ONSHORE IMPACTS OF OFFSHORE OIL. Edited by WILLIAM J. CAIRNS and PATRICK M. ROGERS. Proceedings of the International Conference on Oil in the Environment, Edinburgh, Scotland, 1980. London and New Jersey: Applied Science Publishers Ltd., 1981. 319 p. Hardbound. US$48.00 + $3.10 handling and postage charges. (US and Canadian orders to Applied Science Publishers Inc., 44 Eagle Street, Englewood, N.J. 07631, U.S.A.)

The subject of this book is somewhat narrower than the title implies since it deals almost entirely with experiences in the North Sea only and not on a global scale. The book contains the proceedings, in all 24 individual papers plus discussions and summary remarks, of an international conference on oil in the environment, held at the University of Edinburgh in September 1980. The conference attendees included planners, bankers, engineers, architects and ecologists from the government, petroleum industry, consulting firms and universities, with most of them coming either from the United Kingdom or Norway. The philosophical intention of the conference was to produce friendly confrontation between conservationists, socioeconomists and oil men.

The topic of the conference was, and remains, very relevant, since the effects of offshore petroleum development in the North Sea on both the United Kingdom and Norway are, of course, substantial. For example, in Aberdeen, the offshore petroleum "capital" of Europe, employment in petroleum-related jobs rose by 30 000 in the seventies, and 30 000 new houses were built. The cost of housing increased by 450% for a three-bedroom traditional-style house. In Stavanger, oil-related employment rose from 500 to 14 000 during the same period. Economic, social and cultural effects of the oil boom are enormous, affecting among other things local employment, crime rate and the entire financial basis of the communities involved. It is not surprising that most of the book deals with these issues rather than environmental-ecological ones.

Environmental impact analysis is not obligatory in either the United Kingdom or Norway. To North American readers of the book it is astonishing that in Scotland during 1970-75 all five major oil and gas terminals, all service bases, four land pipelines, some 15 platform yards and 50 other major developments were approved rapidly and without public inquiry. Individual oil companies, particularly British Petroleum (BP), did conduct their own environmental impact assessments for major projects, however, based in part on their experiences in Alaska. In Norway, such assessments emphasized the economic and social effects of oil-related development and paid relatively little attention to natural, physical and biological environments.

Several of the papers outline in general terms the need for planning and control strategies, ranging from the local government level up to the European Economic Community (EEC). Environmental impact legislation is very different in the various EEC countries and nonexistent in many. Most of the papers deal with specific case studies, however, describing problems and solutions in the Orkney and Shetland islands, Scotland and Norway, at Musmorran, the Forties field, St. Fergus, the Flotta terminal, Stavanger, Aberdeen, Sullom Voe, etc. As already mentioned, much of the impact discussed is of the socioeconomic nature, but amenities (e.g., beaches), resources (e.g., fisheries), bird life and marine ecosystems are also referred to. Esthetics play a large role as shown by the following paragraph on color selection for a tank farm:

> "...first a series of perspective drawings were made recording the pattern of light falling on the tanks. From 10 a.m. to 5 p.m. the tanks were either in full light or full shade. But in early morning or early evening there was a sharp contrast between the areas which appeared white. This problem of reflection on a smooth surface, regardless of color, is almost insoluble.
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> Then all possible vegetation colors were photographed in both summer and autumn. On the basis of these colors 48 painted panels were made and set in the vicinity of the island. The panels were viewed against different conditions of ground, vegetation, sky and water background of the island. All but 12 colors were rejected. A series of cylinders of roughly the same shape as the tanks were made and painted with these colors. They were then tested around the island against the various backgrounds. In this way eight of the 12 colors were eliminated leaving a green, a green-brown, a blue and a blue-grey."

It is clear that both the political framework and mechanisms and environmental conditions and concerns in the Arctic dictate an approach to offshore petroleum exploitation which is very different from that in the North Sea. Are there, then, any lessons for us to learn from the North Sea experience? I believe there are. The parallels between Stavanger and Aberdeen on the one hand, and Fairbanks and Anchorage on the other, are all too painfully obvious, particularly when comparing the prices of houses, for example, which rose steeply as a result of the explosive oil development at Prudhoe Bay. Although different governmental mechanisms are in place and the physical and biological environments differ greatly, the basic environmental concerns are the same.

Onshore Impacts of Offshore Oil therefore makes interesting reading for those concerned with the same problems in the Arctic. I have few complaints about the material presented in the book except to note the lack of an introductory overview of industrial activities, including a map showing the various oil terminals, pipelines and support facilities on both sides of the North Sea. This could easily have been added by the editors. In all, I liked the book, however, and recommend it to all those concerned with offshore petroleum development anywhere in the world.

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INDUSTRIALIZATION AND ASSESSMENT — SOCIAL IMPACT ASSESSMENT AS A SOCIAL PHENOMENON. By DOUGLAS TORGERSON. York University Publications in Northern Studies. Toronto: York University, 1980. x+200 p. Softbound. Institutions $7.50; Individuals $5.00.

