It was perhaps more than a coincidence that this address was delivered soon after the resignation from Brown University of President E. Benjamin Andrews.

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SCIENTIFIC BOOKS

The British Tunicata. An Unfinished Monograph by the late JOSHUA ALDER and the late ALBANY HANCOCK, F.L.S. Edited by JOHN HOPKINSON, F.L.S., F.G.S., etc., Secretary of the Ray Society, with a history of the work by the Reverend A. M. NORMAN, M.A., D.C.L., F.R.S., etc. Volume I., 146 pp., 20 pls., 1905; Volume II., 162 pp., 50 pls., 1907; Volume III., 90 pp., 66 pls., 1912. The Ray Society.

With the appearance during the last year of a third volume of Alder and Hancock's researches on British ascidians all that is to be printed of this magnificent work is now available to students. The earlier volumes have been duly noticed by reviewers as they were distributed; but for the sake of completeness it will not be amiss to speak of all three volumes together.

The task of selecting and preparing the manuscript and illustrations must have been both perplexing and laborious, for we are told by Canon Norman in his history of the work which introduces the first volume, that the drawings, particularly those by Hancock, are very numerous and in many stages of completion. The bracketed words, sentences and paragraphs scattered all through the text testify to the extensive and painstaking work performed by Mr. Hopkinson.

Very wisely not much has been added to or subtracted from the work as it left the hands of the authors. The diagnoses of species of the compound ascidians have received more editorial modifications than have those of the simple ones. In a few instances species and genera have been included which did not appear as such in the manuscript, but only where the notes and sketches warranted.

The part played by Canon Norman in bringing the work to the light of day was undoubtedly done under the stimulus of personal devotion and direct scientific interest, his friendship for and association with the authors having been intimate and of long standing, and he contributed much, particularly in the way of specimens, to the substance of the monograph. Mr. Hopkinson's rôle seems to have been solely that of an official and a man of science, and what he has done is a fine testimonial to his ability in this way.

Volume I. contains, as mentioned above, a review of the origin and vicissitudes of the work, by Canon Norman; an introduction by the authors; a reprint of Hancock's "On the Anatomy and Physiology of the Tunicata" originally published in the *Journal of the Linnean Society of London* in 1867; and the systematic treatment of all the species of the genus *Ascidia.* Volume II. opens with a life of Alder by Norman, and of Hancock by Embleton, and deals with the remaining genera, *Ciona* and *Corella,* of the family Ascidiadæ, and the families Molgulidæ, Cynthiadæ, and Clavelinidæ. Volume III. treats of the "Aggregatæ," of which three families, Polyclinidæ, Didemnidæ and Botryllidæ, are recognized, and ends with a supplement by Mr. Hopkinson containing "Additional References and Localities"; a "List of the Species described in the Monograph, with the Genera under which they would probably now be placed," and a "General Index."

There can be no question about the value of this monograph, even though it represents the state of knowledge of ascidians as it was forty years ago, and makes no pretense of concerning itself with other than British species. Its chief utility will naturally be as a handbook for British students and other persons who frequent the shores of the British islands. The great number and excellence of the illustrations, particularly those of habitus of the kinds, "forms," varieties and species, mostly by Alder, will make it specially useful in this way. Nearly all the figures, even the anatomical ones from Hancock's faithful brush, are in color. The authors evidently devoted much less time to the compound than to the simple species; and for illustrating

these the editor has largely supplemented the original drawings from figures by Savigny and Milne Edwards. But the usefulness of the book will be by no means restricted to students who are countrymen of the authors. It will undoubtedly take a conspicuous place in the working library of specialists in the group wherever located, as it already has in that of the reviewer.

Divers reflections are induced by reading the divers things said in these volumes by divers persons. The brief, straightforward account by Canon Norman in Volume I. of how the monograph came to be undertaken relates that Alder was requested by the keeper of the zoological department of the British Museum to prepare a "Catalogue of British Tunicata" as one of the series of catalogues then being issued by the Museum; that Alder at once took up the task and pushed it to the exclusion of everything else; and that after several years' work when he reported the manuscript ready to be turned in he was informed by the keeper (with the deepest regret) that somebody had withdrawn the grant for publishing the catalogues, and that consequently his work could not be published. In the absence of information to the contrary this looks like a flagrant breach of contract on the part of the Museum, and reminds one of the frequent charge that institutions and governments hold themselves less bound by contracts than individuals are supposed to be held. If this be so the fact can only mean that communities in which it is true are still in an immature stage of advancement in civilization, so that as time goes on and with it progress it will be impossible for such cases of broken faith to occur.

