puted matters, and he avoided controversy in a manner exemplary to younger men. His public lectures were not popular by reason of any eloquence of delivery or of rhetorical skill, but because of their clearness, simplicity and convincing quality of accuracy. As a teacher he was particularly successful; having himself a splendid grasp of the fundamentals of mathematics and physics, he presented his subject logically, with emphasis on the essentials; and his humor enlivened the class room. It is doubtful if any teacher in this country has enlarged the intellectual horizon of a greater number of undergraduates than has he, in his culture courses in astronomy. "Twinkle" will never be forgotten by any of his students.

Professor Young's eminent services in research and education received recognition in numerous academic degrees, membership in and awards from various learned societies.

He had suffered from Bright's disease for a number of years; but by good care had kept himself fairly comfortable. The loss of his wife seven years ago, after forty-four years of a particularly happy married life, came as a crushing blow to him; and to his sorrow was lately added the death, after a year of distressing illness, of his widowed daughter, who made her home with him.

The retirement from his position at Princeton in the summer of 1905 was made the occasion of a grateful recognition by his colleagues, and the appreciation shown by his friends at that time must have been a source of much gratification to him. He then returned to Hanover, where he lived quietly, until he succumbed to a brief attack of pneumonia on January 3. Two days later he was gathered to his fathers in the old cemetery close to the house where he was born.

EDWIN B. FROST

YERKES OBSERVATORY,
January 14, 1908

SCIENTIFIC BOOKS

Experimental Zoology. By THOMAS HUNT MORGAN, Professor of Experimental Zoology in Columbia University. New York, The Macmillan Company. 1907.

In a recent number of SCIENCE there appeared an extensive review of this book, which, in the opinion of the writer, does scant justice to an important and valuable work. It is with the thought, therefore, of calling attention to some of the many valuable features of the book that the following supplementary review is written.

Although experimental zoology is one of the youngest of the sciences it has grown so rapidly that it is practically impossible for one not working in this field to keep pace with its development. Until recently there was but one journal devoted to this subject and much of the literature pertaining to it is scattered through publications which are more or less inaccessible. From time to time there is needed in every science, and especially in one not well organized, some general work, which will not only summarize results and bring many scattered observations under one point of view, but which will also awaken interest in the subject and point out the direction of needed research.

Such a book is this of Morgan's—a book which is not only full of information, but which is also illuminating and stimulating. The writer of this notice has made this book the basis of a course of reading for graduate students in zoology with the most satisfactory results. The book discusses in a very concise and direct manner a great range of experimental work in zoology, much of which, it is safe to assume, is relatively unfamiliar to many zoologists. Although these discussions are usually brief, they go straight to the heart of the matter under consideration, and they generally exhibit a critical insight and a breadth of judgment which indicate a thorough acquaintance with the phenomena in question. By the variety and extent of his own experimental work Morgan is probably better fitted than any other man in America to write a general work on experimental zoology.

The book begins with a well-balanced estimate of the relative value of observational and experimental work; it maintains that experiment is the only method by which zoology may be placed upon the same footing with chemistry and physics; it points out the uses and abuses of scientific hypotheses and the necessity of verifying these by experiment; and it concludes that the goal of experimental work is, in the words of Loeb, the control of natural phenomena.

The scope of experimental zoology is so great that it can not be treated as a whole within a volume of ordinary size. The author has therefore omitted from consideration two important fields of study, viz., experimental embryology and the experimental study of regeneration, both of which he has dealt with in other books. The present volume is mainly devoted to those aspects of experimental zoology which have not hitherto received adequate treatment in book form.

The principal topics discussed fall under the following six headings: (1) Experimental Study of Evolution, (2) Experimental Study of Growth, (3) Experimental Studies in Grafting, (4) Experimental Studies of the Influence of the Environment on the Life-cycle, (5) Experimental Studies of the Determination of Sex, (6) Experimental Study of the Secondary Sexual Characters.

Under the first heading are included a large number of topics such as the influence of external conditions in causing changes in the structure of animals, the inherited effects of changes due to environment, the inheritance of acquired characters, experimental hybridizing, the behavior of the germ cells in cross fertilization, inbreeding, the influence of selection, and finally the theory of evolution. These topics are dealt with unequally, the first in particular being very brief, while the last is from its nature rather more speculative than experimental in character. There is everywhere, however, a wealth of reference to works on these topics and many valuable and stimulating suggestions. With the chapters on experimental hybridizing I think it may be said that Morgan first strikes his gait in this book. This subject is treated at much length and in a thorough and admirable manner.

The section of the book on experimental studies on evolution forms rather more than half of the whole work. The remaining sections deal with subjects of a more special character. Under the experimental study of growth, the chapters on the external factors that influence growth, and on growth and regeneration are especially worthy of favorable mention. A single chapter is devoted to experimental studies on grafting, but this chapter is one of the best in the book, and it shows at once the author's intimate and extensive acquaintance with this subject. In the chapters on the experimental studies of the influence of the environment on the life-cycle Morgan has brought together results which are probably less familiar to the average zoologist than are any other topics dealt with in the book. The literature references in these chapters indicate through what a range of publications, many of them relatively inaccessible and but little known, the author has labored in preparing this summary.

The final sections on the determination of sex and on secondary sexual characters deal with some of the most interesting subjects in zoology. The various hypotheses are considered fairly and judicially and the author's own views are set forth in a form which is clear, if not always convincing, and which is sure to stimulate research. And after all this last is perhaps the greatest service which any book can render. In a work which covers so wide a field it is natural that minor faults should occur, but it would be unjust to suppose that it does not also have great merits. Morgan has placed all zoologists under obligation because of this book; it has been received with the highest commendations abroad, and it is a work of which American zoologists may well be proud. EDWIN G. CONKLIN

The Soil-preferences of Certain Alpine and Subalpine Plants. By M. L. FERNALD. Contr. from the Gray Herbarium. Rhodora, September, 1907. 44 pp.

It is refreshing to find, in this study of Fernald, a distinct departure from the hack-