square tests are shown as well as the ideas of alternate hypotheses and quality control. These ideas are further developed in the next chapter on sampling normal populations, which includes a brief discussion of central limit theorem and non-normal data. The concluding chapter is on linear regression and correlation, including rank correlation. A number of numerical

(squares, logs, and so forth) and statistical tables complete the book; they include tables of G for testing hypotheses quickly and approximately by using the range. A four-page index is provided; references follow each chapter except the first. Illustrative numerical problems from subject-matter fields occur throughout, and exercises suitable for classwork, many with answers, are very numerous.

The book is clearly written and readable, and discussion is kept close to numerical illustrations and to data from such fields as psychology, genetics, tests of materials, crops, biology, and economics. It does not give discussions of procedure needed in various experimental situations nor does it catalog statistical methods in the classic order. No discussion of analysis of variance or of experimental design is found. The book should be an excellent preparation for courses either in more deeply mathematical statistics or in experimental statistics. For these uses, it seems very sound.

F. M. WADLEY

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Books Reviewed in THE SCIENTIFIC MONTHLY

April

Age and Achievement, Harvey C. Lehman (Princeton Univ. Press). Reviewed by Stanford C. Ericksen.

The Making of a Scientist, Anne Rol (Dodd, Mead). Reviewed by W. J. Brogden.

The Logic of Modern Science, J. R. Kantor (Principia Press). Reviewed by Paul R. Farnsworth.

Steps in Psychotherapy, John Dollard, Frank Auld, Jr. and Alice Marsden White; Dael Wolfle, Ed. (Macmillan). Reviewed by Raymond W. Waggoner.

Films in Psychiatry, Psychology and Mental Health, Adolf Nichtenhauser, Marie Coleman, and David Ruhe (Health Education Council). Reviewed by Edith M. Lindsay.

Introduction to Electric Theory, R. G. Fowler (Addison-Wesley). Reviewed by William V. Smith.

J. Robert Oppenheimer and the Atomic Story, J. Alvin Kugelmass (Julian Messner). Reviewed by W. Paul Gilbert.

Puritan Sage: Collected Writings of Jonathan Edwards, Vergilius Ferm, Ed. (Library Pub.). Reviewed by Clarence L. Ver Steeg.

Conquest of the Moon, Wernher von Braun, Fred L. Whipple, and Willy Ley (Viking Press). Reviewed by Charles H. Smiley.

Living with a Disability, Howard A. Rusk and Eugene J. Taylor (Blakiston). Reviewed by Oscar O. Selke, Jr.

Disease and Its Conquest, G. T. Hollis (Oxford Univ. Press). Reviewed by Gaylord W. Anderson.

Managing Your Coronary, William A. Brams (J. B. Lippincott). Reviewed by Emmet B. Bay.

Elements of Chordate Anatomy, Charles K. Weichert (McGraw-Hill). Reviewed by D. H. Barron.

Cardano, the Gambling Scholar, Oystein Ore (Princeton Univ. Press). Reviewed by Samuel Karlin.

Contributions to the Theory of Games, Vol. II, H. Kuhn and A. W. Tucker, Eds. (Princeton Univ. Press). Reviewed by Samuel Karlin.

May

Atomic Weapons in Land Combat, G. C. Reinhardt and W. R. Kintner (Military Service Pub.). Reviewed by L. H. Rumbaugh.

Atoms and Energy, H. S. W. Massey (Elek Books; British Book Centre). Reviewed by Arthur H. Snell.

Relativity and Reality, E. G. Barter (Philosophical Library). Reviewed by M. E. Shanks.

Statistical Methods in Experimentation: An Introduction, Oliver L. Lacey (Macmillan). Reviewed by Joseph Berkson.

The Scientific Adventure, Essays in the History and Philosophy of Science, Herbert Dingle (Philosophical Library). Reviewed by Waldo H. Furgason.

An Introduction to Relaxation Methods, F. S. Shaw (Dover). Reviewed by Carl H. Walther.

General Biochemistry, William H. Peterson and F. M. Strong (Prentice-Hall). Reviewed by Harry G. Day.

Scientific Explanation, R. B. Braithwaite (Cambridge Univ. Press. Reviewed by B. Clifford Hendricks.

Practical Taxidermy, A Working Guide, John W. Moyer (Ronald Press). Reviewed by Charles S. East.

A Herd of Mule Deer, Jean M. Linsdale and P. Quentin Tomich (Univ. of Calif. Press). Reviewed by David H. Johnson.

How Animals Move, James Gray (Cambridge Univ. Press). Reviewed by William L. Straus, Jr.

Plant Diseases in Orchard, Nursery and Garden Crops, Ernst Gram and Anna Weber; R. W. G. Dennis, Ed. (Philosophical Library). Reviewed by Thomas H. King.

Motivation and Morale in Industry, Morris C. Viteles (Norton). Reviewed by Kimball Young.

The Recovery of Belief, C. E. M. Joad (Faber and Faber; Macmillan). Reviewed by Theodore M. Greene.

The Suez Canal in World Affairs, Hugh J. Schonfield (Philosophical Library). Reviewed by George Lenczowski.

The Primitive City of Timbuctoo, Horace Miner (Princeton Univ. Press). Reviewed by William Bascom.

The Way of the World, The Rushton Lectures for 1952, George H. T. Kimble (George Grady Press). Reviewed by Meredith F. Burrill.

Clay Mineralogy, Ralph E. Grim (McGraw-Hill). Reviewed by Margaret D. Foster.

Conversation with the Earth, Hans Cloos (Alfred A. Knopf). Reviewed by George T. Faust.

Machines That Built America, Roger Burlingame (Harcourt, Brace). Reviewed by Clyde E. Dankert.

June

Oil in the Soviet Union, Heinrich Hassman (Princeton Univ. Press). Reviewed by L. L. Sloss.

A Field Guide to Rocks and Minerals, Frederick H. Pough (Houghton Mifflin). Reviewed by Victor T. Allen.

Climatic Change, Harlow Shapley (Harvard Univ. Press). Reviewed by Herbert B. Nichols.

From Fish to Philosopher, Homer W. Smith (Little, Brown). Reviewed by W. B. Stallworthy.

The Achievement Motive, David C. McClelland *et al.* (Appleton-Century-Crofts). Reviewed by John F. Dashiell.