

have been redrawn. I found the single list of references at the end of the book distracting, as I was frequently thumbing through a very extensive accumulated bibliography rather than dipping into a shorter and more conveniently placed list at the end of each paper.

As a concept, I do not find it appropriate that the principal criterion for selection in a volume of classic papers on a geomorphological topic should be that of language. This is not a book that I would buy, since (1) the bulk of the papers are somewhat dated, if interesting nonetheless, and (2) the papers are not selected from the entire available pool of literature on the topic. I cannot envisage any but a small handful of scientists consulting the volume regularly. These points are reinforced by the price of £95. (Julian A. Dowdeswell, Centre for Glaciology, Institute of Earth Studies, University of Wales, Aberystwyth, Dyfed SY23 3DB.)

### SCALING FISHERIES: THE SCIENCE OF MEASURING THE EFFECTS OF FISHING, 1855–1955.

Tim D. Smith. 1994. Cambridge: Cambridge University Press. xii + 392 p, illustrated, hard cover. ISBN 0-521-39032-X. £50.00; \$US74.95.

Marine stocks and fisheries stand at a critical juncture. Yields of many marine stocks, including those in the Southern Ocean, have declined, sometimes dramatically, during the last decades. The causes are well known: uncontrolled access to marine resources, uncertain scientific information, and risk-prone assessment driven by short-term economic goals. The histories of the International Whaling Commission (IWC) and the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) offer many examples of when short-term economic goals superseded plans for sustainable use or development.

Fisheries science has developed under the nearly continual dominance of short-term economic interests over long-term economic, social, and scientific goals. With a few exceptions, textbooks on fisheries science generally lack a historical setting or contain only brief notes on the history of fisheries science. I agree with Tim Smith's sentiments that a critical appraisal of the historical development of the studies of fisheries and their successes and mistakes is a prerequisite for the establishment of research programmes independent of short-term management needs. His book attempts to fill this gap.

The book is comprised of three parts. Part 1 describes the fluctuations in fish catches, exemplified in patterns occurring in fisheries for Arcto-Norwegian cod (*Gadus morhua*) off the Lofoten Islands, sardines (*Sardina pilchardus*) around Brittany, and sockeye salmon (*Oncorhynchus nerka*) in the Fraser River of British Columbia. This part sets the stage for the economic and political questions faced by biologists in the mid to late 1800s. Parts 2 and 3 describe the struggle of scientists with these problems.

Part 2 deals with the development of methods between

about 1855 and the beginning of World War II. Basic research methods were developed between 1855 and 1890 in the United States (US Fish Commission) and Europe (for example, Marine Biological Association, Fishery Board of Scotland). The debate began on the usefulness of stocking the sea with artificially reared marine species, such as Atlantic cod (chapter 2) to increase the harvest, a debate that has continued to the present day. These research methods were used in the 1890s in order to determine the effects of fishing on the stocks. The magnitude of this task resulted in the foundation of the International Council for the Exploration of the Sea (ICES) as an international organisation that should develop and coordinate research programmes, a task ICES has continued to undertake to the present day (chapters 3 and 4). By the 1920s, sufficient progress had been made to allow short-term predictions of catches for several fisheries (chapter 5). Then came new methods based on mathematical modelling of dynamics of populations (chapter 6).

Part 3 (chapters 7 to 10) describes the development of the three partial theories of the dynamics of marine fish populations (Schaefer's surplus production theory, Ricker's spawner and recruit theory, and Beverton and Holt's yield per recruit theory) that have considerably shaped the development of fisheries science in the decades thereafter (chapter 10).

We are still far from understanding ecosystems exploited and affected by the fishery, at least in quantitative terms. One of the important lessons to be learnt from Tim Smith's description of the historical development of fisheries science is that long-term strategies for conservation and sustainable use based on scientific findings require a research agenda that is independent of short-term management needs. This is not a new perception, but it cannot be underlined often enough. It has already been realized in a number of international fisheries organisations, such as ICES or CCAMLR, and is reflected in a number of long-term research activities, such as the ICES International Bottom Trawl Surveys in the North Sea or the CCAMLR Ecosystem Monitoring Program. Even so, the direction of research is still strongly influenced by transitory economic and political forces and/or concepts presently in vogue, such as global climate change.

I enjoyed reading the book despite and because of all the 'deja-vus.' It is well written, offers many lessons from which to learn, and is excellent as a reference, and not only for those interested in the history of fisheries science. (Karl-Hermann Kock, Institut für Seefischerei, Bundesforschungsanstalt für Fischerei, Palmaille 9, D-22767 Hamburg, Germany.)

**THE TRAIL OF THE HARE: ENVIRONMENT AND STRESS IN A SUB-ARCTIC COMMUNITY.** Second edition. Joel S. Savishinsky. 1994. Langhorne, PA: Gordon and Breach Science Publishers. xxxii + 294 p, illustrated, soft cover. ISBN 2-88124-618-4. £14.00; \$US22.00.

The second edition of this ethnographic portrait of the Hare