as major influences on mental maps.

One similarly misses, in this single-minded devotion to the domain of cognition, any concern for the motivational or affective side of the problem. The thinking of Kevin Lynch, whose book *The Image of the City* (*4*) is one of the early landmarks in this field and whose influence is acknowledged throughout this volume, was refreshingly free from this limitation, for Lynch made much of the role of "imageability" in leading to a sense of satisfaction, of well-being, of affective investment in one's environment. But of that there is no trace to be found in this volume, just as the notion of "imageability" as a characteristic of particular urban forms, rather than of the cognizer, is left largely untouched, except for one comparative study of mental maps of Milan and Rome, by Donata Francescato and William Mebane.

In conclusion, let me emphasize that these several criticisms, if such they be, are criticisms of the field introduced to the world at large via this book, rather than of the editors. For their work Downs and Stea deserve nothing but praise. Their volume is an evident labor of love, such as is found all too rarely in edited works of this type. They have not only struck a most effective balance between reports of research, literature reviews, and theoretical papers, and shown admirable judgment and a sense of the dimensions of the field in their selections, but have gone to some lengths to ensure adequate representation of the major approaches and aspects of the field, in a number of cases by specifically soliciting papers on particular subjects from their authors. Their own contributions, in the form of an introductory chapter and shorter commentaries prefacing the various sections, are far from perfunctory and are in fact most helpful. One suspects, too, that the general high level of readability of the contributions owes much to their editorial efforts. Finally, their publishers have served them well on the production end. This is, in short, a volume to which those in the growing field of environment-and-behavior will turn frequently, as much from necessity as for enjoyment and profit.

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References

1. P. W. Sheehan, Ed., *The Function and Nature of Imagery* (Academic Press, New York, 1972); S. J. Segal, Ed., *Imagery: Current Cognitive Approaches* (Academic Press, New York, 1971).
2. K. E. Boulding, *The Image* (Univ. of Michigan Press, Ann Arbor, 1956).
3. C. E. Osgood, *Method and Theory in Experimental Psychology* (Oxford Univ. Press, New York, 1953), p. 391.
4. K. Lynch, *The Image of the City* (MIT Press, Cambridge, Mass., 1960).

Acoustics and Fisheries

The Detection of Fish. DAVID CUSHING. Pergamon, New York, 1973. xiv, 200 pp., illus. $16.50. International Series of Monographs in Pure and Applied Biology: Zoology, vol. 52.

The author's primary purpose is to treat the use of echo-sounding techniques in the study of fisheries problems. Particular emphasis is given to estimation of abundance of stocks and open sea studies of fish behavior. The scope is thus somewhat narrower than the title implies, although the introductory material includes brief discussions of fish detection by means other than active echo-ranging. In the light of present fisheries technology this is probably logical, although there has been much reliance on fish detection from aircraft, and in earlier, quieter times fish could be detected passively simply by listening through the hull of one's boat. The noisiest fish, however, do not constitute the resources represented by the cod, herring, hake, and tuna which are logically the book's principal concerns.

Underwater acoustic system capabilities moved forward greatly during World War II in response to the need to find submarines in an environment that cannot be penetrated effectively by electromagnetic radiation (optical or radar systems). The resulting technology and subsequent Navy-oriented developments have been used in limited fashion over the ensuing 30 years in both biological and geological oceanography and the related applied fields of fisheries and mineral exploration. This book assembles an account of these applications and their results in the fisheries context, pulling together material previously available only in widely scattered journals.

It conveys the flavor of the sea in its descriptions of specific fisheries in various parts of the world and indirectly demonstrates some of the attributes of successful interaction among the scientists, engineers, and fishermen who work under often difficult conditions. This latter aspect appears, for example, in the requirement to work with any system of units with which a particular group is comfortable—the figures (all taken from previous papers and reports) may show lengths in meters, fathoms, nautical miles, or cables (0.1 nautical mile) while catches are given in pounds, tons, milliliters, and crans (0.182 ton). The sections on elements of underwater acoustics and data processing are not exhaustive but provide an appropriate background for understanding experiments carried out by means of echo-sounder techniques.

There is growing activity in this field, involving more sophisticated research equipment and data analysis techniques. This is sure to continue, with applied objectives expanding beyond the limited questions of optimal management of existing individual fisheries to biological indications of ocean pollution and the full range of interactions between the fisheries and their environment. In this context, this book will find its greatest use in providing beginners with a good reference foundation, consolidating most of the work done in the 1950's and 1960's.

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Reef Research

Biology and Geology of Coral Reefs. O. A. JONES and R. ENDEAN, Eds. Vol. 1, Geology 1. xviii, 410 pp., illus. + maps. $28. Vol. 2, Biology 1. xxii, 480 pp., illus. $42.50. Academic Press, New York, 1973.

The past 20 years have seen a great revival of research on living and fossil coral reefs by biologists and geologists, partly stimulated, perhaps, by the seemingly sudden destructive eruptions on many living reefs of the Indo-Pacific by the previously apparently rare "crown of thorns" starfish *Acanthaster*. Three years ago saw the publication of a fat volume of papers on the reefs of the Indian Ocean, two years ago there appeared a symposium volume on corals and coral reefs, and now we have two volumes (with two more to come), dedicated appropriately to the Great Barrier Reef Committee, that set out to present "in one source as many as possible of the major advances made in