

GLACIERS AND ICE-SHEETS.

Characteristics of Existing Glaciers. By Prof. W. H. Hobbs. Pp. xxv+301. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1911.) Price 13s. 6d. net.

THE framework of this volume was laid by Prof. Hobbs in three papers, dealing in turn with "Mountain Glaciation," "The Ice of Arctic Regions," and "Antarctic Ice," which were published during 1910 in scientific journals respectively in London, Philadelphia, and Berlin. The author has done good service to the glaciologist and glacial geologist in bringing together his concise description and classification of existing glaciers and ice-sheets in the present convenient form. Especially in the parts devoted to Arctic and Antarctic ice he has made an exhaustive digest of the scattered literature, and has presented a copiously illustrated summary of the available information respecting the distribution and character of the ice of these regions. To the end of each chapter he appends a full list of his authorities, so that the book is in every respect a most useful work of reference. His outlook is throughout that of a physiographer of the modern American school, and he has constantly in view the effect of ice and snow upon the shape of the land beneath it.

In his treatment of mountain glaciers, in the first (and shortest) part of his book, the author asserts himself more prominently than in the later parts, and it may be that some of his readers will consider the value of this part as a digest has, in consequence, been impaired. He reduces the existing Alpine glaciers to their really insignificant position by the aid of comparative diagrams (e.g. plate ii.). He will not allow that any of them, with the possible exception of the Great Aletsch, are worthy even of being called valley-glaciers—"In reality the glaciers of the Alps, far from occupying valleys, do not even fill the mother cirques at the valley heads" (p. 52). His rather elaborate classification of mountain glaciers (p. 42), based partly upon comparative alimentation, is not, however, likely to be generally adopted; most of the "types" are necessarily nothing more than phases which merge together indefinitely both in space and time-relation.

With respect to the long controversy as to the potency of ice as an eroding agent, Prof. Hobbs in his preface explicitly disclaims any intention to deal with "the views of that school of British geologists particularly which holds that the denudational effect of glacier ice is negative." So he does not refer to these views in adopting alternative explanations of the critical phenomena; e.g. the "Cascade Stairway" and the "Hanging Valley," in chapter iv. In this connection it may be remarked, though not mentioned by the author, that the long trench-like valleys by which the great glaciers pour down to the ice-plain of the Barrier from the high Antarctic plateau can scarcely be assigned to any other cause than ice-erosion.

In discussing the relation of mountain-form to glaciation, Prof. Hobbs dwells with particular emphasis upon cirque-development, which he believes

to have a greater importance than has been generally recognised; and in this branch he takes upon himself the rôle of special pleader. For the initiation of a cirque through the agency of a snow-bank, he calls in the process of "nivation," i.e. selective perishing of contiguous moistened rock, as first suggested by Mr. F. E. Matthes from his observations in the Bighorn Mountains of Wyoming. In the later development of the cirque, the berg-schrand is considered to be a prime factor by the author, who has been duly—possibly even unduly—impressed by results of Mr. W. D. Johnson's celebrated exploration of the berg-schrand of Mount Lyell glacier, California, where the sapping of a perpendicular wall of rock was found to be in progress at the bottom of the fissure. The basis of observation is so limited that it may legitimately be questioned whether this sapping effect is general. However, the author considers that cirque recession is mainly responsible for the residual topographical forms of most high mountains, and he illustrates the progressive stages by good examples from western U.S.A., stating that "in parts of Europe, and in the Alps in particular, one looks in vain for evidences of the earlier and more significant stages," owing to the more prolonged and vigorous glaciation.

In final chapters the meteorological conditions of existing ice-sheets are summarised, and it is considered that the strong radial winds of Greenland and the Antarctic are due to the sliding outward of chilled air along the surface of the ice-dome.

The author fully recognises in other parts of his work the proved aridity of both polar areas, but passages on pp. 42-3 and 100-1 are likely to give the erroneous impression that the ice-caps are areas of heavy precipitation. At p. 238 there is an obvious misprint of Arctic for Antarctic.

Independently of the author's opinions on debatable matters, which may or may not be acceptable, every geographer and geologist interested in ice will appreciate these clear descriptions and excellent illustrations of the earth's great glaciers—they make up into a most presentable book.

G. W. L.

PRECESSION AND PARADOX.

Draysonia: being an Attempt to Explain and Popularise the System of the Second Rotation of the Earth, as Discovered by the late Major-General A. W. Drayson; also giving the Probable Date and Duration of the Last Glacial Period, and Furnishing General Drayson's Data, from which any Person of Ordinary Mathematical Ability is Enabled to Calculate the Obliquity of the Ecliptic, the Precession of the Equinoxes, and the Right Ascension and Declination of the Fixed Stars for any Year, Past, Present, or Future. By Admiral Sir A. F. R. de Horsey, K.C.B. Pp. ix+76+diagram. (London: Longmans, Green, and Co., 1911.) Price 3s. 6d. net.

GENERAL DRAYSON'S book on the "Motion of the Fixed Stars" is not a model of lucidity and generally fails to convince those who endeavour to grasp its argument. It was, therefore, most desir-