tropical forest communities, with emphasis on the diversity of annual cycles of flowering and pollinators in relation to community partitioning. The final article, by Lawrence Gilbert, is a summary of his evidence for coevolutionary interactions between a neotropical butterfly genus and two groups of flowering plants, one of which is used for larval and the other for adult food. His study makes a reasonably convincing case that coevolution has promoted species diversity in all three.

The strength of this book lies in the competence and cogency with which the individual authors present their material. Its weakness lies in a loss of focus on the central theme set out by the editors, namely, coevolution as an important process in community evolution. Thus, only half the articles refer to coevolution in their concluding remarks. Nevertheless, by virtue of the breadth of the information summarized the book presents a challenge, demanding a fuller development of the theoretical aspects of coevolution. For this reason it must be regarded as an important contribution to modern evolutionary ecology.

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Chemistry of Soils

Soil Components. JOHN E. GIESEKING, Ed. Vol. 1, Organic Components. x, 534 pp., illus. $72.80. Vol. 2, Inorganic Components. xii, 684 pp., illus. $74.80. Springer-Verlag, New York, 1975.

As the world demand for food inexorably expands, the applied sciences involved in crop production must inevitably undergo a revitalizing resurgence of interest. Soils, lying literally at the root of all agricultural production, have thus become a renewed focus of attention for researchers. Soil science is no single discipline, but a conglomerate of many aspects of chemistry, physics, and several biological sciences such as biochemistry, microbiology, and botany, and the time is ripe for the experts in the various branches of soil science to create order in their own house, to make it possible to communicate their specialty better to others.

It is encouraging to note that in recent years soil chemists have not been dormant, waiting for the specter of world famine and malnutrition to revert attention to their endeavors, but have been steadily collecting and sifting information, searching for understanding of the intricate chemical mixtures on whose vegetational outgrowths the human populace essentially plays parasite.

These two books reveal through a detailed treatment of the subject that, paradoxically, much but still only little is known about many of the constituents of soil, even when they are considered in isolation from one another. The coverage is wide, but intentionally not exhaustive with regard either to materials covered or to extent of treatment.

The approach is descriptive rather than interpretative: the chemical constitutions and properties of the main soil minerals and the organic constituents of topsoils are methodically reviewed with only minimal discussion of their implications for soil fertility, agricultural production, pedogenesis, soil classification, soil conservation, the suitability of soils for accepting solid or liquid wastes, the interaction of soils with man-made substances, or any other of the practical or ecological concerns that have provided the justification for much recent soil research and that occupy major portions of conventional soil science texts.

The second volume is perhaps the more basic one, providing an excellently organized presentation of the wealth of detail on the crystal structures and properties of the principal soil silicates, clay minerals, crystalline and amorphous oxides and hydrous oxides, fibrous and heavy minerals, and the like that is now available as a result of modern instrumental analyses. Much attention is devoted to classification of minerals according to structural features. The stage has thus been set for a systematic nomenclature for soil minerals. It becomes apparent that the continued use of trivial names will inhibit systematic learning of soil mineralogy.

The volume is rounded off by chapters on biolith inclusions and water in soils. The latter chapter is not the conventional treatise on the physics of water in soil and soil-moisture relationships but rather a consideration of physicochemical soil-water interactions. In other chapters the use of thermal and infrared analysis to characterize clay mineral constituent is thoroughly and excellently reviewed. The important subject of minor and heavy elements in soils is hardly discussed, however.

With soil organics, the heterogeneity is so great that much less is known about their structures in soil. Description of the bulk of soil organic matter—the intractable humic substances—thus reduces to a recounting of physical properties and gross chemical composition and characteristics and speculation about origin and constituents. Unfortunately the main chapter in volume 1, though performing these tasks very well, contains much outdated organic nomenclature. More accurate descriptions can be, and are, provided for the sugar, polysaccharide, organophosphorus, organosulfur, lipid, and nitrogenous organic constituents of soils. Accounts of the microscopic appearance of soil organic matter and the relationships between humus and soil types complete the picture, although these topics lend themselves even less well to systematic treatment and are of questionable appropriateness in a work devoted primarily to chemical aspects of soil components.

While one must admire the effort invested here in collecting and collating data on soil constituents, one must recognize that in the field simple, readily analyzable systems are seldom encountered, and the interaction of inorganic and organic constituents inter se and with the soil solution, soil microbiota, and vegetation creates an immensely more complicated situation. Nonetheless, these authoritative volumes help clarify much of the current status of soil chemistry. Such individuals as can pay the price will get their money's worth.

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Books Received

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Classical and Modern Mechanics. James H. Bartlett. University of Alabama Press, University, 1975. xx. 472 pp., illus. Cloth, $15; paper, $6.50.

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