

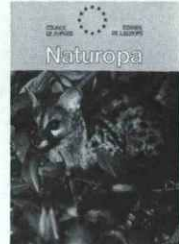
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Naturoopa





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The symbol for the Council of Europe's nature conservation activities.

Naturopa is published in English, in French, in German and in Italian by the European Information Centre for Nature Conservation of the Council of Europe, 67006 Strasbourg Cedex, France.

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Printed by: Koelblindruck, Baden-Baden, Federal Republic of Germany

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Cover: *Genetta genetta*
Back: *Iris boissieri*
(Photos Parco nacional de Peneda Gerês)

Naturopa

No. 28 - 1977

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New horizons

Portugal joined the Council of Europe as its nineteenth member country, and in this issue the Centre's National Agent there describes nature conservation in Portugal and the beneficial effects he expects from the Council of Europe's Intergovernmental Work Programme. In its development and by entering a new era, Portugal may thus profit from the experience gained elsewhere.

Fish: important as a source of protein and as a means of diversion for millions of vacationing sports fishermen. However, many species of freshwater fish appear to be endangered through loss of habitat, water pollution, and over fishing. The Council of Europe is in the process of producing a study on this subject which *Naturopa* now already highlights in this issue as yet another endangered aspect of our natural environment.

Although not a subject of pure nature conservation, the conservation of rural architecture as part of the landscape is important, and we decided to show here

that man can live in harmony with nature and thus blend in without causing destruction. Also, and as we have shown before, mountain regions, with their lure to millions of tourists in summer and winter, tend to change their character. We must now face the existing dangers and conserve, through management, these zones.

We publish our second and last article on the losses of wildlife due to such human actions as pollution, haymaking, high tension wires, etc., hoping that these articles have contributed to an increasing system of prevention.

To round off this issue of *Naturopa*, as diverse this time as nature itself, a legal expert of the Secretariat of the Council of Europe shows modern trends in conservation legislation.

The next issue of *Naturopa* will be entirely dedicated to the plight of the oceans and the efforts made to safeguard the intricate life in the seas. Thus it will be a contribution to the world-wide campaign on this subject.

H. H. H.

Man, in common with other species, has always sought to use the resources of the planet for his own welfare. In doing so he has simply obeyed a universal law of nature and, until fairly recently, his methods have served him well enough. Today this is no longer the case as more and more his methods are becoming self-defeating.

The basic reasons are well known: growing numbers, growing expectations of material comfort, growing technological prowess. And this in a world whose living resources — the animals and plants on which man's welfare finally depends — are not increasing. Quite the reverse, in fact. Forests are shrinking, particularly in the over-stressed tropical regions; the harvest of the seas is declining; many species are still threatened with extinction; formerly productive lands are "losing ground" to erosion: 3 thousand million tons of topsoil annually. And so on.

This destruction and wastage cannot be tolerated. It is, moreover, quite unnecessary. The globe's living resources, wisely managed and harvested, are self-renewing and inexhaustible.

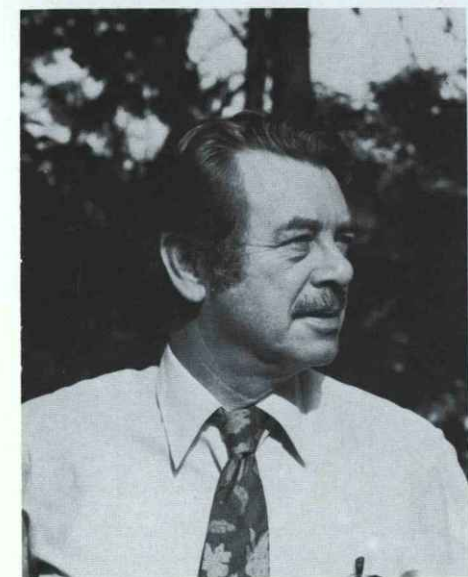
Various organisations attempt to ensure that these resources are wisely managed. Some, such as the International Union for Conservation of Nature and Natural Resources, IUCN, exist primarily for this purpose; for others such as the Council of Europe, conservation is but one of a number of vital issues. It is in the interests of both our organisations:

