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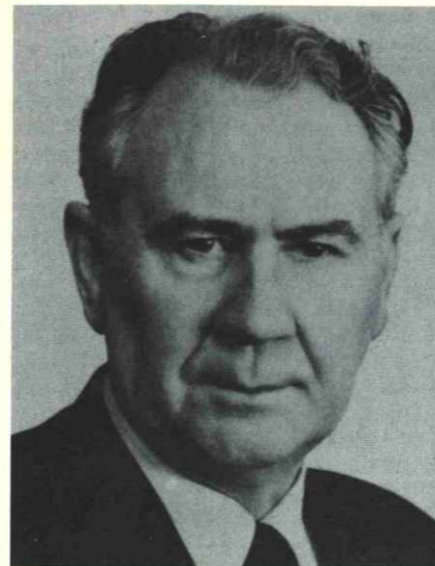
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Lúdvík JOSEFSSON  
Minister of Fisheries, Iceland

nations and, in addition, have serious consequences for the necessary food provisions throughout the world.

The United Nations Conference on the Human Environment, held in Stockholm last year, was a great effort in turning the world attention towards the most dangerous aspects of pollution and many-sided problems of environmental protection.

There have also been united efforts in taking urgent protective measures. Thirteen states in the North-Eastern Atlantic signed an agreement last year in Oslo aimed at reducing the dangerous pollution of the North-East Atlantic caused by poisonous waste materials. The London Agreement on the dumping of wastes at sea, also signed last year in October by 80 nations and representatives of various institutions throughout the world, included possible restrictions for the disposal of waste material from ships, planes, construction works etc. This is certainly an important move in reducing the danger of pollution.

But life in the sea, as well as on land, can also be exterminated or endangered in ways other than by poisoning or pollution. Unlimited exploitation of fishing stocks can fully deplete them, or at least make them useless for the food requirements of man. The fish stocks of the North Atlantic are different in size and strength. Ever growing fishing fleets are exploiting these stocks, using new techniques. The ships are now larger and their fishing gear more efficient than ever before. The modern fisherman can with various complex instruments hunt down practically every single fish and his efficient gear can catch everything, large or small, from midwater to just above the bottom. We are aiming at protective measures against poisoning and pollution in rivers, lakes and in the sea. But at the same time we must come to an agreement to prevent the depletion of fish stocks and other animal life as a result of thoughtless exploitation and overfishing. The North

Atlantic is one of the most endangered areas in that respect. The open sea has been free to everybody, all the fishing nations have directed their fleets towards it. And most of the time these operations have been extended to the coastal waters of the countries in question.

Now nations all over the world have taken up resistance on a wide scale. Many coastal states have claimed more rights to utilise for their own good the resources in their coastal waters. This is a struggle comparable with the fight against pollution. The fishing grounds above the continental shelf of a coastal state are part of its biosphere. They are directly connected with the ecology of the sea bottom and the land itself, of which the continental shelf is in fact an extension. The battle now fought for the rights of every coastal state to protect life in its offshore waters and to control the utilisation of these resources is an important factor in our fight for environmental protection, for more rational and more practical exploitation of natural resources. International trusts must be prevented from poisoning in their greed the atmosphere of man and spoiling the nature's biosphere, thus doing harm to other people. At the same time powerful fishing companies must be barred from sending their fleets to faraway grounds to deplete the fish stocks and disarrange the necessary balance of nature. The sea is a horn of plenty. A rational exploitation of its resources makes it possible to increase considerably the food production based on the richness of the sea. But with carelessness it takes only a short time to destroy this valuable source which would be an irreparable loss to all mankind. We have now started a campaign to prevent pollution and to arouse man's conscious thought for life around him. This struggle aims at the protection of life and the conservation of the necessary balance in nature, so that mankind can be blessed with its treasures in the years to come.

# EDITORIAL



# THE CHANGING BALTIC

Dr. Bengt LUNDHOLM  
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## Hydrology

The Baltic is the largest body of brackish water in the world. Strictly speaking there are two rather isolated water masses, which are separated by a sharp boundary, the halocline, at 60 m depth. The Baltic gets a supply of fresh water from its many rivers. This water forms the surface layer and leaves the Baltic as an outflowing stream with a low salinity of ca 8 ‰. In the inlets to the Baltic there are shallow sills preventing the heavy saline Atlantic water from flowing into the Baltic basin.

At irregular intervals the sills are passed by the heavy Atlantic water, which penetrates along the bottom and forms the deep water layer with a salinity of ca 17 ‰.

## Hydrogen sulphide

The hydrological and chemical variations and changes have been studied since the beginning of the century and we have thus a unique series of records. In the sixties an increasing amount of the toxic hydrogen sulphide in the deeper parts of the Baltic was

reported. Some experts regarded this as a very serious sign of human pollution. Others claimed that the occurrence of hydrogen sulphide was a very natural phenomenon. The difference in opinions among the specialists showed that our knowledge was insufficient. The specialists were too specialised to be able to give an overall picture of the Baltic ecosystem. To answer the questions more investigations and more research were needed, but this had to be integrated research to study the Baltic as one unit.

## Research needed

In Sweden as in the other countries around the Baltic the different research activities were co-ordinated and this co-ordination has slowly been transformed into integrated projects. Biologists, hydrologists and chemists — just to mention a few specialists — are now working together to study the interaction between the Baltic organisms and their environment. In spite of the difficult political situation with the powerlines of east and west crossing the Baltic, "The Baltic Oceanographers" were quick to establish an informal association of scientists and started a co-operative programme. Now the biologists have a similar association, "The Baltic Marine Biologists", which has begun working with great success. Also international — governmental and non-governmental — organisations are playing an important role, as are the bilateral agreements between different countries to promote research co-operation. Even though all the research work needed is not yet completed — and perhaps never will be — our ideas about how the Baltic ecosystem is functioning are now much clearer, and it is already possible to give an overall view of the situation, and one upon which most specialists agree.

## Ecology of the brackish water

From the biological point of view the existing Baltic is young: the organisms have not had enough time to adapt themselves to the environment and they are living under a continuous stress. Only a few species can live during these difficult conditions and they have formed a rather simple ecosystem. In general simple ecosystems are unstable and thus react strongly to changes.

The Baltic has no tides, thus there is limited transport of nutrients from the coastal zones. The nutrient levels are low compared with fresh water and salt water. As a result of this the biomass — the amount of living material — is small compared with oceanic coastal zones. Another important point is the low temperature, with a low turnover rate, giving a low productivity. How will this ecosystem react to a human impact with an increasing flow of nutrient rich wastes?

## Nutrients of human origin

The pollution load is often quantified by the Biological Oxygen Demand (BOD), that is the amount of oxygen needed to break down the organic wastes. Measured in BOD Sweden is

responsible for 40 % of the emissions to the Baltic and Finland for 25 %. The reason for this is that both countries have large forest industries. The municipal discharges are thus not so important if only the BOD is considered. When the organic material is broken down, nutrients are released and become available to the water plants. The nutrients most critical to the productivity are phosphorus and nitrogen. Recent investigations have proved that 80 % of the phosphorus and 40 % of the nitrogen are connected with human activities. It is thus quite clear that man has considerably changed the nutrient flow into the Baltic.

## The vicious circle

It was once believed that this increase in nutrients would be beneficial and only increase the productivity. This situation has, however, turned out to be very complicated. The organic material produced in the sunny surface layer, together with human wastes, continuously sink down into the heavy bottom layer where they start decomposing using the heavy oxygen. When the bottom-water flowed into the Baltic it was rich in oxygen but because of its isolated situation the oxygen is very difficult to replace. If a lot of this material is decomposed, the oxygen becomes depleted and dramatic changes ensue: highly toxic hydrogen sulphide is formed. The higher organisms die or leave the area and are replaced by sulphate-reducing bacteria. This affects the fish stocks, as the deep bottom layers are important breeding and feeding areas. At the same time nutrients earlier fixed in the sediments are released and return to the water. As a result the bottom layer of water becomes very rich in nutrients, such as phosphorus and nitrogen, and the bottom itself turns black and is "dead".

A new inflow of oxygen-rich water from the Atlantic will, however, flush out the old bottom water. The hydrogen sulphide disappears and the nutrients are removed to the surface layer where they will form the base for new productivity. This time, however, the biomass will be larger due to the greater amount of nutrients present. When later this is broken down, more oxygen will be needed and the areas with hydrogen sulphide will increase. More nutrients are thus released and together with new human waste material the next biomass will be even larger with increasing dead areas as a consequence. This vicious circle is simplified, but it indicates the mechanisms at work.

## Toxic substances in the Baltic

Biocides — heavy metals and pesticides — are easily trapped in biological systems. The risk of such accumulations is particularly high in brackish water. The herrings from the Baltic have much higher DDT and PCB levels than those from the Skagerrack. The actual values are so high that they are public health problems. Particularly high levels have been found in fat fishes, such as herring and also salmon. Since these high levels are a serious threat to the fishing activities, it is very urgent that the governments around the Baltic take immediate action to improve the situation. The toxic substances are, however, not only a public health problem, but they have also consequences for the higher organisms depending on the Baltic. Specially threatened are those organisms at the top of the food chain, such as birds of prey and seals. As the Baltic ecosystem is composed of only a few species, losses are very serious as increased instability will automatically follow together with consequences unpredictable even for man.

## Conflicting interests in a changing Baltic

Here I would like to comment on the conflicting interests which are common to all the countries affected by changes in the Baltic. All these interests are interlinked and form a network of forces working in different directions. The eutrophication caused by human impact will result in increased productivity, but at the same time hydrogen sulphide will destroy the breeding grounds of important fish species such as cod. It is even possible that some of the sea-bed will be permanently covered with hydrogen sulphide as in the Black Sea. This will affect fisheries enormously. The cod populations will go down, but the plankton feeding herring will increase. There are already signs that this increase has started, for example, very good herring catches have already been reported. The risk, however, is that eutrophication is coupled with an increased content of toxic substances which might make the fat fish unfit for human consumption.

The Baltic is an important recipient for human wastes. It is of great advantage to municipalities and industries who can discharge their wastes without any costs. The problem is now to find out the hidden costs, which have to be paid in the future by them or by somebody else. It is, of course, at present difficult to compare different





effects, but when we know more it might even be possible to quantify them in economic terms.

The Baltic is naturally very important as a medium for transport. Interlinked with this, however, is pollution and of special interest — oil pollution. From the ecological point of view, oil spills in brackish water are serious and this is one of the strong arguments in favour of banning or greatly restricting oil transport in the Baltic. For the same reason oil drilling is regarded with suspicion. Long term damages can outweigh the short term gains. The coastal areas are being used more and more for recreational purposes. The value of a clean and unpolluted coast is rapidly increasing, at the same time the pollution is increasing. For more than 30 years I have spent summer on the Island of Gotland in the middle of the Baltic, and I have been watching this down-grading of the water. The clean water has turned dirty. Water blooms — formerly a rare occurrence — are now common. The

shore line is now often littered with dead oil-killed birds. And today — when this is written — my neighbour, the farmer, is very upset as for the first time he has caught pikes with large tumours. Tumours which have been correlated with pollution.

### Integrated evaluation needed

During the last years research projects have emerged with integration between the different natural sciences. To be able to make a total evaluation and answer the questions put by society and the decision makers we need further integration with aspects from economic and social sciences. Even if we still have insufficient knowledge to predict in detail what will happen with the Baltic, we have more than enough information to take actions, both on national and international level, if we want to avoid certain consequences of the human impact. The Baltic is a challenge both to the scientists and to the politicians.



# POLLUTION IN THE MEDITERRANEAN

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The Economist of London, regarded usually as a "responsible" weekly, published in March 1973 an article on the Mediterranean in which it was said that "its ecological balance was not seriously disturbed until the early 1960s. Now over-population, the tourist boom, industrial development and maritime irresponsibility are combining to turn it into a dead sea". Two years earlier the New York Times headed an article "Is the Mediterranean dying" and about the same time Tony Loftas writing in the New Scientist on "Mediterranean Pollution — another year of neglect" asserted that "in spite of pollution scares the health of the Mediterranean continues to deteriorate". Reports of incidents leading to pollution of one kind or another get headlines in many parts of the world when they relate to the Mediterranean. This is due partly to the historic associations of this sea and the lands which surround it. But also the area is visited yearly by millions of holiday makers — and numerous scientists — from outside the region, attracted by the special combination of past glories of civilisations and the present sunshine and warm water. Neither is the Mediterranean "neglected" by the people who live there — at least many of them are making a noise about its present state, and numerous organisations have been holding international conferences, passing resolutions and drafting declarations and conventions. The situation is however clouded by a real lack of understanding of just what is "its present state", and complicated by the large number of interested bodies with a variety of ideas about what is to be done about it. Certainly the local people *should* be concerned. In September 1972, Professor W. Brumfitt, a microbiologist, told the "Medicine in the 70s Symposium" that one in ten people living along the Mediterranean coastline had changes in their blood showing exposure to hepatitis virus. Here, I use the term "pollution" as

defined, collectively, by the Agencies of the United Nations system, for their purposes:

"Introduction by man of substances or energy into the marine environment resulting in such deleterious effects as harm to living resources, hazards to human health, hindrance to marine activities including fishing, impairment of quality for use of sea water and reduction of amenities."

Man can significantly influence the sea in more ways than by "introducing substance or energy". Most commonly he over-fishes its living resources; that is to say by fishing intensively he reduces stocks of fish to an excessively low level so that the *harder* he fishes (more and bigger boats, for longer seasons, and more efficient nets) the less fish he catches. I mention this here because one of the important, and most difficult tasks of marine scientists everywhere is to determine to what extent changes in the resources are due to fishing or to other causes — such as pollution.

In the Mediterranean, and in other more or less closed seas, man can cause other changes as he still cannot in the ocean. In the Mediterranean he cut the Suez Canal a hundred years ago and since that time animals and plants native to the Indian Ocean and Red Sea have been finding their way into the eastern Mediterranean; some of these — species of fishes — have become numerous enough to be caught in commercial fisheries (the reverse process — migration of Atlantic/Mediterranean species to the Indo-Pacific — is much less common, but has been reported in the last few years). Much more recently — but having more immediate effects — the high dam at Aswan has been completed. This has substantially changed the south-eastern Mediterranean, by stopping both the fresh water inflow there, and the Nile sediments which used to "fertilise" the sea area. So it has been called — not very suitably — an example of "negative pollution" —

a *withholding* of materials rather than their *introduction*. Lastly, in addition to these diverse changes caused by man we have continuing natural changes, such as fluctuation in sea level, which we observed from geological, archaeological and historical studies, and which continue, albeit slowly.

Notwithstanding the rather considerable recent changes in the physics and chemistry of the Mediterranean, major changes in its biological aspect which might be the result of pollution are not so easy to find. There has been no decline in the total fish catch which has stayed near a modest one million tons annually for several years. Even where the substantial hydrological changes caused by the Aswan dam reach, recent reports indicate no change in the fisheries off Israel, for example, although there seem to have been local changes in the fisheries in and near the Delta, as one would expect.

The Mediterranean is, unlike the North Sea, and even more the Baltic, a deep sea — it is in reality a small ocean, or rather a small part of the great ocean of Tethys which was cut off and isolated by the closing, in the remote past, of north-eastern Africa with Arabia and the south-western part of the continent of Asia. Its isolation was later ended by a break-through of the Atlantic at the Strait of Gibraltar, across which there is still a rather shallow sill. The continental shelf is limited in extent — being broad mainly in the northern Adriatic and off Tunisia. The Mediterranean is practically without tides because its size and shape do not make it a good resonator of either lunar or solar tidal waves. Evaporation in the Mediterranean area is high relative to the nearby Atlantic, and this loss of water is only partially compensated by the Ebro, Po, Rhone and other large rivers flowing into it. Evaporation also causes the Mediterranean water to be saltier, and therefore heavier, than the Atlantic water



near the surface. Evaporation is higher towards the eastern end of the Mediterranean than the western, so the sea level slopes slightly down from west to east. Consequently light water to make up the loss flows in through the Straits of Gibraltar in the upper layer and down the gradient. Currents flowing in the northern hemisphere tend to deflect to the right because of the centrifugal force of the earth's spin. The inflowing surface current, which is impeded by the rather shallow narrows between Sicily and Tunisia, therefore follows an anticlockwise path in the western basin. A lesser current continues into the eastern basin and likewise follows an anti-clockwise path there.

