

providing the occasional landmark. It is essential, she says, that the new service buildings should not compete with this latter category. She feels that all too often the type of building which goes into the countryside for leisure has around it an unwanted, unmown, no-man's-land which divorces it from its surroundings. Something should be done to integrate it with the fields or moorland and permit the grazing stock to rub against its walls. This is why existing buildings may so advantageously be adopted to new leisure uses; Miss Beazley illustrates this in the use of an old croft as the Culloden Information Centre by the National Trust for Scotland. Lately, in the Lake District the house and extensive gardens of Brockhole, a nineteenth century residence, have been successfully taken over as the first National Park Centre.

Miss Beazley's book is for the planner and for all those concerned with the establishment and management of national and country parks. It is a book for all those whose concern is the provision for leisure without, or with the minimum of, damage to the countryside. It is a book with a wealth of ideas.

G. V. BERRY

BRITISH GEOMORPHOLOGY

The Earth in Decay

A History of British Geomorphology, 1578-1878. By Gordon L. Davies. (Oldbourne History of Science Library.) Pp. xvi+390. (Macdonald (Technical and Scientific): London, 1969.) 100s.

GEOMORPHOLOGY, the study of the origins and evolution of the surface features of the Earth, was developed as a branch of geology almost as soon as the latter took form as a separate science. It was formerly known as physical geology, or physiography. Its present name appears to have originated in the United States, where it still forms an important subdivision of the Earth sciences studied by geologists. Latterly, however, in Great Britain, it has been studied much more intensively by geographers than by geologists. It is worth pointing out therefore that this book is one likely to interest geologists as well as geographers.

The subject has its roots far back in time, and in tracing its development the author records how interest in the subject has fluctuated, for various reasons. He also discusses how religious thought and beliefs have affected its development. The story of past debates demonstrates the inherent conservatism of many prominent geologists, and may open the eyes of present day students to the fact that much that they regard as axiomatic formerly aroused bitter arguments.

The first three chapters discuss ideas held by early writers on such subjects as denudation and deposition in relation to land forms, and about the origin of mountains and other topographical features. Among the early writers mentioned are some that have been neglected or entirely overlooked by historians; for example, Nathaniel Carpenter, whose *Geography Delineated Forth*, first published at Oxford in 1625, is stated to contain the first adequate discussion by a British writer of the principles of geomorphology. The period 1705-1808 is covered in chapters 4 to 6. The sixth chapter, containing a critical assessment of the effect of Hutton's *Theory of the Earth* on the development of geomorphology, is of particular interest, and justifies the claim that he is one of the founders of the subject. Chapter seven, entitled "Geology's Laggard", records the failure of geomorphology to advance with other branches of geology during the period 1807-1862. The reasons for this were, basically, the widely held belief that much of the present configuration of the Earth resulted from large scale marine erosion, and the reluctance of many prominent geologists to admit the major part played by rivers in shaping the landscape. When, in 1840, Louis Agassiz startled the world by publishing his *Études sur les Glaciers*,

his demonstration of the effects of ice action removed some of the difficulties raised by those who opposed the efficacy of river action, but it was long before the more conservative geologists accepted Agassiz's views and their implications for geomorphology.

In chapter eight the author records in detail the rise of glaciology and its reaction on geomorphology. It is interesting to learn from this account that among British geologists Robert Jameson seems to have been the first who recognized the probability that glaciers formerly covered areas where they no longer exist, mentioning particularly Scotland. It appears that he expressed this opinion in his lectures, possibly as early as 1826 or 1827, but did not publish his views and hence has received no credit for them. On the other hand, he encouraged publication of papers on glaciology in the *Edinburgh New Philosophical Journal*, which he edited. Among such papers was one by a Scandinavian geologist, J. Esmark, in which he used the evidence of erratics and moraines quite convincingly to demonstrate that a part of Norway, not now ice-covered, must at one time have been glaciated. This paper, published in 1827, was the first to appear in Great Britain suggesting the former existence of ice in an area now free from glaciers, but it has been overlooked by British geologists.

Chapter nine deals with the revival of fluvialism and the final acceptance of the major part played by river action in geomorphology which took place between 1862 and 1878. It discusses, in particular, the work of J. B. Jukes, Sir A. C. Ramsay, and other officers of the Geological Survey.

In preparing this book, the author has taken nothing for granted, and it embodies the results of much original research. It must be regarded as a standard work on the particular field it covers. It has the additional merit that it is written in a lively and readable style, which makes it particularly attractive for non-specialists and even the general reader, who will be assisted by the glossary provided. For the specialist, each chapter has its own list of references, and at the end is a list of the primary and secondary sources used by the author. Davies's book is a welcome addition to the literature dealing with the history of the Earth sciences.

V. A. EYLES

METHODS FOR GEOLOGISTS

Rock and Mineral Analysis

By John A. Maxwell. (Chemical Analysis: a Series of Monographs on Analytical Chemistry and its Applications, Vol. 27.) Pp. xvii+584. (Interscience (Wiley): New York and London, May 1969.) 229s.

THIS book is a welcome contribution to the limited literature of rock and mineral analysis. The format is straightforward, beginning with a discussion of the preparation of rocks and minerals for analysis and of the errors inherent in sampling both the rock and the bottle of crushed powder—a matter about which there is a distressing amount of carelessness among some petrologists. There follow a detailed discussion of the methods available for the wet chemical analysis of each element likely to be sought, and recommended procedures for the analysis of silicates and carbonates. Ores are omitted from the discussion. Relatively short sections deal with X-ray fluorescence and atomic absorption analysis, and details are given of a combined X-ray fluorescence and "rapid" chemical scheme in use at the Geological Survey of Canada.

An immense effort has gone into this book and it clearly has been written against a background of considerable experience. Documentation is thorough yet not pedantically so. The text has been carefully proof-read so that typographical errors are quite insignificant; the standard of production is very high, as also is the price.