

60 skins of snow leopard, 30 lynx, 8500 leopard cat, and 8000 stone marten. Finally a national appeal on behalf of the World Wildlife Fund is to be launched during 1969.

Starting from scratch, Pakistan has achieved in twelve months the framework of a first-class and vigorous conservation programme. Though much remains to be done, the next 12 months should provide substantial improvements in the status and survival of wildlife and habitats in a particularly vulnerable part of the world.

Oil Pollution of the Sea

By C. L. Boyle, OBE

Oil pollution of the sea used to be caused mainly by deliberate dumping of waste oil. Today this problem could be almost mastered by the 'load on top' system, but the chief cause remains accidents to tankers such as the *Torrey Canyon*. In this report on the Rome conference on the subject, held in October 1968, Lieutenant Colonel Boyle, former FPS secretary and a member of the British Advisory Committee on Oil Pollution of the Sea who represented the FPS, describes the working of the 'load on top' system and the discussions on the new problem. Lord Jellicoe, Chairman of the British Committee, presided at the conference.

ACCIDENTS to tankers are the biggest cause of oil pollution in the sea today, but until recently the main cause was the deliberate dumping of waste oil by tankers in order to clean their tanks for the next cargo. The 1954 International Convention on Oil Pollution of the Sea, which has been ratified by 39 nations, has largely stopped this dumping of waste oil in large areas of sea, notably the North Sea and much of the North Atlantic, and has made the provision of oil-water separators in dry cargo ships almost universal. Credit for these achievements is principally due to Mr James Callaghan and Miss Phyllis Barclay-Smith, former Chairman and present Secretary respectively of the British Advisory Committee, and to Counsellor Gunnar Bööf, President of the Nordic Union for the Prevention of Oil Pollution of the Sea.

After a tanker has discharged her cargo, about 0·4 per cent of the oil remains on the tank sides, and this 'clingage', amounting in 1967 to 2·8 million tons of oil, went into the sea in the process of tank washing while the tanker was returning to her loading port. In 1960, Lord Hurcomb questioned the basic assumption that all tanks must be clean on arrival at their loading ports, and from this simple but fundamental question arose the 'load on top' system which has now been adopted by operators of about 80 per cent of the world's tanker tonnage. Under this system the oily sea water from the washing out of tanks and oily ballast water is pumped into a tank called the 'slop tank'; the water settles at the bottom of this and is then pumped back into the sea. The oil above it, though a little contaminated with salt, remains and becomes part of the next cargo.

The chief difficulty is that the very last outflow of 'clean' water from the bottom of the slop tank into the sea contains a considerable proportion

of oil, and thus, although the amount is small, the ship may be contravening the 1954 convention. The conference discussion on this problem ended in a resolution calling for the universal adoption of a Clean Seas Code and urging the oil companies to continue their research with a view to ensuring that no oil from tank washings entered the sea.

Unfortunately, the reduction in deliberate oil pollution of the sea as a result of 'load on top' has not yet been reflected in a reduction in sea bird casualties from oil; the new big factor is accidents to tankers. The Dutch ornithologists, J. J. C. Tanis and M. F. Mörzer Bruyns, reported a steady increase of oiled birds on both Dutch and Belgian coasts between 1962 and 1968; observations made at sea after the 1966 disaster to the tanker *South America* suggested that for every oiled bird which reaches the shore, between eight and eleven perish at sea. They believe that about 150,000 birds are killed by oil on European coasts of the North Atlantic and on the North sea coasts every year, with disastrous effects on the populations whenever calamity strikes concentrations of birds in breeding, moulting, migrating or wintering areas. In the Baltic, long-tailed ducks have been among the worst sufferers.

In the dangerous waters around the Cape of Good Hope, four tanker accidents occurred in the first nine months of 1968; 1000 oiled jackass penguins were collected from the beaches of the Cape Peninsula and Dassen Island, an important breeding place, and in July over 500 oiled Cape gannets were washed up.

