analysis (Odum) I found more than usually impenetrable, and the discussion of steady states and chemical stability (Pytkowicz) is very preliminary: the CO_2 juggernaut (Machta) rolls on.

What would it take to change the chemistry of the oceans? This collection of papers gives a very valuable summary of the current status of our attempts to answer this question. It is interesting to note that little attention is paid to estuarine processes, which probably account for a large part of the action.

JOHN M. EDMOND
Department of Earth and Planetary Sciences, Massachusetts Institute of Technology, Cambridge

Biological Assessment

The Panamic Biota. Some Observations Prior to a Sea-Level Canal. A symposium, Washington, D.C., March 1970. MEREDITH L. JONES, Ed. Biological Society of Washington, Washington, D.C., 1972. viii, 270 pp., illus. Paper. Bulletin of the Biological Society of Washington, No. 2.

In his introduction Meredith Jones states that the primary objective of this symposium is to summarize knowledge of the Panamic biota. Approximately half the 24 contributors attempt to do this for different aspects of the biota. They generally conclude that the reptiles and amphibians, birds, mammals, corals, and some echinoderms are reasonably well known and that the mollusks decapods, fishes, and terrestrial flora are poorly understood. These are, of course, relative evaluations since the various authors are not necessarily applying equivalent criteria to their systematic specialty and some are reviewing much larger taxa than others. For example, Neal Weber does not attempt to estimate the numbers of insects in Panama whereas Alexander Wetmore can place the number of bird species at 865 (10 percent of all the world species) with a reasonable degree of precision.

Sylvia Earle (marine plants), James Porter (corals), Lawrence Abele (decapods), and Richard Chesher (echinoderms) provide the most complete and useful summaries of their groups. Some authors compare the Atlantic and Pacific affinities of their groups and some provide estimates of what the final numbers of species described from Panama will be. As a working document this symposium would have been more valuable if all the authors had adhered to a uniform policy of presenting numbers of known species, estimates of total species, and Atlantic-Pacific comparisons when relevant. Many groups of organisms are not covered in this volume, presumably because no expert was available or there just wasn't enough information to be worth summarizing.

In addition to papers on the flora and fauna there are a succinct historical review of the isthmus, the canal, and the Panama–United States treaty situation; two papers on the physical characteristics of the proposed sea-level canal; and two excellent ecological reviews—of the coastal zones by Peter Glynn, and of the human ecology of the indigenous populations of eastern Panama by Reina Torres de Arauz. Although a few of the papers are trivial, most of the authors adequately assess the current knowledge in their fields. Several authors depart from their charge and speculate on the biological implications of a sea-level canal. In this regard the symposium might have profited by including a population geneticist and a theoretical ecologist. The views of a parasitologist would also seem worthwhile in broadly establishing possible biological interactions. Two papers represent background reports of recent study groups (William Newman) and surveys (Gilbert Voss) of the isthmian region. These make poignant reading as the authors describe their frustrations in attempting to obtain recognition for their institutions or committee report. Newman provides a fascinating discussion of the trials and tribulations of the National Academy committee report, which he and other members of the committee (CERIC) felt was largely neglected by the Atlantic-Pacific Interoceanic Canal Study Commission (see P. M. Boffey, *Science* **171**, 355–58 [1971]).

The participants almost unanimously call for more collections and more research in the isthmian region to overcome the relatively poor state of our knowledge for most groups of isthmian organisms. This situation could have been at least partially remedied had a small part of the Canal Study Commission's $22-million appropriation been spent on a more detailed biological survey. Biologists have often been criticized for their lack of agreement on the implications of the proposed sea-level canal. These scientists are not expected to make the decision on whether or not a canal should be built, but it is they who are best able to evaluate the ecological costs. This can be done intelligently, however, only if adequate long-term support for their research is available. No one expected the engineers to recommend a site for a new canal without rather lavish funding for accumulation of new data pertaining to their assignment; it is unfair to expect precision from biologists with much less complete data. Perhaps biologists involved in funding studies of national environmental issues are not yet up to situations complicated by international overtones and the lack of pork-barrel considerations.

IRA RUBINOFF
Smithsonian Tropical Research Institute, Balboa, Canal Zone

Books Received

Advances in Cancer Research. Vol. 16. George Klein, Sidney Weinhouse, and Alexander Haddow, Eds. Academic Press, New York, 1972. x, 366 pp., illus. $19.50.

Advances in Lipid Research. Vol. 10. Rodolfo Paoletti and David Kritchevsky, Eds. Academic Press, New York, 1972. xviii, 386 pp., illus. $23.50.

Biological Boundaries of Learning. Martin E. P. Seligman and Joanne L. Hager. Appleton-Century-Crofts, New York, 1972. xiv, 480 pp., illus. $12.95. Century Psychology Series.

Cardiovascular Fluid Dynamics. Vol. 1. D. H. Bergel, Ed. Academic Press, New York, 1972. xxii, 366 pp., illus. $20.

Cell Surface Alteration as a Result of Malignant Transformation, II. Papers by Jaro Ankerst and others. MSS Information Corp., New York, 1972. 240 pp., illus. $15.

The Death-Life Law of Nature. Raymond Westbury Maxwell, Jr. Published by the author, Box 13897, Baden Station, St. Louis, Mo. 63147. xii, 400 pp.

Design in the Built Environment. R. Fraser Reekie. Crane Russak, New York, 1972. xii, 142 pp., illus. $10.50.

Dynamics of Learning. Nathaniel Cantor. Agathon, New York, 1973 (distributed by Schocken, New York). xx, 296 pp. $7.50.

The Earth and Human Affairs. National Academy of Sciences Committee on Geological Sciences. Canfield (Harper and Row), New York, 1972. xiv, 142 pp., illus. Cloth, $3.95; paper, $1.95.

Echocardiography. Harvey Feigenbaum with the assistance of Sonia Chang. Lea and Febiger, Philadelphia, 1972. xiv, 240 pp., illus. $11.

Fish Nutrition. John E. Halver, Ed. Academic Press, New York, 1972. xii, 714 pp., illus. $32.50.

FORTRAN for Engineering Physics. Electricity, Magnetism, and Light. Alan B. Grossberg. McGraw-Hill, New York, 1972. viii, 246 pp., illus. Paper, $4.50.

Generalized Functions and Fourier

(Continued on page 834)