— to make sure that recommendations for action are based on the best scientific knowledge available — and that the sociological, economic and political aspects of issues are also taken into account so that recommendations are, indeed, feasible. IUCN's long suit is its global network of consultants and scientists, numbering in all well over a thousand. The Council of Europe can rely on the co-operation of IUCN to bring information from these key people to bear on actual conservation problems;

— to determine the priorities for allocation of resources and manpower, which unfortunately seem unlikely to be sufficient until the long-term value of investment in conservation is fully recognised by decision-makers. Thus we need to be absolutely sure that we focus on the problems which require the most attention;

— to ensure proper co-ordination of conservation and action planning so that interested bodies support rather than duplicate each other's efforts. The Ecosystem Conservation Group, established by UNEP, FAO, Unesco and IUCN, can be of assistance in this respect;

— to get action implemented. This is, of course, the most difficult challenge. It can be met only if national and local organisations — governmental or non-governmental — are ready to do the hard work.



(Photo F. Vollmar, WWF)

International organisations can propose a general framework for action, help to provide ammunition for those fighting on the spot, primarily in the form of guidelines and expertise, and encourage governments which are slow to implement agreed conservation principles.

For IUCN, strategy is the key word. IUCN commands slender resources but a wealth of experts. We are therefore convinced that our main role should be to pinpoint priority areas of concern and then to design the global strategy within which we and others should operate — these others being both international bodies and governments. We are now in the process of determining exact criteria for assessing priorities (no simple task — and one which has never been systemati-

Editorial

cally attempted before) and then working out in detail the shape and content of the strategy.

IUCN headquarters is Morges, Switzerland. This small town on the Lake of Geneva is also the headquarters of the World Wildlife Fund. Our geographical closeness is most helpful in ensuring the very necessary close liaison. The World Wildlife Fund provides roughly one third of IUCN's total funding and in return we provide the scientific support for our many joint projects. UNEP provides another third of our funding because it believes that the development of a global conservation strategy is an essential input to its task of perfecting and promoting the techniques of environmental management.

The Council of Europe has a difficult task. Overfishing in the North Sea and pollution in the Mediterranean and also the Wadden Seas are but some of the problems which are now exercising the nations of Western Europe. These are urgent matters in which IUCN and the Council of Europe must collaborate to get commercial and other interests to understand that conservation, far from being a fringe issue, is central to their own long-term prosperity. The good management of resources such as migratory birds shared, not only by European nations, but also those of other continents, is still a goal to be achieved.

The Council of Europe as an intergovernmental political organisation also has real strengths. It has, among other things, access to the considerable expertise that has developed within its member states. Funds, though still too scarce, are more readily available than in some other regions of the world. Government departments handling environmental problems are getting high recognition and thousands of non-governmental organisations are doing their best to promote — and implement — conservation.

As the new Director-General of IUCN I am, of course, ready to continue the close relationship which exists between the Council of Europe and the Union, and to look for ways to act together to withstand the pressures which threaten the natural heritage of Europe's lands and the welfare of her peoples.