At a very few locations, particularly in the Gulf of Lion, and at times of winter storms, the surface water which has become saltier and heavier through the summer, becomes colder and thus even heavier and rather rapidly sinks to the bottom. This "reverse fountain" renews the oxygen which had become diminished by the respiration of animals swimming and feeding in the surface layers. Lastly, some of the heavy Mediterranean water flows out into the Atlantic underneath the incoming water. This phenomenon was exploited in the Second World War by submarines which discovered they could drift out into the Atlantic unobserved by submerging and shutting off their engines. The deep Mediterranean water can be traced far out into the Atlantic, almost to its western side.

So if we consider the Mediterranean as a whole we see that there are active processes of oxygen renewal which ensure it will not easily become stagnant. Pollutants which can mix and dissolve in the water can eventually find their way out to the Atlantic, or are precipitated in the deep bottom sediments. On the other hand spilt oil stays at the surface, and therefore tends to accumulate in the Mediterranean. Floating waste, such as plastics, in the Atlantic can of course also be carried in by the surface current. Thus, when a freighter lost, in the Atlantic, a number of dangerous containers carrying tetra-ethyl lead residue, U.S. Embassies warned the authorities of the Mediterranean States that they might appear floating near their coasts.

Not only the oil itself, but pollutants which are more soluble in oil than in sea-water, will tend to be accumulated at the surface in the Mediterranean. Oil droplets can be taken into the small organisms which are the food of the fishes, giving the fish catch a bad taste, and with them the more



"... any tourist will vouch that in most places beach pollution by oil and by petroleum residues gets worse every year."

insidious contaminants such as the chlorinated hydrocarbons — pesticides and PCBs.

When the Suez Canal was closed it was at first thought that the Mediterranean would at least benefit from a reduction in tanker traffic and hence in spilt oil. But, on the contrary, with the development of oil resources in North Africa, the construction of pipelines, the enormous growth of oil unloading and refining facilities on the northern shore — especially in Italy — and the traffic of super-tankers entering loaded by Gibraltar, the situation is now very much worse. Despite some improvement as far as tank-cleaning is concerned, through the application of the international conventions under the Intergovernmental Maritime Consultative Organisation, and the "load-ontop" system adopted by oil companies, any tourist will vouch for the fact that in most places beach pollution by oil and by petrochemical residues gets worse each year. In part this is because some tankers do not obey the rules, in part because the international rules still permit tank-cleaning in a limited area of the high seas off the coast of Libya, and because pollution of local origin — engine oil from boats, dumped dirty oil from vehicles and so on — continues to increase, with practically no control.

From west to east, north and south, Mediterranean countries are now exploring for oil on their continental shelves, and soon will be trying deeper than that. Some of them have found oil. Like the sea-bed off California,

the Mediterranean floor is in many parts "active" — volcanoes and earth movements are common. So spills must be expected here, too, no matter how careful and technically adept those in charge of future oil extraction are.

The Mediterranean is a sea of diverse and seemingly incompatible uses. Swimming and boating there are popular because the water is clear as well as warm. It is clear because the water is not very productive biologically, which is why the fish catches are modest, by world standards. Nevertheless, the catches are valuable — they are consumed directly, mostly fresh; practically none are converted to fishmeal for animal feeds, and they fetch high market prices. The fish resources probably benefited on the whole, from the raw sewage pumped into the Mediterranean for many years from the coastal settlements. The populations of Mediterranean countries still increase, more of them are moving to the coastal zone, some to work, some to occupy part-time their scattered seaside houses, and they are joined by "foreigners" from further afield each year. The vastly augmented sewage still mostly goes into the sea untreated, and now spiced with modern additions such as synthetic detergents, with locally most unpleasant results. In fact the detergents in sea-spray have been blamed by Professor Lapucci, of Pisa University, for deterioration of the pine woods along the coast of the Tyrrhenian sea — Neptune's revenge. In some urban areas

a beginning is now being made to install sewage-treatment plants, but the capital cost of this throughout the Mediterranean will be enormous. If the sewage is treated and, instead, wastes containing inorganic nutrients are pumped into this sea, some species of fish again may benefit, provided the effluent is reasonably dispersed in time and space. But we can expect the classical water clarity to be diminished and some recreational attraction to be lost — or perhaps changed, with fewer swimmers and divers and more fishing for sport. However, just as a possible reprieve from urban wastes can be glimpsed, the Mediterranean is being called upon to absorb another order of magnitude of industrial wastes, including warm water — and perhaps low level radioactive wastes — from power plants located on its shores. Such wastes are entering by the rivers, by coastal outfalls, and by dumping from ships. The latter has been the cause of one of the most recent and serious international incidents, as when it was found, early in 1973, that an Italian company was dumping large quantities of acid and heavy metal wastes from titanium oxide manufacture in deep water near Corsica. So far most of the industrialisation is on the north shore, particularly of the western basin. And wastes from petro-chemical industry in particular, whether in the atmosphere — as in south-eastern Sicily for example — or in the sea, are definitely not compatible with healthy life, be it of fish or man himself. The northern Adriatic is also in a sad state, exacerbated by the regular seasonal discharge of wastes from sugar-refining — another of the "dirty" industries. But North Africa and the Levant are beginning to contribute their share. For example last year reports were published of very high concentrations



The enormous growth of oil unloading and refining facilities on its Northern shores, is one of the many contributors to the Mediterranean's increasing problem of oil pollution.

of lead in the sea off the Lebanon coast; in Greece, the Gulf of Thermai has been reported, by an expert committee, as receiving "such large quantities of industrial wastes that it is practically doomed to biological death"; and for much of the year the Lagoon of Tunis is now a stinking swamp.

The Mediterranean has, since early times, been famous for its maricultures — the raising of fish and shellfish in ponds, lagoons and sheltered bays. The shellfish — mussels and clams — are efficient concentrators of just those things in sea-water which man puts there and does not want back again — pathogenic organisms and toxic compounds of heavy metals. It was natural, but not necessarily justified, therefore that when cholera broke out last summer in Naples the mussels would be blamed. At the same time, cholera or no cholera, the authorities in Malta destroyed the new mussel "park" which had adopted a practice not unknown in Italy of fattening the mussels, just before sale, by hanging them near to a main outfall of untreated and nutrient-rich sewage!

One could multiply such cases almost indefinitely; it is now time to look briefly at what is being done about the situation as a whole. While a multitude and variety of local cosmetic actions are essential and urgent, the problems of the Mediterranean are overwhelmingly international. There are very many international organisations concerned with the Mediterranean — European ones, North African ones, regional and sub-regional ones, and worldwide organisations. Furthermore the headquarters of many of this last category are on or near the Mediterranean — Rome, Geneva, Paris — and its problems come readily to their attention. The General Assembly of the International Union for Conservation

of Nature and Natural Resources (IUCN), meeting in Canada in September 1972, pressed the authorities of Mediterranean countries to "demand compliance with the most stringent regulations" concerning the oil industry, and also reaffirmed its support of movements to establish marine parks and reserves in the region. In fact such movements are expanding and seem to be rather successful, at least in holding back the pollutant tide in very limited areas. In many countries they are justified and even financially supported as areas from which "baseline studies" can be conducted to give the sorely needed scientific evidence of the effects of man here. The most recent event was a regional conference on Mediterranean marine parks last summer, convened by the regional government of Campania (Naples and Southern Italy) with the cooperation of the International Ocean Institute of Malta. Many concrete actions may flow from this, but especially training and information about marine ecology to the people of this area. It illustrates, too, another trend: that is, international action at the level of provinces and cities as well as at the level of national government. On the initiative of the Mayor of Beirut a "World Inter-communal Conference for the Protection of the Mediterranean Sea Against Pollution" was also held last summer. It adopted a document, now called the Beirut Charter, laying down principles to be followed, cooperatively, by urban authorities, and agreed to have annual conferences elsewhere in the next few years. The Interparliamentary Union has also recently got into the act, although it will, I presume, be able to influence events only indirectly, and in the Mediterranean countries which have effective parliaments — perhaps a minority of them.

Regionally, OECD, NATO, the International Commission for the Scientific Exploration of the Mediterranean Sea (CIESMM), and others have recently interested themselves in aspects — scientific, technical, economic and legal — of the Mediterranean pollution problem. The OECD study is a pilot one under the leadership of Spain. Subregionally there are a number of concrete initiatives. One is the so-called "Ramage" project of St. Raphael, Monaco and Genoa to study and plan anti-pollution activities along this very important stretch of coast. Another is a proposal by the Government of Malta to its neighbours Italy, Libya and Tunisia, that the four countries jointly operate a pollution monitoring and control ship in the central Mediterranean.



Of the world-wide organisations the Paris-Unesco based Intergovernmental Oceanographic Commission, which is also linked with the Food and Agriculture Organisation of the UN (FAO) and the World Meteorological Organisation (WMO), is concentrating its cooperative scientific investigations of the Mediterranean on research related to pollution. The UN Environment Programme, sired by Stockholm and now based in Nairobi, is expected to give financial and other support to promote continuous monitoring of the Mediterranean environment. And the International Atomic Energy Agency, which has maintained for ten years a marine radioactivity laboratory at Monaco, has now been joined by Unesco in broadening the work of that laboratory to cover also research on heavy metals and chlorinated hydrocarbons. Then, as is well-known, the UN itself is attempting to bring a modicum of global order into things legal and marine, including pollution, through the Conference on the Law of the Sea to be held in Geneva and in New York in 1974. The most far reaching move in this region has, however, been made by the General Fisheries for the Mediterranean (GFCM), an intergovernmental FAO subsidiary. The GFCM published in 1972 an authoritative study of "The State of Marine Pollution in the Mediterranean". To anyone familiar with earlier, similar reviews, such as that produced by ICES for the North Sea, the GFCM study was remarkable for the paucity of concrete information. Nevertheless, it brought together effectively what was known and on the basis of this the Council asked FAO's Director-General to consult governments and convene a plenipotentiary conference to consider and

adopt international legal instruments for the protection of Mediterranean fisheries from pollution damage. It seems that this conference *will* meet in 1974, articles are now being drafted, and their adoption would surely have consequences far beyond the conservation of the vulnerable fish resources. So we all hope the palaver will soon bring forth results and man-made change for the better.

This brings me again, and finally, to the question of regulating the interactions between the various uses of a circumscribed sea area such as the Mediterranean. It is a question which motivated the creation of the International Ocean Institute at Malta. If the UN conference next year is a very big outcome of the initiative of Ambassador Pardo of Malta in the UN General Assembly six years ago, the International Ocean Institute is a very small, but we hope not insignificant, outcome. Our Institute convenes summer schools at which young people from Mediterranean countries become informed about the sea and, naturally, about man's misuse of it. That is not, however, our *raison d'être*. This is to bring together, in special "study projects" and in annual "convocations", diplomats, lawyers, technicians, scientists, economists, politicians, and the interested public to discuss the governance of ocean space. This is a unique role. From it has emerged a clear idea that while actions in each sector, such as fisheries, oil pollution and so on are to be welcomed, they must eventually be seen as part of a whole international regime linking, regulating, promoting and, as far as possible, harmonising all human activities and interests in this vast area

of potential conflict. From such a view crystallised the concept of the "common heritage of mankind" as eventually endorsed last year by the UN General Assembly with respect to the peaceful uses of the sea-bed and ocean floor. Many people would now like to see that concept extended to all ocean space and its resources — a much more difficult pill to swallow by many governments and especially by the maritime powers. In trying to see more clearly what form the governing and consultative organs pertaining to a comprehensive ocean regime might take, the Council of the International Ocean Institute two years ago selected the Mediterranean for a pilot study. In many ways it is a model for the world ocean. Its bordering States are some "developing", others "developed". It has minerals, fish, tourism and maritime transport; the interests and potential conflicts among these are manifest by States outside the area as well as within it. So it is possibly a model for a regional regime within the global one. The main proposal which emerged from the pilot study was for an Interim Council of Mediterranean countries, with many-layered representation from national and municipal government, industry, science and law, to serve initially as a consultative body with respect to all marine problems. This proposition has been put to the Mediterranean governments; it remains to be seen what they will do with it. We are cautiously optimistic, especially as we see looser bodies of citizens — the "consumers" of the sort of world we are all making — and especially students, bringing pressures to bear on authorities, to act before this very special environment really is grossly and irretrievably damaged.





# MARINE POLLUTION IN THE NORTH EAST ATLANTIC

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## INTRODUCTION

In reviewing the problems of marine pollution in the North East Atlantic, one of the principal difficulties is to get the situation into focus and to maintain a balanced judgement in face of the pre-occupation of the communications media with environmental deterioration and disaster. Even the most routine of pollution incidents, involving transient losses of non-commercial fish, are deemed to be worthy of notice in the national newspapers, although such incidents mostly have their origin in human frailty or pure accident, which no amount of restrictive legislation will eliminate. Very little attention is given to the greatly increased control and steadily improving surveillance systems developed in almost all Western European countries during the last 5 years, or to the marked change of heart among many industrialists who are now much concerned to create a good public "image" and to control the environmental aspects of their production processes.

The main difficulty is to get a measure of the problem and to recognise the substances and situations to which priority attention should be given. The public for the most part sees only the estuaries and coastal fringes and is apt to draw too sweeping conclusions from the littered and oily condition of popular bathing beaches and the discoloured waters of estuaries. Moreover, popular writers, even those who have some scientific understanding, are apt to make a mystery of what goes on in the sea and to hint at disasters in the offing due to increasing pollution, knowing full well that their readers are usually in no position to attack the basis for their prophecies. This is a dangerous situation: although it has been argued that to generate public pressure and political action it is necessary to paint the picture in exaggerated terms, this brings with it a risk of becoming trapped in unrealistically perfectionist regulations which are difficult to administer and unnecessarily restrictive on industry. Yet it is this same industry upon which we

must rely to create the wealth and technological resources which will enable us to conserve the environment and to repair the damage that has been done.

