structural polysaccharides, particularly yeast mannan, fungal chitin and glucan, and plant cellulose, are treated in detail. The subcellular localization of the batteries of glycosyl transferases that participate in the assembly of the complex polymers, the localization and direction of their growth, and the role of the cellular fibrillar networks in their assembly are discussed. Finally, a model of structural differentiation and development in which specific polysaccharide hydrolases play a role in the modulation of cell structure is presented. The model is based on precise genetic regulation of the processes involved, and progress in its development will depend upon achieving a better understanding of them at the genetic level.

Remarkable progress in the elucidation of bacterial cell wall structure has been achieved in the past two decades. In chapter 3, Robert S. Munson and Luis Glaser review this progress and present a detailed account of the current understanding of the subject. Coverage of the mode of biosynthesis of cell wall polymers is extensive and is complemented by a description of the events leading to the assembly of the teichoic acids, peptidoglycan, proteins, and lipids in the multilayered, three-dimensional structure of the cell wall.

The membrane of the human erythrocyte, like those of other eukaryotic cells, contains a variety of intrinsic and extrinsic glycoproteins. The major sialoglycoprotein, glycophorin A, has been studied extensively and has been proposed as a model intrinsic membrane glycoprotein. In chapter 4, Heinz Furthmayr outlines the experimental approaches to the determination of the complete structure of glycophorin A, its amino acid sequence, the positions and structures of the many carbohydrate side chains, and the structure and function of the three major domains of the protein that relate to the external amino-terminal, the glycosylated portion, the hydrophobic intramembrane portion, and the carboxy-terminal portion that occupies the internal face of the erythrocyte membrane. The author discusses the evidence supporting the possible functions of glycophorin as a cell surface receptor and as a structural element of the membrane and its role in determining the antigenic mosaic of the erythrocyte surface.

In chapter 5, Jack Preiss and Donal A. Walsh provide a detailed, up-to-date review of the structure and metabolism of glycogen and starch in bacteria, plants, and animals. The treatment focuses on the regulation of the enzymes and enzyme systems that participate in the biosynthesis and breakdown of these polysaccharides. It is truly an exercise in comparative biochemistry to compare the complex hormonal regulation of glycogen metabolism in animals with the equally complex regulation of starch and glycogen metabolism in plants and microorganisms.

Overall, this volume is an excellent beginning for the series. Both the topics and the contributors are well chosen, and the chapters are clear and well documented.

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The Role of Diet in Cancer

Nutrition and Cancer. Etiology and Treatment. GUY R. NEWELL and NEIL M. ELLISON, Eds. Raven, New York, 1981. xiv, 446 pp., illus. $49.50. Progress in Cancer Research and Therapy, vol. 17.

It is now just over 60 years since it was clearly demonstrated that cancer could be produced experimentally in animals. This discovery came at a time when there was a growing realization that some diseases are due to deficiencies of trace dietary components, and it was natural in such circumstances that there should be considerable interest in the role of nutrition in the development of cancer. Experiments over the next 30 to 40 years showed that carcinogenesis could indeed be influenced by factors such as caloric intake and level of fat in the diet, but interest in the subject gradually lessened, in part because the studies of nutrition and cancer in animals had no clearly perceived relevance to human cancer.

Meanwhile, epidemiological data were being collected that showed large geographical differences in the incidence of and mortality from particular types of cancer. Other evidence, particularly from studies of migrating populations, indicated that these differences were largely due to environmental rather than hereditary influences. Comparison of the data with the results of animal experimentation showed that some of the dietary components that influenced the susceptibility of animals to cancer were correlated with mortality from the same types of cancer in humans. These observations have led to a revival of interest in the role of nutrition in cancer and have stimulated many experimental and epidemiological studies in recent years. Along with the renewed interest in nutrition as a factor in the causation of cancer has come an increased awareness that nutrition plays an important role in the treatment of cancer patients. Literature on the subject has burgeoned, and numerous symposiums have been devoted to it.

The present volume is an ambitious attempt to cover the various aspects of the role of nutrition in both the causation and the treatment of cancer. On the whole, the contributors have succeeded in providing a good overview of the current state of knowledge.

The book includes chapters on the epidemiology of cancer and on the associations between cancer and such dietary constituents as fat, fiber, vitamins, minerals and trace elements, artificial sweeteners, food additives and contaminants, and alcohol. The availability of in vitro assays has made it easier to detect the presence in food of mutagens, some of which are produced by exposure to high temperatures during cooking. Such substances are potentially able to act as carcinogens as well. Diet can also have an important influence at the promotional stage of carcinogenesis, and dietary components such as fat probably act as promoters rather than as carcinogens. Other chapters are devoted to nutrition, immunology, and cancer and to the relationship of diet to hormones and cancer.

