exogenous, such as inhaled carbon particles or ingested drugs, or endogenous, such as bile, melanins, lipofuscins; melanins, in fact, are the subject of only three of the chapters in this monograph.

Some of the chapters could well have been dispensed with. The chapter "Histochemistry of melanins" is an exhaustive tabulation of archaic and undocumented statements about the histochemistry of melanin and melanogenesis, for example. A serious omission in this monograph is that there is no summary of the recent findings on the chemistry of melanins by the Nicolaus group in Naples.

There are, however, worthwhile discussions of bile pigments, the Dubin–Johnson syndrome, lipids, the nature of the pigmentation in ochronosis, and the curious pigmentation of the intestinal tract. There is a lucid and comprehensive summary entitled "Normal and abnormal melanin pigmentation of the skin." The presence of melanin in neurons is a subject of much interest because of the successful treatment of Parkinson's disease with L-dopa. The author concludes, after a thorough review of the literature, that "neuronal melanin is not synthesized by a tyrosine-tyrosinase system as in skin melanocytes, but by a different pathway involving oxidation of brain catecholamines, in particular, dopamine."

This monograph is a necessary reference book for the library of the pathologist and a good source book for the biologist and the physician.

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Plants

Biologie Végétale. Vol. 1, Cytologie. A. NOUGARÈDE. xii, 600 pp., illus.; 130 F. Vol. 2, Nutrition et Métabolisme. R. HELLER. viii, 580 pp., illus.; 115 F. Vol. 3, Croissance, Morphogenèse, Reproduction. R. CHAMPAGNAT, P. OZENDA, and L. BAILLAUD. viii, 512 pp., illus.; 115 F. Masson, Paris, 1969. Précis de Sciences Biologiques.

This treatise in three volumes has been written to fill the need for an up-to-date presentation of plant biology in the French language, for the benefit of university students. One can feel that the first volume, devoted to plant cytology, has been prepared by one who is both an excellent teacher and an expert in her field. The methods that have opened new vistas in the study of cells are clearly and accurately presented: phase microscopy, autoradiography, electron microscopy, freeze-etching, ultracentrifugation, and so on. Fundamental aspects of proteins and nucleic acids are reviewed as a background to the study of the constitution and functions of the cytoplasm and its inclusions. The mode of formation of the latter and the figures seen in the electron microscope for the plasmalemma, endoplasmic reticulum, Golgi apparatus, mitochondria, and chloroplasts are very well illustrated through numerous diagrams and full-page electron micrographs. The author does not hesitate when necessary to bring in examples from animal cytology, such as the fine structures of the mitochondrial cristae of beef heart or those of flagellae of the branchial epithelium of the mussel. An explanatory presentation of the process of cell division constitutes the last part of the volume. On the whole, the author has achieved the difficult task of bringing together in a clear picture the outburst of investigations in the fields of electron microscopy and biochemistry which have been directed at the cell in the past 25 years.

The second volume, devoted to nutrition and metabolism, has a much drier presentation. The story of mineral nutrition follows a classical pattern. Certain terms are left unexplained. It is stated, for example (p. 4), that the structural proteins of the protoplasmic gel are held to water by "imbibition forces," which are not defined. In the chapter concerned with the assimilation of nitrogen, nothing is said about the fact that nitrate reductase is an inducible enzyme. Such fundamental processes as the incorporation of the nitrogen atom into an organic molecule and the fixation of reduced nitrogen on keto acids are barely mentioned. A few good metabolic maps would more suitably fill the two and a half pages that are occupied by drawings and photographs of insectivorous plants. Also, the metabolic chains of the biosynthesis of phenolic compounds which are specific to the plant world and have been so intensively studied would have been interesting to discuss. In general, the presentation of plant metabolism is weak.

