

a graduate seminar. The course instructor serves only as a resource person and course coordinator. He does not dominate the classroom scene. He provides answers to subject-matter questions for which the student has no suitable background, but he generally does not lecture, give unannounced quizzes, or serve as the class whip. Rather, the instructor relies on student curiosity about how science "works" to establish the necessary momentum for the course. For the skeptical, it can only be said that experience has shown that the strategy is generally successful—not only for Professor Epstein but for a reasonable number of others who have tried it. So, if you are a skeptic, read *A Strategy for Education* and give the method a try. If you haven't tried it, don't knock it.

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DEVELOPING CHILDREN'S THINKING THROUGH SCIENCE, by Ronald D. Anderson, Alfred De Vito, Odvard Egil Dyrli, Maurice Kellogg, Leonard Kochendorfer, and James Weigand. 1970. Prentice-Hall, Inc., Englewood Cliffs, N.J. 360 pp. \$9.95.

Six bright young science educators, each teaching at a different university, have produced a fresh and useful book on elementary science education. After two years of hassling over outlines and philosophy, of writing and rewriting chapters, of meetings and discussions, of disagreements and compromises, the authors are probably now stronger friends, welded together by their common experiences in producing this book. For this is not a collection of the separate chapters of each man: it is the result of a unified team effort.

The overall feeling conveyed by the book is that the authors have studied and practiced modern methods of teaching elementary science. The authors are products of the whole National Science Foundation curriculum movement in the United States, and their philosophy of teaching science is a result of their internalization of the AAAS-SAPA, ESS, SCIS, and other approaches to elementary science. They have been actively involved in the training of prospective and in-service teachers in the new curriculum studies. For example, Dyrli has been carrying on successful NSF college cooperative projects in Connecticut, using SCIS, and Anderson has been doing the same work with the AAAS project in Colorado. The authors have participated in study visits and leadership workshops in all the major elementary projects. Their book benefits from this immersion in the new and the old of science education.

The make-up of the book itself is attractive: not too bulky, and containing

photographs and other illustrations arranged to help overcome the inherent resistances sometimes found in non-science majors. The authors certainly try not to oversell science to the non-scientist. The authors are sensitive to the fears many teachers have about teaching science in the elementary school, and they make a decided effort to allay those fears and build confidence. The lessons taught by the Gagne, the Karplus, and the Randy Brown proponents find their way into the authors' total view of science education. This means that they think of science as a process emphasizing observation and measurement in an inquiry-oriented approach.

The authors also ask, "Is it not presumptuous to plan a science program without considering the child's capability and capacity to learn and the conditions conducive to learning?" Their concern with these considerations contributes an added dimension to the book. A leading theme is the development of children's thinking through the science program. It is a worthwhile theme, though a difficult one to sustain throughout the book.

Each chapter begins with a list of performance objectives; for example, "Upon completion of Chapter 3 you should be able to [among ten objectives]: . . . 2. Identify, construct, and present problem-solving situations; . . . 4. Construct mystery boxes; . . . 8. List the attributes of a good questioning technique." This list seems a McLuhanesque "massage," which bothered me at first—especially when, after reading the chapter, a cloud of guilt descended on me, because I could not successfully complete some of the performance objectives without further study. It will be interesting to see how students of the elementary-science education courses react to these performance objectives.

One might assume that the performance objectives would be used for evaluation purposes. In fact they may well be used for those purposes; but in addition to the list of objectives each chapter has a section called "Suggestions for Self-Evaluation." These sections contain well-thought-out situations that require the student, in many instances, to make some judgments. These situations and problems, which are sometimes fascinating, make up another part of the "massage." A lot of thought and ingenuity has gone into devising these problems, which should lead to exciting disagreements and discussions. Some of the self-evaluations are reminiscent of short "invitations to inquiry" à la Joseph Schwab.

Given their resources, the authors should be encouraged to create a laboratory guide for use with this book. Perhaps such a guide is already being contemplated. At any rate, the performance objective for this review may be

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stated as follows: "Having read this review, you should be interested in examining the book itself for possible use in the teaching of elementary-school science."

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THE BEHAVIOR CHANGE PROCESS, by Oscar G. Mink. 1970. Harper & Row, Inc., New York and Evanston. 217 pp. \$3.95.

This interesting self-instructional book has been written to familiarize classroom instructors and counselors with a process for behavioral change. The author has chosen the reinforcement-learning model as a theoretic basis for his behavioral-change process. The author extends this model from mere operant conditioning during a short period of time to a "shaping process" that may cover months or years. This model extension has interesting implications for educators who advocate long-term learning goals, such as "learning how to learn" and increased self-direction. Based on the author's presentation, it would be reasonable to conclude that a student can be scheduled to assume responsibility for scheduling his own learning activities.

