

jectives offered are not stated in behavioral terms. The suggested course organization does not seem to encourage a spirit of inquiry in either the teacher or the students. Concept development is indicated as the intent of teaching biology, and a large number of concepts are suggested; there are too many of them, and some are better suited to a college course.

Unit plans are offered in ecology-conservation, the cell, classification, simple organisms, Porifera through Echinodermata, Arthropoda, Chordata, the human body, inheritance and development, and the plant kingdom. In these units all teachers, but in particular the preservice and the new teacher, will find some useful and interesting ideas. At the end of each unit many books, journals, reports, films, and exercises are suggested. The exercises, although good, seem vague. Reference to good laboratory manuals for specific directions for each of the exercises would have been of great value, but such references are offered in only a few cases. I know that it would be impossible to list all the good teaching aids that exist today, but omission of any mention of the BSCS Inquiry Slides or Inquiry Single-Topic Films is unpardonable.

Despite its shortcomings the book contains things that can help make any teacher's classes better. It belongs in the biology teacher's library next to *Biology Teachers' Handbook* and *A Sourcebook for the Biological Sciences*.

Henry E. Drexler, Jr.  
Pius XI High School  
Milwaukee, Wis.

**ON THE THEORY OF ACHIEVEMENT TEST ITEMS**, by John R. Bormuth. 1970. University of Chicago Press. 163 p. \$9.75.

The purpose of this volume is to present an operational approach to the construction of achievement-test items. The author is proposing a method that cannot yet be fully implemented; he indicates that much research and development remains to be done before it can be applied. Therefore, although the book includes some seminal ideas, it will be more valuable to persons doing research on test construction than to those involved in the actual construction of tests. But even for the former group, a problem arises: the illustrations used are primarily in structural linguistics, semantics, and logic, and it is not immediately apparent how the system Bormuth proposes can be adapted to science.

The author's statements about the inadequacies of existing tests and the strengths of his proposed method are made in such dogmatic terms that the reader is almost pleased to find such specific flaws as oversimplification or

inaccuracy ("The well-known case of the modern physics program which resulted in vastly improved achievement in the students taking the course but also in drastically reduced numbers of students taking the course is a case in point") and sloppy scholarship (an incorrect bibliographic reference to a paper by Scriven).

Hulda Grobman  
New York University  
New York City

**DEVELOPMENTAL CURRICULUM PROJECTS: DECISION POINTS AND PROCESSES**, by Hulda Grobman. 1970. F. E. Peacock Publishers, Inc., Itasca, Ill. 261 p. \$8.00.

This book is a result of Grobman's extensive experience with curriculum materials development projects. The point of departure is a description of three such projects: Biological Sciences Curriculum Study (BSCS), Developmental Economic Education Program (DEEP), and Interaction of Matter and Energy (IME). Diversity in modes of operation of these projects is emphasized, but the treatment would have been improved by a tabular listing showing similarities and differences.

Major aspects of developmental curriculum projects discussed are situational and administrative constraints, aims and purposes, work on the developmental curriculum, diffusion of materials, and evaluation. Throughout, Grobman speaks about progress and problems from an "inside" perspective. Real human interactions that influence outcomes are frequently discussed.

The chapter on situational and administrative constraint deals with funding, organization structure, and personnel. It would be of interest to a rather limited audience and seems redundant at times. In the chapter on aims and purposes, Grobman includes major helps for anyone engaged in curriculum work, and she raises major issues and problems that often go unrecognized by educators. This is an excellent section for any teacher or administrator.

"Work on the Developmental Curriculum" includes subchapters on definition of curriculum, role of the teacher, acceptance of existing structure and media, target audience, preparation of materials, and tryout and use of materials. These subchapters often fail to come to grips with the main issues; for example, one might hope for recommendations concerning the concept of curriculum or the roles and behaviors of teachers and implications for curriculum developers. Even so, most teachers will find considerations of value in their own curriculum development. Directors and personnel of developmental curriculum projects should find the considerations highly valuable.

