

If population estimates were accurate by the early 1960s, then why is the present plight of whales so dismal, and what is being done to improve it? These questions are alluded to throughout the book, but are focused most clearly in J. L. McHugh's chapter on the historical roles of the IWC, and S. McVay's "Reflections on Management of Whaling." The picture that emerges is of an international "commons" (the Antarctic) exploited by increasingly efficient—but no more enlightened—"commoners." No legal restrictions were placed on whaling until the 1940s. Then the IWC was established by the International Whaling Convention to seek the opposing goals of whale management and whaler economics. It first disregarded the recommendations of cetologists and erred badly in favor of whalers, then almost dissolved in the mid 1960s as whaling interests struggled over sharply-reduced quotas. But whale populations were even more greatly reduced, and for several years the catch failed to reach even these new limits. Eventually the struggling interests resigned themselves to quotas below the s.y., and many went out of business or moved their operation northward. By 1972, hard-learned lessons had led to postmature change in the management of remaining stocks. Quotas were assigned by species in northern or southern hemisphere. International exchange of observers made the observance of quotas and size limits more likely. Quotas had been reduced to below s.y. on all major stocks. Evidence presented in the book suggested that populations of at least some protected species were slowly rebuilding, and that quotas and restrictions were being observed. Hopefully these changes will save the whales not only from extinction, but for future harvest, since they are apparently the best means that we have of using the zooplankton biomass. Clearly, Hardin's "tragedy of the commons" applies to oceans as well as to land use, but in oceanic exploitation the tragedy is magnified by international politics.

My reaction to this book is somewhat mixed. Many will find something useful in it: population biologists will be interested in seeing the application of tools of their speciality; preservationists will find numerical descriptions of whale exploitation and will be interested in the history of the IWC and factors that impeded it in bringing whale harvest in line with productivity; biology instructors wishing to objectively discuss the whale problem in class and cetologists will find international bibliographies and a description of the "state of cetological art." Unfortunately, this was the state of cetological art four years ago (except for McHugh's chapter which was written after the IWC meetings of 1972.) The book was remarkably free from errors: I found only 3 misspellings and one printing error. However, much of the

writing was tedious to read. There were long tables of raw whaling statistics that could better have been presented in graphs or appendixes, repetitious qualifications of data, and variable writing quality. A more complete glossary would have made this book more readable for the layman. Most of the authors expressed faith that once the whale take was reduced to below the s.y., whale populations would begin building back up to the m.s.y. and the whale problem would be solved. They did not discuss the possibility that (i) whale populations might have been reduced to the point that either their genetic diversity or social structure might have been irretrievably altered; (ii) their concept of m.s.y. was derived from fish, and might be inapplicable to marine mammals; (iii) there might be economically sounder management goals than m.s.y. (maximal interest, for example). My criticisms must be tempered with the fact that the book was intended primarily for research cetologists and that the value of individual expression may outweigh quality in symposia. I recommend this book to anyone who seriously wishes to understand the whale problem. Surely even though he might find only a part of the book of interest, its relatively low cost will make its purchase worthwhile.

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General Biology

LIVING SYSTEMS: PRINCIPLES AND RELATIONSHIPS, by James M. Ford and James E. Monroe. 2nd ed., 1974. Canfield Press, San Francisco. 541 p. \$11.50 (hardback).

This is a textbook well equipped to fulfill a complete semester of college instruction. The 12 modular units are well selected and include the study of science and biology; chemistry and life; cells; tissues, organs, and organisms; ecology and environment; energy relationships; metabolism and supporting processes; control mechanisms; behavior; reproduction; genetics; and evolution.

The excellent unit on behavior includes paragraphs on drugs and human sexual behavior. Both plant and animal reproduction are well done in the unit on reproduction. Enough historical information is included that should satisfy the traditionalist. Chemical principles are developed where appropriate in any unit and are quite detailed when necessary. The human organism is well correlated into the principles units.

