selection may be crowded into the early stages of ontogeny by post selection. Evidently the degenerate condition is not crowded back for the same reason. How it is crowded back I am unable to say. A satisfactory explanation of this will also be a satisfactory explanation of the process by which individually acquired characteristics are enabled to appear in the next generation. The facts, which are patent, have been formulated by Hyatt in his law of tachygenesis.

Cessation of development takes place only in so far as the number of cells are concerned. The number of cell generations produced being continually smaller, result in an organ as a consequence also smaller. In this sense we have a cessation of development (cell division, not morphogenic development) in ever earlier stages. That there is an actual retardation of development is evident from *Amblyopsis* and *Typhlichthys* in which the eye has not reached its final form when the fish are 25 mm. long.

Histogenic development is a prolonged process and ontogenic degeneration is still operative at least in *Amblyopsis*.

Degeneration in the individual is not the result of the ingrowth of connective tissue cells as far as I can determine. It is rather a process of starving, or shriveling and resorption of parts.

From the foregoing it is evident that degeneration has not proceeded in the reverse order of development, rather the older normal stages of ontogenic development have been modified into the more recent phyletic stages through which the eye has passed. The adult degenerate eye is not an arrested ontogenic stage of development but a new adaptation and there is an attempt in ontogeny to reach the degenerate adult condition in the most direct way possible.

CARL H. EIGENMANN.

SCIENTIFIC BOOKS.

The Ore Deposits of the United States and Canada. By JAMES FURMAN KEMP. Third Edition entirely rewritten and enlarged. New York and London, The Scientific Publishing Company. 1900.

The first edition of 'Kemp's Ore Deposits of the United States' appeared in 1893. The second edition from the same plates, in which forty to fifty pages of additional matter had been inserted, was published in 1895. We now have the third edition, with entirely new plates, which forms a volume nearly twice as thick as the first, with larger type, heavier paper and additional plates which contribute, as well as the new matter, to its increased size. As this is practically the only modern work dealing in any adequate fashion with this important subject, and as it hence constitutes the standard work for reference with regard to the ore deposits of the United States and Canada, it is important to consider its shortcomings as well as its merits, and even to dwell upon the former.

It must be evident to all who consult the work that Professor Kemp has been remarkably thorough in his search of the literature of his subject and few books have a more complete bibliography; the references, moreover, are distributed throughout the text, not lumped together at the end, so that it requires very little labor on the part of the reader to go back to original authorities on any given point. Kemp possesses, moreover, in a high degree the important faculty of reading intelligently and of expressing concisely the leading facts gathered in the course of his reading. This is perhaps the most important qualification for a work that is essentially a compilation rather than an original treatise.

For a philosophical treatment of phenomena like ore deposits, in which different observers may in all honesty draw diametrically different conclusions from their respective examinations of the same deposit, it is essential that the author should have been able by personal inspection to verify the relative accuracy or degree of probability of opposing views; for in this case, even if we may differ with the author's theoretical opinions, we know that the coeffi-

cient of error, if such we regard it, will be constant through his work.

In the first edition of Kemp's work, there was some evidence of haste in preparation, for which, apparently, the publishers' demand for copy was in a measure responsible. In the later editions, there has been ample time to remedy any shortcomings that may have arisen from this cause, hence it is well to examine with some detail the nature of the changes that have been made in the last edition. The book is divided into two parts; Part II., a description of the deposits of the respective metals, occupying about five-sixths of the total space. In Part I., which deals with general characteristics, there has been added to Chapter I., on the 'Formation of Cavities,' a statement of Van Hise's division of the earth's crust into three zones, one of fracture, one of fracture and flowage combined, and one of flowage alone; also six pages on 'Underground Circulation,' but nothing to the very brief mention of 'Replacement as a mode of deposition.' In Chapter III., on 'Minerals and their source,' there has been added a paragraph on the association of certain metals with certain rocks, and one on secondary migrations of vein materials, with references to De Launay's recently expressed views. In Chapter VI., on the 'Classification of Ore Deposit,' the author has elaborated the discussion of his own system; especially in the direction of magmatic differentiation, relegating the descriptions of other systems to an appendix at the close of the work; the other three chapters are practically unchanged.

It is in the descriptions in Part II. that the most changes have been made, and these have been mainly as insertions of new paragraphs, so that the statement on the title page that the volume has been 'entirely rewritten,' for which the publishers are evidently responsible, is hardly justified. The actual increase in the number of pages is one hundred and eleven, but this is in considerable part due to larger type. It has evidently been considered important to preserve, as far as possible, the same relative numbering of paragraphs in this as in former editions; new matter is largely taken from new publications of Government surveys, and from papers in the transactions of the American Institute of Mining Engineers. The following are the more important changes in order of chapters:

