Antarctic Research Series

Antarctic Snow and Ice Studies. Malcolm Mellor, Ed. American Geophysical Union, Washington, D.C., 1964. xii + 277 pp. Illus. Plates. $12.

The ten articles presented in *Antarctic Snow and Ice Studies*, volume 2 of the Antarctic Research Series, place major emphasis on the snow and ice budget of Antarctica. Budget computations are complicated by local and regional variations in the rate of accumulation, by destruction of parts of the record as a result of wind erosion, by wind drift off the continent, and by the inability to differentiate primary precipitation from drift. The latter difficulty is due to rapid sublimation changes in the original crystalline shapes. The following authors contributed papers to volume 2: R. L. Cameron; Hiromu Shimizu; J. G. Zumberge; W. Hoffman, E. Dorrer, and K. Nottarp; J. A. Heap and A. S. Rundle; M. B. Giovinetto; Kenji Kojima; R. M. Koerner; J. R. Reid, Jr.; and L. D. Taylor and James Gliozzi. Some of their results and conclusions are briefly summarized in the following paragraphs.

Accumulation statistics are based on stake and pit studies. An innovation in the methods used is the periodic spraying of dye around stakes to provide key horizons. Techniques in pit studies include ink-staining, differential melting by blowtorch, and the excavation of paired pits so that the surface studied is a narrow translucent partition.

Seasonal layers are identified by melt crusts and oxygen isotope ratios. A new technique is that of measuring the concentration of ultramicroscopic particles by resistance changes in the meltwater electrolytes. The particle concentrations appear to be cyclical, suggesting the possibility of a new method of absolute dating.

The accuracy of the budget for the continent as a whole is believed to have been improved by giving individual consideration to the different drainage basins. The conclusion that after the onset of glaciation West Antarctica reached budget equilibrium twice as fast as East Antarctica is an interesting one.

Horizontal strain in the Ross Shelf Ice has been determined by resurveys of strain rosettes consisting of a center stake and three others at distances of 100 meters and forming central angles of 120 degrees. The resurveys provide the basis for an analytical strain solution.

A fabric study of a firn fold revealed maximum preferred orientation of c-axes of ice grains midway between crest and trough, the point at which shear stresses are theoretically greatest. The fabric diagram, however, failed to correspond to observed or theoretical patterns and is believed to indicate "rotation of the stresses relative to the present fold axis."

It is a source of satisfaction to me to note that it is now common practice to return ice specimens from Antarctica to the United States for detailed study. The feasibility of this practice was demonstrated in 1946.

The procedures and factual data presented in this excellent volume will undoubtedly strongly influence future glaciological investigations in Antarctica. The National Science Foundation is to be congratulated for supporting the publication of these specialized studies.

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Botany

Physiological Basis of Salt Tolerance of Plants (as affected by various types of salinity). B. P. Strogonov. Translated from the Russian edition (Moscow, 1962) by Alexandra Poljakoff-Mayber and A. M. Mayer. Israel Program for Scientific Translations, Jerusalem; Davey, New York, 1964. 285 pp. Illus. $12.50.

There is a great deal of information on the morphology, anatomy, and ecology of plants that occur naturally on salinized soils but relatively little concerning their physiology. Even less is known of the effects of salt on the physiology of plants that ordinarily cannot tolerate saline conditions. It is to this particular problem that the book *Physiological Basis of Salt Tolerance of Plants* is directed.

Strogonov first considers the question of the nature of the salt composition of salinized soils, pointing out that it is important to know the relative amounts of the various salts present in a soil as well as the total salt content. Thus soils may be classified as sulfate, chloride, or carbonate, or any combination of these three such as carbonate-sulfate, sulfate-carbonate, chloride-sulfate, if these anions predominate. The actual performance of a variety of plants, native and cultivated, growing in salinized soils in the U.S.S.R. clearly shows that the plants responded quite differently, depending on the anion or anions present in the soil solution.

Most of the book is devoted to a description of experiments where crop plants were grown in soils artificially salinized by various salt mixtures. Different structural and functional aspects of the plants were examined, including such factors as the anatomy and morphology of the stem, root, and leaf; transpiration ratio; osmotic properties of the cells; nitrogen metabolism (free amino acid, amines, and diamines); leaf necrosis; and the accumulation of specific toxic components such as putrescine and cadaverine. The microflora of the root zone was also investigated. On the basis of these studies the author concludes that the different salts have a specific metabolic effect, giving rise to compounds not normally found in the plants.

Practical methods for increasing the salt tolerance of plants are discussed in some detail. After describing numerous agrotechnical methods, Strogonov suggests that a plant breeding program might be expected to be successful to some extent.

The book is of value because it makes available a great deal of factual information previously not available in English. The author's views are quite modern and point the way to new methods of attacking the problem of increasing the productivity of saline soils.

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The Acetate Hypothesis

The Biosynthesis of Steroids, Terpenes, and Acetogenins. John H. Richards and James B. Hendrickson. Benjamin, New York, 1964. xii + 416 pp. Illus. $18.50.

