THE CHEM STUDY STORY, ed. by Richard J. Merrill and David W. Ridgway. 1969. W. H. Freeman & Co. 162 pp. $2.50

This is a concise overview of a national science curriculum project. Articles authored by persons closely allied with the project are combined here with efforts by the editors to provide the reader with interesting behind-the-scenes views of how CHEM Study was originated and developed.

Persons not familiar with the Chemical Education Materials Study program may find the continued reference to specific individuals confusing; but such references add to the historical accuracy of the highly successful curriculum project. Persons familiar with the project will enjoy the overview of the program and participants will see how their efforts contributed to the success of CHEM Study. The book is not lengthy and is enjoyable reading.

Appendices provide an in-depth study of details of the proposals and conclusions offered during the conferences held at all stages of the project. Films developed for use with the CHEM Study textbook and laboratory manual are described, and a chart showing how the films can be used effectively with several popular chemistry texts is included. Discussion of teacher-training films is a valuable section.

Biology teachers are encouraged to preview and use the film "Biochemistry and Molecular Structure," which demonstrates the role of molecular structure in determining biological activity. Teachers are also encouraged to analyze the sample open-book achievement tests, presented in an appendix, for ideas on how to construct effective objective tests.

Science educators who are contemplating curriculum projects that will be implemented in a district, city, or county school system would derive several benefits from a careful appraisal of this book before starting such a venture. This book is not only for the person who is interested in an historical account of a curriculum project but has much to offer persons involved in curriculum development.

Henry M. Lujan
Colorado Springs, Colo., Public Schools

POPULATIONS: TEACHER'S GUIDE, by Science Curriculum Improvement Study. 1969. Rand McNally & Co., Chicago. 87 pp. $2.00.

Populations, the third unit in the life science portion of the SCIS program, could be used successfully in grades 4-6. This unit is in keeping with the SCIS theme: to excite children in science, to turn the classroom into a laboratory, and at the same time to help the child to develop intellectually.

In this unit children study populations of *Daphnia* and *Hydra*, duckweed, crickets, aphids, and fruit flies. Ecologic concepts of predator-prey relationships, food chains, food webs, and communities are developed through laboratory activities, both in the classroom and in the field.

The teacher's guide is complete and well written. It provides the teacher with background information, teaching suggestions, and suggestions for optional activities. The guide does not, however, dictate the teaching strategy. SCIS has worked out an apparently foolproof system through a tentative schedule of activities to assist the teacher to obtain the living materials when they are needed. Clear instructions are given to the teacher for the care of the living specimens. The complete equipment and supply kit needed to teach populations may be purchased from Rand McNally at a cost of $150.

Biology teachers at the secondary and college levels will find it interesting to examine the total SCIS life science program—in particular the unit *Populations*. SCIS is to be commended for preparing such an exciting and fascinating unit for use with elementary school children.

Jack E. Sherman
University of Colorado Colorado Springs

ZOOLOGY

THE COTURNIX QUAIL: ANATOMY AND HISTOLOGY, by Theodore C. Fitzgerald. 1970. Iowa State University Press, Ames. 325 pp. $7.95.

The author, who died in 1967, was professor of anatomy in the veterinary medicine school at Auburn University and a leading proponent of the use of quail as laboratory subjects in this country. The book was completed, especially as regards illustration, by Fitzgerald's colleague Judith Guenther.

Here is a full anatomic and histologic manual of "coturnix"—taxon unspecified but presumably *Coturnix coturnix*, the common quail of Eurasia and Africa. Each organ system is given a chapter; and, within each chapter, tissue description is subsumed to gross description of each organ or part. This arrangement is ideal, and it benefits further by the clear separation of topics under subheadings and sub-subheadings. The author's style is succinct in matters of detail but never elliptical. The text, set in easy-to-read type, is arranged double-column on adequately margined 6½-by-10-inch pages, and the book (cloth-bound) lies flat when open. The 166 black-and-white drawings, keyed to the text and conveniently placed, are lucidly semidiagrammatic, and each carries a scale indicator. Text and figure-labels alike are exceptionally free of typographic errors.

The index is extensive but far from exhaustive, and it is erratic: for example, "uropygeal gland" appears in the index but not in the text where "oil gland, or preen gland" is discussed; "plexus" is not indexed at all, though various plexi are the subjects of whole paragraphs; and, among histologic terms, "lamina" has a single entry (several being possible) and "tunica" is absent. To some extent the table of contents, which is virtually an outline, offsets the index's shortcomings.

The 218-item general bibliography does not carry the reader beyond 1964. It lists few titles in any language other than English, though the European literature on *Coturnix* is extensive; in fact, it goes back to Roman times. References from text to bibliography are scanted or omitted in section after section; for this reason a topical (perhaps chapter-end) arrangement of the bibliography would have been more appropriate.

The anatomic terms mostly agree with those of the International Anatomical Nomenclature Committee, but here and there the author's choice as to Latin or English (including transliterations) is arbitrary and unsettling; thus we have "bulbus oculi (eyeball)" but "third eyelid (nictitating membrane)." Eponyms persist, uncertainly capitalized and usually unaccompanied by an alternative name. In such cases one yearns for consistency or at least for the kind of attention to synonymy that distinguishes the chapter on musculature.

The functions of organs are mentioned briefly and not always helpfully; we are told, for example, that claws are used "for support and in scratching for food." Pathology and anomaly do not receive quite the attention one might expect in a treatise on a semidomesticated bird. In this connection, a chapter on the fine taxonomy of *Coturnix* might have been useful, inasmuch as subspecific characters and hybrid intrusions may be variably evident in the stocks being developed, at Auburn and elsewhere, for the laboratory. And, for purposes of orientation and extrapolation, a chapter comparing *Coturnix* with the pigeon and the chicken—birds more familiar to American researchers—would have been welcome.

These deficiencies are minor. Fitzgerald's book is a model of clarity and utility. Meant first as a reference work for experimentalists, it will also serve the occasional needs of veterinarians, poultry specialists, educated gamekeepers, and general ornithologists. This fundamental work deserves equally good companion volumes on the development, physiology, genetics, and behavior of *Coturnix*, so that the laboratory usefulness of this small, thrifty, fast-maturing, and easily managed bird can be fully realized in every field of research.

Sam Gadd
Colorado Springs