

# Geomorphology and Engineering

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plexities of mineralogy.

As a final note, mention of the upcoming (March 1978) symposium, "Trace Metals and Health" of the Royal Society shows the continuing efforts of this group.

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## Geomorphology and Engineering

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Edited by Donald R. Coates  
*Dowden, Hutchinson and Ross, Inc.,  
Stroudsburg, Pa.,  
1976 (Dist. by Halsted Press Division of  
John Wiley and Sons Inc.), 360 p. U.S.  
\$27.50*

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This book is in reality a volume of the proceedings of the Seventh Annual Geomorphology Symposium held at the State University of New York at Binghamton in September 1976. To achieve a single volume it is presented in small type on 360 pages which seemed to this reviewer more like 700 pages of normal reading.

The proceedings present an extensive, usually descriptive exercise in the application of geomorphology to engineering practice. Since it deals with an enormous breadth of subject matter, it probably contains a relatively small amount of information of interest to a single reader. Indeed, this reviewer found the book to be long and tedious except for selected papers in which he had some direct familiarity or interest. Nevertheless, complete reading is certainly an education even if a rather descriptive one.

The preface of the book is a short review of its purpose and contents; a dissertation requiring over 1200 words thus attesting to its extraordinary length. The format consists of five major parts each containing two to five papers (chapters). For this review, brief comments are presented on the contents of each major part as follows:

### Part I: Methods and Mapping

Chapter 1 on "Geomorphic Engineering" by D. R. Coates was to this reviewer an overly long exercise in oversell of the idea of a discipline of Geomorphic Engineering. I wonder if the author had in mind legal responsibility for design by such a new breed of engineer? Chapter 2 on "Landuse Contributions of Soil Survey with Geomorphology and Engineering" by Olson is a useful chapter describing U.S. Agricultural Soil Mapping techniques which include printouts of suggested landuse suitability including such items as suitability for septic or landfill purposes. Chapter 3 on "Mapping of Mountainous Soils West of Denver, Colorado, for Planning Purposes" by Schmidt and Pierce is chiefly an exercise in soil/rock designation applicable to the two problems of septic infiltration and excavation. Chapter 4 on "Preconstruction Terrain Evaluation for the Trans-Alaska Pipeline Project" by Kreig and Reger is a good review of the terrain evaluation and mapping techniques used to keep exploration time and costs at a reasonable level yet with a "known" level of risk associated with inevitable errors from lack of complete coverage of the pipeline route.

### Part II: River Engineering

Chapter 5 on "The Mississippi River Flood of 1973" by Noble is a general review of the 1973 flood and its stages relative to forecasts used for design of Mississippi protective works. The costs of the U.S. Mississippi River and Tributaries Flood Control Project relative to forecasted flood damages due to flood plain encroachment are revealing. Chapter 6 on "Geologic Control of Sand Boils along Mississippi River Levees" by Kolb is an excellent descriptive account of the role played by complex systems of meanders, bars, fillings, etc. on the distribution of sand boils. Chapter 7 on "Channelization: Environmental, Geomorphic and Engineering Aspects" by Keller is a good, conscientious description of the many factors to be considered in preserving the natural ecology of man-modified streams. Chapter 8 on "Drainage Basin Characteristics Applied to Hydraulic Design and Water-Resources Management" by Orsborn is a review and suggested new approach to modelling drainage basins to make optimum use of gaging stations. Worth reading.

### Part III: Resource Engineering

Chapter 9 on "Kinza Dam and the Glacial Foreland" by Philbrick is a case history of the problems, plans and eventual construction of a dam built in Pennsylvania. Conscientious use seems to have been made of extensive geologic and geomorphic input data. Chapter 10 on "Timber Harvesting, Mass Erosion and Steepland Forest Geomorphology in the Pacific Northwest" by Swanson and Swanson describes the effects of clear cutting timber-harvesting on mass wasting in high relief terrain. It is hard to believe that such slaughter of forested slopes is still permitted. Chapter 11 on "Forecasting the Effect of Landuse Plans on the Regional Market Conditions of the Sand and Gravel Business" by Fakundiny is an interesting discussion of market area rosettes, domains, and funnel maps and their long term modification as controlled by transportation routes, population growth and supplies. (Good economic geomorphology?)

### Part IV: Urbanization Effects

Chapter 12 on "The Urbanizing River: A Case Study in the Maryland Piedmont" by Fox is a comparative, descriptive account of erosion-sedimentation studies in urban and rural sections of the Patuxent River. Chapter 13 on "Geomorphology and Engineering Control of Landslides" by Leighton incorporates several good messages for geotechnical engineers about whom the author seems rather cynical. Chapter 14 on "Scientific and Engineering Parameters in Planning and Development of a Landfill Site in Pennsylvania" by Foose and Hess is a useful case history of landfill monitoring methods as applied to a site converted from a trench-type to an area landfill.