## RECOGNITION OF THE PROBLEM

If one measures the state of the North East Atlantic by its production of fish and shellfish, then one can only conclude that pollution is having very little effect. The table on page 12 gives the gross international production of fish of all kinds (including cod, haddock, plaice and herring) from this area during the last 10 years — a period of great industrial and technological advancement, accompanied by a substantial population increase. Recognising

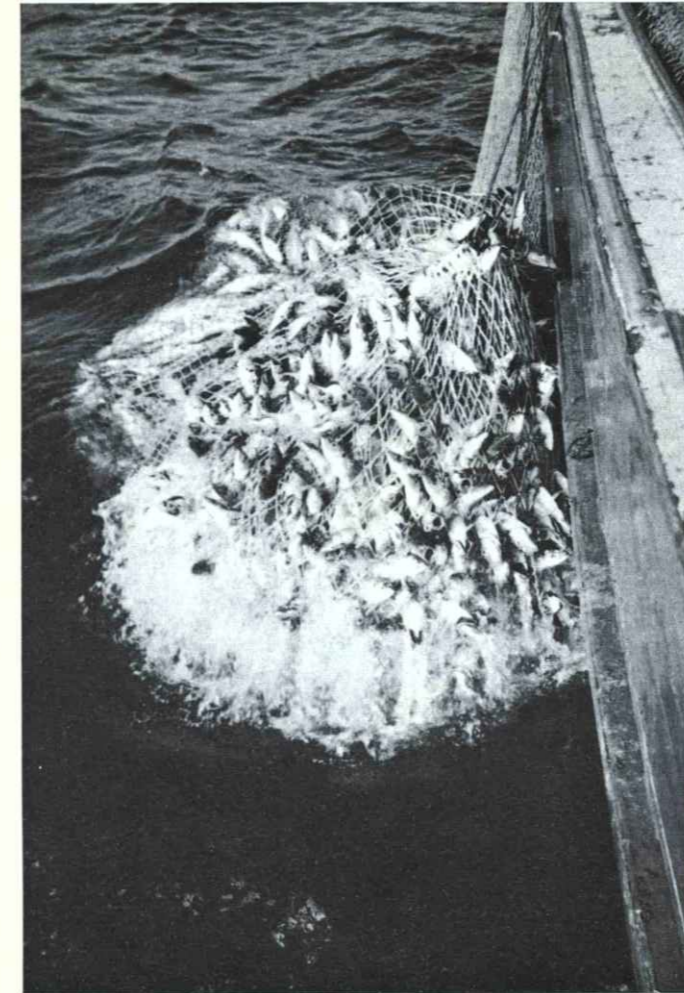
that fish catches are influenced by the success of failure year by year of the broods of young fish, by the extent to which conservation practices and fishing policies are matched to the productivity of the fish stocks, and by the growing efficiency of nets, it is quite remarkable that catches have, generally speaking, steadily increased during this period. If one considers the North Sea alone, certainly the area in the North East Atlantic most exposed to pollution, both the gross catches and the catch per unit of effort of all the main commercial kinds of fish, with the exception of herring, have substantially increased. In the case of the herring, an obvious mismatch of catching policy and conservation measures has resulted in near destruc-



(left and opposite)  
*Sailing from Whitby, U.K., the "Provider" is just one of the many thousands of fishing boats on the North Sea. For how long will they continue to provide us with healthy catches?*

tion of several highly productive stocks, but no one has seriously suggested that pollution has played any part in the decline.

Where then can we find the symptoms of pollution damage in the sea and what do we need to do to bring these more clearly to the attention of politicians and administrators? Not unexpectedly, it is in the estuaries and coastal fringes that clear evidence of changes resulting from pollution can be found. In the open sea, apart from the frequent presence of "tar-balls" and oil slicks, all seems much as it was and, as we have already seen,



landings are not only well maintained but, despite somewhat imperfect international management of resources, are actually increasing.

Estuaries and the shallow coastal waters are the main areas of shellfish production, but in Northern Europe they yield only a very small percentage of the catch of marketable fin-fish. The main fishing grounds are offshore, usually out of sight of land, and at depths often greater than 100 metres. In such conditions polluting sub-

stances derived from shore discharges are inevitably diluted to such an extent that they are no longer directly harmful. In the estuaries and shallow coastal waters, by contrast, harmful concentrations of wastes may be present locally and may produce conditions unsuitable for the production of shellfish, particularly static filterfeeders such as oysters, mussels and cockles. Such areas may, however, also act as nursery grounds for the very young stages of plaice, sole, saithe, herring



and other valuable fish on which the offshore commercial fisheries depend. The main nursery grounds for the North Sea sole and plaice stocks, for example, are the shallow coastal waters of The Netherlands, Germany and Denmark, so that all European fishermen have an interest in preventing these from becoming polluted by the industries discharging their wastes to the basins of the Scheldt, the Rhine and the Elbe. Similarly, the fishermen of the Continent are concerned to ensure the safety of the main North Sea herring spawning grounds which lie in the immediate vicinity of the French and British coasts. While one cannot say that the polluted state of European estuaries generally and the increasing quantity and variety of discharges to rivers and coastal waters has had no depressing effect on the production of young flatfish and on the spawning and survival of herring, it appears that such effects, if they exist, have so far been masked by other climatic or environmental influences affecting the success or failure of year-classes. There is, however, another aspect of the matter which has to be considered.



This is the accumulation in fish and shellfish of certain persistent substances, such as metals and very slowly degradable organic substances, which may reach levels that are objectionable on public health grounds. Such substances may be without apparent effect on the health of the adult fish or shellfish themselves (although we cannot be so certain about the more delicate juvenile stages) but may still be present in sufficient amounts to cause concern, especially where large quantities of fish and shellfish are eaten by local groups having virtually unlimited access to supplies. As a generality, the public in Northern Europe is not at risk from metallic or organochlorine residues in sea fish or shellfish, but locally, in estuaries and bays where industrial effluents are present, levels in fish which spend much of their life close inshore or in static shellfish may be such that very high rates of consumption are undesirable. In Sweden this has led to the banning of the sale of certain fish, particularly salmonids, from some estuaries. In the Baltic the use of cod liver oil for human consumption has been stopped because of high organochlorine content. No such action has been found to be necessary in any country bordering the Southern North Sea. In the United Kingdom the results of extensive surveys of the occurrence of mercury, cadmium and lead in fish, shellfish and other foods have recently been published and have not called for any restrictive action. It may be added that similar publication annually of the results of monitoring radioactive discharges from the UK has shown that the public is more than adequately protected.

All the polluting metals are present naturally in the sea and are constantly being added to by the slow processes of erosion of metalliferous rocks. Except locally, man is not able to add materially to the metal content of the sea and conditions in the deep oceans change only very slowly. It is not therefore surprising that the metal content of oceanic fish such as tuna is very much the same now as it was when specimens were preserved in museums 50 to 100 years ago. The problems with metal discharges, where they exist, are (with a few exceptions) essentially local, due to intense exposure in waters providing poor dispersal, and the remedy is almost always to reduce or eliminate the discharges at source rather than to limit the exploitation of the resources of fish and shellfish. The exceptions relate to metals, such as lead, which are discharged into the air and reach the sea with rainfall or snow. There is

evidence from the Greenland ice cap that lead from anti-knock motor fuels has been distributed very widely by aerial transport and amounts reaching the sea in this way have increased markedly over the last 20 years. There is virtually no evidence, however, that in Northern Europe any public health hazard has arisen from fish or shellfish contaminated in this way. Persistent organic substances, particularly the chlorinated hydrocarbons, present a different problem. Most of them do not occur naturally in the sea (or anywhere else for that matter, being products of man's ingenuity in synthesis), so that they may be resistant to the normal processes of chemical and biological breakdown. They may be accumulated by marine

animals and plants to levels several orders of magnitude greater than their concentration in the sea and, if they are also toxic, may disturb physiological processes or render such organisms harmful to predators including man. Although it seems unlikely that any of these substances are totally resistant to degradation, their "half-lives" in the sea may be years rather than months or days. Examples of these substances which have received much attention are the organochlorine pesticides such as DDT and dieldrin, and the polychlorinated biphenyls (PCBs) so widely used in industry. Restrictive measures on the manufacture, sale and use of these compounds to reduce their rate of loss to the environment have already



Fish landings (excl. shellfish) from the N.E. Atlantic (metric tons)

| Year | Cod       | Haddock | Plaice  | Herring   | Total all wet fish |
|------|-----------|---------|---------|-----------|--------------------|
| 1961 | 1 496 366 | 319 357 | 146 762 | 2 218 540 | 7 345 247          |
| 1962 | 1 637 472 | 405 505 | 153 776 | 2 336 423 | 7 062 282          |
| 1963 | 1 564 608 | 373 230 | 163 071 | 2 515 419 | 7 366 781          |
| 1964 | 1 267 230 | 449 719 | 163 120 | 3 031 444 | 7 882 583          |
| 1965 | 1 288 785 | 490 001 | 144 117 | 3 575 637 | 8 803 376          |
| 1966 | 1 388 822 | 520 615 | 143 527 | 3 610 571 | 9 408 167          |
| 1967 | 1 501 634 | 366 141 | 155 965 | 3 252 634 | 9 465 062          |
| 1968 | 2 064 697 | 390 481 | 160 717 | 2 333 829 | 9 404 986          |
| 1969 | 2 122 853 | 889 422 | 170 482 | 1 398 990 | 9 135 906          |
| 1970 | 1 910 803 | 864 671 | 175 150 | 1 420 493 | 9 976 232          |

Figures taken from "Bulletin Statistique des Pêches Maritimes"

been introduced in many countries, but it is as well to remember that there are literally thousands of organic substances in regular use in most developed countries. Through the agency of the United Nations Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP), the characteristics of the more important of these organic substances are gradually being catalogued, but there is a dearth of information about what happens to them if discharged into the sea and, especially, about their effects on fish, shellfish and other marine life. Many are volatile and substantial quantities may be leaked into the air during manufacture and use. We know next to nothing of what happens to these airborne substances thereafter, of the extent of photochemical breakdown, absorption on to particulate matter, or partition between air, sea and soil. It would be impossible, I believe, for any country to produce a credible "budget" accounting for the final disposal of all it manufactured or even one of the simpler industrial organics such as carbon tetrachloride, xylene or benzene. Worldwide production figures are difficult to come by and trends of production can only be based on the figures of the most co-operative and environmentally conscious industries. Yet these are basic statistics needed to make a balanced assessment of the risks which these substances may present to the marine environment and its resources.

#### A COURSE OF ACTION

All restrictive action to control marine pollution should be soundly based on evidence of the properties and quantities of particular substances reaching the sea, and the likely consequence to resources, amenities, public health and other users of the marine environment. Although we cannot wait for complete certainty before acting to control potentially harmful discharges, panic action resulting in limitations on the use of living resources, on the one hand, or unnecessary restrictions on industry, on the other, should be firmly resisted. Acute situations calling for emergency action may arise locally (a good example was provided by the phosphorus liberations in Placentia Bay, Newfoundland), but the open sea changes very slowly and there is ample time to make well-considered judgments.

The first thought must always be to reduce pollution at source by treating the waste before release, by tightening up on production losses, and, where necessary, by modifying production processes. In the case of highly toxic

and persistent substances, such as mercury and cadmium and their salts and organochlorine pesticides, the question should be asked "is it essential to use these substances in this process, or for this purpose?". If not, then possible substitutes should be examined.

Administratively, action at national and regional levels is more likely to be effective than a global approach. For this reason the initiative of the countries party to the Oslo Convention on dumping is to be commended: it resulted in quick agreement because there was a close community of interest among the parties concerned. But dumping is only a small part of the picture; other sources of marine pollution are vastly more important, particularly river discharges. The action of the French Government in calling for a regional convention for the control of land-based discharges is therefore to be welcomed as a further step along the road. Clearly a consistent policy must be pursued covering all sources of pollution to the sea: if mercury and persistent organochlorine substances are so harmful that they should not be dumped then it is even more important to reduce to the minimum the much larger discharges by rivers and pipelines. The great flurry of international activity generated by the 1972 Stockholm Conference on the Human Environment should not be allowed to obscure the need for local action, at the source, in the industrialised countries; this is where a massive reduction of the problem can be brought about. Some pollutants have to be tackled internationally — oil is the best example — and here it is important to support to the full the work of the Intergovernmental Maritime Consultative Organisation (IMCO), which led the way with its 1954 Convention on the Prevention of the Pollution of the Sea by Oil. This year IMCO has tackled the subject again in a world-wide Conference on Marine Pollution, dealing also with the growing nuisance created on our shores by ship-borne garbage, the disposal of washings from chemical tankers and the treatment of sewage derived from ships. Their courageous and well-prepared efforts deserve our full support.

On all fronts there is a shortage of factual knowledge about pollutants and their effects. This is particularly true of the complex organic substances which exist in such bewildering variety and enter increasingly into a wide variety of manufacturing processes. This is where a major fraction of scientific effort should be applied in the coming years.



# Whales

Captain MÖRZER-BRUYNS, Netherlands

During the last few decades man has been remarkably successful in practically exterminating a group of mammals which are amongst the most highly developed living creatures next to himself. Furthermore man hardly knows how these animals perform such basic activities as feeding and reproducing. And the majority of mankind does not seem to care. I mean of course, those gentle ingenious creatures whales, together with the smaller members of the same order, dolphins and porpoises.

The extent to which our knowledge is lacking is appalling. For example, we know 116 species exist, yet 12 still remain to be positively identified. Whereas whales such as the Little Killer were already known from evidence of washed up skulls as early as 1846, it was not until 1963 that a living specimen was accidentally found and described in Japan.

Why do we have little or no basic biological information about whales? (this situation for some species and dolphins has now changed and will be referred to in greater detail later on).

The answer is simple: whales, particularly the larger ones, have always primarily been regarded as objects of commercial interest. Basic biological or scientific research has always taken second place. Modern whaling really started on a large scale in 1904 from landstations in South Georgia and together with the development of new whaling techniques such as the harpoon gun; the result has been an ever-increasing mass slaughter which still goes on today. Inevitably, extreme overexploitation led very quickly to the near extermination of several species to the extent that a few efforts were made to enforce international conventions. Since 1946, the International Whaling Commission (IWC) has tried unsuccessfully to impose this. A case in point is the rejection of the 10-year moratorium in June this year. Why has the IWC, an organisation set up specifically for the purpose of look-

ing after the future of whales, been so unsuccessful?

Their statistics have been naturally queried over and over again by whalers offering their own more tolerant calculations. Yet this continues even after a world-wide neutral count by merchant ships of many nations in the middle fifties proved the IWC's statistics to be correct.

In 1937 55,000 whales were killed. An international agreement was signed to protect them. Why then were 75,000 whales killed in 1963?

Why did the Blue Whales only become protected in 1965? A result of this slightly tardy move is that 7% of the original stock of 200,000 remain. And since this meagre 7% is widely dispersed throughout the unknown depths and vastness of the oceans, their chances of survival seem thin. Fin Whales face the same predicament.

The **Blue Whales** (the largest living animals: 130m - 150 tons, the Fins coming a close second with 25m - 65 tons) and **Fins** were the principal tar-

gets of the whaling "factory" ships, first introduced in 1925. In the 1930/31 season, 26,000 Blues and 6,600 Fins were caught. In the 1937 season this had increased to 55,000 whales including 18,000 Blues and 34,000 Fins. A Geneva Convention protecting mothers with calves, young animals under a certain length and "Right" Whales (see later) was obviously insufficiently severe. After the IWC was first formed, their efforts to restrict quotas of numbers of whales caught were unsuccessful, not only because several large whaling countries refused to join IWC but also because others refused international inspectors on their factory ships.

As a result the decline in numbers of these mighty animals became more and more obvious so that in 1953, of 16,000 Blue Whale Units allotted, only 4,000 Blues were obtained and the Fins had to foot the bill by a catch of 25,500. Ten years later the fate of the Blues was practically sealed. With a quota of 15,000 BWU only 112 were

caught and evidently the stock of Fins had been so much depleted that of the 30,000 allowed (2 per BWU) only 13,870 could be taken.

Meanwhile, with the attractive larger whales becoming scarce, attention was turned to the lesser species in particular the much smaller **Sei Whale** (18m - 23 tons) and the **Sperm Whale**, the only large toothed whale. In 1963 the catch of Seis had risen from a few hundred a few years previously, to over 8,000.

If there still might be any doubt about killing the hen which laid the golden eggs, the figures for the 1964 season, with 10,000 BWU allowed, of: 20 Blues; 7,308 Fins; and 20,000 Sei's proved that the IWC could not fulfill the task for which it had been created. In less than 40 years man has managed to destroy a heritage of 27 million years. The original stock of Sei's (250,000) has been almost halved in the space of 20 years, similarly for the bull Sperms, the females being protected by the restriction in length. They are in no immediate danger — but for how long? The quota for 1973, is 2,300 BWU which could account for almost 10,000 Sei's. The taking of Sperms is unrestricted both in time and number.