The author appears to have reached his stated objective of presenting the material in a nontechnical manner. The simplistic style of treating a few principles in a variety of ways with a minimum of jargon holds the reader's attention. It is easy to respond to the trial exercises and the pre- and post-tests and to read the entire book within three hours. The author uses some interesting examples of behavior that represent a variety of typical classroom situations. Included in the examples are episodes of students working in small groups as well as in individual and large-class situations.

The book should be useful to persons having both theoretic and practical concerns—but primarily the latter, because much attention is given to how the principles are applied in the everyday classroom or counseling situation. The principles can be easily applied by any classroom teacher, because they relate directly to problems faced almost daily.

In addition to the presentation of learning principles, the author presents exercises on setting behavioral objectives and on how to use programmed-learning devices. The former seem very useful, but the latter seem to belabor the point, inasmuch as linear programs have been in use for a long time. Following the introduction to linear programs, the author presents seven steps in the behavior-change process through the customary programmed-learning format. Each unit of material builds sequentially and systematically, and

there is an occasional review of the units previously covered.

It is interesting to find the rationale for programmed instruction in the evaluative-data section, near the end of the book. Perhaps the author wished to get the student involved in the process before telling him what is happening. The evaluation data on pre- and post-tests would seem to favor the student who remembers well: the main sections of the tests are identical, and it seems likely that the student could respond to the pre-test, be cued to correct answers, and thus improve his post score without reading the intervening material.

A short review of the literature on the teacher as behavior therapist is given (by Richard T. Walls) in the final section. It is similar to that found in a typical Skinnerian presentation.

Although the book emphasizes the acquisition of cognitive principles and skills, there is implicit attention given to the affective domain. For many educators who favor an inquiry orientation to learning, much attention must be given to the readiness of the individual to inquire. For many children, readiness to assume the responsibility necessary to take the risk of becoming involved is inhibited by the low expectations of their teachers. Through these negative reinforcers a succession of such teachers may have created extreme barriers to learning. It is reasonable to assume that if the teachers of the academically unsuccessful students would decide what behaviors they really wanted to have happen and reinforced any instances that approximated this behavior, perhaps the student would, in time, overcome his learning barriers. Perhaps time is as important a variable as skill in applying the principles presented in this book.

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ISSUES IN AMERICAN EDUCATION, ed. by Arthur M. Kroll. 1970. Oxford University Press, New York. 202 pp. \$1.95.

This book consists of a collection of essays, which were originally presented as major addresses at the Institute for Administrators of Pupil Personnel Services, held by the Graduate School of Education at Harvard University. Prepared by 10 of the outstanding men in American education today, the essays cover a diverse but interrelated cross-section of issues in education. Included are discussions of the value of youth, particularly of college youth; the impact of collective negotiations on American education; technology in education; the fumbled torch of administrative theory; and other timely and equally important issues.

The authors do not say much that has not been said before, nor do they offer many solutions; but they do identify the background and causes of many of the issues (in some cases "crises" might be a better word than "issues"). Their material is carefully thought out and is presented in a concise and cogent manner. There is surprisingly little of the vocabularial muscle-flexing so characteristic of pedagogic literature. These men desire to communicate rather than to display; and this, in addition to the contents, makes the book well worth reading.

The book is recommended to all who make their living in the field of education. It and a number of related books should be required reading for those who become members of school or college boards, but unfortunately those in education have not yet achieved a means of assuring even a minimum of compulsory education for the people who govern them. It would also be useful if the book could be condensed into tablet form and administered to the rapidly increasing number of public figures who have the idea that the crises in education are due to simple causes amenable to simple solutions.

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SUMMERHILL: FOR AND AGAINST, ed. by H. H. Hart. 1970. Hart Publishing Co., Inc., New York. 271 pp. \$1.95 soft-back, \$7.50 hardback.

A. S. Neill's *Summerhill* (1960) grew in popularity throughout the decade and presently is required reading in more than 600 university courses. Because of the enormous interest in Neill's principles of child-rearing, Harold H. Hart invited a number of leading thinkers to discuss Neill's principles—pro and con.

Of the 15 people selected, the four who definitely disapprove are Max Rafferty, Louise Bates Ames, Eda J. LeShan, and Sylvia Ashton-Warner. The six who advocate Neill's principles are John Culkin, John Holt, Bruno Bettelheim, Michael Rossman, Goodwin Watson, and Erich Fromm. Arguments on both sides are presented by Fred M. Hechinger, Ashley Montagu, Ernst Papanek, and Nathan W. Ackerman. One respondent, Paul Goodman, tears down present-day education and then builds his own plan; though his ideas ring of *Summerhill*, the only mention Goodman makes of Neill is that the results of *Summerhill* in society are probably not what had been hoped for and that there is something inauthentic in Neill's lack of standards.

It is impossible to review adequately

(Continued on page 249)