Social impact assessment is a major growing edge of applied social science. Probably hundreds of social impact assessments (SIAs) are conducted in North America each year as a consequence of a need, now widely perceived (and often required by law), to assess the socioeconomic implications of projects as diverse as northern pipelines, airport extensions and waste-disposal sites. Numerous volumes have been written in the last decade on the theory and method of social impact assessment, and there are now journals and newsletters devoted to the subject. Yet there is almost no literature exploring the premises and functions of SIA in the context of the development of modern industrial society. Torgerson's monograph is a major contribution in this respect. Not only does it fill a gap, it does so extremely well. It is a study in the sociology of the social and policy sciences, relying heavily for illustration on the use of social impact assessment in the Canadian North, with particular reference to the Berger Inquiry.

Industrialization and Assessment is not a casual read. Those interested in producing formula impact statements, based on a prescribed checklist, to meet only the minimum legal or political requirements, will not find it very helpful to that end. I can recommend this work very highly, however, to practitioners or citizens who are interested in the deeper issues that social impact assessment raises in contemporary society. The essence of Torgerson's argument may be found in the first chapter. The subsequent sections consist of a more detailed exploration of the ideology of industrialization, and the development of the policy sciences with particular reference to social impact assessment in that context. The book is documented with extensive references and footnotes.

SIA is a process now largely institutionalized by governments. Impact statements are now routinely prepared, and there is a fast-evolving system of guidelines for their preparation, for their assessment, and for public involvement in those processes. They are almost invariably project-specific, and they rely heavily on technical and scientific expertise and method. Yet the public debate about the projects under assessment frequently focuses on issues not amenable to "scientific" measurement, analysis, or even discourse, as we commonly understand those procedures.

There is now a standard catalogue of impact categories: income, employment, business investment, multiplier effects, public infrastructure and finance, demographics, and a few social indicators like health and education. When these are exhausted, we are left with vague notions of social well-being, quality of life, and "lifestyle" preferences, which conventional assessments dismiss in a few paragraphs as important but unmeasurable and hence incapable of objective evaluation. Yet these are the matters that citizens themselves are most likely to raise in response to development initiatives, although often in quite unsystematic fashion. Project proponents are in turn likely to dismiss this opposition as reactionary, uninformed, unrealistic or irresponsible. The pattern repeats itself from assessment to assessment, and from inquiry to inquiry, yet we never seem to come to grips with it. Both proponents and intervenors often go away frustrated.

Torgerson identifies two divergent trends in SIA that manifest this problem. One is a technocratic, positivist approach that relies heavily on expertise, and claims to be value-free. It attempts to achieve technical control over social life by anticipating and then modifying the impact of specified acts. The second

emphasizes ethics and values, normative goals and hence citizen participation. It denies the possibility of a value-free science with respect to human or societal objectives. This second tendency thus casts the problem of SIA in a wider context, emphasizing not simply the local impact of a project, but the impact of the larger process of development of which any particular project is but a part, on society as a whole. SIA, from this perspective, necessarily raises three questions: Where are we? Where are we going? Where should we go?

These observations have been made by many who have participated in impact assessments in the last decade or so, although Torgerson systematizes these divergent trends quite lucidly. Further, however, he elaborates what most of us are less aware of, which is the premises and origins of these positions in modern social thought.

How to resolve the divergence? Torgerson argues that it is indeed necessary to answer the larger questions implicit in social impact assessment, and that the second tendency can do so on what are, in the end, more rational grounds than the first. That is because these questions are in part trans-scientific — neither the scientific method nor the existing body of scientific achievement can alone answer them. Torgerson sees the possibility of arriving at rational answers to these questions through a reflective process of social inquiry that incorporates rather than ignores the normative views of the community. SIA would be a means of rational and conscious, but democratic, control over the course of social development.

It follows, although Torgerson does not add this, that the second mode of SIA has the potential to become a major public forum in which to consider the general pattern of social and economic development, both that which currently obtains, and the alternatives to it. That implies a much more clearly political, rather than scientific, inquiry as we commonly understand those terms. Those who might welcome such a prospect will find *Industrialization and Assessment* an essential aid in sharpening their analysis. Those who do not, should read it anyway, for enlightenment.

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THE THICK-BILLED MURRES OF PRINCE LEOPOLD ISLAND. By A.J. GASTON and D.N. NETTLESHIP. Canadian Wildlife Service Monograph Series No. 6. Cat. No. CW65-7/6E. ISBN 0-660-10857-7. Ottawa: Canadian Wildlife Service, 1981. 350 p. Hardbound. CAN$32.00; outside Canada CAN$37.50. (Available in English or French.)