One of the most interesting and spectacular whales is the **Humpback**, a short thickset whale (17m - 45 tons)

which often jumps right out of the water and in spite of its bulk can make repeated backward somersaults, a delight to watch. After the larger whales became scarce, these too became a profitable substitute.

Their slowness, conspicuousness, fixed routes and regular schedules were fatal. Already by 1963 their numbers were reduced to 5% of the original stock. They became a protected species and many of the landstations had to close down. It was then estimated that only 50 years complete rest would be necessary for them to recover.

But what of the "Right" whales, in particular the Greenland Right Whale was which in fact the most popular whale for the general public since it was the main target for the first 300 years of the thriving whaling industry. It was for many of us the only whale we learned about in school although it had already been exterminated decades previously. The following is a summary of their sad history: **The "Right" Whales:** Right because they were slow, fat and could be approached with rowing boats, dived vertically after being harpooned to a medium depth to surface again in the same spot where they could be finished off with spears. They floated when dead and could be flensed alongside the small ships.

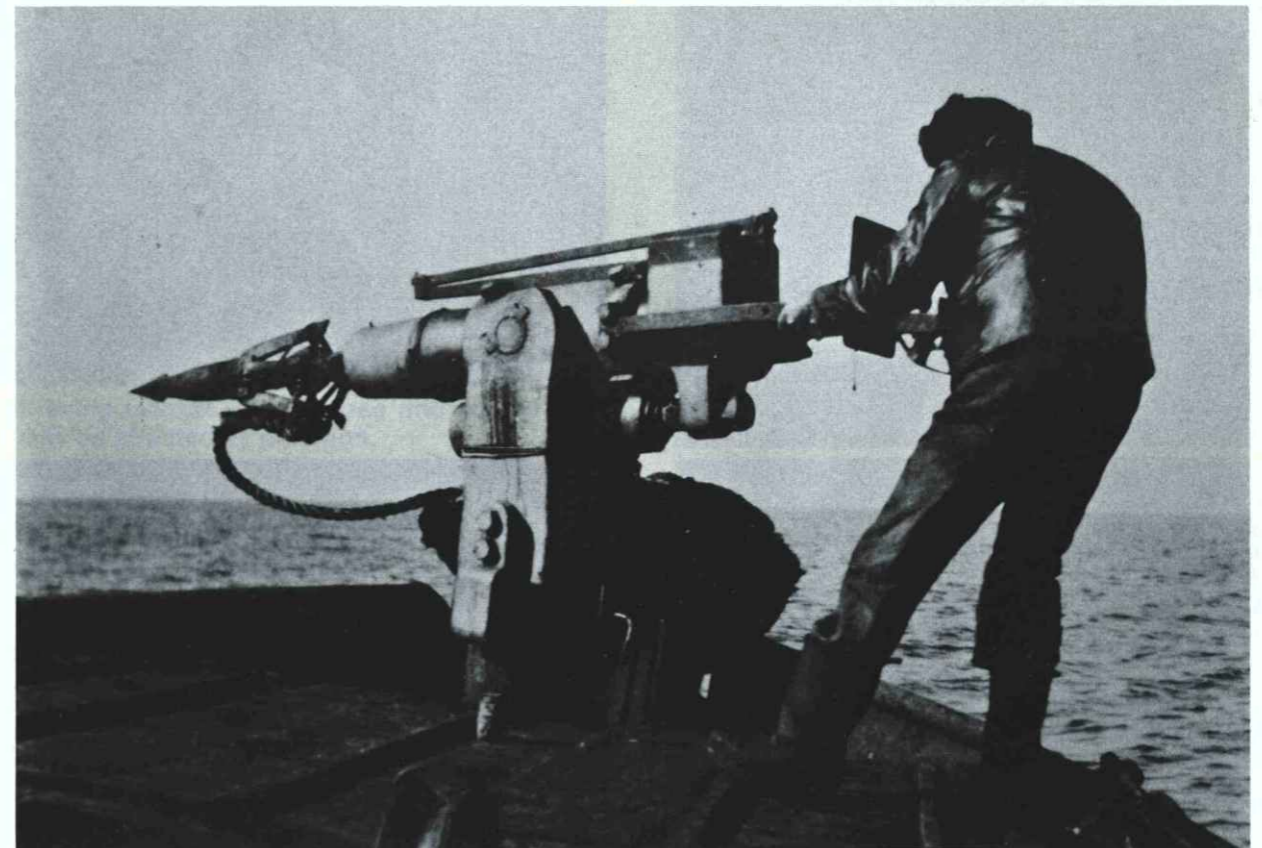
The last **Greenland Right Whale** of a

probable original stock of 100,000 (author's guess) was killed in northern Baffin Bay in 1899. Although in the beginning of this century reports seeped through that eskimos occasionally sighted and caught one, north and west of Alaska, the first specimen which proved the species had survived so far came from Japan in 1969.

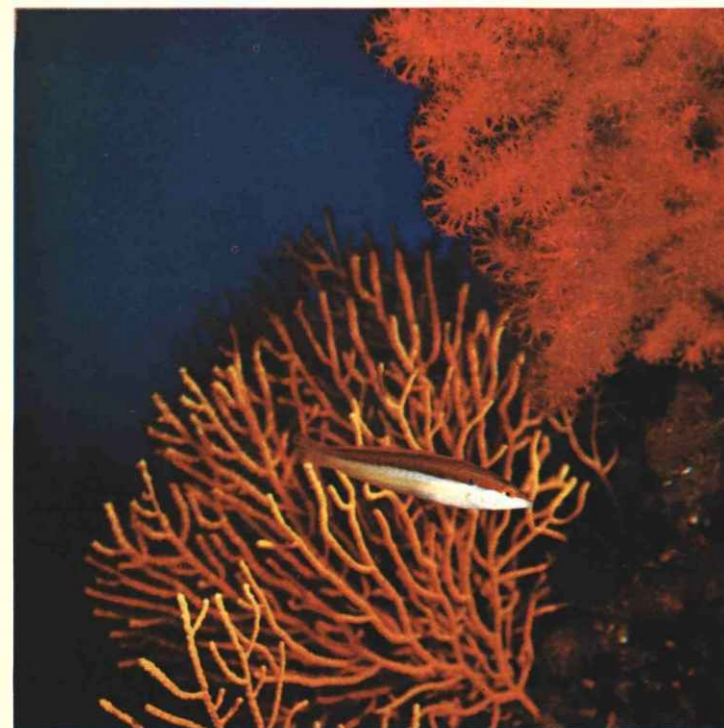
The **Black Right Whale** is a slightly smaller species with a world wide distribution in more temperate waters. The original population must have been higher than that of the previous species. They became scarce by 1929 and received partial protection by Norwegian whalers. A total protection became internationally accepted by 1936 when in the Antarctic only 4 were caught. In its hey-day 10,000 a year were slaughtered in the New Zealand region alone. The North Atlantic and North Pacific Ocean populations are still on the brink of extinction. In Antarctic waters they recovered to an estimated total of between 1000 and 2000 animals. In spite of his protection there have been reports of whaling ships which have again started taking this species.

On each side of the North Pacific Ocean lived a population of the smaller also very slow **Grey Whale**, a species intermediate between the Right and Fin-Whales. They migrated along

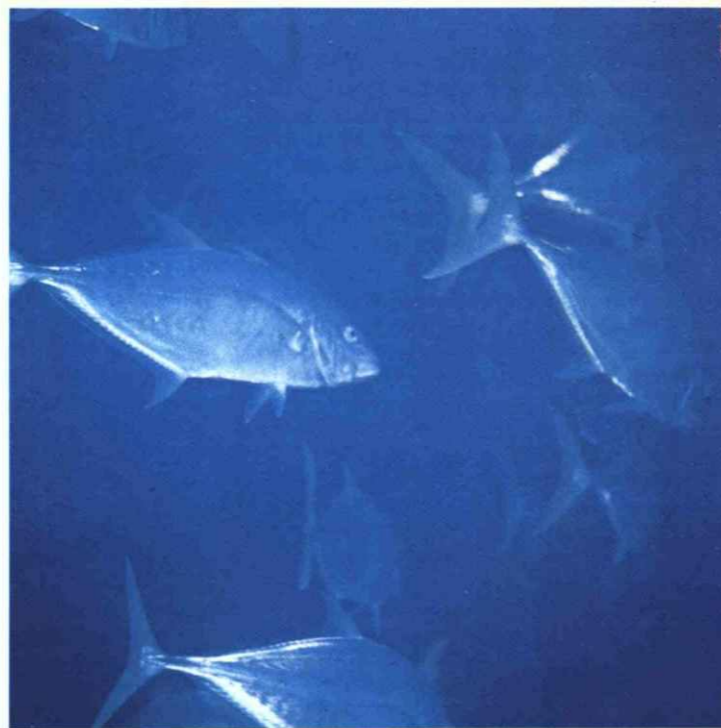
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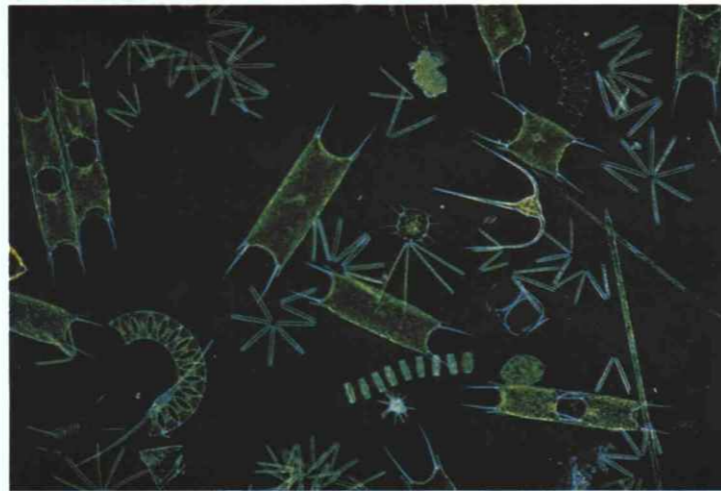
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# The Sea

Almost three quarters of the world's surface is covered by the sea from which all life originated. The sea, which man believed to be inexhaustible, acts as a giant thermostat and heat reservoir; it is the only environment on earth to contain all the chemical ingredients of the most primitive living organisms and houses several million species of plants and animals, twenty thousand of the latter comprising fish species.

The sea has for many centuries provided shore tribes, peoples and nations with food, avenues of commerce and communication, means for inexpensive transport, cultural exchange, recreation and natural defense. The sea was also man's means of discovering the earth itself. And yet despite its vastness and seemingly endless powers of dilution, the sea is not exempt from pollution.

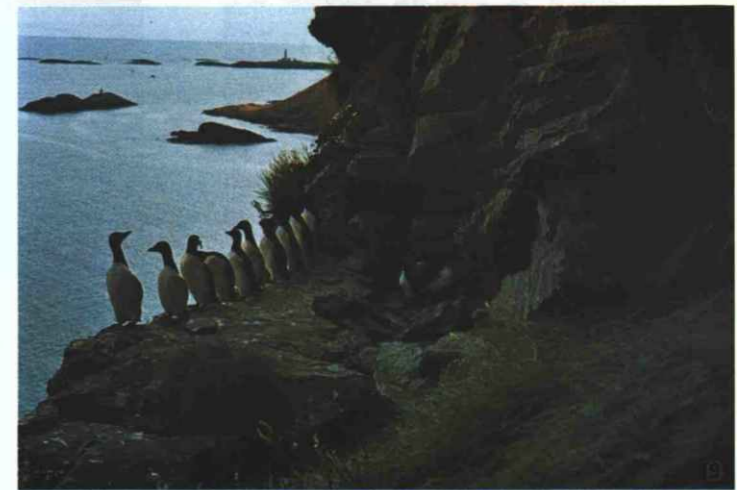
This great hope for future food supplies is becoming increasingly threatened by this problem as more and more tourists flock to its shores to enjoy its natural amenities; with the expansion of commercial shipping and the subsequent deliberate or accidental release of noxious substances; with the growing use of the sea bed for mineral extraction, as well as from wastes from the air and pollutants entering the sea through rivers and land run-off.

Various tanker disasters and the discovery of persistent man-made chemicals in organisms at the head of food chains, have demonstrated the extent to which living resources in the sea and on its shores may be affected by pollution.

In this issue "Nature in Focus" takes a look at the current state of some of Europe's major seas — the Mediterranean, the Baltic, the North Sea and North-East Atlantic.



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very coastal routes from their summer-quarters in the Behring Sea to pass winter in temperate and sub-tropical waters where they proved easy prey for local fishermen in America and Japan operating from harbours in small boats.

Through indiscriminate slaughter during the 19th century the Eastern population was thought to be extinct by 1911. They reappeared however in small numbers in 1925 and have since been protected.

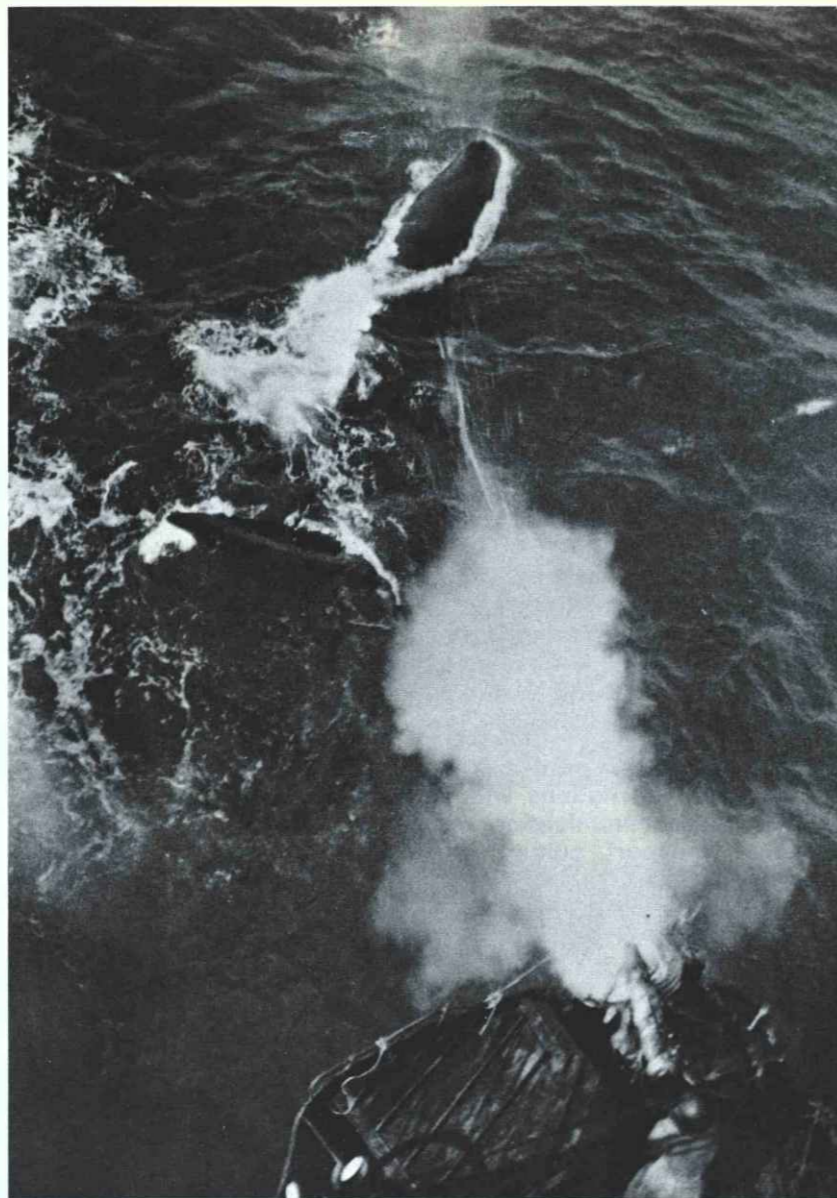
The not so numerous western population suffered the same fate and was considered extinct in 1933. It received protection in 1944, but has not recovered, although one was sighted and killed in 1959 and another one in 1968. These may have been strays from the eastern population.

