

These papers also provide ample documentation of large volumes of sediment that is derived from the reef environment and subsequently driven back toward the more leeward lagoons or transported down the fore-reef slopes. Submersibles have been instrumental in investigating this latter region as is evident in Land and Moore's article on North Jamaica. Much additional information on comparable environments now exists in the literature but this article well illustrates that framework construction by deeper-water corals and sclerosponges is both extensive and volumetrically significant in the deep fore-reef, supplemented by complex submarine cementation.

The section on reef biota focusses on the contribution to modern reefs of a number of specific organisms: corals, mollusks, bryozoa, foraminifera, ostracods, sponges, crinoids, parrot fish, and sea urchins. Special emphasis is placed on the constructive or destructive roles played by these organisms and on ecologic relationships that might be applied to the interpretation of ancient environments. By way of an example, an article by Ball *et al.* on Pennsylvanian limestone sequences recognizes phylloid algae as important sediment producers, but argues that they were not builders of depositional topography, a role for which they have often received credit.

This section also contains three short but noteworthy review articles: Hartman outlines the very impressive role of sponges in building and shaping reefs; Cuffey illustrates the significant contribution of bryozoa through geologic time; and Warne describes how important carbonate borers have been to reef ecology, modification, and preservation. A fourth, equally thoughtful, summary article by Frost appears in the previous section. Through comparative examination of the Cenozoic reef systems of the Caribbean he points out some of the limitations of a uniformitarian approach to paleoecologic synthesis.

The last group of papers deals with the deposition and diagenesis of Cenozoic carbonates. Holocene sedimentation patterns are reported from the continental shelf off southern Brazil and from around Barbuda (West Indies). In the latter case a comparison is also made with older Tertiary-Pleistocene limestones on the island. In a somewhat

similar vein, a study on St. Croix compares an interesting Miocene sequence, consisting largely of shallow-water carbonates interbedded as turbidites and debris flows with basinal pelagic chalks, to comparable modern deposits laid down in an open basin and basin margin position.

Two final papers provide insight into specific aspects of diagenesis. The first deals with the evolution of porosity and permeability in modern and Pleistocene coral reefs from the Red Sea area, and provides yet another illustration of how extensive subaerial diagenesis can be prior to burial of these sediments in the subsurface. The second article leaves the reef environment *per se* and moves ashore to address the problem of sabkha (supratidal flat) hydrology in the Persian Gulf. Careful documentation reveals the presence of marine, continental, and mixed waters beneath the sabkha, and it is clear that an understanding of diagenetic processes in such an environment requires an appreciation of the direction and rate of movement and chemical make-up of these brines.

To summarize, the majority of the papers in this volume are highly recommended and mark a transition, in the study of coral reef systems, from descriptive exploration and data gathering to a more consolidated integration of data and subsequent development of tentative geological and biological models. The text is well laid out, the photos and line drawings are abundant and, with only a few exceptions, crisp, uncluttered, and clearly legible. All in all, this view of coral reef systems provides sufficient flavour to attract the non-specialist and enough meat to satisfy the most serious student.

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Natural Resources of British Columbia and the Yukon

By Mary L. Baker
Douglas, David and Charles,
Vancouver, B.C., 155 p., 1977.
\$14.95

Reviewed by V. A. Preto
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This concise, but readable, outline of the Natural Resources of British Columbia and the Yukon, provides useful and interesting reading for the layman, student and professional. It is a fundamental description of the natural principles, processes and laws involved that combined to form the Canadian Cordillera; indeed, a truly splendid section of North America, rich in mineral wealth and beauty. The protagonist, Nature, is shown in its many roles which include landforming, mountain building, the creation of mineral deposits, soils, forests, rivers, climate and the causation of earthquakes, floods, and landslides.

The book is divided into five chapters. These are: 1) Minerals, Energy, and Water, 2) Land and Forest Resources, 3) Fish and Wildlife, 4) Parks and Recreation, and 5) Natural Hazards.

The section dealing with minerals offers a brief outline of the physiography and tectonics of the Canadian Cordillera. This is followed by a discussion of the main commodities, including their distribution, the main types of deposits, and their mining histories. References are made to some of the more colourful chapters of the mining history of some metals, consequently lending added attraction to each section. Coal, oil, gas and hydroelectric power are dealt with in a similar manner. The section dedicated to water resources is essentially an elementary course in ecology, profiling the natural processes which produce these resources and how man has proceeded to develop them.

