Book Reviews

Temperate-Zone Biogeography

Biogeographical Relationships between Temperate Eastern Asia and Temperate Eastern North America. Missouri Botanical Garden, St. Louis, 1984. 329 pp., illus. Paper, $15. Reprinted from *Annals of the Missouri Botanical Garden*, vol. 70, nos. 3 and 4 (pp. 421–749). From a symposium, St. Louis, Sept. 1982.

Major disjunctions in the distribution of organisms have fascinated biologists since the time of Linnaeus. In the absence of sound geologic parameters, early attempts to explain these disjunctions often appear today to be unrestricted flights of fantasy. For example, Simroth proposed in 1914 that the earth swings like a pendulum, producing the bipolar distributions perceived in *Gnetum*, *Pinus*, and *Magnolia*. Nor were disjunctions in the fossil record spared from innovative interpretation. Joleaud proposed in 1919 a land bridge running from Florida and the Antilles across northern Africa to Spain to account for the presence of *Hipparion* in the New and the Old World. He later expanded the bridge to include the entire region between Maryland and Brazil, across to northern France and Morocco. To account for periodicities in similarities evident in the fossil record, Joleaud further proposed (incurring at this point the wrath of George Gaylord Simpson) that the continents had repeatedly moved back and forth like an accordion. Udvardy, in his book *Dynamic Zoogeography*, presents an instructive map plotting all Cretaceous and Tertiary land bridges proposed prior to 1913. These geophysically impossible land masses fill the ocean basins of the world. Clearly, a prerequisite to understanding disjunctions is an accurate geologic record of the extent, timing, and paleoenvironments of continental connections.

Interest in the classic disjunction between the temperate eastern United States and temperate eastern Asia began with the observations of Linneaus as recorded in the dissertation of Jonas P. Halenius, 1750. Subsequently, the pattern was discussed by Asa Gray beginning in the 1840's, by Li in 1952, and by a series of authors in the 1972 compilation *Floristics and Paleofloristics of Asia and Eastern North America* edited by Graham. From these summaries it was evident that future advances would benefit from (i) more information on the biotas of the People's Republic of China and (ii) a closer integration of zoological data into a subject that had, because of the influence of Gray, been treated primarily from a botanical viewpoint.

The most recent and extensive treatment is this volume resulting from the Missouri Botanical Garden's 29th Annual Systematics Symposium. Both the symposium and the resulting publication are milestones in several respects, including the participation of "the largest delegation of Chinese botanists to attend a scientific conference in the United States since 1949." The introductory paper by D. E. Boufford and S. A. Spongberg presents a timely review of earlier studies and adds new insights, based on letters and manuscripts (some unpublished) in the archives of the Gray Herbarium, into the previously overlooked contributions of Thomas Nuttall and into the influence of Charles Darwin on the phytogeographic thinking of Asa Gray. The papers by Warren Hamilton ("Cretaceous and Cenozoic history of the northern continents") and Malcolm McKenna ("Holarctic landmass rearrangement, cosmic events, and Cenozoic terrestrial organisms") admirably fulfill the need noted earlier for a summary of the geologic relations of the northern continents and for the integration of more data on faunal similarities. The outline of land-sea relationships between northeastern North America and western Europe is particularly valuable, since this connection is more complex and less well understood than that through Beringia.

Perhaps of greatest interest to non-Chinese biologists will be the papers on the fossil and modern vegetation of the PRC by Jen Hsü (late Cretaceous and Cenozoic vegetation), David Chang (the Tibetan plateau), and Zhong Cheng (Hubei Province); general review papers by Wu Zhengyi and Tsün-shen Ying; and discussions of specific groups by Hong De-Yuan (Scrophulariaceae), Chen Singchi (orchids), and Shan-An He and Frank Santamour (*Liquidambar* and *Liriodendron*). Other groups and related subjects are treated by a host of distinguished American and Japanese authors, and the special evening lecture by Margaret Davis ("Quaternary history of deciduous forests of eastern North America and Europe") is also included in the volume.

I have saved for final comment a paper that for me is a capstone to an impressive array of contributions. This is the extensive (42-page) summary by Hsioh-Yu Hou of the vegetation of the PRC, which includes 36 half-tone illustrations of various community types. Accompanying the text, as a folded insert, is a vegetation map of the PRC (scale 1:14,000,000; in color) with an English translation of the legend briefly characterizing the 85 communities recognized.

This volume follows a long line of important contributions resulting from the systematics symposiums held annually at the Missouri Botanical Garden. Director Peter H. Raven, as a member of the science and engineering panel of the Committee on Scholarly Communications with the People's Republic of China, has facilitated a significant scientific event, and editor Nancy Morin has capably guided into print a volume that is a major contribution to the biogeographic literature.

ALAN GRAHAM
Department of Biological Sciences,
Kent State University,
Kent, Ohio 44242

A Practical Chemist

Boussingault. Chemist and Agriculturist. F. W. J. McCosh. Reidel, Boston, 1984 (distributor, Kluwer Boston, Hingham, Mass.). xviii, 280 pp., illus. $55.50. Chemists and Chemistry.

It is well known that while in the 19th century Justus Liebig lent his illustrious name and skillful pen to dramatizing what science could do for agriculture others did the bench and field work to validate his claims. Among these Jean Baptiste Boussingault stands in the front row. On his farm, often called the first agricultural experiment station, Boussingault made "the first ever complete analysis" of plant nutrients taken up and returned to the soil in a five-year crop rotation and demonstrated that a well-manured field could successfully grow the same crop year after year. He also proved that legumes increase the nitrogen content of soil and helped straighten out Liebig's misconceptions about the source of nitrogen nutrients for plants.