In descriptions of 'Iron Deposits' important enlargements are made from the work of Van Hise and his associates in the Lake Superior region and from the author's studies in the Adirondacks. Under 'Copper Ores' the description of the Ducktown and Butte deposits have been largely rewritten, and those on the 'Lake Superior Deposits' have been elaborated; mention is made of some in Idaho. Additions have been made to the discussions of the Lead and Zinc Deposits of the Mississippi Valley from the reports of Winslow and Jenney; in the chapter on 'Zinc alone,' no change is perceptible. Under 'Lead and Silver' new descriptions are given of the Tenmile, Eagle River and Aspen districts in Colorado (the latter rather inadequate), and under 'Silver and Gold' of the Telluride, Custer County and Cripple Creek districts, in the same State. Under the same head, hitherto unpublished data is given from a paper by J. D. Irving on the Black Hills' Deposits, which, like those of Cripple Creek, are more properly classed under 'Gold alone.' New data as to Montana, Idaho and Utah, are added on the authority of Weed, Lindgren and Spurr, respectively. Descriptions of the 'Gold Deposits of the Pacific Slope' are very largely rewritten from the reports of Lindgren, Becker, Turner and others. Under the heading 'Gold elsewhere in the United States and Canada,' the gold deposits of the Appalachians, which have been barely noticed before, are briefly described, mainly from Becker's report; but of the eight pages of text fully one-half are occupied by references. Eleven pages are given to Alaska and British Columbia, with notes on Nova Scotia. About eighteen paragraphs have been added to the chapter on the 'Lesser Metals' in which those that bear upon the theory of magmatic separation are especially prominent.

The improvement in the illustrations of the volume is most marked, as there were very inferior reproductions in former editions; some of the poorest have been eliminated, and the half-tone prints, both old and new, are of remarkably improved quality, though some still leave much

to be desired (*e. g.*, Fig. 122). The new illustrations are largely from Government reports, but many photographs are by individuals, especially by the author. From these it appears that, since the publication of the first edition, the author has himself visited some of the important mining districts of the west, but in many cases it is evident he still does not possess sufficient familiarity with the regions to judge, from published reports of a given mining district, whether or not those of one author possess inherent merits entitling his views to superior consideration over those of another.

Professor Kemp, who is an excellent petrographer, has, as shown by his papers published elsewhere, a decided leaning toward the theory of magmatic separation of ore minerals held by Scandinavian geologists, like them, viewing the subject primarily from a petrographic standpoint. The sufficiency of this method for the formation of ore deposits, unless aided by later concentrations through the agency of circulating waters, is not, however, regarded with so much favor by most mining geologists of wide practical experience in America.

Taken as a whole the book presents an excellent bird's-eye view of the ore deposits of the country, as nearly up to date as is practicable, with a fair-minded presentation of the various views held as to their origin and mode of formation. The mining community is certainly indebted to Professor Kemp for the ability and thoroughness with which he has accomplished his laborious task, the magnitude of which few beside the author can adequately appreciate.

S. F. EMMONS.

The Nature and Work of Plants. An Introduction to the Study of Botany. By DANIEL TREMBLY MACDOUGAL, Ph.D., Director of the Laboratories, New York Botanical Garden. New York, The Macmillan Company. 1900. Pp. xviii + 218. 12mo.

The author's introductory paragraph gives us his point of view. "The course outlined in this little book is essentially a study of the functions or action of the plant, and organs are considered chiefly as instruments for the performance of work, with but little attention to their morphology. It is believed that this method of introduction to the subject of botany will be best suited for beginners who have not at hand the facilities of a laboratory. In conformity with this idea, the use of technical terms has been restricted to the actual necessities of logical treatment, and the demonstrations have been developed by the simplest experimental methods."

He takes up the subject in ten chapters, as follows: I. the composition and purposes of plants: II. the material of which plants are made up; III. the manner in which different kinds of work are divided among the members of the body; IV. the roots; V. the leaves; VI. stems; VII. the way in which new plants arise; VIII. seeds and fruits; IX. the power or energy of the plant; X. relations of plants to each other, and the place in which they live. These chapters include two hundred and fifty paragraphs, each of which directs attention to a single fact or group of facts, which in most cases may be subjected to observation or experiment by the pupil. Very simple suggestions are given for these observations and experiments, and the pupil is usually left quite free to use his own ingenuity in carrying them out. While function is emphasized, structure is not ignored, but this is almost entirely confined to gross structure, the author's intention being to require no greater aid to the naked eye than a hand lens magnifying from six to ten diameters.

The book is non-technical, in conformity to the trend of recent text-books, and is remarkable in having *no illustrations whatever*, the author depending upon the simplicity and clearness of his text and the plant or experiment itself to furnish ideas to the pupil. Whether the pupils and teachers who have been brought to expect fine 'half-tone' illustrations of everything from cell elements to plant communities, and a profusion of diagrams of physiological apparatus, with 'half-tones' showing the results of experiments, will take kindly to this book which implies and demands *work* on the part of both, remains to be seen. There is a good deal of laziness in the world, and we fear that the temptation to use a book with pictures (which too often are studied in lieu of the experiments) may be so strong as to