David A. Munro



Portugal

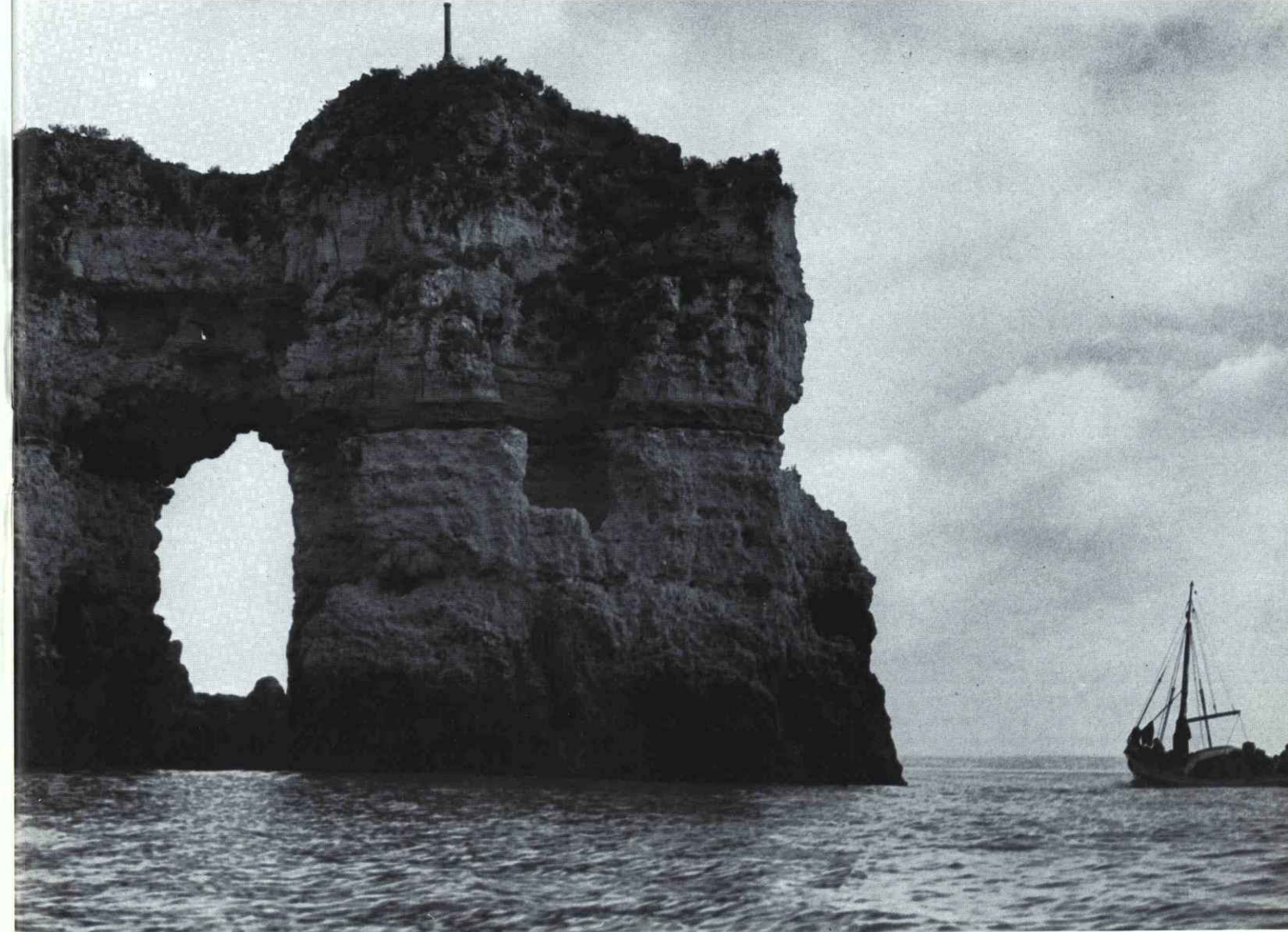
José de Almeida Fernandes

New horizons

From the very start nature has been the scene of man's incessant urge over the centuries to leave his mark, initially all to the good but progressively, with the development of modern technology, bringing about fundamental changes in its balance.

Like all other industrialised countries, Portugal is searching for ways to avoid inflicting excessive damage on its natural environment.

Action today is primarily in the hands of the public authorities and non-governmental bodies.



Public action

Ever since they were set up, in April 1974, the new Portuguese authorities have given proof of their eagerness to protect the natural environment of their country. Consequently they divided responsibility between the Ministry of Agriculture and Fisheries and the Secretariat of State for the Environment set up for this purpose (1974) and instructed these bodies to take immediate action.

For instance, the Ministry of Agriculture and Fisheries has promulgated three new laws:

- an act regulating hunting with a view, in the first place, to giving more effective protection to fauna not mentioned in the previous legislation and, secondly, to introducing shorter hunting seasons and restricting the amount of game that may be shot;
- an act implementing agrarian reforms;
- an act providing local authorities with the instruments they needed to take direct action to protect highly productive farmland and safeguard vegetation.

The responsibilities of the Secretariat of State for the Environment consist primarily of setting up nature parks and reserves.

Under Act No. 631-76 of 27 July 1976, this Secretariat was "established for the pur-

pose of implementing integrated measures in all sectors influencing the environment:

- nature conservation,
- protection of landscape and sites,
- rational management of natural resources, and
- protection of their faculty of recovery and renewal,

all of which factors shall be borne in mind in connection with the framing of regional planning programmes."