The two-color contrast in part of the figures makes them more readable. Full-color plates in part of the book would have made it more appealing on first impression. Too much black-and-

white gives a drab appearance. It is a little awkward to have to refer to a credit page for the opening photograph captions in each unit.

A very good phylogenetic outline appears in the appendix and is adequately illustrated. A useful glossary is included as well as an index. Supplemental readings are indicated following the list of thought-provoking review questions at the end of each unit. Summarizing statements precede each list of questions. A unit outline introduces the unit.

The language of the book is descriptive, reads smoothly, and maintains a college level of understanding. Scientific accuracy is upheld. Unfortunately the mechanics of the book, its traditional aspect of presentation, and its use of chemical detail may make it unpalatable to many.

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HANDS ON BIOLOGY, by John M. White and Robert D. Barnes. 1974. Hamilton Publishing Co., New York. Price not given.

Hands On Biology is a series of scripts for an audiotutorial learning system. The scripts are organized into a comprehensive whole which is designed for beginning undergraduates or advanced high school students. They include typical freshman-biology titles and some not so typical ones as "Origin of Man" and "Human Sexuality."

The scripts may be used collectively or individually as part of an on-going audiotutorial system or to buy time for developing such a system.

Hands On Biology freely exercises the strong characteristics of an A-T system: short segments of information transmission punctuated by direct visual and manipulative activities and colorful and integrated visuals with "instant replay" capabilities to enhance meaningful processing by learners. Selected laboratory techniques are presented as they are needed rather than being separated in time from their application. Immediate (not interactive) feedback on data, observations, and calculations is not used to maximum advantage. The authors' attempt to develop units easily modifiable to fit individual instructors or instructional requirements has apparently been successful.

The structure of subject matter is sound and balanced, although some units (for example, ecology) were so superficially treated as to be in need of serious revision.

Some of the terminology appears to have come from a group lecture ("The next subject I want to take up is..."; "See, you are now studying evolution."). The scripts are basically didactic presentations of accumulated knowledge

and complex terminology. Rarely is the student confronted with exciting details of how biologists formulate and test hypotheses. Precise behavioral objectives, not available to the reviewer, would add considerably to the thrust of the scripts.

In summary, these scripts are of above average to average quality and could serve a useful function in existing or developing audiotutorial biology programs.

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LIFE: ACTIVITIES AND EXPLORATIONS, by Eleanor R. Fabiano and Eunice S. Liberson. 1975. Houghton Mifflin Co., Boston. 495 p. \$4.98 (school price).

This biology textbook is not only very readable but stimulating and refreshing in its approach. The first unit captures the interest of the student by dealing with behavior—the whole individual, and then the authors build on this interest in the following units by looking within the individual and concentrating on the cell and mechanisms of life. The lab activities are integrated with the text and worksheets utilize the question-and-answer format. In most cases, the questions lead the student to broad concepts and are combined with such skills as making careful observations, recording data, and even designing experiments.

The open-ended ideas presented in "Research You Can Do" are especially good and in most cases introduce the student to current books, ongoing research, and some current social issues. The basic biological techniques—using the microscope, making wet mounts, the dissection of the frog—are skillfully presented and clearly illustrated. Also deserving of praise is the "Use Your Wits" section at the end of each chapter. These problem-solving activities are easily adaptable to many levels of difficulty and serve as a valuable resource for test questions. The appendix contains a useful "Careers in Health" table and a badly needed "Biology Hall of Fame."

Noticeably absent are the use of biological terms (almost to a fault) and in-depth explanations, which enhances the book's suitability for terminal science students and those not exposed to K-12 science programs.

The chapter on genetics lacks any mention of pedigree, Mendelian mechanisms of inheritance, and genetic technology and its implications; but the material on behavioral studies and on the brain—topics not usually scrutinized in books of this type—compensates. The last unit, on preventative medicine, lacks luster and substance. The issues of drugs, alcohol and tobacco are not included as teen-age health problems. Had these issues been included and ex-

amined objectively and in combination with values, a meaningful learning experience would have been provided. As it is, the unit belongs at the end of the book.

