

GEOGRAPHICAL REVIEWS

MAN AND ENVIRONMENTAL PROCESSES: A Physical Geography Perspective. Edited by K. J. GREGORY and D. E. WALLING. xiv and 276 pp.; maps, diags., ills., bibliogr., index. Boulder, Colo.: Westview Press, 1980. \$26.50 (hardbound); \$13.50 (softbound). 10 × 7¾ inches.

GEOMORPHOLOGICAL PROCESSES. By E. DERBYSHIRE, K. J. GREGORY, and J. R. HAILS. 312 pp.; maps, diags., ills., bibliogr., index. Boulder, Colo.: Westview Press, 1979. \$26.50 (hardbound); \$13.50 (softbound). 10 × 7¾ inches.

PROCESS IN GEOMORPHOLOGY. Edited by CLIFFORD EMBLETON and JOHN THORNES. xii and 436 pp.; maps, diags., ills., bibliogr., index. New York: John Wiley & Sons, 1979. \$59.95 (hardbound); \$29.95 (softbound). 9½ × 7 inches.

TIMESCALES IN GEOMORPHOLOGY. Edited by R. A. CULLINGFORD, D. A. DAVIDSON, and J. LEWIN. ix and 360 pp.; maps, diags., ills., bibliogr., index. New York: John Wiley & Sons, 1980. \$86.95. 10 × 9½ inches.

These four volumes, written mainly but not exclusively by British geographers, show not only that geomorphology is very much alive and well but also that process studies have clearly moved to the forefront of recent research. "Man and Environmental Processes" differs significantly from its companions by having a strong human perspective. The brief, cogent introduction sets a goal of investigating human influence on physical landscape processes. Atmospheric components are outlined under three headings: the radiation balance (D. Greenland), precipitation (B. W. Atkinson), and man-modified climates (W. R. Rouse). Chapters on hydrological and coastal processes (D. E. Walling and E. C. F. Bird) follow. The core of the geomorphological presentation includes contributions by M. J. Selby on slopes and weathering, by K. J. Gregory on river channels, by H. M. French on permafrost and ground ice, and by D. R. Coates on subsurface influences. Soil aspects include soil-profile processes by S. Trudgill and soil erosion and conservation by R. B. Ryan. The biotic picture is represented by an examination of ecosystems and communities by C. M. Harrison and by a chapter on conservation of plants, animals, and ecosystems by I. G. Simmons. Gregory and Walling, the editors of the book, offer the concluding perspective.

A book must be evaluated in a particular context. I used "Man and Environmental Processes" as a major reference in my preparation for a new course on the human use of landforms and found the book quite useful. It complements R. U. Cooke and J. C. Doornkamp, "Geomorphology in Environmental Management" (Oxford: Oxford University Press, 1974) by dealing with a wide range of human influences in a rigorous, but not overly technical, and synthetic manner. Particularly useful were the chapters on hydrology (including strip mining, water quality and quantity), coastal changes, which is an effective treatment of coastal modifications and their results, riverine adjustments to direct and indirect interference, permafrost as affected by construction activities, loading and subsurface withdrawal effects, soil-profile change and soil

pollution, and soil erosion and management. The article by Simmons on technological versus equilibrium futures for world ecosystems is impressive. I would have preferred even more human emphasis with greater detail and further discussion of applications, but these aspects are fortunately covered in the applied geography series published by Longman. There also continues to be a need in a general applied course for books with additional emphasis on geophysical hazards for settlement. In this sense, the Gregory-Walling volume is intermediate between a systematic and an applied book, and not quite tailored to an applied course.

"Geomorphological Processes" represents a text in systematic geomorphology that is explicitly focused on the nature of processes and their controls. The authors bring to bear a wealth of recent research experience. The introduction gives a short but good précis of weathering processes that is followed by in-depth treatments of drainage-basin, coastal, eolian, and cryonival/glacial processes. The authors are to be commended for their ability to present good empirical data without resorting to unnecessary mathematical elaborations. Their synthetic talents, displayed in numerous diagrams and tables, are also unusually good. These features make the volume worth the while of all lecturers in physical geography, if for no other reason than no existing general textbook analyzes processes so well and with such up-to-date material. Needless to write, some readers will miss more explicit treatment of their favorite themes. I found the material on slope processes to be spotty; the discussions of eolian and dune processes are not fully satisfactory, and the American and Russian literature on frozen-ground processes is underutilized. Nonetheless, the authors have achieved an admirable overall balance and must be commended for their restraint in showering raw numbers and primitive regression equations on readers.