The preamble to this act sets out, in addition to guidelines for the new Portuguese environment policy, definitions of concepts such as nature park, nature reserve, national park, protected landscape and scheduled site.

A nature park is an "area planned to meet the requirements of recreation, nature conservation, landscape protection and promotion of the interests of inhabitants of rural districts . . . in which, zone by zone, the specific uses of each part of the area are determined". A good example is the Serra de Arrábida nature park, one of the last relics of the Mediterranean "maquis" vegetation and preserving the traces of a south European pre-Ice-Age forest, which continues to suffer damage from excessive encroachments by industry and from the number of tourists it attracts.

A nature reserve is an area "calling for protection yet not corresponding to either the space or recreational criteria required for the setting up of a nature park . . . Here attention is concentrated on preserving certain specific aspects of the natural setting taken as a whole (flora and fauna, soil, geology or water resources), by taking the requisite measures compatible with the idea of protection, scientific studies or a variety of uses. Consequently, biological, botanical, zoological (ornithological etc.), aquatic and marine reserves can be set up."

The Sapal de Castro Marim and Tage estuary reserves can be mentioned in this context. The former, located on the Chaca estuary in the very south of Portugal near the Spanish border, is a marshy area with many archaeological remains which comprises a delta ecosystem which is a resting stage for many migratory species. The name "Sapal" refers to halipholous plant life (growing in salty soil). The latter reserve would seem to be one of the main halts on the routes followed by migratory birds.

A national park can comprise nature reserves totally or in part as well as conservation or recreation areas. The only form of man-made installation allowed in these parks is the actual park facilities. They are "set up for purposes of conservation and education".

Portugal New horizons

serve are currently being developed with a view to incorporation into the Council of Europe's European network of biogenetic reserves. The three first mentioned are also proposed as biogenetic reserves in the context of the Unesco/MAB programme.

Private action

Official measures are backed up by private action which operates primarily within the framework of two non-governmental organisations of long standing:

— the *Nucleo português de estudo e protecção da vida selvagem* (Portuguese association for the study and protection of wildlife) which organised, in April 1977, the first Portuguese ornithological congress, and

— the *Liga para a protecção da Natureza* (Nature Conservation League). This organisation, set up more than thirty years ago, has come to play an increasingly important role over the years.

In accordance with its terms of reference, the league has done its best to "provide the general public with relevant information, educating it in nature conservation matters". With this in mind, it has concen-

trated its efforts on informing the young people who will shortly take over responsibility for the natural heritage of the country. A monthly information bulletin, *Bios*, which gave its support to the Council of Europe's Wetlands Campaign, is sent out to its members. In its very first number (December 1975), before Portugal even became a member of the Council of Europe, *Bios* published the speech launching this campaign and reported regularly in subsequent issues on the impact achieved.

