suggestive as is that idea, and ignored as has been the element of truth in it. One may also think that in failing to see *how* brute conflict naturally evokes thought, he underestimates the part played in the progress of mankind by the ventures and insistencies of just brute vital impulse, however uninformed; and that accordingly, at times, the pale cast of thought is too emphasized and the fear of individualistic assertion too acute. Again, it seems to me that he gives the indifferency of facts to ideas, to purposes, too absolute a character, failing to see the full strength of the pragmatic doctrine that in a universe in which ends are developed in conception and insisted upon in action, thought must, as a part of the inherent machinery of such conception and realization, attribute indifferency and disregard to the 'world of facts'—in order, that is, to free and multiply ends, and to liberate and vary the selection and use of means.

But, with whatever of criticism and qualification, those who think, as does the present writer, that the really vital problem of present philosophy is the union of naturalism and idealism, must gratefully acknowledge the extraordinary force and simplicity with which Dr. Santayana has grasped this problem, and the rich and sure way in which he has interpreted, in its light, the intricacies and depths of our common experiences. It is a work nobly conceived and adequately executed.

JOHN DEWEY.

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Economic Geology of the United States. By HEINRICH RIES, A.M., Ph.D., Assistant Professor of Economic Geology at Cornell University. New York, The Macmillan Company. 1905.

This book at once invites comparison with its predecessor of the same title, by the same publishers, and by an author from the faculty of the same institution. One is pleased to find that it is no revision, but an entirely new work, worthy of Dr. Ries, who has done so much good work in special reports in the field it covers. Though it contains fewer pages than Tarr's 'Economic Geology' (435 against 525), it contains quite as much matter on economic geology, and a host of good *and illustrative* illustrations. This comes about in three ways. In the first place all general introductory geological or mineralogical matter is omitted. The reader is supposed to have acquired that. In the second place a slightly smaller type is used for less important matter. In the third place the style is condensed to the last degree.

This is not, however, at the expense of clearness, which is French. Indeed, the short crisp sentences often need qualification, which will (p. 230, l. 28) sometimes be found in an adjacent sentence or paragraph.

The author begins, inverting Tarr's order, with the lower priced but more important nonmetallic substances. This is natural, as Dr. Ries's work has been mainly in this field, but it seems to the reviewer logically preferable also. He begins with the fuels. The bibliographic additions at the end of each chapter are noteworthy, giving the latest references, not cumbered up with a lot of obsolete matters, yet retaining the more important books of any age, and they enable the student, or the business man who cares, to pursue any subject farther readily and effectively. It seems to me they are decidedly preferable to a general list at the end of the volume.

From fuels he passes to building materials, and does not give a disproportionate treatment to clay, upon which he has done so much work. Indeed, he might well have let himself out a little. Thence he passes to salt, salines, gypsum (the order should logically be inverted), fertilizers, next to which soils and road materials might well have come, abrasives (here a little discussion of diamond and other drilling might have been appropriate) and water. This latter subject is handled in somewhat stepmotherly fashion, considering that at present in the work of the United States Geological Survey the Hydrographic Division is the tail that wags the dog. Evidently the author thinks that water power and irrigation are not properly handled in economic geology, or, perhaps, he thought that if once he started in he would not know where to stop. The second part, on 'Metallic Minerals and Ores,' begins with a clear and fair

condensed statement of present beliefs and theories as to the occurrence and formation of ore deposits. It is marked by good common sense. Iron, copper, gold and silver, silver-lead (a genetic group) follow roughly in the order of their importance. Then follow very brief statements regarding a host of minor metals, the sources, distribution, uses and production of which are briefly given, with valuable lists of references.

Throughout the book one can often see where one might wish more added, but there is little to correct or omit. Each teacher will naturally supplement as circumstances demand. A few comments on matters in the reviewer's province may be pardoned.

The occurrence of the copper 'beneath higher ground' is the weakest of the arguments for the rôle of descending waters and lateral secretion in the formation of the Lake Superior copper deposits. Indeed, the fact itself is rather questionable. The reviewer probably misled Dr. Ries by mentioning it first in the paper cited by him, but that was done to attract local interest to the matter. The progress of developments seems to show that the prevalence of mines on higher ground is mainly due to ease of discovery.

So, too, the reference (p. 290) to electrolytic refining of Lake Superior copper needs to be qualified. That has not been the normal method of treating these deposits of native copper, though very unfortunately, as it seems to me, western copper has been brought into the district and treated electrolytically. There are certain grades of concentrates from the Quincy and Calumet and Hecla which it pays to treat electrolytically to save the associated silver, and there has been a little copper, like the Mohawkite from the Mohawk Mine, where the amount of arsenic and nickel was enough to warrant electrolytic treatment, together with the product of the impure slags and various drippings and skimmings and oxidation products that go to the cupola. But the vast bulk of genuine lake copper has not been handled electrolytically. It reduces the toughness a little.

Recent and up to date as the book in general is, it is not recent enough to recognize the report of the joint committee on the Lake Superior stratigraphy[1] and the triple division of the Huronian. Nor is the statement that the 'archean iron-bearing formations are unproductive' true so long as the Vermillion Range is left in that variously delimited group.