This excellent monograph may be the most comprehensive treatment yet published on an arctic seabird; it is by far the best on the Thick-billed Murre. Unlike Tuck's (1961) earlier and more popularly written monograph, Gaston and Nettleship have presented their work in a highly quantitative fashion, with almost 90 tables and over 100 graphs and histograms interspersed over 350 pages; a thorough statistical treatment of their data is given throughout. The detailed treatment given most subjects demands a slow and careful assimilation. This book should not be considered light reading.

The book's six chapters provide a review of the relevant background information, a detailed description of the study area in western Lancaster Sound, a review of study techniques, a discussion of attendance and behaviour at the colony, timing and success of reproduction, the development of young, and a discussion of the foods, feeding areas and weights of adults during the breeding season. The final chapter is an integration and synthesis of the information given in preceding chapters and gives a review of the biology of the Thick-billed Murre; I thought this was the best chapter in the book.

Each chapter has been organized so that it is independent of the others, without need for extensive cross-referencing. As the authors state in the Preface, this has "...resulted in some repetition and a somewhat unorthodox order of appearance of some topics". Regardless, most readers will appreciate that each chapter is self-contained, with an introduction, a description and discussion of the specific methods used to investigate each subject, a detailed presentation of results and a thorough discussion and summary of the main points.

The production quality of this book is excellent. The printing is good (I found only three typographical errors throughout) and reproductions of the excellent colour photographs (mostly by Nettleship) are extremely good.

The major objective, as stated by the authors, "was to gather as much information as possible on the reproductive biology and ecological requirements of Thick-billed Murres breeding at a single location in Lancaster Sound, the gateway to the Northwest Passage". They were most concerned with "...aspects of ecology and behaviour which might allow us to predict the effects of environmental changes, particularly those associated with human activities, and...the evaluation of methods in hope of formulating guidelines for future investigators." The authors considered the main shortcomings of their work to be associated with the extreme intra-year and intra-colony variation in practically every aspect of the biology of the Thick-billed Murre. In some instances (chick growth and feeding rates) their sample sizes were small and therefore possibly not an accurate representation of the whole colony. The amount of information on the distribution of birds at sea was especially disappointing; they were able to conduct aerial surveys on only 10 days during three seasons (1975-1977). In my view, however, the greatest shortcoming of this monograph was that it contained almost none of the very important and relevant information gathered during the 1978 breeding season at Prince Leopold Island. During this year (and in 1979 — see Birkhead and Nettleship, 1981) unusually cold weather and heavy ice conditions persisted in the Lancaster Sound area throughout much of the summer; nearly 100% ice cover prevailed near Prince Leopold Island and eastward several hundred kilometres as far as the entrance to Lancaster Sound. Some seabirds, such as Black-legged Kittiwakes, did not lay eggs in the Lancaster Sound area in 1978 and it is probable that during this year no murre chicks survived to leave Lancaster Sound (Nettleship *et al.*, 1980). It is understandable that some data collected may not be included in a monograph of this type because of publication deadlines or financial constraints. But, considering one of the primary objectives stated at the beginning of the monograph was to gather enough information to be able to predict the effects of major environmental changes, I was disappointed that the biology of the Thick-billed Murre during the 1978 breeding season was not thoroughly described and compared with the earlier three seasons [n.b.: some discussion of this subject is given in less detail in Nettleship *et al.* (1980) and Birkhead and Nettleship (1981)]. The documentation of methodologies has served the authors well in realizing their second major objective of formulating guidelines for future investigators.

In his Foreword, Hugh Boyd wrote, with respect to the authors: "They devise hypotheses and ways of testing them so as to obtain clear results, and otherwise behave like scientists, rather than voyeurs. This is more remarkable because they have been surrounded by the flummery of environmental assessment." The authors do indeed present a number of hypotheses throughout the monograph; however, there is an important difference between an hypothesis presented *a priori* and subsequently tested by careful experimentation, and an hypothesis presented *a posteriori* (i.e., after the research) as an explanation for observed phenomena; most of the hypotheses presented in this monograph appear to fall into this second category. With regard to "the flummery of environmental assessment", this indictment seems especially inappropriate considering the large body of top-quality scientific research, much of it oriented towards environmental assessment, that has been conducted in Lancaster Sound and adjacent waters during recent years (for example, see *Arctic*, Vol. 35, No. 1). Nevertheless, Boyd's main point is well taken: Gaston and Nettleship are to be commended for their rigorous scientific approach.

The authors made thorough use of most relevant literature describing similar research in other parts of the world, with special attention given, for obvious reasons, to investigations conducted in the Atlantic. But I was disappointed at the lack of consideration given literature that has been available for several years on the biology of the Thick-billed Murre in Alaska (see Searing, 1977; Springer and Roseneau, 1977, 1978; Springer *et al.*, 1979; Murphy *et al.*, 1980.)

With these few shortcomings, I strongly recommend this book to all serious students of ecology, and especially to those interested in seabirds.

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