

latest industrial gear, which is certain to go out of date quickly), to give college preparatory students a new sense of concreteness in their study of history (building, mining, blacksmithing, time measurement, and so on), and to create the area of common activity needed to get some collaboration between students whose work centers in the shop and those whose work centers in the library. The present book is an attractive first step toward implementation of this notion. Its appeal, however, is not limited to educators and secondary school students: any scientist with an interest in history or in ingenuity will be fascinated by the drawings and brief accounts of the wide range of machines collected: the classical steam engine and classical slot machine, the oliver (a medieval blacksmith's aid), the Cornish man-engine (a weird anticipation of modern mine elevators), the Chinese south-pointing chariot, and 30-odd more. The format—a page of text facing a full-page drawing of each device—is as attractive as any such layout can possibly be. One defect of the book so far as its ostensible purpose is concerned, but a virtue for a wider audience than potential model-builders, is its preference for the mechanically unorthodox or amusing to more routine, simpler items.

As reading for a humanist or scientist, and as a step toward a new set of programs in education, the book is excellent. As an actual guide to building the attractive models it presents, it is not as good. The author keeps forgetting at crucial points that the potential model-builder can't telephone the machine shop of the school of engineering to send him a pair of balanced fine-jet nozzles of equal weight or a 30-tooth wheel for the verge-and-foliot model (the suggestion that this can be made by the student with saw and file seems to me to make sense only if the student is in prison, with nothing else to do with his time), and so on. Advice ranges from the insultingly trivial (a pulley can be whittled out of wood) to the impossible (correct adjustment of the planetary shaft of the differential box of the south-pointing chariot is essential). The compression of the text precludes more than brief allusions to historically interesting material, and every so often leads to omission of essential details. (The text and drawing of the verge-and-foliot model really give no clue to the way the pallets work; the screw-cutting machine comes

out a model of obscurity; and so on.) The author talks about using standard materials, but never mentions Tinker Toy, Erector, or Meccano parts where these would be exactly what is needed.

Maybe this book is just the right first step: an exotic, if somewhat arbitrarily selected, set of plans that will interest a wide audience in its central idea. But it needs as a second step a complete redesign—perhaps four pages rather than two for each machine—in collaboration with someone who actually teaches or works in a modestly equipped shop, but who is able to get needed parts from local toy, grocery, and hardware stores. A bibliography would also help—the credits for photographs and plans are totally inadequate for this purpose. Any young model-builder should be told about Heron's *Pneumatica*, Britten's *Old Clocks and Watches*, Vitruvius' *On Architecture*, and a dozen or so more works.

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Working Oceanographers

The New World of the Oceans. Men and Oceanography. DANIEL BEHRMAN. Little, Brown, Boston, 1969. xii + 436 pp., illus. \$8.95.

This book is a pleasant surprise. Reading it on board a hot, cramped vessel in the Atlantic, I was prepared for another wide-eyed, slack-jawed account of oceanography in the manner of the glossy magazines, and prepared to dislike it.

Behrman's book is definitely journalistic, but in a respectable tradition. He writes in a Sunday supplement style, with a sense of humor and some degree of irreverence. Behrman is able to communicate what oceanographers do, how they do it, and, to some extent, why they do it. Everyone working in or at the sea likes to call himself an "oceanographer"; this book is a good guide to the most important scientific areas covered by that now almost meaningless term.

The book is built around the large American oceanographic institutions and the men who work in them. Behrman is able to capture the personalities and conversational styles of the people he interviews. In a way, the book is like a gossip column; working ocean-

ographers will enjoy reading between the lines, and seeing how an outsider reacts to some of the strong personalities that abound. The book is vaguely reminiscent of a recent volume by Rex Reed entitled *Do You Sleep in the Nude?*, which does for movie stars what Behrman has tried to do for oceanography.

There is solid science in the book, generally well explained. Some of the more technical matters are accompanied by accounts that are a bit muddled and don't explain. But these are small slips and detract little from the value of the book.

The point where I do take issue with it is in the lack of distinction between good science and bad or even pseudo science. *The New World of the Oceans* is a potpourri of the profound with a sprinkling of the humbug and silly. Perhaps it takes a working scientist to appreciate the difference, or to appreciate that not all scientists are particularly bright. The author is not enough of a skeptic.

On the whole, however, this book makes good reading, either on a long oceanographic cruise or as a general source on what people try to do on oceanographic cruises.

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Processes in Plants

Perspectives in Phytochemistry. Proceedings of the Phytochemical Society Symposium, Cambridge, England, April 1968. J. B. HARBORNE and T. SWAIN, Eds. Academic Press, New York, 1969. xii + 236 pp., illus. \$9.

Emphasis in this symposium is on secondary metabolism, with particular reference to biosynthesis and chemotaxonomy. T. J. Mabry has contributed an interesting discussion on the establishment of structures of flavonoids by ultraviolet and nuclear magnetic resonance spectroscopy. The occurrence of secondary metabolites in relation to classification of plant taxa is discussed generally by R. Hegnauer and by H. Erdtman. V. Herout and F. Sorm consider sesquiterpenoids in relation to classification of the Compositae. E. C. Bate-Smith has written a thought-provoking paper on the occurrence of flavonoids in relation to