In assessing the impact of diet on cancer it is desirable to be able to quantify dietary intake, and a section of the book deals with methods of nutritional assessment. Dietary intakes estimated from diet histories or diaries are subject to many inaccuracies and methods involving direct weighing and analysis of food consumed are tedious and time-consuming. Some indication of nutritional status and body composition can be obtained from anthropomorphic measurements such as height, weight, skinfold thickness, and body circumference, but such methods also have limitations. Although many biochemical tests have been used for nutritional assessment, there is no single ideal marker for early malnutrition. Newer noninvasive techniques such as computerized axial tomography can be used to provide information on specific organs of normal and cancer patients. However, it is clear that more and better methods of nutritional assessment are greatly needed.

The last section of the book is devoted to the role of nutrition in the treatment of cancer patients. A well-nourished patient generally has a more favorable prognosis, and providing optimal nutrition is a major challenge for the medical

team. Chapters in this section deal with topics such as nutritional problems associated with chemotherapy and radiation therapy, the day-to-day nutritional management of cancer patients, and special techniques such as enteral and parenteral feeding. One chapter is devoted to special problems in the nutritional management of children with cancer.

This book can be recommended to specialists as well as to a wider audience as a useful source of much of the evidence that exists on the subject of nutrition and cancer.

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A Plant Family

The Orchids. Natural History and Classification. ROBERT L. DRESSLER. Harvard University Press, Cambridge, Mass., 1981. xii, 332 pp., illus., + plates. $27.50.

The orchids, with their often dazzling and seemingly extravagant flowers, elicit greater human response and probably have attracted a larger group of devotees than any other group in the plant kingdom. With some 20,000 known species (and perhaps 5000 yet to be described) in approximately 725 genera, the Orchidaceae are conceded by most to be the largest family of flowering plants. Herbaceous in form, with flowering plants ranging in size from about 1 centimeter long (*Platystele*) to lianas of many meters (*Vanilla*, whence the true vanilla flavoring is derived), orchids are found in most regions of the habitable globe, either occupying terrestrial habitats, as is the case in temperate zones, or, as is most typical of tropical regions, being constitutents of the rich epiphytic flora. It is in these tropical arboreal settings, especially in the Americas and southeast Asia, that orchids have attained their greatest density and diversity.

The same elevated habitats that have been so rewarding to orchid evolution have served in their relative inaccessibility to restrict our view of the orchids. Despite the extensive literature dealing with them, much of it written in a popular vein and often lavishly illustrated, the orchids remain enigmatic. Little is known of their population structure and dynamics, and even though much of their diversity in floral morphology may be related to their rich pollinator fauna—a fact that did not escape the attention of Darwin—many interpretations are based on conjecture rather than observation. Despite excellent research carried on by some orchidologists, including the author of this book, much of the work tends to be compilatory or floristic, lacking the depth that may be attained monographically or the insights that may be gained from modern systematic approaches. The Orchidaceae remain fertile ground for innovative study.

For those who wish to enter the world of orchids, whether botanically or horticulturally, this beautifully illustrated and well-produced book will be an indispensable reference. Writing in a style that will appeal to amateur enthusiasts and professionals, the author justifiably digresses here and there to provide brief discussions of subjects such as classification, the organization of the plant kingdom, and speciation. Yet these sections do not seem to detract from the fact that this is a solid botanical contribution.

The book divides itself naturally into two parts. The first part consists of seven expository chapters that provide a definition of the orchids, consider their geographical dispersion in terms of the present and of geologic history, and describe their morphology, especially floral structures, in both phenetic and phyletic contexts. In the chapter on ecology, sections are devoted to mycorrhiza, epiphytism, ant relationships, phenology, and pollinators, among other subjects. Speciation and evolution of higher categories are the principal elements of the chapter on evolution; that dealing with classification provides a rationale for the taxonomic treatment of subfamilies, tribes, and subtribes that constitutes the second part of the treatise. For each of these taxa, as is appropriate, information is given on morphology, distribution, pollination, chromosome numbers, number of species, names of genera, and occurrence of intergeneric hybrids. The treatment of each concludes with a general discussion, thoughts on relationships and phyletic trends, and pertinent references.

The book is not without fault. For example, the discussion of the evolution of habit precedes the definition of pseudobulbs and other terms that give the background necessary to appreciate the evolutionary interpretations, and the introduction of the terms *r* and *K* selection without definition will leave some readers perplexed. But these are minor points. The book is informative and a delight to read.

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Books Received

Controlling Technology. Genetic Engineering and the Law. Yvonne M. Cripps. Praeger, New York, 1980. xiv, 156 pp. $21.95.

Coping with Crisis and Handicap. Proceedings of a symposium, Boston, Sept. 1979. Aubrey Milunsky, Ed. Plenum, New York, 1981. xvi, 358 pp., illus. $19.50.

The Cornea in Measles. N. W. H. M. Dekkers. Junk, The Hague, 1981 (U.S. distributor, Kluwer Boston, Hingham, Mass.). vi, 122 pp., illus. $29.