"Process in Geomorphology" is a very different book. The editors and the other contributors, Denys Brunnsden, Andrew Warren, Brian Whalley, and Malcolm Clark, successively cover all the standard processual themes in geomorphology. In this effort they resort heavily to physical principles as exemplified in the excellent chapter on energy, forces, resistances, and responses by Clifford Embleton and Whalley. The wealth of chemical data in the massive chapter on weathering by Brunnsden gives it a unique status in the literature; for the first time it is unnecessary to fall back on the older, monographic syntheses. The mass-movement treatment also by Brunnsden stands as another classic. The chapter on glaciers represents a good summation of Embleton's detailed work in C. Embleton and C. A. M. King, "Glacial Geomorphology" (London: Edward Arnold, 1975). But I am less impressed by the other sections. They lack the same sense of judgment and balance, and their scholarship, in terms of recent research, is marred by a provincial bias. The final recapitulation on processes and interrelationships, rates, and changes by John Thornes is decidedly inadequate for the task. I recommend "Process in Geomorphology" as a fine reference work, particularly for the best chapters that I singled out here. Although the level is significantly more advanced than in "Geomorphological Processes," the quality of craftsmanship is less consistent.

In a broad evaluation, all three of these books underscore a disturbing trend, a deliberate deemphasis of the fundamental goal of geomorphology, which is

to integrate processes and landforms. This remark is not intended as a criticism of the various authors, either of their purpose or their performance, but as a comment on the direction of most contemporary research in the subdiscipline. Processes were too long neglected as fields of meritorious study *sui generis* before 1950. But the pendulum has now clearly swung the other way. Processes are critical to an effective geomorphological input to environmental and especially ecological studies. Vast surfaces of the earth remain to be properly explained and beg some synthetic attention from students of process who are willing to extend their range of vision from the micro to the macro scale. Until they do so, synthetic geomorphology will continue to be dominated by outmoded denudation studies and less-qualified generalists.

This concern brings me to another major focus that was largely ignored in these particular volumes—the role of time in microprocesses and in cumulative, long-term geomorphological sculpture. Fortunately this theme finds a fresh reappraisal in “Timescales in Geomorphology,” the first attempt to advance from structural histories and Davisian denudation cycles to a modern study of real, temporal perspectives. “Timescales in Geomorphology” reviews new techniques that can be applied to integrate process and form at three different scales: short (10–1,000 years), medium (1,000–10,000 years), and long-term (more than 10,000 years).

The twenty-two chapters by thirty-six authors cannot be satisfactorily summarized in a review such as this one. But each of the three sections has a similar organization. An evaluative general essay introduces the specific problems related to short, medium, and long-term processes and effects; following are detailed examples that deal with techniques, processes, or case studies. At one end of the time range, the essays serve to show how direct observations of activity rates and patterns can be combined with historical or sediment data to extend and to qualify conclusions derived from brief observational data. At the other end, the essays illustrate how the sedimentary record can be dated by isotopic techniques or otherwise calibrated or correlated by palynology, geochemistry, and other approaches. This combination can then provide more objective temporal controls to assess the repeated episodes of sedimentation and erosion that ultimately model the surface forms of the earth. “Timescales in Geomorphology” is not intended to be a definitive work but charts a new course for temporal studies in geomorphology. The contents of the book should go a long way toward convincing its readers that time in geomorphology is not an abstraction to be confused with landscape geometry, but rather that time is an empirical variable of pivotal significance in calibrating change and evaluating form in objective terms.—KARL W. BUTZER

INTERACTIONS OF ENERGY AND CLIMATE. Edited by WILFRID BACH, JURGEN PANKRATH, and JILL WILLIAMS. xl and 569 pp.; maps, diagrs., ills., notes. Boston and Dordrecht: D. Reidel Publishing Co., 1980. \$58.00 (hardbound); \$26.50 (softbound). 9½ × 6¼ inches.

One dilemma facing the world community is the possibility of changes in cultural practices and living standards in fossil fuel-based economies unless