Three authors have cooperated in writing the third volume, which deals with growth, morphogenesis, and reproduction. On the whole, the subjects of growth, differentiation, morphogenesis, and correlations are adequately treated. Auxins are dealt with in some detail, in contrast to gibberellins and cytokinins. Several auxin tests are presented, but the inhibitory part of the curves, which is known (and has been for four years now) to be due to the endogenous formation of ethylene, is left unexplained. Ethylene itself, which is now recognized as a genuine plant hormone, is not mentioned (not even as a fruit-ripening agent, since ripening and senescence are not discussed). In the chapter dealing with plant movements, nothing is said about the biochemical aspects of tendril excitation, for example the role of flavonoids. The part devoted to plant reproduction gives a fairly complete botanical base for the reproduction of algae, fungi, and higher plants. Again, the presentation is rather formal and classical, with no reference to the interesting results obtained during the last ten years in the hormonal control of formation of antheridia in ferns or the developmental physiology of the myxomycetes, which the last author purposely leaves outside the scope of his presentation.

On the whole, the treatise is an updated version of older treatises; there are some gaps with respect to the newest developments of plant biology, but this science is so vast now that it is impossible to encompass it all nowadays. The usefulness of volumes 2 and 3 as reference manuals is reduced by the fact that only books, and not original articles, are cited.

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The Premier Geosyncline

Studies of Appalachian Geology: Northern and Maritime. E-AN ZEN, WALTER S. WHITE, JARVIS B. HADLEY, and JAMES B. THOMPSON, JR., Eds. Interscience (Wiley), New York, 1968. xviii, 480 pp., illus. $29.50.

Studies of Appalachian Geology: Central and Southern. GEORGE W. FISHER, F. J. PETTIJOHN, J. C. REED, JR., and KENNETH N. WEAVER, Eds. Interscience (Wiley), New York, 1970. xx, 460 pp. + plates. $29.50.

"The Appalachian Chain," as P. B. King writes in the epilogue of the second of these two volumes, "is the most elegant on earth, so regularly arranged that its belts of formations and structures persist virtually from one end to the other—from its first appearance from beneath the sea in Newfoundland,

to its final disappearance under the Gulf Coastal Plain in Alabama. No wonder is it that the Appalachians have been the birthplace of many of the great principles of . . . geology."

For purposes of these volumes, the Delaware River is taken as the boundary between the northern and central Appalachians. Therefore, the first volume deals with northwestern New Jersey and the Appalachians to the northeast, whereas the second volume deals with Pennsylvania and the Appalachians to the southwest.

For the first volume, an introduction and the regional geologic map, which is placed near the back of the book to facilitate reference to it, set the stage. The rest of the topical coverage is divided into six sections: 1, Regional Stratigraphy and Paleogeography, with seven papers most of which are review articles about the chief stratigraphic systems of this part of the province; 2, 3, and 4, Stratigraphy and Structural Relationships in the Outer or Northwestern Belt, . . . in the Central Belt, and . . . in the Inner or Southwestern Belt, with five, seven, and three papers, respectively, nearly all of which are about specific areas but a few of which also outline important concepts relating to orogenic events; 5, Igneous and Metamorphic Petrology and Petrogenesis, with seven chapters dealing with radiometric dating, metamorphism, and diverse kinds of igneous activity; and 6, Geophysics, with four articles giving data and interpretations of gravity anomalies, aeromagnetics, and heat flow. The already mentioned generalized geologic map (1:2,500,000) is essentially a U.S. Geological Survey map put on open file in 1968. Although its inclusion in the volume will be of great aid to readers, special attention needs to be directed to the rather peculiar fact that the dash pattern used for the Cambrian and Ordovician rocks "is not intended to represent structural trend lines."