Cosmology. Michael Rowan-Robinson. Clarendon (Oxford University Press), New York, ed. 2, 1981. xiv, 154 pp., illus. Cloth, $34.50; paper, $17.95. Oxford Physics Series, 15.

The Endometrium. Hormonal Impacts. Proceedings of a symposium, Paris, Apr. 1980. Jean de Brux, Rodrigue Mortel, and Jean Pierre Gautray, Eds. Plenum, New York, 1981. viii, 168 pp., illus. $29.50.

Energy and the Oceans. André Brin. Translated from the French edition (Paris, 1979). Westbury House, Guildford, Surrey, England, 1981 (U.S. distributor, Butterworths, Boston). x, 134 pp., illus. $29.95.

Energy for Rural and Island Communities. Proceedings of a conference, Inverness, Scotland, Sept. 1980. John Twidell, Ed. Pergamon, New York, 1981. x, 254 pp., illus. $45.

Energy from Biomass and Wastes V. Papers from a symposium. Lake Buena Vista, Fla., Jan. 1981. Donald L. Klass, chairman. J. W. Weatherly III, director. Institute of Gas Technology, Chicago, 1981. xii, 1092 pp., illus. Paper, $75. Symposium Papers.

Laboratory Exercises in Physiology. Homer L. Dorman, Ed. Illustrations by Edward M. Grube. Kendall/Hunt, Dubuque, Iowa, ed. 4, 1981. x, 182 pp. Spiral bound, $13.45.

Lead Pollution. Causes and Control. R. M. Harrison and D. P. H. Laxen. Chapman and Hall, London, 1981 (U.S. distributor, Methuen, New York). viii, 168 pp., illus. $19.95.

Leukemia Markers. Proceedings of a conference, Vienna, Feb. 1981. W. Knapp, Ed. Academic Press, New York, 1981. xvi, 574 pp., illus. $48.

Manual of Clinical Nephrology of the Rogosin Kidney Center. Jhoong S. Cheigh, Kurt H. Stenzel, and Albert L. Rubin, Eds. Nijhoff, The Hague, 1981 (U.S. distributor, Kluwer Boston, Hingham, Mass.). xxii, 492 pp. $65. Developments in Nephrology, vol. 1.

Map Data Processing. Proceedings of a NATO Advanced Study Institute, Maratea, Italy, June 1979. Herbert Freeman and Goffredo G. Pieroni, Eds. Academic Press, New York, 1980. x, 374 pp., illus. $26.

Oxides and Oxide Films. Vol. 6. Ashok K. Vijh, Ed. Dekker, New York, 1981. xii, 346 pp., illus. $55. The Anodic Behavior of Metals and Semiconductors.

The Papers of Joseph Henry. Vol. 4, January 1838–December 1840, The Princeton Years. Nathan Reingold, Arthur P. Molella, and Marc Rothenberg, Eds. Smithsonian Institution Press, Washington, D.C., 1981. xxxiv, 476 pp., illus. $30.

Particle Physics 1980. Proceedings of a meeting, Dubrovnik, Sept. 1980. Ivan Andrić, Ivan Dadić, and Nikola Zovko, Eds. North-Holland, Amsterdam, 1981 (U.S. distributor, Elsevier North-Holland, New York), viii, 500 pp., illus. $78.

The Snouters. Form and Life of the Rhinogrades. Harald Stümpke. Translated from the German edition (Stuttgart, 1957) by Leigh Chadwick. University of Chicago Press, Chicago, 1981. xxvi, 92 pp., illus. Paper, $4.95. Reprint of the 1967 edition.

Spectrometric Techniques. Vol. 2. George A. Vanasse, Ed. Academic Press, New York, 1981. xiv, 304 pp., illus. $43.

Sprache und Spracherlernung. Unter mathematisch-biologischer Perspektive. Volker Beeh. Walter de Gruyter, New York, 1981. viii, 192 pp., illus. $46.

Staff Reports to the President's Commission on the Accident at Three Mile Island. Pergamon, New York, 1981. viii, 438 pp. $97. Progress in Nuclear Energy, vol. 6. Reprinted from U.S. government publications.

Statistical Supplement to the Annual Report, 1979–80. Alcoholism and Drug Addiction Research Foundation, Toronto, 1981. xxii, 274 pp. Paper, C$12.50.

Steroids. Keys to Life. Rupert F. Witzmann. Translated from the German edition (1977) by Rosemarie Peter. Van Nostrand Reinhold, New York, 1981. xvi, 256 pp., illus., + plates. $28.50.

Structural Crystallography in Chemistry and Biology. Jenny P. Glusker, Ed. Hutchinson Ross, Stroudsburg, Pa., 1981 (distributor, Academic Press, New York). xx, 422 pp., illus. $50. Benchmark Papers in Physical Chemistry and Chemical Physics, vol. 4.

Xth International Seaweed Symposium. Göteborg, Sweden, Aug. 1980. Tore Levring, Ed. Walter de Gruyter, New York, 1981. xiv, 782 pp., illus. $97.50.