### Part V Geomorphic Synthesis

Chapter 15 on "The Role of Geomorphology in Planning" by Legget is a plea for geological and geomorphic input into political planning as affected by infrequent, hazardous, geologic events. Chapter 16 on "River Management Criteria for Oregon and Washington" by Palmer is likewise a plea for river management approaches compatible with natural events that occur within four major physiographic river zones related to gradient and therefore hydraulic flow characteristics.

The book (proceedings) seems more suitable as an institutional library acquisition than as a personal acquisition.

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## Quaternary Stratigraphy of North America

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Edited by W. C. Mahaney  
*Dowden Hutchinson and Ross*,  
512 p., 1976  
\$27.50

Reviewed by R. J. Fulton  
*Geological Survey of Canada*  
601 Booth St.  
Ottawa, Ontario K1A 0E8

A friend in thumbing through this book commented that it appeared similar to a bottle of Canadian wine: the label suggests great things but the contents do not live up to the label. The Quaternary stratigraphy of North America is a big subject and this book certainly does not cover it completely.

The preface says that emphasis is on summarizing research completed following publication of "Quaternary Research of the United States" and on new research. However a considerable amount of the material was included in the above mentioned volume and most of the post 1965 information presented has already been published elsewhere. It appears that emphasis was placed on obtaining contributions from big names who would attract attention and sell the book rather than on going after new work and work from critical areas that might have added pieces to the puzzle that has already been blocked out.

The Canadian financed symposium at which these papers were presented would have been an excellent opportunity to pull together recent Canadian Quaternary Stratigraphy and to show how it related to the more fully exposed United States work. However only six of the 24 papers concern Canada and as an example of an omission, important work done in the past 10 years in the strategically located Hudson Bay Lowland is not even mentioned.

The book contains papers on the following areas:  
Eastern Arctic Canada - Andrews and

Miller; St. Lawrence Lowlands and Great Lakes (2) - Gadd and Terasmae and Dreimanis; Northern New England - Coates; Midwest United States (4) - Black, Wright, Johnson and Ruhe; North Central United States - Moran *et al*; West Texas and Eastern New Mexico (2) - Reeves and Hawley *et al*; Sierra Nevada - Birkeland *et al*; Colorado Plateau and Front Range (3) - Karlstrom, Madole and Mahoney and Fahey; Western Wyoming-Richmond; Washington-Easterbrook; Southwestern Canadian Prairies-Stalker; Central Canadian Rockies - Rutter; Alaskan Panhandle and adjacent British Columbia - Miller; and Alaska - Péwé. Three other areas - Atlantic Provinces, Southern New England and Western Ohio - are included but regrettably are only covered by abstracts. One of these (Grant - Atlantic Provinces) does contain a list of references so that it can be used as an entry to the stratigraphy of the area.

In general each paper starts with a brief history of the development of Quaternary history in the area under consideration, presents the stratigraphy as it is currently understood, provides regional correlations and closes with comments on specific problems, controversies or suggestions for future work. Several papers, in addition to describing the local stratigraphy, include discussions of some of the correlation techniques used (Andrews and Miller - amino acid diagenesis, Wright - vegetation colonization and Birkeland - relative age criteria for correlating moraines).

The quality of the papers is variable, several are excellent, one or two are mediocre and a couple are bad but in general they convey the necessary information in an understandable form. As already mentioned much of the information presented has been in the literature for years but in at least one case (Rutter - Central Canada Rockies) new information is presented. Most of the authors made good use of this opportunity to pull together published information and to enlarge on current problems or controversies so that even though much of the information may already be available these papers provide useful summaries and updates.

Despite my personal disappointment that there was not more emphasis on the Canadian part of the North American continent and that more new information was not presented, I feel that this is a well

edited and presented book that is well worth reading. Many papers contain numerous references making the book a fairly complete bibliography for the areas covered. It provides a general review of the Quaternary stratigraphy of classical areas such as the Sierra Nevada, Northern Rockies, Southern Canadian Prairies, Great Lakes and Illinois and also of other important areas such as Eastern Canadian Arctic and Atlantic Provinces. It is unfortunate that other critical or classical areas such as the Yukon and James Bay Lowland were omitted.

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## Recent Foraminifera

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By Esteban Boltovskoy and Ramil Wright  
Dr. W. Junk b. V. Publishers,  
*The Hague*, 1976, 512 p.

Reviewed by G. Vilks  
*Environmental Marine Geology*  
*Atlantic Geoscience Centre*  
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This book presents a well written account of research on Recent foraminifera. Emphasis is on ecology and working methods with systematics and physiology of the living organism of secondary importance. The text has been updated from the 1965 Spanish edition and the addition of new material can be judged from the 750 post-1965 references of the total 1600.

The subject matter is presented in 18 chapters, six of which involve ecology of foraminifera. On the offshore continental shelves the major criterion governing the distribution of species is the water temperature. As a result, the boundaries of the biogeographical provinces based on foraminifera reflect the major current systems; i.e., cold water currents extend the provinces of cold water faunas towards lower latitudes and warm currents have the opposite effect. The authors demonstrate the relationships of faunas to the regional oceanography in a world map of benthonic foraminiferal zoogeography and throughout the text with a frequent use of examples of