In this book, Richards and Hendrickson have brought together a wealth of information on the biogenesis of the many classes of naturally occurring compounds that can be considered, either by structural analogy or by di-

rect experimentation, to have been derived by the condensation of two-carbon units. The acetate hypothesis, by no means a new one, has frequently been criticized on the grounds that it is too vague and that by condensation of two-carbon units one may, formally at least, produce almost any desired organic compound. Yet, one of the great achievements of modern biochemistry has been the recognition of the central role of acetyl coenzyme A in the synthesis of many classes of carbon compounds. The authors address themselves to the classification of such compounds and then to the details, where known, of the chemical pathways for their formation. The book is, therefore, broad in scope since it considers compounds as structurally diverse as fatty acids, oxygen heterocycles, phenolic compounds, macrolide antibiotics, some alkaloids, and those compounds broadly categorized as terpenoid.

From a general discussion of the acetate hypothesis, the authors proceed to a statistical survey of more than 20 classes of naturally occurring compounds that can be considered to be formed by the condensation of acetate units. The correlation of known structures with the acetate hypothesis is exceptionally good for most of these compounds. There follows a detailed survey of the synthesis of fatty acids, of aromatic substances, and finally, in the latter half of the book, of those compounds derived from the isoprenoid carbon skeleton. Included is a thorough discussion of the biosynthesis of the plant terpenes, of squalene, the triterpenoid compounds derived from it by various modes of cyclization, and the steroids derived from lanosterol. A lucid account is given of the biogenesis of bile acids and steroid hormones, and even of some steroidal alkaloids. It is, therefore, somewhat disappointing to find no mention of the steroidal sapogenins, the cardiac aglycones of plant and animal origin, or the D vitamins.

The great strength of the book is in the utilization of modern organic chemical mechanisms to clarify and rationalize biosynthetic reaction pathways. Emphasis is correctly placed on the concept that enzymatic reactions must eventually be explicable in terms of organic chemical theory. Less stress is placed on the more biochemical aspects of the problem and, indeed, one senses more emphasis on the catalytic activity of enzymes than on their characteristic specificities.

Despite its deficiences, the graduate student in organic or biological chemistry will find in this book much valuable information on known pathways as well as a host of unsolved problems of organic and biological chemistry. He will also find useful the summarizing sections that punctuate the volume.

The book is well documented and well printed. The literature is covered through 1962, and many references are given to work published in 1963. An otherwise excellent work is marred by many typographical errors, misspelled names (Chaikoff, I. L.; Charkoff, I. L.; and Clarkoff, J. L.), and occasional incorrect structural formulas. These should be corrected in future printings.

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Statistical Terms

Russian-English Dictionary of Statistical Terms and Expressions and Russian Reader in Statistics. Samuel Kotz. University of North Carolina Press, Chapel Hill, 1964. xviii + 115 pp. $7.50.

This is the latest member of the increasing family of specialized Russian-English dictionaries. The publication of such a volume invites comparison with existing and somewhat similar dictionaries—the two Russian-English dictionaries published by the American Mathematical Society (1950 and 1961), the dictionary published by the University of Wisconsin Press (1962), and the Russian-German, Russian-English dictionary published by the Deutscher Verlag der Wissenschaften (1959).

The present work contains almost exclusively statistical terms and mathematical terms frequently encountered in the statistical literature. In particular, it does not contain prepositions, adverbs, pronouns, or particles, except as they occur in combination with other words. Thus, it is necessary to use this statistical dictionary in conjunction with a general dictionary. The decision to restrict the scope of the dictionary was primarily motivated by the fact that the literature of applied statistics contains practically all scientific terms and many expressions used in everyday life. The decision not to include a grammar was also based on the desire to restrict the size of the volume. Each of the mathematical dictionaries mentioned above contain a grammar and include also the important parts of speech, features that, in my experience, enable the user to read mathematical texts without referring to a general dictionary.

The book consists of two parts. The first offers a word list of about 89 pages as well as a very concise introduction that contains the Russian alphabet together with its pronunciation and transliteration and a description of the structure of the dictionary. The second part is primarily a Russian reader in statistics. Passages from recent Soviet publications are selected and reproduced with interlinear translations. In addition, this part contains a Russian-English author index. This will help translators to avoid the pitfalls that one encounters when names of Western authors, used in Russian texts, are transliterated back into English. It may be worthy of mention that this statistical dictionary gives the accents as well as the diaresis over the letter e and thereby greatly facilitates the correct pronunciation of the Russian words.

The book will be a useful tool to statisticians who want to use or to translate Russian statistical literature.

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New Books

Mathematics, Physical Sciences, and Engineering

Physics of Magnetism. Soshin Chikazumi and Stanley H. Charap. Wiley, New York, 1964. 566 pp. Illus. $15.75.

The Principles and Application of Variational Methods. Martin Becker. M.I.T. Press, Cambridge, Mass., 1964. 128 pp. Illus. $5.

Principles of Radiation Protection. G. Eaves. Gordon and Breach, New York, 1964. 185 pp. Illus. $8.25.

Progress in Aeronautical Sciences. vol. 5. D. Küchemann and L. H. G. Sterne. Pergamon, London; Macmillan, New York, 1964. 325 pp. Illus. $15. Six papers: "The design of low-speed wind tunnels" by P. Bradshaw and R. C. Pankhurst; "Low-speed flows involving bubble separations" by I. Tani; "Ergebnisse der theorie Schallnaher Strömungen" by I. Teipel; "Écoulements transsoniques homogènes" by P. Germain; "Rarified gas dynamics" by I. Esterman and A. Roshko, and "A correction to 'The theory of sonic bangs'" by C. H. E. Warren.

The Pulsation Theory of Variable Stars. Svein Rosseland. Dover, New York, 1964 (corrected reprint of 1949 edition). 160 pp. Illus. Paper, $1.65.

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