This is a sad story. Because of the decline in resources nearly all countries involved in whaling had stopped operating by 1968 as it was no longer profitable. Apart from landstations, three countries persist in oceanic whaling — Russia, Japan and Ecuador. The first two are members of the IWC but do not allow international inspectors on their ships, the latter is not a member and does not feel obliged to enforce any restriction at all.

With the larger whales either gone or protected, the smaller ones (7-10 m in length) as well as dolphins and porpoises have drawn the attention of the industry. They have no protection at all, next to nothing is known about them and off-course statistics to guide any restrictive measures to preserve their species, do not exist. They include the rare **Baird's Beaked Whale** in the North Pacific Ocean, already hunted for generations by local Japanese fishermen. The yearly catch of 200 to 300 specimens rose to 380 in 1952 and has since declined to 125 in 1968 and 1969, in spite of increasing modern equipment. Such figures need serious consideration.

On both sides of the North Pacific Ocean more than half a million dolphins are killed each year. In Japan they are necessary as food, on the American side it is just a "side effect" of a new and more efficient net to catch Tunafish which also drowns 300,000 dolphins in the process. These are thrown away as valueless and the profitable business is not going to change its equipment to save the lives of dolphins, although the US Fish and Wildlife Service is trying hard to find a solution.

Hitherto dolphins have always been treated with respect and reverence. In many countries there is a superstition that bringing in a dead dolphin will cause sickness or death to one's

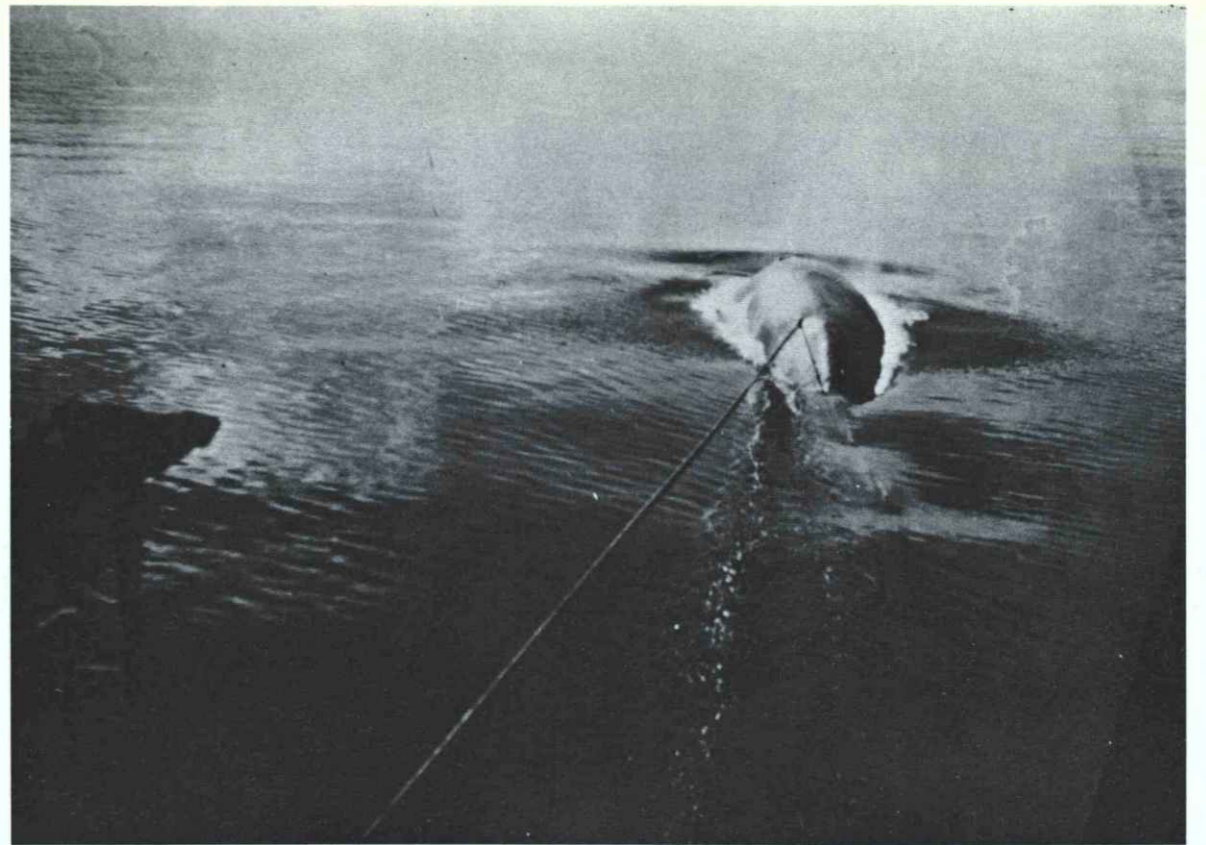


relatives, and it took the author two years to get New Zealand fishermen to bring in drowned specimens for scientific research concerning marine pollution. They have been brought in since 1971 and have proved their value. In Panama and Mexico these efforts were unsuccessful. Dolphins, as well as whales, are spontaneously friendly trusting animals. Their dislike of loneliness and inactivity as well as their remarkable intelligence makes training them easy and strong bonds develop between dolphins and their trainers. Dolphins were first trained to attract and amuse audiences on a commercial basis but scientists were quick to realise that they, and especially the bottle-nosed dolphin were different from other trained animals. Test programmes were developed to analyse their

sonar (high frequency underwater communication system) used for "talking" and "detecting". With it they can for instance find their way blindfold through a maze of obstructions, distinguish a piece of haddock from a piece of herring and even between various metals.

The US Navy has trained dolphins to help with diving operations by acting as messengers and carriers of equipment as well as doing guard-duty, warning for unfamiliar objects entering a certain area.

We know they talk, at least communicate with each other almost continuously. So far it has proved impossible to decipher the conversation. The challenge of this problem is important because we might be faced with it one day if we ever meet intelligent life somewhere from outer space.



One reciprocal test, of trying to teach a dolphin to speak English, organised by Dr. J. C. Lilly, USA, only had partial success.

For this purpose a young male bottle-nosed dolphin and a young woman, a schoolteacher from Florida lived together in a specially built 'water-house' completely isolated from the outside world for three months.

They became close friends and although he was twice her size, always remained very gentle and considerate. A dolphin likes to stroke and caress with his teeth, about 100 of them, all strong conical and sharp. At first, she was afraid when he wanted to take her arm in his beak, and put him off by saying: "No, No". Each time this happened he swam to a child's balloon in the pool (one of the toys they played with) took it carefully in his sharp teeth, brought it to the girl and gently dropped it undamaged in front of her in the water.

She got the message and after that allowed him to caress her arms.

There are countless examples of the inventiveness of dolphins, including immediate positive reactions to verbal requests or commands having nothing to do with routine training.

Stories of dolphins rescuing drowning people have been told for thousands of years, although they are often met with great scepticism especially in

our present day rational unromantic world; positive evidence does however support this phenomenon.

Perhaps the most remarkable feature of the dolphins is their brain. Its weight in relation to the body and the intricacy of the "folds" are more similar to those in man, than of any other animal except the elephant, where extraordinarily large "lobes", serving the very sensitive trunk, supply the extra weight.

In latter years, the dolphins, like the whales, are becoming threatened not only from the direct danger of indiscriminate pursuit by man, but also from lack of food, i.e. fish and also from progressive poisoning by persistent chemicals and heavy metals due to their position at the end of a food chain.

With respect to the second danger, overfishing in our own part of the world is already a well-known fact; and fishing factory ships actually clutter the rich fishing grounds of the cold ocean currents all over the globe. In the Humboldt current along the West coast of South America this has already had serious repercussions for the all important bird populations. In the North Sea, if we put the fish stock as 100% in 1946, then today there is less than 10% left. Furthermore, the remaining stock is sufficiently polluted to be fatal for dolphins and for seals.

The fish for the Dolphinarium and Zoos in Europe has to be obtained from the Atlantic to the West of Ireland where most of the fish we eat ourselves also comes from.

However, if over-fishing is a comparatively local problem, pollution, which is carried all over the world by the mighty ocean currents, has already taken on dangerous proportions.

We are apt to think of the Antarctic waters as being far removed from polluting sources and as remaining pure and unspoiled for a long time to come. This regrettably is not the case. Not only have Antarctic penguins and petrels proved to be affected, but recent research by TNO in Holland on sub-Antarctic dolphins brought here in frozen condition from New Zealand waters also showed that although their livers were less contaminated with PCB and Dieldrin, they contained a far higher level of DDT, DDE and DDD than our European Harbour porpoises, who are the most affected species in our area. They also showed a much higher level of contamination with heavy metals.

Protection of the environment and life in the world's oceans is a major and almost impossible task. Unlike the land masses, which are divided into countries and can be further divided into protected reservations, the sea is free





*Dolphins are friendly, trusting animals, not afraid of man and his ships. The picture above shows Common Dolphins.*

— a no-man's land, without law or rules except those of international conventions which nobody can enforce.

The necessary protection is only possible through a common effort, to

**STOP:**

- the killing of the insufficiently protected larger whales;
- the indiscriminate killing of the smaller whales and dolphins before it becomes an established enterprise;
- the indiscriminate overfishing of the rich fishing-grounds as well as in the open ocean;

- using the oceans as a big dustbin for all the highly poisonous and dangerous waste substances. They endanger life there as much or even more than on land. It is crazy to think that as long as we cannot see where we get rid of them, the danger does not exist.

This common effort must start at the national level in each country. Ultimately offences on the high seas should be dealt with by an International Maritime Authority charged with the task of controlling the high seas, not only for environmental offences but for those against all other international conventions as well, including the International Convention for the Safety of (human) Life at Sea.



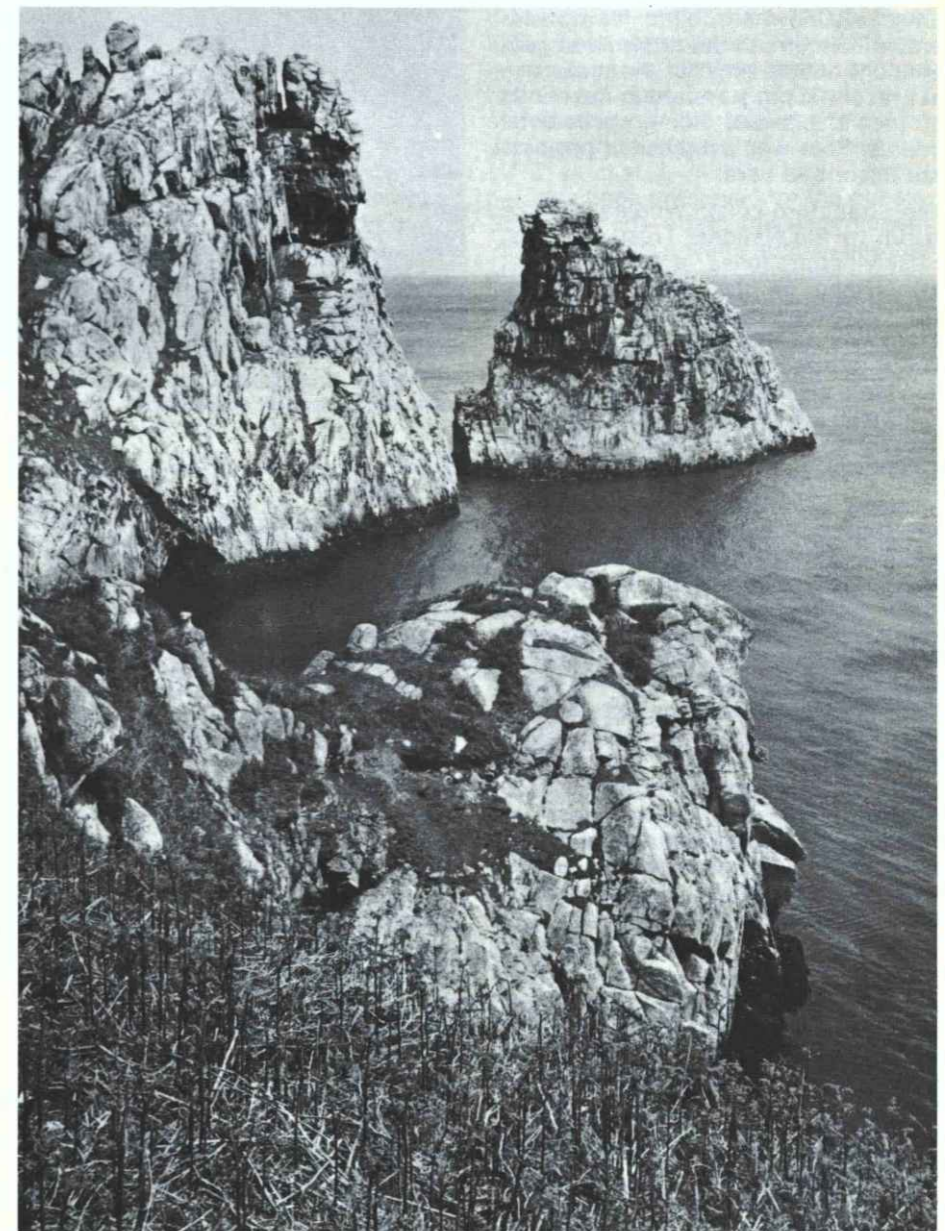
# CONFLICT AND CONSERVATION AT THE COAST OF BRITAIN

Keith HISCOCK  
Marine Science Laboratories,  
Menai Bridge, Anglesey, United Kingdom

The coastal areas of Britain are used for navigation, fishing, mineral extraction, recreation, scientific study, and as the ultimate sink for a variety of effluents ranging from organic sewage to highly toxic chemicals. Stretches of shore and seabed together with their marine wildlife have been irreversibly damaged but there are also large areas virtually untouched by direct human interference. Such unspoilt sites are in increasing demand from the growing number of people wishing to spend their leisure beside, on, or under the sea. The encroachment of industry and urbanisation together with the deprivations which often accompany intensive recreational use are now causing conflict between those wishing to develop and those wishing to preserve.

On the land, similar confrontations have been largely resolved by the establishment of National Parks (for their scenic attraction and value for open-air recreation) or National Nature Reserves (for their scientific interest and value for study and research). In many parts of the world, truly marine parks and reserves have been created to protect against damaging influences whether they are in the form of industry and urban development or such activities as spearfishing, shell and coral collecting.

The establishment of similar areas around Britain seems a logical sequence to conservation measures on the land and has the same function of protecting whilst allowing and facilitating public participation. The Countryside Commission has already designated extensive areas of coastline as "Areas of Outstanding Natural Beauty" and has suggested the creation of 1180 km of "Heritage Coast" where positive management would facilitate certain recreational pursuits only in the areas most suited to them.