The extent to which embryological knowledge may modify interpretations based solely on anatomical knowledge could hardly be more strikingly illustrated than by Hancock's ideas about the homologies of tunicate organs. He knew almost as much as we of to-day know about the gross structure of full-grown ascidians, yet he considered the close kindred of the group with the polyzoa to be fully established! The proposal made by several zoologists to separate the ascidians from the molluscs he looked upon with great disfavor, and his efforts to prove the resemblance between the respiratory apparatus of an ascidian and that of a bivalve mollusc seem curious enough to us now. Of course he was familiar with the tadpole stage of the individual ascidian, though he thought it a secondary acquirement. But it is not alone with reference to these broad generalizations as to group affinities and classification that discoveries in development have changed morphological ideas. There is hardly a page of Hancock's essay that does not contain some interpretation, expressed or implied, which does not accord with present views. Kowalevsky's epochal "Entwickelungsgeschichte der einfachen Ascidien" was published in 1866, and although Hancock's "On the Anatomy and Physiology of the Tunicata" did not appear until the next year, there is no indication that the English comparative anatomists had read the memoir of the Russian embryologist.

In an addendum to the biographies of the authors which introduce the second volume, Canon Norman remarks that Alder and Hancock were "naturalists of a by-gone time." "With only very moderate advantages," he says, "as regards early education, they progressed greatly in knowledge by private study as years went by. An intense love of nature absorbed them, and they realized that everything else must be sacrificed to allow them to find out nature's secrets." When one recalls that these were only two among a considerable number of Britishers of that period who, largely self-trained, passed all or a great part of their lives in unremitting toil as investigators of nature, and did this without compensation or institutional aid, he can but be mindful how unqualifiedly true is Norman's remark about a by-gone age. Undoubtedly the refinements of method in nearly all departments of research, necessitated by the advancements that have been made, account in large measure for the almost entire disappearance of this type of scientific men. The professionalizing and institutionalizing of science in our day as compared with former days have

been, inevitably, both result and cause of the wonderful progress that has gone on. Surely there is neither possibility nor desire to return to the conditions of a half-century ago. But a certain quality or attitude of mind essential, according to the reviewer's notion, to the best achievements has been lost since the former days. Reference may be made to what some astronomer, Professor Hale I believe, has extolled as the amateur spirit in science: a spontaneous, perennial curiosity; a wide-awakeness of perception; an openness of mind; and a nimbleness of imagination, as touching all sorts of objects and processes and incidents in one's surroundings. The belief prevails widely among biologists of the present day that this sort of thing necessarily begets superficiality—that it is inimical to that profundity demanded by the deep, ultimate problems which constitute the soul of science. The belief is, however, not justified by either the history of scientific discovery, or our modern knowledge of the constitution and workings of the human mind. The "complex" of recent psychology is a "system of connected ideas with a strong emotional tone"; and specialization may go so far in both differentiation and intensification as to tend to reduce the system of ideas to one idea, and to destroy the "emotional tone."

Such works as the one now before us, taken in their entirety, ought to serve the two-fold end of helping on knowledge in a restricted field of zoology, and of restoring to biological research something of the amateur spirit.

WM. E. RITTER

List of North American Land Mammals in the United States National Museum, 1911. By GERRIT S. MILLER, JR., Curator, Division of Mammals, United States National Museum. Bulletin 79, United States National Museum. Washington, Government Printing Office. 1912. 8vo. Pp. xiv + 455.

This volume is a most welcome contribution to mammalogical literature, giving, as it does, in systematic sequence, the names of the species and subspecies of all North American land mammals currently recognized down to the end of the year 1911, and a large part of those described during 1912. "North America," for the purpose of the list, comprises "the entire continent from Panama northward, together with Greenland and the Greater and Lesser Antilles." It consequently includes the Island of Trinidad, which is, faunally and geographically, really South American. According to the author's tabular summary, the number of "forms" included in the list is 2,138, of which 1,955 are represented in the United States National Museum, leaving only 183 as unrepresented. The types of about one half of the total number of forms are in the National Museum.

The plan of the list is about as follows: The classification, or "sequence of groups is, in its main features, that adopted by Osborn in his 'Age of Mammals,' 1910, though the arrangement of the families and genera has been revised to make it as consistently as possible in harmony with that of the higher groups." References are given to the place of first publication of all generic, specific and subspecific names, and types are designated for the genera. In the case of species and subspecies, reference is usually made to the first use of the binomial or trinomial here adopted, and to True's list of 1885. "The type locality of each form is stated with all possible exactitude; and in revised genera the ranges are given as printed by the author," references to such revisions being given in footnotes.

The list includes: (1) species and subspecies that "had not been questioned in some recent work of definite monographic character" prior to the end of the year 1911; (2) forms belonging to groups which have not been treated in a monographic paper; and in cases where differences of opinion regarding their status have developed, "references are given to the conflicting views," at least in most cases. The utility of this work to investigators is further enhanced by an asterisk prefixed to the names of forms contained in the National Museum, and also a dagger in case the museum also has the type. The author has of