were successful occasioned a large amount of fighting and confusion on the rookeries in the season of 1913.

Fortunately, Mr. Hanna has given us the data to illustrate just what this fighting and confusion has meant; he has supplied us with a count of the dead animals. Similar figures for 1915 are not available, but we have such figures for 1912 and they may be compared as follows:

Animals Dead	1912	1916
Bulls	3	12
Cows	27	79
Pups	1,060	2,482

The deaths in 1912 were what might be considered normal and inevitable. In that season there were only 113 idle bulls and the fighting was a negligible factor. The deaths occurred as a result of accidents inherent in the crowded condition of harem life. In 1916, however, we find the deaths among bulls quadrupled; among cows, almost trebled and among pups, increased 134 per cent. Moreover, this is with only between two and three thousand idle bulls. What will be the result when the 60,000 to 70,000 idle bulls begin six to eight years hence to bring their pressure to bear upon the breeding grounds?

In my report for 1913 I attempted, without effect, to bring this unfortunate aspect of the fur-seal law of 1912, which could readily be foreseen, to the attention of the Bureau of Fisheries in the following words:

> The bull fur seal is an animal of about 500 pounds weight; his mates are animals of 80 pounds weight; the pup at birth is a weak thing of 12 pounds. The harem life of the seals is crowded at best and subject to commotion. The mother seal takes no thought of the time and place of labor. Newly born pups are trampled and smothered under the best of circumstances. Anything which creates turmoil and fighting in the vicinity of the breeding grounds is necessarily fraught with danger to the young. Fighting among the bulls arises from attempts by idle bulls to steal cows from their more successful neighbors. In these contests cows are torn and injured and pups trampled. . . .

George Archibald Clark
Stanford University, Calif.,
January 23, 1916

Professor Curtis's Review of Petrunkevitch's Morphology of Invertebrate Types

The review of Professor Petrunkevitch's "Morphology of Invertebrate Types" by Professor W. C. Curtis in Science for December 1 is rather misleading. The method of presentation in Professor Petrunkevitch's book is certainly one for which many teachers of invertebrate zoology have been waiting. Commendation of the principles upon which the book is founded and explanation of the necessity for such a work have been very ably put forth in Professor Curtis's review. However the method of presentation of subject-matter and type forms taken up for consideration are but two of the many points to be considered in determining the value of a book as a text for student use. It has been my experience, and I am sure it is shared by others, that one of the most difficult things to accomplish with the student in science is an appreciation of the necessity for clearness of expression. Mistakes in grammar and in English are too frequently looked upon as of no consequence to the scientist. In view of these facts I feel that the reviewer has omitted some points to which attention should have been called.

When Professor Curtis makes the remark that "the book is well done, clear, concise and to the point . . ." he very evidently does not consider such passages as:

> Place a specimen in a white dish with water on its right side and make a drawing twice natural size showing the left side (page 155).

On page 8 the student is directed to

> Label anterior and posterior end, dorsal and ventral surface.

Another example of what does not appear to be either clear or concise is found on page 39, where the reader is told that

> The *circular canal* follows the edge of the disc between every rhopalium.

I do not believe that a zoology text could be written in sufficient detail to eliminate the necessity of a teacher, but I do think that a large percentage of the average undergraduate class in studying the anatomy of *Molgula* would require an explanation on the part of

the instructor of the exact relations existing between the two structures "the tunique" and "the tunic" when that explanation could be avoided through greater consistency in the use of terms in the text.

Errors of a nature more serious than those just cited are not wanting in the text. In the discussion of the earth-worm the sperm sacs or seminal vesicles of the male reproductive system are called spermathecæ (misspelled spermothecæ three times on page 94). In so far as I have been able to determine the term spermathecæ is applied by morphologists and by specialists in the oligochætes to that part of the female reproductive system which Petrunkevitch calls the receptacula seminis. I doubt that readers of a review would consider errors of this type "of such a minor nature that to mention them might seem like petty criticism."

The all too frequent misspellings of words and inconsistencies in punctuation, in capitalization, and in the indiscriminate use of or omission of the hyphen in identical combinations of words, while items in themselves of but minor importance, impair the value of the book as one to be placed in the hands of undergraduate students, whose carelessness along these lines would tend to be accentuated. For some of these errors it is probable that the publishers are in some degree responsible. Granted that "it is not a work which gives the impression of having been carelessly put together," yet more care in proofing, in making certain of the correctness of the statements, and in the form of the expression would have added considerably to its value.

H. J. VAN CLEAVE

SCIENTIFIC BOOKS

Discovery, or the Spirit and Service of Science. By R. A. GREGORY. New York, Macmillan and Co. Price $1.75.

The appearance of this book could not well have been more timely. At the present date when all English-speaking peoples are in greater or less degree reaping the bitter fruits of their past indifference to the welfare of scientific investigation, a widespread awakening to the more immediate utilitarian advantages of scientific discovery is finding expression in the formulation of far-reaching governmental plans for the furtherance of technical research, research in other words that "pays." Our governors and leaders utterly lacking the viewpoint of the investigators and any consciousness of the larger import and ultimate aims and utilities of science are of course as indifferent as ever to the welfare or outcome of the more fundamental and far-reaching problems of research, for these can not be guaranteed within any defined period to return the several hundred or thousand per cent. which the political or commercial public naturally expects as the outcome of any investment in research. There is a manifest danger that the welfare of scientific investigation will actually suffer by reason of the new-born and ill-directed interest of the politician. This is an occasion, therefore, when it is more than ever necessary to undertake a definite campaign of popularization of the true aims and aspirations and methods of the scientific discipline of thought.

The educator, no less, perhaps, than the politician, requires instruction in the true aims and inspiration of science. In the words of our author, "The following pages will perhaps show that the spirit of scientific research has inspired the highest ethical thought and action, as well as increased the comforts of life and added greatly to material welfare. We seek to justify the claim of science to be an ennobling influence as well as a creator of riches; and therefore as much importance is attached to motive and method as to discovery and industrial development, however marvellous or valuable these may be." It may be added that the citations in this little book will perhaps serve to show our "humanistic" colleagues that science has been able to inspire literature which will bear comparison in nobility of thought and beauty of expression with the literary standard of the "humanities."

By a pardonable oversight on page 103 the Yerkes Observatory is situated in California.

T. BRAILSFORD ROBERTSON