

## REVIEWS

“Torrey Canyon” Pollution and Marine Life; a report by the Plymouth Laboratory of the Marine Biological Association of the United Kingdom. Edited by J. E. SMITH, Cambridge University Press 1968. 39 Figures, 29 Plates, 196 pp. 55 sh.

Pollution of the environment seems almost inevitable where human population is dense and more specifically where industrial plants of various description try to get rid of their waste material in the cheapest way possible. Since industrial development and a high standard of living are apparently closely linked, man is too easily inclined to shut his eyes for the consequences of pollution, this the more when pollution increases but slowly, step by step. This stealthy process can, however, upset the balance of nature in due course and may gradually destroy amenities and valuable natural resources, this both on the land and in the water, the marine environment included. The attention of the public is, however, more easily alarmed by accidents like that of the “Torrey Canyon”, which reach the front pages of the newspapers for many days in succession. Though such catastrophes are of local occurrence and affect the natural environment only temporarily, they teach us a lesson and demonstrate how little one is prepared to counteract the effects of such calamities.

As such the “Torrey Canyon” report, written by the scientists of the Plymouth Laboratory, whose assistance was invoked in the battle against the 117,000 tons of crude oil which leaked into the sea, is a most interesting document. Though the duty of the Plymouth scientists was before all to assess the damage done to marine life by the oil and by the detergents so liberally employed, they soon saw the need to collect information outside that rather narrow field. This makes the report the more interesting and their recommendations on organizational requirements for future emergencies the more valuable. All action taken was based on the policy that preservation of the coastal recreational amenities was first priority in the hope that the effect of detergents on marine life would not be catastrophic. Therefore detergents were employed at sea in a quantity up to 700,000 gallons in an effort to emulsify the oil before it reached the shore. Under optimal conditions some 15,000 tons of crude oil could be emulsified this way for a price of some £ 400,000. In addition huge quantities of detergents of various description were used in efforts to clean rocky and sandy beaches hit by the floating oil masses.

The oil itself had little effect on marine life of various description, but killed innumerable seabirds. The detergents, on the other hand, were considerably more poisonous and led to the death of various marine organisms, both on the beach and in the sublittoral area. The detergents were extensively used on sandy and rocky beaches. The effect of the detergents would have been considerably worse if they had been applied in areas with muddy sands or mud bottom or where important shellfish beds occur.

The detergents only disperse the oil, they do not destroy it. They appeared to be useful for a rapid cleansing of rocky shores needed for holiday recreation. In sandy areas the success was only partial: the detergents made the oil sink

into the sand, but later the oil reappeared either on the surface of the sand or in the sea. Since most of the detergents used are destructive to life they should be employed with discrimination.

It is interesting to note that the observations following the "Torrey Canyon" disaster led to a formula to forecast the drift of oil "fields" on the sea when direction and velocity of the wind is known. It is important to know that part of the oil (up to 25% by volume) evaporates rather quickly, which increases the density of the residue. Further, that often the oil is transferred into a yellow-brown emulsion, requiring a different method of attack in efforts to destroy it. Too little is known on the various processes of photo-oxidation and microbiological degradation. It is clear that natural processes bring, in due course, considerable recovery, at a much lower price than indiscriminate use of detergents. The exact way absorbing materials such as finely dispersed chalk lead to final disappearance of the oil is still poorly understood. Among the many colour plates in the report, those which show how the marine vegetation soon flourished after the killing of herbivorous animals by detergents are particularly striking.

Apart from the need to fill the gaps in our knowledge, it is clear that there is a need for early discussion and collaboration of scientists and officials involved in coping with this type of emergencies, and that air reconnaissance can be an important tool in advising on those coasts which are at hazard.

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F. R. HARDEN JONES: *Fish Migration*, Edward Arnold (Publishers) Ltd., Lond., 325 pp, 86 Figs, 39 Tables. 1968, 120 sh.

"In this book an attempt will be made to determine whether or not enough is known about fish migrations to account for the facts, and should the facts themselves prove inadequate, to suggest what further observations and experiments are required. The argument is mainly restricted to salmon, eel, cod, plaice, and herring, as these are the fish about whose migrations most is known." The above quotation, Chapter 1, p. 5, clearly states the author's intentions and scope of coverage. The omission of virtually all references to tuna and related species is regrettable in spite of the fact that the author has acknowledged this in the preface.

The book is divided into thirteen chapters consisting of: Introduction, Biological Aspects of Migration, Methods of Studying Fish Migration, Salmon and Trout, The Eel, The Herring, The Cod, The Plaice, A Recapitulation, The Reaction of Fish to Stimuli, Movement Without Reference to Local Landmarks, Homing and the Use of Local Landmarks: Pilotage, and Epilogue. The detailed author, subject and geographical indices provided in *Fish Migration* are a credit to both author and publisher. Uniformly high quality tables (39) and figures (86) are further assets, although it is believed that shading the edges of land masses would have improved legibility of most of the figures. By my count,