The subchapters of "Diffusion" pertain to format, teacher training, and implementation. The considerations under teacher training are pertinent in that the appropriateness of past efforts is carefully assessed; however, relatively little is provided by way of detailed recommendations, for example, on how to promote inquiry. Most other aspects of this chapter will be of interest primarily to personnel and scholars of developmental curriculum projects.

The last major chapter concerns evaluation. It is an extensive but entirely nonstatistical discussion of alternatives (and, often, pitfalls) in formative and summative evaluation. Again, numerous considerations pertain specifically to developmental curriculum projects, but many of the insights are pertinent to anyone with a curriculum responsibility, including many educational researchers. An implicit point well made is that potential users of materials should demand more evaluation evidence.

The summary chapter somewhat condenses recommendations and thoughts about the future. I believe that a much more specific and extensive pursuit of this task would constitute the greatest single improvement of the volume.

The greatest contribution of this volume to the largest audience is in chapters 3 (aims and purposes) and 5 (evaluation). One would hope that the principles enunciated would already be clear to most people involved in curriculum development; but, as the volume so often points out, observation of results does not warrant this assumption. The entire volume, in spite of seeming too discursive and somewhat redundant at times, is a must for all personnel and scholars of developmental curriculum projects.

LeVon Balzer  
Western Washington State College  
Bellingham

**RETIREMENT SYSTEMS OF THE AMERICAN TEACHER**, by W. William Schmid, in cooperation with the American Federation of Teachers. 1971. Fleet Academic Editions, New York. \$15.00.

This book considers retirement in terms of financial and emotional fulfillment. It reviews the historical and philosophic background of teacher retirement systems in America and then, through a wealth of tabular materials, thoroughly reviews the many aspects of the teaching profession as it relates to retirement. Of particular interest is the geographic survey and description of retirement systems, including their administration and financial operations. Schmid discusses the different systems of state funding; almost universally, he finds, they "favor security at the sacrifice of investment returns" and "have lost far more by inaction than by spec-

ulative investment practices." It becomes painfully clear to the reader that in most states public operation of retirement systems is inefficient and ineffective.

Many states have legal devices limiting the amount of retirement allowance available to teachers. For example, 22 states deny the recognition of any out-of-state service for purposes of retirement; the mobile teacher is seriously jeopardized by this practice. Schmid calls for reciprocity among the agencies granting retirement benefits to teachers, but he points out that this would be difficult to achieve: it would require agreement among 75 major political units across the nation.

A serious shortcoming is the almost total lack of cost-of-living adjustments for the retired teacher. Altogether, the author provides 27 suggestions for improvement of public retirement systems (as of June 1969).

*Retirement Systems of the American Teacher* is recommended to any teacher who is concerned about retirement and about reforming the retirement system under which he must work.

Richard A. Dodge  
Columbia (Calif.) Junior College

**QUANTITATIVE ANALYSIS OF STRUCTURE IN TEACHING**, by O. Roger Anderson. 1971. Teachers College Press, New York. 212 p. \$9.95.

This book represents an elaboration of progress the author and his research team have made with the concept of structure in teaching since the publication of *Structure in Teaching*, in 1969. This book presents additional information on the relationship of structure in teaching to the acquisition of knowledge. The roles of contiguity and commonality (having elements in common) are discussed as they pertain to relatedness among discourse units in a communication. The interaction between commonality and progression (the rate at which new information is added) is discussed. Classifications of transitions between major topics in a communication and their empiric identification are described and are illustrated by means of transcripts of classroom discourse. Considerable advancement has been made in the use of kinetograms in deciphering the structure of a communication. Some careful tests have been made to determine the reliability and robustness of the quantitative methods employing coefficients of kinetic structure. The serial comparison method of analyzing structure in a communication has been applied to classroom discourse through the use of computer programs; previously, only programmed lessons were amenable to such an analysis.