By the time an oiled sea bird reaches the shore and can be picked up it is *in extremis*. It is fairly easy to remove oil from a bird; many detergents will do it, although most will also kill the bird eventually. The real problems are to remedy the effects of starvation, disease and shock, to restore the bird's plumage including feather wax, and finally to return it to the wild. The whole process may take months.

Of 8000 birds (mostly guillemots) brought in from British beaches after the *Torrey Canyon* wreck in 1967, only 100 or 150 eventually seemed fit for release – according to the Royal Society for the Protection of Birds – and of 60 ringed before release, 16 were found dead within a month. Did any really survive?

Certainly the methods which failed must never be repeated. The British Oil Pollution Committee, with the support of the RSPB, the RSPCA and the WWF, has founded a research unit under Professor R. B. Clark, in the Department of Zoology at Newcastle University, to study rehabilitation of oiled auks, especially guillemots, by overcoming the effects of starvation, emaciation and stress and also the social problem of introducing rescued birds into established breeding colonies.

The conference heard Colin Goad, the secretary-general of IMCO (Intergovernmental Marine Consultative Organisation) describe proposals to improve safety of ships at sea, including one-way lanes for traffic separation. On the important question of cleaning up after a disaster had occurred, Lord Geddes suggested the creation of an international secretariat to act as a communications centre and to get the right equipment quickly to the scene of an accident, and T. W. Moore described

a new substance called Corexit that promises good results in the dispersal of oil at sea. Toxicity tests by the South African Division of Sea Fisheries have shown it to be far less toxic to marine life than the least toxic of the detergents used after *Torrey Canyon*, which had proved utterly destructive to small animal life in the intertidal zones. No satisfactory method of removing oil from beaches, except physically, has yet been found. As the South African report on oil pollution put it, 'the application of detergents should in no circumstances be permitted for mopping-up operations ashore, except on beaches of high recreational value'.

A complete report of the conference, with all papers and resolutions, will be published shortly by ICBP.

STUDIES ON OIL POLLUTION

'Torrey Canyon', Pollution and Marine Life edited by **J. E. Smith**. CUP, 55s.

The Biological Effects of Oil Pollution on Littoral Communities, edited by **J. D. Carthy** and **Don R. Arthur**. Field Studies Council, London, 45s.

Between 14,000 and 18,000 tons of crude oil came ashore in England from the *Torrey Canyon* wreck in March 1967. Since then a plethora of reports, committees, plans of action and research programmes have been put together, all with the underlying theme of the inevitability of such an accident occurring again – with even larger tankers. It is the acceptance of this inevitability and our only too evident lack of knowledge which is so frightening and a characteristic of our materialistic age. We know so little of the general ecological results of pollution, whether it is oil in Cornwall or defoliants in Vietnam, that we cannot afford to be complacent; we must demand more research and greater care as to what goes into the world around us.

These two reports emphasise only too well the need for research. The first, the report of the Marine Biological Association, effectively and efficiently puts together the work of their laboratory at Plymouth when, for ten weeks after the stranding of the *Torrey Canyon*, their entire resources were devoted to an examination of oil/detergent pollution on marine life. The chapter headings succinctly summarise the lines of work and thought followed: oil and detergents, sea surveys, shore surveys – rocky shores, sandy shores and estuaries, off-shore spread and toxic effects of detergents sprayed on shores, toxicity experiments, the pattern of oil discharge and oil movements following the wreck, oil pollution in France and Guernsey, and some lessons learned.

The second report is a collection of papers given at a symposium, sponsored by the Field Studies Council in February 1968. The intention was to assess the problems raised by the pollution of a highly complex ecosystem, and to collect together the basic information on oil and on the environment which could act as a guide to future research. The papers range widely – the chemistry of oils and detergents, the effects of oil/detergent pollution on plant and animal communities, and the microbiological aspects of pollution – presenting much information that is new; but often they are merely reviews, and only too often they are reviews of our ignorance. This in itself, of course, is useful.

Both reports end with valuable summings-up and useful guide-lines for future research and paths of action when (and not *if*) such an accident occurs again. Let us hope some of the lessons learned provide something more practical than academic exercises.

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