sity Press (1957)] has been devoted to the topic.

The supplementary notes and statistics are excellent. For nearly all of the commodities and industries, enough information is given to show production trends.

The title is perhaps modest. The *Oxford Regional Economic Atlas of the Middle East and North Africa* contains the general physical and economic background of the region plus more detailed treatment of the salient physical and economic landmarks. The information is sufficiently comprehensive for the reader to obtain a sound understanding of the principal resource patterns and problems of the Middle East and North Africa.

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Stratigraphic Principles and Practice. J. Marvin Weller. Harper and Brothers, New York, 1960. xvi + 725 pp. Illus.

With the ever-increasing need for a rational synthesis and integration of the vast store of published factual data in stratigraphy, it is a timely task to review and to reappraise the fundamental principles and major concepts which constitute the stratigraphic discipline. It is also timely to advance the standards in methods and procedures of stratigraphic work in the field and in the office.

Marvin Weller has admirably accomplished this task in his new book *Stratigraphic Principles and Practice.* The text is a welcome contribution to the better understanding of stratigraphic problems, many of which still await solution. The book is well written and places proper emphasis on the application of principles, the consideration of concepts, and the interpretation of basic data; this is a marked contrast to the outmoded catalog-like presentation of the subject.

Controversial issues are treated with an objectivity that provides a stimulating challenge to students to think and to reason things out for themselves. The bibliographic references, given at the end of each chapter, are, for the most part, adequate, but the addition of a few more titles of original sources would be desirable.

The book is divided into four parts: The first, short part contains the "Introduction," "Development of stratigraphy," and "Geologic systems"; the second contains "Materials of stratigraphy"; "Stratigraphic bodies and relationships, including classification and nomenclature" is the third part; the fourth, the "Appendix," contains practical suggestions for field work and the preparation of reports. The text is well illustrated, containing 271 figures and many tables.

The historical approach in dealing with the development of stratigraphy is highly commendable, but it should not have been stopped with William Smith. The important contributions made by Lyell and other early investigators during the fruitful years of the middle of the last century are alluded to only briefly at various places in subsequent chapters.

Reference to "zonation" (in association with William Smith's name) as one of the fundamental principles that had been recognized at the beginning of the 19th century may be misleading, unless in this instance the author uses *zonation* to mean something different from the principle which was established during the years 1856–58 by Albert Oppel.

The second part of the book, dealing with the materials of stratigraphy, calls for no special comments. Probably no two stratigraphers would agree on the extent to which the subject of sedimentology and the study of sedimentary rocks should be treated in a text on stratigraphy. The point of view may also vary from institution to institution, depending on curricula.

In general this part of the text is well balanced and well illustrated by drawings and diagrams based on recent original contributions.

The simplification of terminology in the discussion of unconformities, in part 3, is well supported by valid reasoning, although exception may be taken to the definition of an unconformity as a *stratigraphic plane. Stratigraphic plane,* if at all applicable, is only one element of an unconformity. An unconformity is a *geologic structure* or a structural relationship between two sets of rocks.

The subject of stratigraphic classification and nomenclature is well presented and is skillfully combined with the essential points of the Stratigraphic Code.

Weller is probably correct in saying that Füchsel in 1756 was the first to formulate the rudiments of the concept of the formation, but it should be pointed out that Füchsel *did not* introduce the term *formation.* He had recognized distinctive lithologic units, such as the Muschelkalk and others, and these he called *series montana* or *Geburge* (probably this should have been spelled "Gebürge"). The misunderstanding, which has been perpetuated in geologic literature for many years, appears to stem from Zittel (1899, page 51) who inserted the term "(Formation)" as his own idea of the equivalent of Füchsel's *series montana.*

It may be also pertinent to note that the idea of the formation, with a connotation of time, as formulated by Humboldt and by his contemporary Buch, is different from the concept of the formation currently used in the United States and from the concept earlier expressed by Conybeare and Phillips and by Lyell. In the German geologic literature the term formation is applied to the concept which is now called a System, for example, *Die Juraformation.*

The discussion of biostratigraphic units, and, particularly, the distinction between biostratigraphic units and the time-rock units does not entirely clear up the points of contention among different schools of thought on that subject. Any fossiliferous unit is a biostratigraphic unit when it is analyzed for biostratigraphic data, such as composition of fauna (or flora), geologic age, paleoecology, paleobiogeography, dispersal of organisms, and the like. One, therefore, cannot agree with the author that biostratigraphic units "are wholly objective and not dependent upon interpretative considerations. . . ."

