

From the general subject of Canadian mineral resources, and the need for their development, Prof. Roberts-Austen passes to a particular metal—nickel. The splash of a falling marble which is dropped into milk, and of a gold bullet dropping into molten gold, is shown, by means of reproductions of photographs, to bear a resemblance to the splash produced upon armour plates by projectiles. To prevent the marble from entering the milk, the surface of the liquid might be hardened by freezing it. Using this illustration, Prof. Roberts-Austen ingeniously explains that in a similar way an armour plate should have a face of rigid steel to break up a projectile, and a tough back to save the plate from fracture. These conditions are obtained by the addition of 4 or 5 per cent. of nickel to steel.

There are many curious points connected with the relations of iron and nickel, and several of scientific interest are described in the present volume. Every one interested in the properties of metals, or desirous of obtaining a concise and trustworthy account of Canada's mineral riches, should read what Prof. Roberts-Austen has to say upon these subjects.

*Hann, Hochstetter, Pokorny—Allgemeine Erdkunde, Fünfte, neu-bearbeitete Auflage.* II. Abtheilung: Die feste Erdrinde und ihre Formen. Von Ed. Brückner. Pp. xii + 368. (Wien: F. Tempsky, 1898).

IN undertaking to produce a new edition of Hochstetter's share in the *Allgemeine Erdkunde*, Prof. Brückner very wisely determined to rewrite the whole section, and so to bring it into line with contemporary methods and results. The scope of this treatise on the crust of the earth and its forms includes a sketch of petrography, geological structure, stratigraphy, the agencies which work on the earth's surface (classed as endogenous and exogenous), the forms of the crust, and the morphology of the land-surface.

Prof. Brückner follows Richthofen and Penck for the most part; but his range is wide, and he pays due regard to the work of British and American geologists. It is particularly noteworthy that an authority who knows the Alps so well should refrain from making them the main source of his illustrative examples. In speaking of the interior of the earth the author leans to the view of the central part being in a gaseous state, the gaseous rock being reduced by intense pressure to a higher density than any liquid known on the surface; but he quotes and very impartially discusses the more generally accepted view of a solid earth due to the raised melting-point of rocks under pressure. Earthquakes are treated at some length; but the work of Milne is not referred to, Rebeur-Paschwitz being the principal modern authority cited. In discussing the origin of land-forms, more weight is given than in most text-books with which we are familiar to the importance of tilted or vertically displaced blocks of crust, and relatively less importance is attributed to folded structures. In treating of the *régime* of rivers and the classification of land-forms, Prof. Brückner follows Penck closely.

A number of useful references are given to special works treating on the special departments under notice; and it is gratifying to find a fair proportion of English books amongst those cited. In speaking of caverns, however, the author fails to mention M. Martel's important researches, or to refer to the Speleological Society. The revision of the work is very thorough; the only serious misprint of proper names we have noticed is the citation of the author of the *Mundus Subterraneus* as "Kirchner" in place of "Kircher."

This important work, so well-written by a master of his subject, is simply one amongst many German books on physical geography, a class still very poorly represented in the English language.

H. R. M.

*Elementary Botany.* By Percy Groom, M.A., F.L.S. Pp. x + 252. (London: G. Bell and Sons, 1898.)

IN his preface the author explains that his object has been "to place the subject before elementary students in such a way as to exercise to the full their powers of observation, and to enable them to make accurate deductions for themselves from the facts which they observe." The book is written on the assumption that a compound microscope is not employed; and in the section on physiology no knowledge of the histology of plants is assumed. There are already numerous books more or less suitable as guides to the student of elementary botany, some of them so excellent as to leave little, if anything, to be desired in their special fields. But they either omit a good deal that might readily enough be examined and verified even by beginners, or they require such a use of the compound microscope as is scarcely practicable in the teaching of botany in schools. A book on the lines indicated by Mr. Groom should prove very helpful alike to beginners and to teachers, and would doubtless be welcomed if felt to be the result of adequate personal experience. But we cannot altogether congratulate the author on his success in carrying out his objects, despite the merits of his work, especially if it is intended as a school-book. Children can scarcely be expected to benefit as much from the study of general morphology as from the examination of selected plants, in which they could observe and gradually become familiar with the various structures and life-histories.

The definitions of terms are at times scarcely in keeping with general usage; for example, those of *compound leaves*, *astivation* and *vernation*, and *compound fruits*. It may be questioned whether the statement—"that portion of a single flower which persists after fertilisation until the seeds are ripe is termed the fruit"—is preferable to the usual definition. The classification of fruits also is unsatisfactory.

Such a statement as that "a root can only produce as lateral members branches like itself" is misleading, and indicates want of care. The production of buds by roots can easily be verified; indeed, the author refers to their growth on roots under "adventitious shoots."

In the physiology a knowledge of chemistry is assumed to an extent beyond what is to be looked for in many schools. In consequence a good deal of this section could be little more than words to those for whom the book seems to be intended. The plants treated of all belong to the flowering plants, though there seems no good reason why representatives of the larger cryptogams should not find a place in such a work. But the task of a censor is unpleasant; and although it has been necessary to criticise what must impair the usefulness of the book, we gladly recognise that it should often be found suggestive by teachers and others possessed of sufficient knowledge to avoid being misled where the risk exists. The book is well printed, and is of very convenient size, and the illustrations are good and numerous; but it would have made them more useful had some of them been repeated where more than once particularly referred to and explained. References to figures, sometimes many pages back, are apt to be irritating.

*Alembic Club Reprints.* No. 13. *The Early History of Chlorine.* No. 14. *Researches on Molecular Asymmetry.* Pp. 46 and 48. (Edinburgh: W. F. Clay, 1897.)

THE first of these reprints contains translations of papers by Carl Wilhelm Scheele (1774), C. L. Berthollet (1785), Guyton de Morveau (1787), and J. L. Gay-Lussac and L. J. Thenard (1809). This volume, together with the earlier reprint in this series (No. 9), containing Davy's researches, completes the history of chlorine from its discovery by Scheele to the proof of its elementary nature by Davy. The importance of this discussion upon the