*The East coast of Lundy, Britain's first marine nature reserve.*

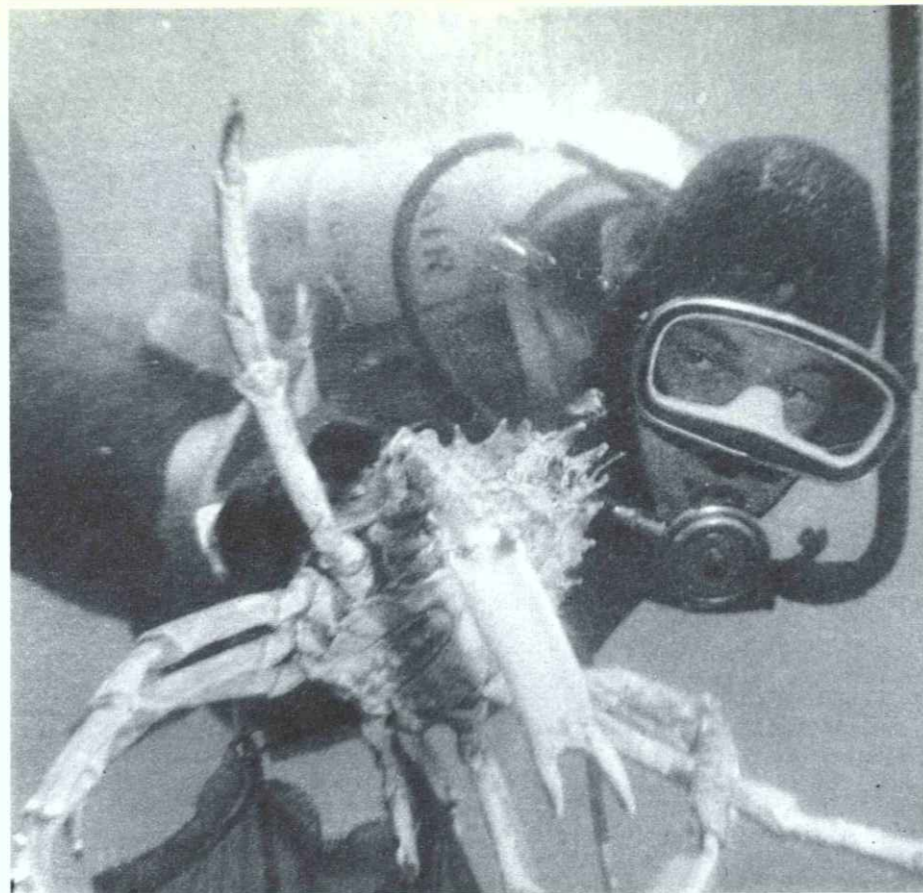


The Nature Conservancy Council manages 15,000 ha of foreshore within 33 National Nature Reserves but this area is mainly a reflection of ornithological interest and only 7.5% is cliff and rocky shore. It is encouraging that a small number of intertidal National Nature Reserves have been established specifically for the interest of their marine life in Northern Ireland. However, government bodies are restricted in their activities to areas above low water mark. In 1949, when both the Nature Conservancy and the Countryside Commission were given wide-ranging powers, very few people were concerned with maritime recreation and no-one spent their leisure on the sea-bed. With the advent of diving in the 1950's, this situation changed radically so that underwater areas are now a subject for considerable concern. In the absence of government action, most of the measures at present in progress are in the hands of individuals and non-governmental bodies. Four well established projects are described here.

The Strangford Lough Wildlife Scheme is run by the National Trust and most closely approaches a marine park established on the coast of Britain. The scheme deliberately concerns itself with all intertidal life; balancing the interests of mariculture, recreation and scientific study by diverting inappropriate pursuits away from vulnerable areas whilst encouraging them elsewhere.

An area with considerable potential as Britain's first underwater park is situated at the tip of Pembrokeshire and includes the island of Skomer. Much of the coast of Pembrokeshire above low water is already a National Park and Skomer is a National Nature Reserve but these designations have not protected subtidal areas from souvenir hunters and divers supplying the biological curios market. A feasibility study is at present in progress and, hopefully, support will be found to establish facilities which will allow an even fuller enjoyment of the underwater scenery whilst encouraging a more conservative attitude in the users.

The most advanced subtidal project at present underway is at Lundy where a marine nature reserve has been declared by the island authorities. A management policy has been published and a code of conduct is law to all visitors diving from the island. Such unilateral action has only been possible because of the island's isolation and administration but consultation with all appropriate bodies has brought general approval and support



At popular diving sites there has been considerable depletion of certain species collected for food or souvenirs.

for the scheme. A marine warden will be appointed in 1974 and progress will continue towards the establishment of facilities appropriate to a marine reserve.

Areas intensively used for education also require protection if they are to retain their value for teaching. The proposed marine reserve at Saltern Cove in Torbay includes a variety of habitats within a small area and so is particularly useful for this purpose. The boundary extends 380 m beyond low water but difficulties are being experienced in the legal aspects of protecting the subtidal area.

It would seem that with the present conflict of interests at the coast, there should be some positive means of ensuring protection for marine habitats of outstanding recreational or scientific value. Such action has been left for far too long in the hands of what are, after all, mainly enthusiastic amateurs. The revision of a few existing laws to enable appropriate government bodies to extend their functions below low water would now seem appropriate if we are to successfully manage a very rich, interesting and beautiful part of our environment.



# THE INFLUENCE OF WINTER SPORTS ON THE ENVIRONMENT

H. BARNICK

In the wake of rising mass incomes, increasing leisure time, and growing mobility of industrial nations, the classical individual tourism has given way to mass tourism during the last few decades. Winter tourism, and especially Alpine skiing, with its space-influencing establishments, have contributed the most to this development. When it became technically possible to open up the mountain world, simple aesthetic enjoyment of the Alpine region developed rapidly into the present "mass" sports. Delight in scenery has now given way to pleasure in motion, the weightless swinging, the rush of speed; the landscape has become the scene of sporting activities in the clear mountain air. The countryside, however, and climatic suitability have been and still are the basic reasons for Alpine skiing.

The Alps could well acquire a monopoly for skiing since they provide all the necessary prerequisites for modern winter sports, that is, not only from the scenic, topographic and climatic points of view but also because of their favourable location with respect to the densely populated areas of Central Europe. Moreover, tourism is not a particularly new factor in the Alps, their touristic value in summer having been discovered long ago. Thus tourism is already an important part of the economy and has also provided a reason for the people in the Alpine valley to remain after agriculture no longer yielded sufficient income. In addition, for the tourist industry to be profitable, it was found that the accommodation for summer tourism would also have to be made use of in winter. So the creation of a second season became more and more an economic necessity and thus a matter of general concern. Speculators too entered into the winter sports business and cleared their profits from the desire for a second home as a holiday residence, capital investment or as a status symbol. Thus the Alps were opened up more and more, during the course of which in some cases the limit of "overopening up" was reached. This limit cannot yet be defined, the capacity of the landscape

being difficult to quantify in most cases. Only some present stresses and strains are known, but the point at which over-strain is reached, however, is not marked by a red line. This is why in this field especially, there is an urgent call for basic research to obtain useful data for planning. Without integral, interdisciplinary planning the future of the Alps as a recreation area is not warranted!

The strains on the environment by winter sports do not differ basically from the strains of tourism in general; strong spacial and temporal concentrations, comprehensive establishments necessary for winter sports, and the climatic peculiarities of the winter bring about specific problems. This is already manifest in the building activities for winter tourism. The new French skiing centres "from the retort" can serve as an example: in altitudes between 1500 and 2100 m, partly located above the upper timber line, they were planned for winter sports only, are very often run during the winter season exclusively, and reveal all the advantages and disadvantages of an extreme specialisation. City-like complexes with accommodation providing up to more than 10,000 beds have been placed in the midst of the free countryside, some with brutally drastic results, some, on the other hand, exhibiting very interesting architectural ideas. Such sporting places often influence the scenery very decisively. By concentrating the buildings in a small region, the rest of the area could remain free, yet is covered with a network of cable transport systems. This exploration in "colonial style" is attributed to the special conditions in the West-Alpine mountain regions: extensive depopulation of the inner valleys created sufficient space that nobody made claims for developments which were to become centres of revitalisation. Unfortunately, this revitalisation only takes place for a short time during the season, leaving relatively few chances for the native population present to participate sufficiently.

The other method practised especially in the Eastern Alps and in Switzerland is the slower or faster conversion of

already existing settlements into centres of winter sports. This development has usually been an unplanned and random process, and the need for more space has often resulted in a cancerlike sprawl, which has no regard at all for the necessary infrastructure. In this way, too, winter sports places with more than 10,000 beds have been established. Nevertheless — so long as not too many second residences have been constructed by speculators, — the native population was mostly the bearer of this development so that a certain local flavour has also been preserved for the guests. Both methods affect the environment in the same way: water supply, sewage and refuse disposal, heating, traffic, and the sheer number of guests put a strain on our environment. While in cities it is easier to cope with all these problems (central biological sewage treatment-plants, garbage dumps, central heating, large garages), in slowly developed winter resorts the sewage often stinks to high heaven in the truest sense of the word, as demonstrated by receiving streams beneath such places: especially in winter, when at the time of the minimum water flow, the load is a maximum. Hence, fully biological sewage treatment-plants are to be demanded, the main difficulty being the insufficient load of such plants in the dead seasons. In the winter sports resort Kühtai near Innsbruck, which lies at an altitude of 2000 m, 850 guest-beds, which are only well utilised in winter, come to approximately 50 permanent inhabitants. At present the water supply is the only criterion that sets a limit to expansion and capacitance: a good hotel needs about 500 l of water per bed and day, and this at the time of minimum yield. A strain on the environment typical of winter sports arises from ascent devices and downhill slopes, which are indispensable for modern skiing. In 1967 500 cable transport systems existed in the Tyrol, 373 being tow lifts, which are used for winter sports exclusively; only 103 establishment out of 500 were also in operation in summer. In 1973 the number of cable cars had already increased to 770. Those



establishments influence the landscape in particular, if they are connected to extensive systems, in which the aisles necessary are usually less disfiguring to nature than the multitude of poles and cables in the free Alpine desert and particularly on glaciers. In areas which are crowded in the holiday season, three parallel lifts can sometimes be found side by side! The cable transport systems are usually exploited mostly in winter, because the guest uses them several times a day for skiing, while in summer he hardly ever makes use of them more than twice during his vacation. Some figures elucidate the extent of "wiring" of the Alpine winter sports areas: 37 establishments in the area of Val d'Isère have a combined length of 35 km; 16 establishments near Cervinia-Breuil reach 25 km; establishments around St. Anton at the Arlberg are 29 km long; 33 ascent devices in Saalbach (Province Salzburg) reach 29 km; the large area of Kitzbühel has 40 establishments with a length of about 40 km. In this connection the summer skiing areas deserve to be mentioned as they usually require costly cable railroads. At present there are 32 areas in the Alps, where skiing is possible far into the summer and — especially in regions with Northern catchment areas — in autumn; another 17 summer skiing areas are said to be planned. Whether this opening up of high glacier areas for skiing represents a real need rather than a fashionable one remains to be

seen; it is almost as if we now have a society which not only creates needs but has also lost all sense of criteria and proportion concerning the means and the end. Consequent installations, such as access roads and cable transport systems are connected all, and furthermore they provide the initiative for further constructions and establishments.

Skiing slopes naturally have extensive spatial requirements: 15 surveyed Austrian slopes have an average difference in height of about 800 m, a length of 3500 m, an average width of 45 m, and cover an area of 15-16 ha. Slopes are now demanded that have a width corresponding to one tenth of the hourly capacity of the operating cable transport system, this means e.g. 100 m width at 1000 people/h. In the Tyrol 383 ha. of forest were cleared for skiing slopes between 1964 and 1971. To prevent erosion damages, the slopes must be planted with grass. Unless this is impossible, due to extreme altitudes, extreme changes in the landscape can thus be neutralised. Nevertheless, in spite of grass planting and water discharge regulation in the best possible manner, skiing slopes do change water conservation, rainfall, run-off, and evaporation relations of the slope, especially in wooded areas. If this is neglected, avalanches of sand and stone may start, as happened recently in Vorarlberg for instance. The chemical preparation of the slopes, too, with snow preservatives influences the environment. In most

cases the fertilizer, technical urea, is used. However, an overdosage of this can lead to an over-fertilization of the waters and cause damage to the plants. Therefore before applying such substances hydrology and biology experts should be asked for advice.

The sheer number of winter sports addicts and their activities alone strain the environment. Bed capacities, such as e.g. 16,000 beds in the area of Davos, 13,000 in and around Kitzbühel, or 12,000 in the high Tignes demonstrate the problem very distinctly and yet many centres will be expanded even more! Already now the cable transport systems around Innsbruck have an hourly conveying capacity of 25,000 people, in Les Menuires or La Plagne 18,000 people are hauled up the mountains per hour; in addition to the resident guests there are also the excursionists from the cities; on holidays about 24,000 inhabitants of Munich populate the near Alpine skiing areas, where this kind of tourism can disturb the recreational tourism very severely and overload the traffic network. In the Tyrolian border city of Kufstein seven times more people queue up at the lifts on winter Sundays than during the week.

Some peak loads are known from the Tyrol: up to 900-1000 are parked in the Olympic skiing area of the Axamer Lizum and along the access road on fine March Sundays, — which means about 1,800-2,500 skiers, plus those, who come to the Lizum by bus. 9,800 to 10,000 downhill runs have been counted

## Ensemble montagnard de L'Alpe des Chaux Altitude 1550 m



on a holiday on a 20-24 ha. slope with 3 lifts near Seefeld, which is likely to be the limit of capacitance, the skiers here are usually less skilled. On a 9 ha. slope with one lift near Innsbruck the number of downhill runs can reach 4,100-4,500 on Sundays, probably performed by approximately 1,500-2,000 mostly well-trained skiers. The four largest cable transport systems around Innsbruck convey 13,000-14,000 people, about 6,000-8,000 of them being skiers, on winter Sundays. The highest density so far is recorded from a 10 ha. one lift slope in an Austrian summer skiing area: on one holiday in autumn 8,600 downhill runs were counted. The number of expert skiers concerned however, cannot be quoted.

Ski flights by planes or helicopters must also be mentioned. This noisy access method for a small minority is very common especially in France, but in the Arlberg area too 60 flying targets are available. Here a restriction to some flying areas will be necessary to keep other regions completely free from this sport. Sporting rides on snow mobiles are already prohibited in some Austrian provinces, but tours with full track vehicles on glaciers as well should be stopped as an entirely superfluous method of exploration, which, moreover, strains the environment in manifold ways.

Those are the loads to which our environment is exposed already. Increasing travel and the growing desire for a second vacation will bring about even more strains. Thus only thorough

planning can help to preserve the Alps as living space, recreation area, and ecologic balancing region: only appropriate country should be opened up on the principles of a moderate density; other regions should be kept free from every technological development as recreation areas. For places lacking suitable skiing country alternative tourist attractions are to be developed. The expansion of supply and disposal-installations must be accorded special attention, the wasting of space by poorly utilised secondary residences must be stopped. Such planning, by mutual co-ordination beyond national borders, should above all conceive the Alps as a joint living space.





# MR. GENSCHER: TOMORROW'S ENVIRONMENT?

At the occasion of his speech to the Consultative Assembly of the Council of Europe on 28 September 1973, Mr. Hans-Dietrich Genscher, Minister of the Interior of the Federal Republic of Germany gave the following exclusive interview to "Nature in Focus" answering questions concerning Federal environment policy at national and international level:

**NATURE IN FOCUS:** Minister, in your widely reported speech to the Consultative Assembly of the Council of Europe on 28 September 1973 you said: "This year of 1973 is a year of European environmental policy". In your view, this description is justified by two outstanding events: the Vienna Environment Conference of March 1973, and the EEC Council's adoption of the Community's Environmental Action Programme in July. In your speech, you went on to say that both were concerned with "taking practical decisions about practical action" and you argued: "Now, instead of the governments, it is the turn of the parliaments: they must on the one hand bring about the conditions for a European policy on the environment which will harmonise with present national policies and on the other hand give their present national policies a fully European dimension."