A word of especial commendation should be given to the illustrations. Numerous cuts and small but clear maps of distribution are inserted in the text, which is printed on unglazed paper of good quality, while the halftones are well brought out by being generally inserted on glazed paper. This is easier on the reviewer's eyes, and probably easier on the binding than the use of glazed paper throughout as in Chamberlin and Salisbury's new 'Geology.' Comparatively few are expressly drawn for the work, but that is no criticism, for they are recent (almost all of the last ten years), clear and pertinent. In fact it is a positive favor thus to skim the cream of the various state and special reports. One could hardly ask for more, except perhaps a few diagrams of production such as are so valuable a feature of Branner's syllabus.

The proof-reading seems exceptionally clean, but a few errors of sense have been obtained, mainly from the author, and are appended.[2]

[1] *Journal of Geology*, 1905, p. 104.

[2] Errata: Page 15, fifth line from bottom, read (1, 3) instead of (13). Page 22, eighth line from top read 10,000,000,000 instead of 10,000,000. Page 28, twelfth line from below, read 250 instead of 150. Page 36, reference 21, read 'Coosa.' Page 38, last line, read 1863 instead of 1883. Page 72, sixth line from top, omit 'per cent.' after 20. Page 115, analysis of chalk should have 4.42 SiO_2. Page 142, ninth line from top, plate reference should be placed after Alabaster on line above. Page 163, line 10 from below, insert natural before abrasive. Page 202, SiO_2, of first analysis, should be 63.07 instead of .07. Page 286, line 19 from top, read '2,000 or 2,500.' Page 306, Fig. 62, pattern for Potosi limestone, is wrong in legend; the Potosi limestone is represented by upper one fourth inch of left and right end of section. Page 329, fifth line from bottom, read 'the metals.' Page 429, under Michigan, insert iron ores, 256, 261, 265. Page 434, under Texas, take out 'fuller's earth,' 175.

On the whole the book may be pronounced excellent—one that every broad-minded business man should have, and that deserves the wide acceptance in the colleges that it is finding.

To be adopted as a text-book on economic geology by such an authority on that particular subject as Professor Geo. P. Merrill is enough to show that it is indeed a good one.

A. C. LANE.

Die Riechstoffe. By Dr. GEORG COHN. Braunschweig, F. Vieweg und Sohn. 1904. Pp. 219.

This is Section II., Group 2, Vol. VI., of Bolley-Engler's well-known 'Handbuch der chemischen Technologie,' which is now published in this separate form for the convenience of those interested in the study of the perfumes.

The book is divided into the following chapters: I., Definition of a Perfume; II., Literature; III., History of Perfumes; IV., Occurrence of Perfumes in Nature; V., Preparation of Perfumes; VI., Physical Properties of Perfumes; VII., Chemical Behavior of Perfumes; VIII., Quantitative Estimation of Perfumes; IX., Physiological Action of Perfumes; X., Use of Perfumes; Addenda, and Index.

Certain branches of organic chemistry have developed so rapidly during the past few years as to have risen almost to the rank of separate sciences. The chemistry of the dyestuffs and of the synthetic drugs, are cases in point. While the chemistry of the perfumes has not experienced so great a development as these, it has, nevertheless, reached the point where special books on the subject are necessary, and many have already been published. The history of perfumery goes back to remotest antiquity, but that of the chemistry of the perfumes is comparatively recent.

The book under review gives a concise summary of our present knowledge of the subject, including the chemical, physical and physiological properties of the various perfumes, together with their methods of preparation. The synthetical preparation of perfume substances, and the methods of obtaining perfumes from natural sources, particularly, are treated very fully.

All plants which yield ethereal oils are classified according to their natural families; and this list is supplemented by an alphabetical tabulation of all known ethereal oils, giving their physical constants and chemical constituents. The composition of various artificial ethereal oils, at least so far as ascertainable from the patent literature, is given in a later chapter (X.).

In the special part (included in chapter V.), 108 pages are devoted to a detailed discussion of the various perfume substances. The classification is based upon chemical structure, and includes the following groups: Hydrocarbons, alcohols, acetales, ethers, esters, lactones, aldehydes, ketones, phenols and phenolic ethers, nitro compounds, and bases. The methods of preparation and the characteristic reactions of the various groups are given.

The references to the literature throughout are numerous. The importance of the patent literature is recognized, and not only are references given to patents in the text, but there is also a separate classified list of all German patents covering methods of isolation or preparation of perfume substances. The different European factories which manufacture perfumes are also noted.

Trade statistics, however, are almost wholly lacking. Many reports have been published in recent years on the production of ethereal oils and perfume substances in various parts of the world, the consumption of flowers for this purpose, cost of same, percentage of oil yielded per pound of flowers, and so forth. A *résumé* of such data would have been interesting.

The book should prove a useful compilation for all interested in this branch of organic chemistry.

Die ätherischen Oele nach ihren chemischen Bestandteilen unter Berüsksichtigung der geschichtlichen Entwicklung. By Dr. F. W. SEMMLER, ord. Honorarprofessor an der Universität Greifswald. Leipzig, Von Veit & Company. 1905. Erste Band; Erste Lieferung; Allgemeiner Teil. Large