The use of the term *Series* for units which should be properly called *Stages* is, perhaps, a reflection of the transitory state of our period of stratigraphic thinking in the United States. The formational units called series in the sense of rock-units are commonly given "an" or "ian" endings and are, thus, "promoted" to time-rock Series. A greater uniformity in nomenclature would be achieved if the term *Series* were retained for subdivisions of Systems, such as Lower, Middle, and Upper.

The chapter on facies is comprehensive in scope and is amply illustrated with diagrams, graphs, and maps.

Some aspects of the limitation of paleontologic correlation, shown by the lack of correspondence in the stratigraphic occurrence of Jurassic ammonites in England and in France (Figs. 215 and 216), should be viewed in the light of more recent studies. The apparent anomaly in the succession (Fig. 215) has been explained by Spath (1938,

page 34) as being due to misidentification. As to "the other anomalies," according to Arkell (1956, page 104) "doubt is inevitably cast on them also."

The chapter on historical geology appropriately summarizes the objective of stratigraphy.

Students of stratigraphy, particularly beginners, will find the appendix with its practical suggestions for field work and for graphic presentation of results to be a very useful part of the book. The list of references to various manuals could be profitably enlarged by including Busk's *Earth Flexures, Suggestion to Authors*, and a few others.

Minor points, critically mentioned in the preceding paragraphs, do not detract from the general excellence of the book. *Stratigraphic Principles and Practice* merits favorable consideration for adoption as a text in stratigraphy.

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Biochemistry of Plants and Animals. M. Frank Mallette, Paul M. Althouse, and Carl O. Clagett. Wiley, New York, 1960. xiii + 552 pp. Illus. $8.50.

In writing this textbook the authors had to cope with the difficult problem of presenting a vast amount of biochemical knowledge, in its many ramifications, to students of agriculture with limited preparation in modern physics, chemistry, and biology. Their solution is the best testimony of their broad scientific approach to complex subject matter and of their educational skill. I was surprised and impressed to find such advanced topics as the function of deoxyribonucleic acid and ribonucleic acid, nicotinamide adenine dinucleoxide, adenosine triphosphate, biotin, gibberellic acid, auxins, and antiauxins discussed on an elementary level.

In the excellent chapter on mineral metabolism, radiation and radioisotopes are mentioned; in the very good chapter on feedstuffs, the use of antibiotics in livestock feeding has been given proper attention. Although written primarily to serve as a biochemical foundation for those studying the agricultural sciences, the book can also be recommended to all who wish to obtain a condensed review of the present status of biochemical knowledge.

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New Books

Mathematics, Physical Sciences, and Engineering

Pulp and Paper. Chemistry and chemical technology. vol. 1, *Pulping and Bleaching.* James P. Casey. Interscience, New York, ed. 2, 1960. 694 pp. Illus. $19.50.

Reactions between Complex Nuclei. Alexander Zucker, Frederick T. Howard, and Edith C. Halbert, Eds. Wiley, New York, 1960. 328 pp. Illus. $7. Proceedings of a conference (2–4 May 1960) sponsored by the American Physical Society and the Oak Ridge National Laboratory.

Reports on Progress in Physics. vol. 22, 1960. A. C. Stickland, Ed. Physical Society, London, 1960. 633 pp.

Rival Theories of Cosmology. A symposium and discussion of modern theories of the structure of the universe. H. Bondi, W. B. Bonnor, R. A. Lyttleton, and G. J. Whitrow. Oxford Univ. Press, New York, 1960. 76 pp. Illus. $2.25.

Röntgenographische Chemie. E. Brandenberger and W. Epprech. Birkhauser, Basel, Switzerland, 1960. 272 pp. Illus. F. 32.

Seminar on Transformation Groups. Armand Borel. Princeton Univ. Press, Princeton, N.J., 1960. 251 pp. $4.50. Contributions by G. Bredon, E. E. Floyd, D. Montgomery, and R. Palais.

Silicon and Its Binary Systems. A. S. Berezhanoi. Translated from Russian. Consultants Bureau, New York, 1960. 283 pp. $8.50. Originally published in 1958 by the Academy of Sciences of the Ukrainian SSR.

Silicon Carbide. A high temperature semiconductor. J. R. O'Connor and J. Smiltens, Eds. Pergamon, New York, 1960. 540 pp. Illus. $12.50. Proceedings of a conference (1959) sponsored by Air Force Cambridge Research Center.