The book is recommended to science educators interested in communication

structure in teaching. However, the book is not recommended for classroom teachers because the system is complex and time-consuming. Some appropriate use could be made of the techniques and the ideas with in-service programs for teachers concerned with the problems of group instruction.

Robert E. Yager  
University of Iowa  
Iowa City

## ENVIRONMENT

**LIVING WITH YOUR LAND**, by John Vosburgh. 1971. Charles Scribner's Sons, New York. 191 p. \$6.95.

This book joins the deluge of environmental "how to" manuals. To determine where it ranks the reader must weigh the positive aspects against the negative.

First, the negative. Is the author sincerely interested in improving the environment or is he merely joining the ecology bandwagon? Vosburgh himself doesn't seem sure, and this basic indecision is seen throughout his book. The purpose of the book is to help the suburbanite live with and enjoy nature at the city's fringes; however, topic by topic the author tells how to eliminate (by removal or death—especially the latter) any plant or animal that interferes with man's concept of how things should be. The book is written with the attitude that nature should be tailored to man's liking; and here the book betrays its goal of helping man live with nature. An additional criticism is that the author repeatedly wanders from his stated topics.

On the positive side: the book contains a valuable list of poisonous plants, and it points out the "good" attributes of various animals. It also contains excellent supportive photographs and drawings, a bibliography, and an index.

*Living with Your Land* can have a prominent and useful place on the bookshelf if the reader takes care to disregard the "if it interferes get rid of it" viewpoint evident in many chapters.

Nancy A. Andersen  
University of New Mexico  
Albuquerque

**BIOETHICS: BRIDGE TO THE FUTURE**, by Van Rensselaer Potter. 1971. Prentice-Hall, Inc., Englewood Cliffs, N.J. 222 p. \$3.95 softback, \$6.95 hardback.

With the publication of Rachel Carson's *Silent Spring*, in 1962, America moved into an age of "scare biology." To many this was another fad of American youth, but it has now spread throughout the world, has made "ecology" a household word, and has even crept into the ponderous machinery of some of the world's more alert governments. And the United Nations "Stock-

holm '72" coincides with the 10th anniversary of the publication of Miss Carson's book.

During this period, most biologists have viewed the ecology movement with a conflict of emotions. They have been generally pleased with the environmental awareness of the public that has resulted but have been displeased with the entropic activities of some of the scare biologists and environmental action groups. The displeasure has arisen from the fact that many biologists have been concerned with environmental problems for decades: they have learned that environmental problems have no simple solutions, but instead demand a more deeply intellectual approach. By 1962 S. P. R. Charter was calling for a design theory for Man on Earth and Van Rensselaer Potter was calling for a bridge between science and philosophy.

Now the avant-garde of the general public is beginning to either overtake Charter, Potter, and other thinking biologists or else is beginning to tire of doomsday biology—and we stand in danger of an "ecology backlash." It is not my intention to discredit the environmental movement in any way. Many future generations of plants, animals, and men will be indebted to it for the good it has done in bringing about public and government awareness of the environment and for the research it has generated. But the time has come to take a look at the future and to redirect our thoughts and activities.

No colonial species can exist without having some polluting effect on its environment. Even a nest of field mice has this effect. Thus, man cannot exist in a pollution-free environment. He can, however, make it as pollution-free as possible by establishing maximum levels for population and pollution. The next step for the environmental movement is to shift public thinking from pollution-free existence to controlled-pollution existence, and the step beyond that—a short step—is to focus public attention on the array of moral, ethical, and philosophic questions concerned with this.

To aid in spanning the gap between science and philosophy, Van Rensselaer Potter has reworked and updated some of his essays from the 1960s, supplied some new essays, and combined them skillfully in a book appropriately titled *Bioethics: Bridge to the Future*. In the first essay, Potter considers man as an error-prone cybernetic machine whose survival in a limited natural environment may depend on ethics based on biologic knowledge. In another chapter Potter proposes a council on the future "that would be charged with predicting the consequences and interactions that might result from the application of new knowledge, an institution above politics and not responsible for political action."