The Lands and Forest Resources chapter, begins with an efficient account of the climatic variability over the land, stressing its dominating influence on the glacial history, soil types, and forests of

the Canadian Cordillera. Forest resources and Agriculture are effectively treated to indicate their dependence on the physiography and climate. Examples of good and bad policies and practices are given from time to time, in order to focus on specific issues.

The Fishing section, of the Fish and Wildlife chapter, has been given more emphasis due to its vast impact on the local economy. Included in this chapter are the disturbing, catastrophic disasters borne by nature due to man; such as the Hells Gate slide of 1913-14 which caused unrecoverable losses to the Fraser River fishery, and the very near total depletion of Halibut stocks due to overfishing in the earlier part of the century.

In the chapter on Parks and Recreation, the subject matter has been written in a balanced and realistic way. The point is made that aesthetic, recreational and historical resources are every bit as important as minerals, oil and gas, coal, hydroelectricity, forest and agricultural products.

The last chapter surveys Natural Hazards such as landslides, earthquakes, floods, forest fires, and insect infestations.

The work has clarity and has been presented in a fluid style differing from the usually laconic, text-book script. The numerous diagrams, maps and sketches are lucid and perfectly adequate; some coloured graphs and maps would, however, have contributed nicely to the aesthetics. Also, photographs including colour prints (perhaps on the title pages of each section) would have been a welcome feature.

Finally, there are errors in some conversions to the metric system and a few spelling mistakes which could have been avoided by more careful scrutiny during editing.

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Soils of Canada

By J. C. Clayton, W. A. Ehrlich, D. B. Cann, J. H. Day and I. B. Marshall.
Canada Department of Agriculture, Supply and Services, Ottawa: Volume 1, 243 p.; Volume 2, 239 p., 1977.
\$25.00

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Pedology, the scientific investigation of soil, is, when compared to geology, a relatively young science. Much of the early impetus in pedology has been accredited to V. V. Dokuchaev of St. Petersburg University in the 1880s, though soil investigations in North America began much later. Soil survey in Canada for instance started in the 1910s in Ontario and in the 1920s in the Prairie Provinces. The first Canadian system of soil classification was introduced as recently as 1955. With such a recent history it is not too surprising to find that this publication is the first comprehensive attempt to describe in some detail the soils of Canada. This attempt is a cooperative project of the Canada Soil Survey Committee and the Soil Research Institute, Agriculture Canada, Ottawa.

The objective of this lavishly produced two volume work, as outlined in the introduction, is to describe the characteristics, distribution and extent of the major soils of Canada, and to assess their present potential and limitations for use as part of the renewable land resources of Canada.

The first volume consists of an outline of the biophysical environment as it affects soil distribution plus a description of the soils themselves. The second volume is a descriptive inventory of the individual map units delineated on the soil map. Included with the two volumes are three maps, a soil moisture map and a soil temperature map at a scale of 1:10,000,000 and soil distribution map at a scale of 1:5,000,000.

Volume one, the soil report, contains a short introduction to the current concepts of soil, a much larger discussion on the glacial history and geology of the

major physiographic regions of Canada, a brief outline of soil climate and vegetation and concludes with a discussion on the genesis, distribution and uses of the soils themselves. These various discussions are supplemented with over 130 quarter-page colour plates and some 20 line drawings. The appendix includes soil profile descriptions of over 30 major soil subgroups.

A major criticism of the publication is that the soil classification system used is to a large extent out of date. The main reason for this is that the major push to produce the publication, that of the forthcoming 12th International Congress of Soil Science meeting in Edmonton in June 1978, has also prompted a major effort by the Canadian Soil Classification Committee to update and refine the present soil taxonomic system. Although there is a small comment at the beginning of the publication pointing out that there were some changes expected in the system I think the authors themselves were not aware of the full extent of the impending changes at the time of going to press.

Although the publication contains a wealth of information on Canadian Soils there are so very few references that it is difficult to locate the original source of much of it. For instance the section describing the characteristics and use of soils does not contain a single reference to any published paper on Canadian soils. This certainly limits the usefulness of the publication for student teaching and for the researcher. The usefulness of the appendix is also lessened somewhat by a number of errors in classification, particularly in the chernozemic order.

In spite of these criticisms this is still the only major source of reference for Canadian soils and as such is a milestone in Canadian pedology. The publication will be of great value to the informed layman and to researchers in other disciplines who want a general overview of Canadian soils. The serious shortcomings of the book will be most noticed by pedologists themselves.

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