Almost two years ago to the day (29 September 1971) the FRG adopted its forward-looking environment programme, based on the following stated aims:

(a) long-range environmental planning (including up-to-date environmental legislation); (b) introduction of the polluter-must-pay principle; (c) development of "clean" technology; (d) environmental education and information.

WHICH ITEMS IN THIS PROGRAMME HAVE BEEN BROUGHT CLOSER TO A SOLUTION IN THE TWO YEARS SINCE ITS ADOPTION?

**MR. GENSCHER:** Since the adoption of its environment programme, the Federal Government has resolutely set about achieving the major objectives you mention. We regard it as one of our most important tasks to incorporate the idea of comprehensive, forward-looking environmental protection in all specialised planning; draft legislation has already been prepared for

giving effect to the principle whereby all public measures and planning must be compatible with conservation of the environment.

The Federal Government is also making every effort to bring about the implementation of the polluter-must-pay principle both nationally and internationally. An important example of this in national legislation will be the planned Effluent Levy Act, which is intended to reduce and eliminate pollution of our surface waters and provides for the imposition on the discharging establishment of a levy varying according to the amount and toxicity of the waste discharged.

Implementation of the polluter-must-pay principle and the development of "clean" technology go hand-in-hand. Rigorous enforcement of the polluter-must-pay principle will be an incentive to develop "clean" processes and products. It may be said, on the whole, that German industry has, since the adoption of the environment programme, accepted the challenge of environmental conservation — though much remains to be done.

The Federal Government realises that a progressive environmental policy is only possible if the public as a whole are fully aware of the need for it. The Government's efforts to inform the public have shown promising results and will be continued with the aim of contributing to greater critical awareness of environmental issues.

**NATURE IN FOCUS:** WHICH TYPES OF PROBLEM WILL THE FRG HAVE TO CONCENTRATE ON IN THE YEARS AHEAD?

**MR. GENSCHER:** In the years ahead, the Federal Government will concentrate in its environmental policy on the objectives laid down in the environment programme. Special attention will be given to research and the further development of environmental

planning instruments, including legislation governing water management, effluent levies, pollution control, noise abatement, nuclear reactor safety and radiation protection. Emphasis will also be placed on international co-operation.

**NATURE IN FOCUS:** In your speech, you also said: "It is my firm belief, rooted in experience, that no country in Europe can pursue an effective environmental policy alone, and indeed that even Europe should not look to itself alone but should join the ranks of those who are defending the world at large against the looming ecological crisis... Europe entered the field of environmental policy with a clearly announced purpose."

WHAT IS THE FRG DOING TO HELP BRING ABOUT EFFECTIVE INTERNATIONAL CO-OPERATION:

(a) IN THE UN; (b) IN THE EUROPEAN COMMUNITY; (c) IN THE COUNCIL OF EUROPE; (d) WITH EASTERN EUROPE?

**MR. GENSCHER:** The Federal Government attaches crucial importance to international co-operation in the environmental field and gives its support in all international organisations to the intensification of such co-operation. It has, for example, offered to contribute to the United Nations environment programme through:

- participation in the Earthwatch programme,
- participation in the priority programme items of Information and Education proposed by the UN.

The Bonn Environment Ministers' Conference of 31 October 1972 helped to prepare the European Communities' environment programme, in which the principles of European environmental policy it adopted were subsequently incorporated. In the Council of Europe, the Federal Government gives full support to all endeavours to obtain re-

cognition of man's right to a healthy environment and to develop models of integrated planning and means of assessing the Impact-Statement as advocated by the Vienna Conference.

The Federal Government is also making every effort, both by means of bilateral agreements and through the ECE, to engage in co-operation on environmental matters with the countries of Eastern Europe.

**NATURE IN FOCUS:** TO WHAT EXTENT HAS ENVIRONMENTAL POLICY IN THE FRG BEEN INFLUENCED BY THE WORK OF THE COUNCIL OF EUROPE

(DECLARATIONS - Declaration of principles on air pollution control; European Nature Conservation Declaration;

CHARTERS - European Water Charter, European Soil Charter;

CONVENTIONS - preparation of a European Convention on the protection of international fresh waters against pollution)

WHAT IS THE FRG'S POSITION WITH REGARD TO THE LAST-MENTIONED CONVENTION?

WHAT IS THE PART PLAYED IN THIS CONNECTION BY THE CONSULTATIVE ASSEMBLY AND ITS COMMITTEES?

**MR. GENSCHER:** The declarations and charters you mention have helped to underpin the environmental policies of Council of Europe member states and to lend greater weight to the idea of environmental conservation in Europe. The Federal Government was actively involved in the preparatory work in Strasbourg and its environmental objectives and measures are confirmed by the Council of Europe's resolutions. These resolutions form part of the basis for planned German legislation on water management and pollution control.

The European Convention on freshwater pollution control now being drawn up by a Council of Europe expert committee is likely to prove a useful instrument for harmonising national demands on such waters. The Federal Government is accordingly in favour of its prompt adoption.

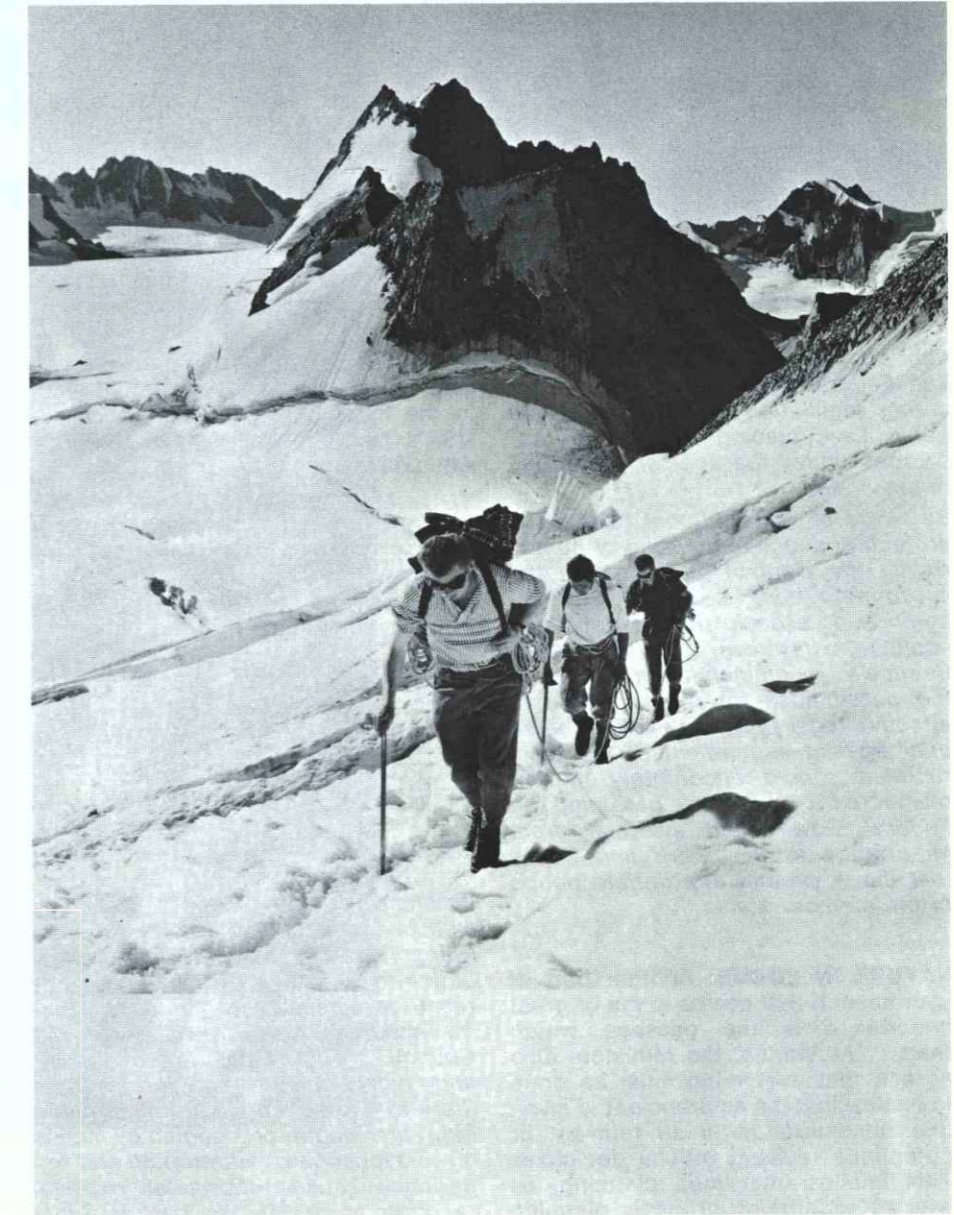
The Consultative Assembly, the Council of Europe's parliamentary body, must continue to exert pressure for the further development of European environmental policies. Environmental policy can be planned by governments but there are large areas in which it can be put into practice only with the support of the parliaments, the legislative bodies. The Consultative Assembly is an indispensable channel

through which to stimulate action in the national parliaments.

**NATURE IN FOCUS:** In your speech you also stated "that people have a basic right to an environment worthy of human beings, and that such a right should have constitutional force" and went on to say: "Among the conclusions of the Vienna Conference there is a feature of the utmost importance; they raise the general question of the foundation of law, organisation and planning required for an effective policy on the environment... The Federal German Government attaches the greatest importance to this whole question and considers that the investigation called for should be carried out without delay".

COULD YOU GO INTO GREATER DETAIL ON THIS POINT? WHAT POSSIBLE SOLUTIONS ARE AVAILABLE AT NATIONAL LEVEL? WHAT CONTRIBUTION CAN THE COUNCIL OF EUROPE MAKE AT INTERNATIONAL LEVEL?

**MR. GENSCHER:** In the Federal Government's environment programme it is stressed that the protection of human dignity must serve as the criterion by which to measure any environment policy and that any danger to man's health or well-being now or in the future are a threat to that dignity. That was what I meant when I said in my Strasbourg speech that people have a basic right to an environment worthy of human beings and that such a



Mens sana in corpore sano.





Does increase in welfare have to cause increase in waste, despoiling our environment?

right should have constitutional force. The Federal Government is now preparing legislation to supplement the Basic Law, placing vital natural resources under the special protection of the State.

By virtue of its traditional role in the protection and safeguarding of human rights, the Council of Europe is the appropriate body to further the recognition of a basic human right to a healthy environment. The Vienna Conference's recommendation to study the possibilities for the provision of effective legal protection of the individual against impairment of the environment should accordingly be implemented as quickly as possible. The Federal Government attaches great importance to this work and hopes that it will prompt appropriate action in the member states.

**NATURE IN FOCUS:** Another part of your speech that seems to me of great importance is the passage which reads: "At Vienna, the Ministers also agreed that everything must be done to ensure that the environment is given due consideration in all relevant or potentially relevant official decisions. This implies integrated planning, as well as scrutiny of all public planning decisions to ensure that the environ-

ment does not suffer thereby." What is meant is the "Impact-Statement" which is the most important feature of the USA's National Environmental Policy Act, which entered into force in 1969.

YOU, MINISTER, HAVE PROPOSED HOLDING AN EXPERT CONFERENCE ON THE IMPACT-STATEMENT IN THE FEDERAL REPUBLIC IN 1974, UNDER THE PATRONAGE OF THE COUNCIL OF EUROPE.

WHAT SHOULD BE THIS CONFERENCE'S TERMS OF REFERENCE? WHAT PART CAN THE COUNCIL OF EUROPE PLAY IN WORKING OUT PROPOSALS FOR THE ASSESSMENT OF THE IMPACT-STATEMENT?

**MR. GENSCHER:** The Federal Government believes that the scrutiny of public measures as to their compatibility with conservation of the environment (Impact) can make a valuable contribution to the protection of vital natural resources. As the protection of natural resources is an area in which the Council of Europe has done excellent and highly meritorious work, it is there that this idea should be pursued in greater depth, proceeding by means of an exchange of information and experience between European experts, in order to devise the best possible such instrument.

The Federal Government is prepared to contribute preliminary work already done in Germany to such expert discussions. These could be held in the Federal Republic in the not too distant future and should lead to the development of a scheme for assessing the Impact-Statement.

**NATURE IN FOCUS:** MINISTER, A SUCCESSFUL ENVIRONMENTAL POLICY LEADS TO CONFLICTS OF OBJECTIVES BETWEEN ENVIRONMENTAL CONSIDERATIONS AND ECONOMIC GROWTH. WHAT ARE THE MAIN AREAS OF CONFLICT?

**MR. GENSCHER:** Economic growth and environmental policy will come into conflict only if it proves impossible to channel industrial growth, which has hitherto been purely quantitative, into improving the quality of human life through conservation of the environment. I have said over and over again that the net quality of growth must be improved by conserving the environment, so that purely quantitative growth does not result in the destruction of resources vital to the survival of future generations. I believe that this new forward-looking approach to growth policy will soon become a

generally accepted part of economic thinking and that purely quantitative growth will then be inconceivable. Furthermore, I am convinced that those countries which are the first to embrace this policy of improving the quality of life through environmental conservation will gain a competitive advantage as a result of this approach to the measurement of economic performance.

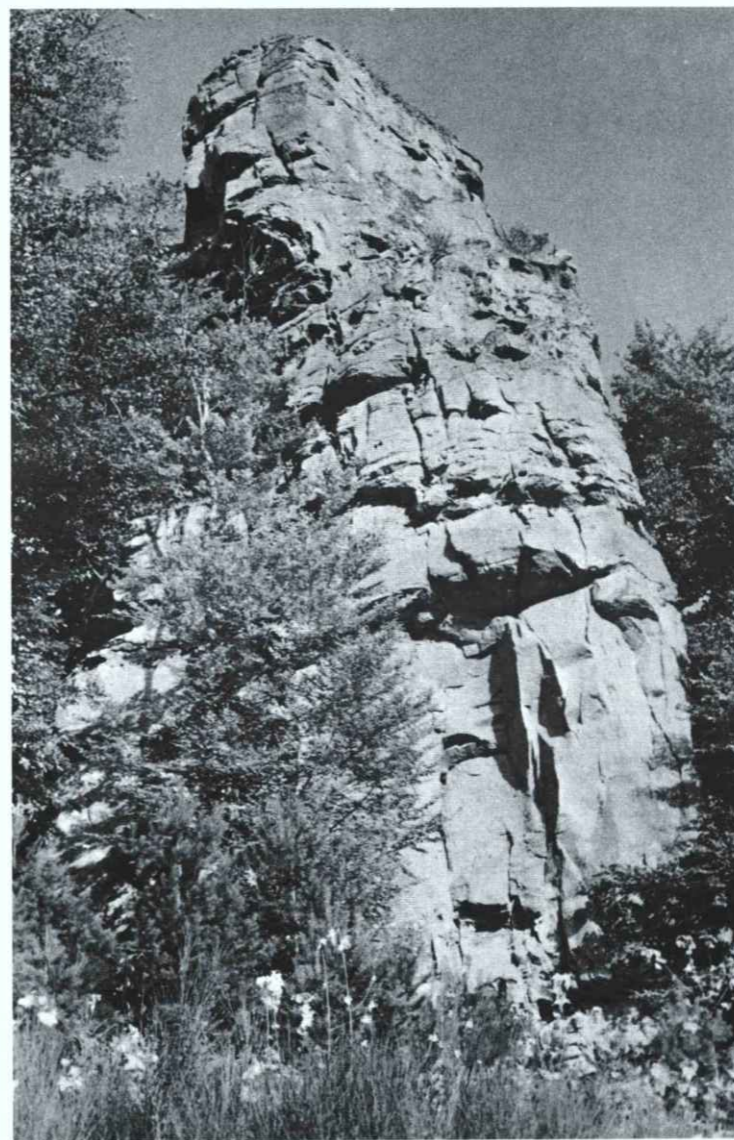
At the present time, such conflicts are most likely to arise in the field of energy supply. However, such conflicts will not be with conservation of the environment — which is relevant in this context only as a cost factor — but with the habitual tendency to regard energy as an asset which need not be used sparingly.