Some Ionospheric Results Obtained during the International Geophysical Year. W. J. G. Beynon, Ed. Elsevier, Amsterdam, 1960 (order from Van Nostrand, Princeton, N.J.). 413 pp. Illus. Proceedings of a symposium organized by the URSI/AGI Committee (Brussels, September 1959).

Space Rockets and Missiles. Raymond F. Yates and E. Russell. Harper, New York, 1960. 349 pp. Illus. $3.50.

Spectra and Analysis. A. A. Kharkevich. Translated from Russian. Consultants Bureau, New York, 1960. 228 pp. $8.75. Translated from the revised edition published by the State Press for Technical and Theoretical Literature, Moscow, 1957.

Spot Tests in Organic Analysis. Fritz Feigl. Translated by Ralph E. Oesper. Elsevier, Amsterdam, ed. 6, 1960 (order from Van Nostrand, Princeton, N.J.). 695, pp. Illus. $13.25.

Tables and Nomograms of Hydrochemical Analysis. I. Yu. Sokolov. Translated from Russian. Consultants Bureau, New York, 1960. 85 pp. Paper, $4.35.

Tables of Lommel's Function of Two Variables. E. N. Dekanosidze. Translated from Russian by D. G. Fry. Pergamon, New York, 1960. 499 pp. $20.

Vibrations from Blasting Rock. L. Don Leet. Harvard Univ. Press, Cambridge, Mass., 1960. 149 pp. Illus. $4.75.

Miscellaneous Publications

(Inquiries concerning these publications should be addressed, not to Science, *but to the publisher or agency sponsoring the publication.)*

American Midland Naturalist. *Cumulative Index,* (vols. 1–60). George R. Bernard, Ed. American Midland Naturalist, Notre Dame, Ind., 1958. 530 pp. $4.25. Contains author, new genera and species, and subject indexes.

Education for Africans in Tanganyika. A preliminary survey. Betty George. U.S. Office of Education, Washington, D.C., 1960 (order from Supt. of Documents, GPO, Washington 25). 97 pp. $0.40.

The Ending of Wilhelm Reich's Researches. Charles R. Kelley. Interscience Research Inst., Stamford, Conn., 1960. 19 pp. $0.50. Kelley examines the Reich-orgone energy controversy and recounts his attempts to discuss, with responsible officials, the injunction obtained by the Food and Drug Administration to ban Reich's books and journal publications. Kelley says that he was unable to obtain an appointment with Mrs. Hobby who was the Secretary of Health, Education, and Welfare at the time.

Federal Funds for Science. No. 9, *The Federal Research and Development Budget, Fiscal Years 1959, 1960, and 1961.* National Science Foundation, Washington, D.C., 1960 (order from Supt. of Documents, GPO, Washington 25). 89 pp. $0.50.

Labor Relations Policy in an Expanding Economy. vol. 333 of *Annals of the American Academy of Political and Social Science.* Marten S. Estey, Ed. The Academy, Philadelphia, Pa., 1961. 213 pp. Cloth, $3; paper, $2.

Large Radiation Sources in Industry. vol. 2. International Atomic Energy Agency, Vienna 1, Austria, 1960 (order from UNESCO Publications Center, New York 22). 447 pp. Illus. Paper, $4.50. This is the second volume of the proceedings of a conference on the application of large radiation sources in industry and especially to chemical processes, which was organized by the Agency at Warsaw on 8–12 September 1959. Four major topics are covered: radiation and chemical reaction, special applications of radiation, radiation and food preservation, and economics of radiation processing.

A Monograph of the Nearctic Plagiochilaceae. Rudolf M. Schuster. American Midland Naturalist, Notre Dame, Ind., 1960. 434 pp. $4. Papers reprinted from vols. 62 and 63, *American Midland Naturalist.*

Review of Fungal Diseases of Cotton in Egypt. Egyptian Reviews of Science, vol. 3. M. A. Mostafa. Science Council, Cairo, 1959. 55 pp.

Symposium: Speciation and Raciation in Cavernicoles. American Midland Naturalist, Notre Dame, Ind., 1960. 160 pp. $2.50. Papers presented at the 1959 annual meeting of the AAAS, in a symposium sponsored by the National Speleological Society and the Society of Systematic Zoology.

United States Business Performance Abroad. No. 9, *The General Electric Company in Brazil.* Theodore Geiger. National Planning Assoc., Washington 9, 1961. 105 pp. Paper, $1.