For the second volume, the coverage is divided into four sections, each with its own introduction, and an epilogue. The four sections are: 1 and 2, The Valley and Ridge and Appalachian Plateau—Stratigraphy and Sedimentation, and . . .—Structure and Tectonics, with six papers in each section and about such subjects as depositional sequences, turbidites, "iron sedimentation," kinematic patterns, and estimates of lateral shortening; 3, The Blue Ridge and Reading Prong, with seven papers most of which are reiterations of previously published facts and fancies; and 4, The Piedmont, with ten articles dealing with such diverse subjects as the Martic problem and post-Triassic tectonism. This second volume also includes a regional map near the back. (Perhaps only the reviewer's copy has this map tipped in upside down.) This map (also 1:2,500,000) is a revision by J. C. Reed, Jr., of the appropriate portion of the Tectonic Map of the United States, originally published in 1961 by the U.S. Geological Survey and the American Association of Petroleum Geologists. The epilogue is ended by the posing of questions the answers to which are needed before any truly comprehensive history of the Appalachians may be given. The questions deal with delineation of relationships beyond the currently known boundaries—at depth, to the northeast, to the southwest, and to the southeast—of the province.

As in nearly all such collections of articles, there are marked differences in the quality of the data as well as of the interpretations presented. There are also noteworthy omissions in topical coverage and of contributors. For examples: metallogenesis within the province and possible genetic relationships between Triassic events and earlier Appalachian history are essentially ignored *and* no papers by any of the University of North Carolina geologists who have been and continue to be so actively involved in investigations of the southern Piedmont are included. On the other hand, there is the praiseworthy virtue that both volumes contain papers that give conflicting interpretations and hypotheses to account for the same or apparently similar geological features.

There is a marked contrast between the currency of several of the papers in the first volume and the rather dated character of many of the papers in the second. The dated papers, however, add a historical dimension that makes it seem rather likely that the pair may become attractive to a wider audience than either volume would by itself.

Much of the first volume will gain early plaudits. Much of the second volume will also gain approval by those who are not discouraged from reading all of it because of such statements as "Viva Appalachia" and "The Piedmont has the shape of a wild duck swimming gracefully northward" which occur in the introductory remarks. Papers in both volumes will serve as standard references in the future and will prompt future investigation within the province. A few of the papers will undoubtedly also stimulate further synthesis of data relating not only to the Appalachians but also to other geosynclinal tracts which have undergone mountain-building and associated activities.

Geologists the world over owe a debt of gratitude to the 86 authors and editors who prepared and collected the 63 articles and regional maps that constitute these two volumes, to the geologists to whom the volumes are dedicated—Marland P. Billings, "a pioneer in the renaissance of Appalachian geology . . ." and Ernst Cloos, "who rekindled a spirit of inquiry into Appalachian geology"—and to the several other early Appalachian geologists whose contributions played important roles in promoting the investigations and thoughts recorded in these volumes.

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Aurora and Airglow

Atmospheric Emissions. Proceedings of a NATO Advanced Study Institute, Ås, Norway, July–Aug. 1968. BILLY M. MCCORMAC and ANDERS OMHOLT, Eds. Van Nostrand Reinhold, New York, 1969. xii, 564 pp., illus. $25.95.

This book is a delightful festschrift in disguise. The book actually is based upon the proceedings of the NATO Advanced Study Institute on the Aurora and Airglow. The organizers of the institute, however, selected the occasion to honor that dynamic explorer of the geomagnetic and upper atmospheric processes Sidney Chapman, who at 80 is as fully endowed with enthusiasm as on the day when the reviewer first encountered him at an auroral conference in 1949 in London, Ontario. I remember the occasion well because at that time Chapman gave a speech honoring the 84th birthday of the principal guest, another grand pioneer of auroral phenomena, Carl Störmer. In subsequent years I found myself one of those 59 collaborators in 109 papers who have been privileged to work with Chapman.

In the lead paper in the volume at hand Chapman sketches the development of auroral science from 1600 to 1965, noting the highlights and the evolution of concepts, culminating in the intense burst of activity resulting from the programs of the International Geophysical Year. Despite the remarkable changes in the ensemble of observational facts and successions of theories, he concludes with the observation that his talk must end in a question