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Periodicals

BIOLOGY DIGEST. Vol. 1, Issue 1, September 1974, and Issue 2, October 1974. 199 p. and 187 p., respectively. Data Courier, Inc., Louisville, Ky. 9-issue subscription \$75; \$10 per single issue.

Biology Digest, a new publication, has been designed to keep the educated layman and the biology teacher abreast of recently published materials in the biological sciences. It contains digests, or abstracts of articles, appearing in numerous publications ranging from the sophisticated scientific journal (*Scientific American*, *Science*) to the nonscientific publication (*Time*, *Prevention*, *New York Times*, *Washington Post*)—several hundred in all. Neither the scientific sophistication nor the brevity of *Biological Abstracts* is attempted by the editors.

Each abstract is placed under one of the following general headings: Plant Life, Living Systems, Micropopulations, Biosphere, Health Science, Biogenesis and Development, Animal Kingdom, and General Topics. An index based upon keywords identifying the main themes of an article assists in locating each abstract. This keyword index is not divided according to the eight major divisions of the publication, a feature which should prove helpful if included in future issues. An index listed according to publications represented would also be a valuable asset. An author index is included.

Each issue contains two special feature articles—one on a biological topic of interest, the other reviewing a life science career; a list of publications received for each issue (without addresses); and four or five unsigned book reviews. Whether these features actually contribute to the central purpose of *Biology Digest* or simply serve as a marketing device will have to be decided by the reader.

The brevity of each abstract (approximately 300 words) and the excellent writing style provide for interesting and easy reading. I found it difficult to put these issues down once I began reading and was surprised at how many of the over 550 reviews were of immediate value. My biggest disappointment was that several reviews which happened to be of particular interest were listed as having anonymous authors. Not only was it disappointing but, I believe, inconsistent with the standards of profes-

sional reporting to which a publication like *Biology Digest* should aspire.

Biology Digest does not pretend to appeal to the researcher, but will be of interest to the secondary school and college student and teacher, as stated by the publisher. Its high quality appearance, general interest reviews, attractive functional format, and non-technical terminology will also appeal to many persons outside of the formal classroom. The primary drawback to wide use beyond the school or departmental library will be cost. If such an amount is to be spent on the latest biological information, one must consider that a similar expenditure will also purchase annual subscriptions to several special-interest scientific journals of high quality.

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Genetics

THE EXPERIMENTAL GENETICIST: AN INTRODUCTORY LABORATORY MANUAL, by P. Saint Lawrence, J. W. Fristrom, and W. H. Petri. 1974. W. H. Freeman and Co., San Francisco. 118 p. \$4.95.

This high-power collection of genetic experiments has been developed at the University of California, Berkeley. The authors gratefully acknowledge assistance from a number of friends who have also formulated packets of genetic experiments and from several teaching assistants who helped eliminate the "bugs."

The manual is geared to juniors and seniors with a minimum of two quarters of biology, a quarter of genetics, and two quarters of organic chemistry. Some will have taken courses in biochemistry and statistics as well. Strangely enough in view of the prerequisites, the authors state that the majority of the students have had very little previous laboratory experience in biology.

Their objectives for the course are laudable for, as they observe: "These experiments have been chosen because we believe that each presents a significant concept, experimental design, or technique that has contributed to the development of modern genetics." A ten-page section is devoted to the descriptions and life histories of the objects to be studied. Included are bacteriophages, *Bacillus subtilis*, *Escherichia coli*, *Salmonella typhimurium*, *Neurospora crassa*, *Saccharomyces*, *Drosophila*, and *Tribolium confusum* and *t. castaneum*.

At Berkeley each laboratory section is made up of 20 students who work in pairs. Several of the 23 experiments are required of everyone and the students may choose a certain number from the remainder. Some of the experiments are quite expensive, for they require costly