**NATURE IN FOCUS:** IS NOT A SUCCESSFUL ENVIRONMENTAL POLICY ACHIEVED WITH THE INSTRUMENTS OF OUR SOCIAL MARKET ECONOMY PROOF OF A FREE DEMOCRACY'S SUPERIORITY OVER THE PLANNED ECONOMY SYSTEMS WHICH HAVE TO FACE THE SAME ENVIRONMENTAL PROBLEMS AS OURSELVES?

**MR. GENSCHER:** I have no doubt that our market economy system, that goes hand-in-hand with our democratic constitution will be more successful than the planned economy systems in getting to grips with conservation of the environment. I should like to take issue here with the argument that the profit motive is a determining factor in environmental pollution. If that were

so, then surely there would be no pollution at all in those countries that have planned economies; in fact the contrary is true: their problems are, if anything, greater than ours.

Pollution is caused, rather, by increasing production without introducing appropriate preventive measures. The more produced, the higher, normally speaking, is the level of utilisation, and hence the degree of pollution, of the environment. Yet this very striving after increased output to meet predetermined targets is the main feature of economic activity in the countries with planned economies. Maximum profit, on the other hand, tends, to depend on obtaining the highest return at the lowest cost and, hence, at a lower level of output.



Wisely safeguarding our heritage, Germany and Luxembourg decided on the creation of the first-ever transfrontier park, the Germano-Luxembourgish Natural Park, to which the Council of Europe's European Diploma was awarded on 23 October 1973.





# ...NEWS...NEWS...NEWS...NEWS...NEWS... FROM STRASBOURG

## Second European Conference of Ministers responsible for Regional Planning

The Ministers responsible for Regional Planning from 20 European countries\* meeting from 25 to 27 September at La Grande Motte (France), affirmed in a General Resolution and six special resolutions that the fundamental aim of all regional policy remained the correction of inequalities due to the unbalanced development of regional economies, and the achievement of the necessary balance between the requirements of economic development and preservation of the environment. Following the initial Conference held in Bonn in 1970, the second, organised by the Council of Europe at the invitation of the French Government, chose the regional planning showpiece of La Grande Motte, the new resort on the Languedoc-Roussillon coast, as its venue. The Chair was taken by Mr. Olivier Guichard, French Minister of Regional Planning. Several international organisations were represented by observers.\*\*

In the course of their discussions, the Ministers agreed that regional planning, while securing harmonious development of the regions, must, in addition, fulfil a socio-cultural function going beyond purely economic considerations and entailing the preservation and improvement of living conditions and the environment — in short, the quality of life.

In order to further European co-operation in this field, the Conference asked the Council of Europe to make special efforts concerning:

- co-operation between frontier regions
- mountain regions.

The Conference also instructed its Committee of Senior Officials to develop instruments of technical co-operation between the participating countries in

- regional planning forecasting research

- common terminology, statistics and cartography.

The Conference was addressed by Mr. George Thomson, member of the Commission of the European Communities, on the European regional policy proposals and the implications of that policy for the whole of Europe. The importance of conservation of the environment was repeatedly stressed at the Conference. Priority was given to the problems of urbanisation. Regional planning policy has indeed to cope with increasing and often uncontrolled urbanisation, accompanied by constant deterioration in the urban environment.

What regional planning has to do is to provide answers to the questions asked by Mr. GUICHARD at the opening of the Conference: what can be done to make our great cities more human, to breathe fresh life into our medium-sized towns? What can we do to combat modern towns' characteristic tendency towards segregation that ends in their destroying something

they ought to foster: the sense of belonging to a community? It was with these problems in mind that the Ministers decided to make restoration of the fabric of urban life the main theme of their 3rd Conference, which will be held in Italy in 1975/76.

Finally, the Ministers took note with satisfaction of the invitations for the 4th and 5th conferences extended by the Turkish and British Governments.

The texts of the final resolutions, reports and background papers are available on request from the Secretariat of the Council of Europe.

\* Austria, Belgium, Cyprus, Denmark, Finland, France, Federal Republic of Germany, Iceland, Ireland, Italy, Luxembourg, Malta, The Netherlands, Norway, Sweden, Spain, Switzerland, Turkey, United Kingdom, Yugoslavia.

\*\* ECMT, ECE, OECD, CEC, ILO, EFTA, FAO, WHO, Council of Europe Consultative Assembly, European Conference of Local Authorities.



La Grande Motte.

# NOTES

## Nature protection in the Evros delta

Byron Antipas,  
Hellenic Society for Nature Protection,  
Athens



As in former years small teams of specialists will again this winter visit those wetlands in Europe, Asia and Africa where the palearctic wildfowl spend the winter months. The goal of these studies is not only to evaluate the numbers of wintering wildfowl and examine trends in their population dynamics, but also to study the wetlands, the lakes, the dunes, marshes, deltas and shallow seas where this wildfowl lives and their relationship to these birds.

One of the most interesting areas is certainly the delta of the river Evros or Meric in the frontier region between Greece and Turkey. This large area formed by the meandering lowland river has been steadily losing some of its values over the post-war years due to dykes limiting the original river region, drying out of parts of the area

and through the influence of intensified agricultural activities. This unique region provides in the first place very important breeding grounds, especially for all sorts of heron species; in the second place it is a rich feeding area for birds of prey nesting in the surrounding mountains: 22 different species of diurnal and nocturnal birds of prey have been identified! Last but not least, it harbours between 100,000 and 150,000 anatidae in winter time. Since 1965 a joint project by the International Union for the Conservation of Nature and Natural Resources, the World Wildlife Fund and the International Waterfowl Research Bureau has been underway with a view to creating a national park, if possible on both sides of the border, which would include all the aspects which give this region its unique value and which

could stand as a true monument to nature conservation.

### Further reading

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# ZUSAMMENFASSUNGEN

## VERÄNDERUNGEN IN DER OSTSEE — S 2

**Dr. Bengt Lundholm,**  
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Die Wasserverschmutzung macht Salzwasser- wie Süßwasserorganismen zu schaffen. Die wenigen in der Ostsee vorkommenden Arten bilden ein einfaches Ökosystem, welches auf ein niedriges Nahrungsniveau eingestellt ist. Dieses Niveau ist vom Menschen angehoben worden. Die Folge ist eine deutliche Eutrophierung. Damit verbunden ist die Bildung von toxischem Hydrogensulfid auf dem Meeresgrund. «Toter» Meeresgrund ist das Resultat und der Fischfang wird beeinträchtigt. Bedrohlich für den Fischfang ist auch die Ansammlung toxischer Stoffe im Fisch. Zudem nimmt die Küstenverschmutzung zu und damit die Notwendigkeit, die gefährdeten Küstenlinien zu schützen.

## DIE MITTELMEER-VERSCHMUTZUNG S 5

**S. J. Holt**  
**Direktor des Internationalen Instituts  
für Meereskunde in Malta**

In den letzten Jahren erschienen zahlreiche aufsehenerregende Berichte über das Mittelmeer, in denen behauptet wurde, das Mittelmeer verschlechtere sich zusehends und sei am Absterben. Dieses fast ganz umschlossene Meer weist die Merkmale eines kleineren Ozeans auf und ist für einige Verschmutzungsarten nicht anfällig. Andererseits ist es aussergewöhnlich empfindlich, was die Verschmutzung durch Öl, öllösliche Substanzen und Treibgut anbelangt. Verschmutzung durch die meist ungeklärt eingeleiteten Abwässer stellt eine zunehmende Gefahr dar. Ferner ist das Mittelmeer durch die Industrialisierung seiner Küsten der Belastung durch vielfältige Giftstoffe ausgesetzt, die durch Flüsse und andere Zuleitungen oder von Schiffen herab ins Wasser gelangen.

Die Mittelmeerverschmutzung ist sowohl ein örtliches als auch ein internationales Problem; denn sie betrifft einerseits die Anlieger, andererseits alle die, die zur Erholung oder aus kulturellem Interesse ans Mittelmeer kommen oder es zu geschäftlichen Zwecken überqueren. Viele Organisationen — örtliche, regionale, nationale und weltumspannende — suchen nach wirksamen Mitteln, die Lage unter Kontrolle zu bringen und die verschiedenen Zwecke, denen dieses Meer und sein Potential dienstbar gemacht werden, in Einklang zu bringen. Bisher waren ihre Bemühungen nicht sehr erfolgreich, nicht zuletzt auch wegen der gespannten politischen und militärischen Lage in diesem Raum, doch zeichnen sich gewisse Fortschritte ab.

## MEERESVERSCHMUTZUNG IM NORDOST-ATLANTIK — S 10

**H. A. Cole,**  
**Fisheries Laboratory, Lowestoft, England**

Obwohl Teile des Nordost-Atlantiks, z.B. die Nordsee, grosse Mengen Abwässer und alle möglichen industriellen Schmutzstoffe aufnehmen, sind die Fischbestände in den letzten Jahren angewachsen. Die Aus-

wirkungen der Verschmutzung zeigen sich in Flussmündungen und seichten Küstengebieten, die die meisten Schalentiere beherbergen und in denen vor allem junge Fische vieler kommerziell verwertbarer Arten heranwachsen. Der Artikel weist auf die Bedeutung von Metallen und dauerhaften organischen Substanzen hin und betont, dass die Verschmutzung an ihrer Wurzel zu bekämpfen ist, indem der Ausstoss von Schmutzstoffen durch Industriebetriebe reduziert wird. Örtliche Initiative und regionale Zusammenarbeit können wahrscheinlich eher die Meeresverschmutzung eindämmen als internationale Aktionen auf globalem Niveau.

## WALE UND DELPHINE — S 14

**Kapitän Mörzer-Bruyns**

Es gibt wenig grundlegende wissenschaftliche Kenntnisse über die Wale, weil das Interesse an ihnen in erster Linie ein kommerzielles war. Versuche, insbesondere die grösseren Wale zu schützen, waren erfolglos. Die Ablehnung einer zehnjährigen Schonfrist auf der diesjährigen IWC-Konferenz ist ein typischer Fall. Zweizahnwale, Pottwale, Finnwale, Seiwale, Blauwale, Buckelwale und Glattwale sind am meisten bedroht. Das rücksichtslose Abschachten setzte 1925 mit der Inbetriebnahme von Walfang - Fabrikschiffen ein. Hauptbeute war der Blauwal, nachdem der Glattwal praktisch ausgerottet war; erst 1965 wurde der Blauwal unter Schutz gestellt. Sein Überleben wie das des Finnwals ist aber fraglich.

Die meisten Walfangländer stellten den Walfang 1968 wegen der Abnahme der Wale ein; nur drei Länder machen weiter. Ferner sind nach dem Verschwinden oder nach der Unter-Schutz-Stellung der grösseren Walfischarten die kleineren wie etwa der seltene Baird-Wal und auch Delphine und Tümmler kommerziell interessant geworden.

Die Delphine sind aussergewöhnlich kluge und erfinderische Tiere, deren Gehirn dem des Menschen sehr ähnlich ist. Auch sie sind jedoch bedroht, weil sie entweder wegen des zu intensiven Fischfangs nicht mehr genügend Fische als Nahrung finden oder durch ins Meer geworfene Chemikalien und andere Abfälle vergiftet werden oder aber rücksichtslos von den Menschen abgeschlachtet werden.

## UMWELTSCHUTZPROBLEME AN DER BRITISCHEN KÜSTE — S 21

**Keith Hiscock,**  
**Forschungsanstalt für Meereskunde,  
Menai Bridge, Anglesey,  
Vereinigtes Königreich**

Zu Zwecken des Umweltschutzes und zugleich zur Ermöglichung und Erleichterung des öffentlichen Zugangs ist man gegenwärtig dabei, entlang der britischen Küsten und insbesondere in von Ebbe und Flut betroffenen Strandbereichen Schutzzonen festzulegen; dies geschieht hauptsächlich durch die Landschaftsschutz-Kommission (Countryside Commission) und den Naturschutzrat (Nature Conservancy Council). Die staatlichen Behörden sind jedoch leider gezwungen, ihre Tätigkeit auf die bei Ebbe zugänglichen Landstreifen zu be-

schränken. Die seit den fünfziger Jahren angewachsene Taucheraktivität lenkte jedoch die Aufmerksamkeit auch auf den Schutz der auch bei Ebbe unter Wasser bleibenden Küstenzonen. Der Artikel beschreibt vier gelungene Unterwasser-Schutzprojekte in Pembrokeshire, Lundy, Saltern Cove (Torbay) und Strangford Lough.

## DER EINFLUSS DES WINTERSPORTS AUF DIE UMWELT — S 23

Zur Entwicklung des Massentourismus hat gerade der alpine Skisport beigetragen. Dabei kam es zu einer Erschliessung, teilweise wohl auch Überserschliessung der Alpen, obwohl dieser Schwellenwert noch nicht definiert und daher zu erforschen ist. Der Wintersport beeinflusst die Umwelt vor allem durch starke räumlich-zeitliche Konzentrationserscheinungen, aufwendige Einrichtungen und klimabedingte Besonderheiten. Beispiele sind die Bautätigkeit und ihre Folgen (hoch gelegene «Retortenstädte» oder langsam gewachsene Skorte belasten mit ihrer Bettenkapazität gerade während der geringsten Wasserführung die Vorfluter), weitgespannte Liftsysteme und raumbeanspruchende Skipisten. Die Skifahrer, oft Ausflügler aus alpennahen Ballungsräumen, belasten allein durch ihre Zahl die Landschaft.

Zur Sicherung der Alpen als Lebens-, Erholungs- und ökologischen Ausgleichsraum sind integrale, interdisziplinäre Planungen erforderlich, die über Staatsgrenzen hinweggreifen müssen.

## INTERVIEW MIT DEM BUNDESMINISTER DES INNERN — S 26

Im Anschluss an seine Ansprache vor der Beratenden Versammlung des Europarats am 28. September 1973 gab Bundesinnenminister Genscher ein Interview zur Veröffentlichung in dieser Zeitschrift. Dieses Gespräch erstreckte sich auf folgende Gegenstände:

- Die Leistungen der Bundesregierung bei Durchführung ihres am 29. September 1971 angenommenen Umweltprogramms,
- die Bedeutung, die die Bundesregierung der internationalen Zusammenarbeit in Umweltfragen und insbesondere der Zusammenarbeit mit der UNO, den Europäischen Gemeinschaften, dem Europarat und Osteuropa beimisst,
- die Auswirkungen der Arbeit des Europarats, besonders der vorgeschlagenen Wasserreinhaltungskonvention, auf die deutsche Politik und der Wert der Tätigkeit der Beratenden Versammlung,
- die praktische Anwendung des Prinzips, dass «die gesamte Menschheit ein Grundrecht auf gesunde Umwelt» hat, und die Notwendigkeit, öffentliche Massnahmen auf nationaler und internationaler Ebene mit den Erfordernissen des Umweltschutzes in Einklang zu bringen,
- die rein qualitative Verbesserung des Wachstums durch die Erhaltung der Umwelt in der Weise, dass rein quantitatives Wachstum nicht zur Zerstörung der für das Überleben künftiger Generationen wichtigen Hilfsquellen führt.

Zusammenfassend äusserte der Minister, er habe keinen Zweifel daran, dass «unser eng mit der demokratischen Verfassung verflochtenes marktwirtschaftliches System beim Versuch, den Umweltschutz in Griff zu bekommen, erfolgreicher als etwa das planwirtschaftliche System sein werde».

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