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tourists visiting the Meadow Lake Provincial Park in Saskatchewan. This park lies along the Waterhen River from Cold Lake on the Alberta border to north of the hamlet of Meadow Lake. The Pamphlet is in part a road-guide originating from Meadow Lake and making a circle tour of 172 km through the park with 10 road stops designated and described geologically.

The text is well illustrated with multicoloured maps and cross-sections. Some of the diagrams are devoted to the purpose of definitions of general geologic terms such as are found in introductory text-books. The Pleistocene geology is discussed with a few cursory remarks on the sub-drift paleo-topography. Modern topographic features at the road-stops are well explained. The detailed treatment of the sequence of tills in this area would make it worthwhile as a brief case-study for reading in Pleistocene courses.

A convenient glossary in the appendix provides definitions, for the layman, of various scientific terms used in the guidebook.

Two-thirds of the illustrations of a total of 69 figures are in colour and on the cover is a handsome lithograph of the area from a satellite. The format 16.5 x 26.5 cms, stapled on the short dimension, makes the guidebook difficult to file on an ordinary reference shelf and if a series of these guidebooks are envisaged for other parks, shelving convenience should become a consideration. As a shadow of things to come, there is a small foul up on metric conversion in Figure 9.

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Geomorphology

By Robert V. Ruhe
Houghton Mifflin Company, Boston
246 p., 1975.
$14.00.

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Most knowledgeable Canadian readers of this book will find that they have two reactions to it. Firstly, they will probably want to include it in their personal libraries, and secondly, they will only want to expose Canadian students to it as a source for American examples.

Bob Ruhe has certainly succeeded in covering the relationship between soil studies and geomorphology more completely and informatively that in any other book known to the reviewer. This is largely because, as he states in his preface, he prefers to use examples from his "own work and from the work of close associates during the past several decades". Because of his geomorphological work with the Soil Conservation Service, he has had unique opportunities to build up great experience in a wide variety of geomorphic situations and he makes good use of the time element in geomorphology. Hence the value of the book to professional geomorphologists.

The name of the book is misleading. The author only tackles selected areas of the field normally called "geomorphology". What he does cover is tackled in an interesting, readable fashion, although he is inclined to use more formulae than are always really necessary. Fluvial geomorphologists may be surprised to find that he uses about the same number of formulae to account for fluid mechanics and hydrology as he does to explain wind action or glaciers.

As noted above, almost all the examples chosen are from the United States of America. This may be fine for a student at the University of Iowa, but it will upset Canadian students. An additional problem is that he gives mainly American references. Thus the only reference for details of the use of lichenometry is to Reger and Péwé, 1969. Where references is made to subjects studied mainly elsewhere, e.g., gilgai, or loess in New Zealand, he often gives only a few references which fail to cover the subject adequately.

His coverage of the ideas current in American geomorphology will sometimes seem uneven. Thus he refers to the Pearlette ash as originating from North-Central New Mexico, although adding that "at present there is doubt as to the validity of the source. . . and whether the Pearlette is only one ash". Again in Chapter 6, he ignores the variety of catenas discussed by Bucknell in his paper, "The catena cauldron". However, these are quite important to geomorphologists using soil. At times, he gets into difficulties through trying to fit the results of his research into the overall geomorphological picture. One example occurs under "glaciation and landscapes" where he gives data on measured rates of ice movement in temperate glaciers and in the Antarctic ice sheet. He then follows this by discussing measured rates of advance for ice fronts in the last phases of the Wisconsin glaciation in the United States, concluding with obvious relief that they are about the same order of magnitude. He misses the fact that ice movement at any point in an ice mass equals the rate needed to replace the loss by ablation downstream, plus the rate needed to make any alterations occurring in the position of the ice front. No mention is made of the evidence for local lobate surging of the Laurentide ice, indicated by radiocarbon dates. Many discussions are incomplete, e.g., he does not mention lithology as a control on the size of alluvial fans.

This is not a traditional text, and he does not use Davisian cycles of erosion. He does use simple Thornthwaite climatic models and he does use case studies. Environmental effects by Man are generally ignored. Only one typographical error was noted by the reviewer and the book is well illustrated with usually novel examples. At least one caption (Fig. 4.5) should be lengthened to explain which thin section was which, while Fig. 8.9 is rather complicated. Two diagrams would have been better.

Altogether, it would seem to be a very useful book for those interested in the use of soil studies in geomorphology and the Quaternary. It is unlikely that it will be used as a textbook in many pure geomorphology courses at Canadian universities, but it might be used in an introductory Quaternary soils course by an informed instructor.

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