

MILLER, D. F., AND BLAYDES, G. W.  
*Methods and Materials Teaching Biological Sciences*. New York: McGraw Hill, 1928. 435 pp. \$3.50.

This textbook and source book for teachers in training and teachers in service contains a wealth of useful material. It is divided into two parts. Part one is primarily a course in biological methods for teachers in service. The text proper is supplemented by a number of problems in which the principles discussed can be worked out in practical fashion. The bibliography and the extensive index add to the usefulness of the book.

The authors apparently feel that many high-school courses in biology follow a textbook in a blind and slavish way and that the class period is too often nothing but a repetition of the statements in the textbook assignment for the day. If that is the state of affairs teachers in service may well pay heed to the oft-reiterated emphasis on the study of living things.

Definite criteria for judging textbooks are listed. The authors favor breaking away from strict adherence to any one text and suggest placing at the disposal of the pupils a number of books to be used as references. The chapter on the evaluation program included a discussion of various types of tests and examinations with special emphasis on the newer kinds of tests and measurements.

One of the most stimulating chapters is the one entitled, "The Lack of Materials and Equipment." It is refreshing to find in place of the elaborate and expensive array of equipment no laboratory should be without a frank recognition of the financial limitations of the average biology department. The authors proceed to suggest and describe inexpensive and easily procurable substitutes that

may serve the purpose about as well as the apparatus especially made for biological laboratories. They think that much of the material used, both plant and animal, should preferably be collected by teacher or pupils.

Part two is a source book on the collection, preparation, and use of material for the classroom. It is this part of the book which will probably prove of greatest interest and value to the experienced teacher, for in it is included almost every plant or animal that would ever be used in biology classes. It takes in many forms seldom if ever used in elementary work as well as the more familiar ones. Technical specific names are generally used, and brief notes and descriptions of habitat, appearance, and methods of preservation are given for each form. A number of drawings are included.

One chapter is devoted to the preparation of microscopic material. Methods described are, in general, simple ones not involving the use of a microtome. A number of formulas for stains and reagents are listed.

Under the head of physiological processes such as photosynthesis, digestion and the like we find a number of practical and interesting experiments and demonstrations that do not require much expense or elaborate apparatus. Some of them are doubtless familiar to most biology teachers but others new to most of us. Some of the suggestions might perhaps be more appropriate for classes at the college or junior college level than for high-school pupils. Demonstrations which call for pithing a frog, sawing the shell of an etherized turtle and dissecting the turtle to show the beating of the heart may not be a wise thing for all secondary school groups.

Here is a source book, however, which contains so much useful information, so many definite and practical suggestions that it is destined not merely to be read with interest but to be thumbed over and over by any biology teacher fortunate enough to have a copy available.

HELEN J. MANK

DOBELL, C. *Anthony Leeuwenhoek and His "Little Animals."* Harcourt, Brace. 1932.

Most biology teachers have probably heard of Dobell's treatise on Leeuwenhoek, published in 1932 on the three hundredth anniversary of the Dutch microscopist's birth. This belated review is prompted by two factors. First, while the volume was published at a price of seven dollars and a half, it has recently been offered, as a publisher's remainder, at two dollars and a half. At this price it should certainly be in every high school library, and every teacher's, if the supply is sufficient.

Second, this review may be made the occasion for reference to the persistent fallacies regarding Leeuwenhoek which seem to be widely instilled in the field of high school biology. They come to my attention both in the form of elementary texts, and in the fixed ideas of many first term students in college biology. College texts in biology, botany, and zoology seem to be free of erroneous Leeuwenhoek data, as indicated by an examination of thirty-odd texts.

As Dobell writes, his interest as a bacteriologist and protozoologist was aroused when on different occasions he found that Leeuwenhoek had been the first to see and report the existence of bacteria, free-living protozoa, and parasitic protozoa. For twenty years he pursued the study of Leeuwenhoek's contributions in these

fields, mastering 16th century Dutch as part of the procedure. Now known as Leeuwenhoek's "greatest living admirer," Dobell does not find it necessary to claim that he invented the instrument. He expressly notes that all Leeuwenhoek's microscopes were simple lenses, which had had a long earlier history and use, to Roger Bacon in the 13th century, if not even to classical times. Dobell does not ask either that Leeuwenhoek be recognized as the first to use magnification for the examination of living things. He notes that Malpighi, Hooke, Borell, and others of his contemporaries had preceded him by ten or fifteen years in using some form of magnification in the study of living things. Leeuwenhoek, himself, in one of his letters (1675), mentions Swammerdam as describing certain minute animals of stagnant water. Furthermore, as Dobell notes, the Italian, Stelluti, had figured insect anatomy before Leeuwenhoek was born, and Singer is authority that Galileo had noted the compound eyes of insects by 1610, and is to be counted "the effective inventor of the compound microscope."

Not to continue citations of what Leeuwenhoek had not discovered, the things for which credit is due may be cited. Dobell calls him the father of both bacteriology and protozoology. Following his announcements of these microorganisms, their possible connection with infections was immediately suggested. By nearly all accounts, Leeuwenhoek was a careful observer, who made mistakes, but did not hesitate to correct them later, and who clearly differentiated between his observations and his speculations. His observations had much to do also with interesting men of the day in what we call microbiology. His contemporaries, Malpighi, Grew, and Swammer-