course, that the application of information from these specialties to the hillslope situation may not be entirely correct. For example, we know a great deal about open-channel hydraulics, but we do not know if the direct application of its principles to overland flow is meaningful. Until further research is performed on the hydraulics of overland flow there is no alternative to this approach, however.

Because of the diverse subjects treated, each reader may find minor weaknesses in the presentation of material with which he is most familiar. For example, the authors perpetuate the error of Horton and of Leopold *et al.* (pp. 210–11) in assuming that Renner's data were presented in degrees; he used percentages. In fact, Renner explained that in his area maximum erosion on 35- to 45-percent slopes was due primarily to the activity of cattle rather than to gravitational and hydraulic interactions as assumed by Horton.

Minor problems aside, the work is indispensable for the geomorphology postgraduate student and his professor. Much future research will be based on the authors' comments, criticisms, and conclusions. They have performed a significant service for their colleagues and for anyone concerned with the changing landscape.

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## Effects of Plant Substances

**Phytochemical Ecology.** A symposium, Englefield Green, Surrey, Apr. 1971. J. B. HARBORNE, Ed. Academic Press, New York, 1972. xiv, 272 pp., illus. $15. Annual Proceedings of the Phytochemical Society, No. 8.

This symposium volume consists of 14 chapters by different authors who discuss a great diversity of phenomena ranging from biosynthesis of fungal toxins to feeding habits of gorillas. The common theme is the worthwhile but often elusive goal of unraveling the ecological functions of secondary compounds in plants. Strictly speaking there is not much ecology in this book. The authors are concerned chiefly with chemical structure, biosynthesis, physiology, and behavioral bioassay in the laboratory. Only in a few instances, such as the studies reported here by C. H. Muller and C.-H. Chou and by D. A. Jones, has there yet been any attempt to evaluate quantitatively the significance of chemical adaptations in natural populations or communities, yet this must be the ultimate objective of the chemical ecologist. Muller and Chou compare various mechanisms whereby terpenoid and phenolic compounds are released by certain shrub and tree species, inhibiting the growth of surrounding and potentially competing vegetation. Jones offers a plausible explanation for the observed polymorphic pattern of cyanogenesis in natural populations of some legume species. Deterrence of herbivores favors cyanogenesis in relatively warm and low-lying areas but is offset at higher elevations by risk of autotoxicity due to frost damage or perhaps by higher metabolic costs associated with cyanogenesis.

Growth rates of phytophagous insects may be determined by the concentrations of relatively few key compounds in their food plants. For two aphid species reared on various cruciferous plants, H. F. van Emden demonstrates that quantitative variation between plants of amino acids and of allyl isothiocyanate alone accounts for most of the variation in aphid performance from one plant to another. The great variety of plants attacked by leaf-cutting ants may be attributable in part to novelty-preference behavior (J. M. Cherrett). Miriam Rothschild emphasizes the importance of the visual acuity of bird predators as a factor in the evolution of the feeding habits of many herbivorous insects. Other chapters concerned with the chemical basis of food plant selection by animals are presented here by E. C. Bate-Smith (higher animals), G. W. Arnold and J. L. Hill (ruminants), and T. A. Rohan (chemistry of flavor).

Reviews of the occurrence, toxicity, and metabolism of secondary compounds in plants are presented by A. Shrift (selenium compounds), E. A. Bell (unusual amino acids), A. R. Mattocks (*Senecio* alkaloids), and M. O. Moss (fungal toxins). Though the impetus for much of the research on these and other toxic plant compounds stems from their possible effects on man and his domesticated animals, ecologists are likely to remain frustrated by the relative lack of information (and sometimes even of concern) as to their functions in natural communities.

The book concludes with two interesting chapters on phytoalexins (B. J. Deverall) and on the chemical mechanisms by which seeds of various parasitic higher plants are stimulated to germinate in close proximity to their host plants (W. G. H. Edwards).

This book is full of interesting facts and ideas and can be recommended both as good reading and as a valuable reference source. A useful feature is the inclusion at the end of the volume of an additional index each for all plant species, animal species, and authors cited in the text.

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## Oceanography Observed

**The Great Ocean Business.** BRENDA HORSFIELD and PETER BENNET STONE. Coward, McCann and Geoghegan, New York, 1972. 360 pp. + plates. $12.95.

This is an integrated exploration of the scientific, economic, social, and political consequences of the last two decades of explosive growth in oceanography. Its authors are mainly observers of science rather than practitioners, although Stone has a background in geology. They are journalists, scriptwriters, directors, and broadcasters who have personally interviewed many of the diverse groups of people whose work they discuss. From these beginnings they have gone on to original work at the frontiers of the earth sciences. To quote Sir Edward Bullard's preface, "It is one of the attractions of travelling on a rapidly accelerating bandwagon that so many people jump on, and in two or three years one finds oneself among the oldest travellers and a sage in one's own right."

The first half of the book is concerned with continental drift, sea floor spreading, plate tectonics, and the scientific revolution that these special terms identify. The reader is led through a historical sequence from the ancient time (1910–1920), through the period of descriptive groping (1950's), to the integrating hypotheses of the 1960's.

The authors had to leave the bandwagon sometime, and, allowing for reasonable publishing rates, it probably was near the end of 1970. The output of papers on plate tectonics is doubling every two years. Inevitably the aficionado will find some conclusions out of date. The global model of the sea floor, shown in dramatic photos, is an example of a solidified myth. The descriptive groping still continues.