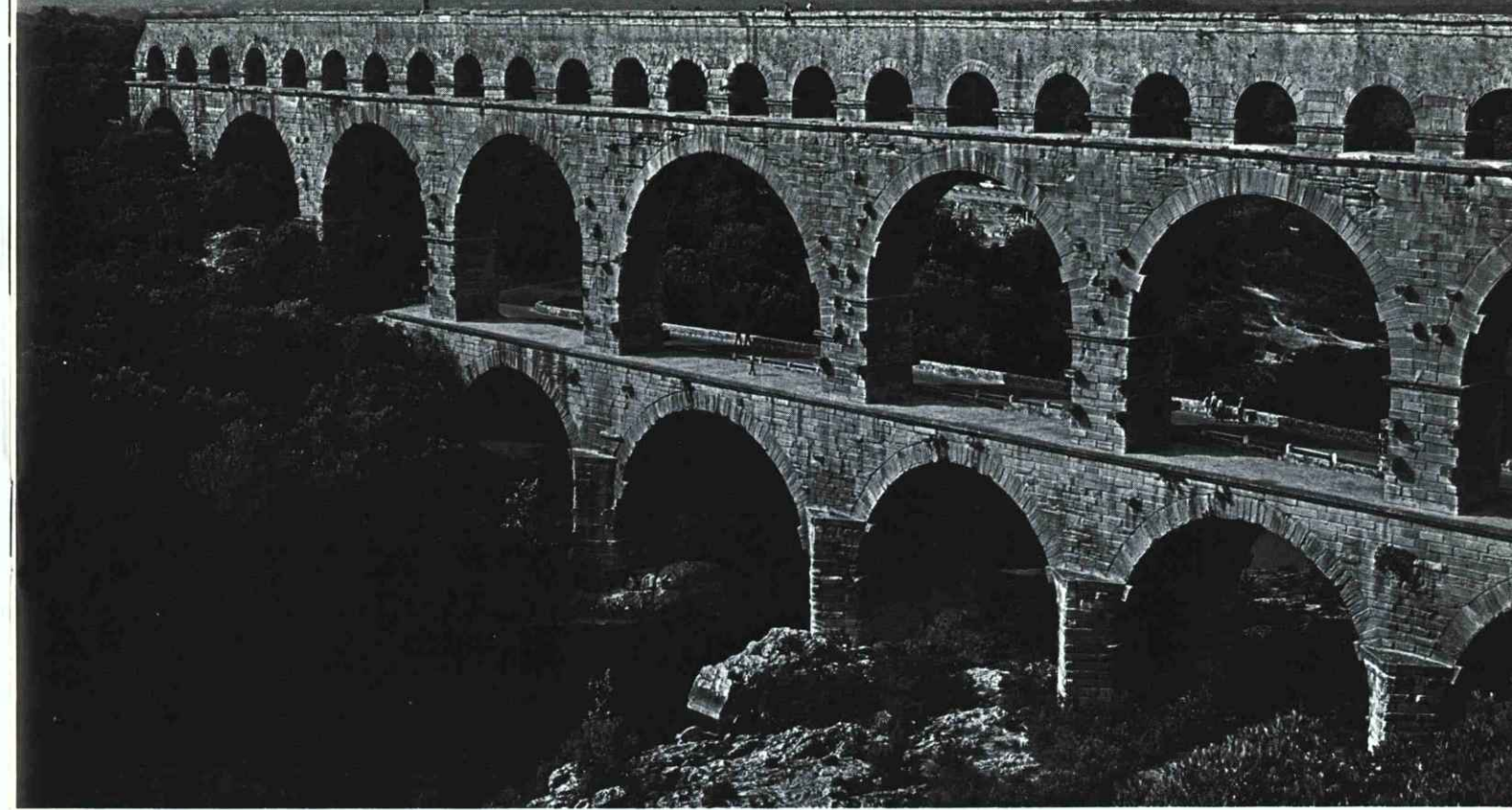
In October 1976, the league also organised a national colloquy with wetlands as the theme.

Further aims of the league consist of:

— "assisting the public authorities in the implementation of measures essential for the conservation of all species of interest or in danger of extinction", and

— "co-operating with the public or private organisations concerned whenever necessary".

Accordingly, shortly before Portugal's accession to the Council of Europe, the Nature Conservation League was designated as Portugal's National Agency for the European Information Centre for Nature Conservation. J. A. F.



Pont du Gard, France — Roman aqueduct (Photo John G. Walmsley)

The Peneda-Gerês park in the north of Portugal comes into this category. Its flora and fauna are very varied and it offers a very wide range of natural landscape along with archaeological sites of major interest. Only the fringes of the park are inhabited and equipped with reception facilities.

The Peneda-Gerês national park, the Serra de Arrábida nature park and the Sapal de Castro Marim and Tage estuary re-



Man in harmony with the environment — corn-lofts in the Peneda Gerês Park (Photo P. N. de Peneda Gerês)

Legacy of living landscapes

Jacques Houlet

Rural architecture is in vogue; everyone is concerned with its conservation from the haughty scientists pontificating about how ethnological interests are to be defended, to the modest city-dweller who chokes in his concrete jungle and dreams of pure air. Certainly, no one could be more pleased about this craze than I am, even if the reasons for it are not crystal clear! However, it must be admitted that it is developing in truly magnificent confusion. Indeed, what is there in common between the ethnologist anxious to preserve an old farm which by some miracle is still standing but practically uninhabitable, and the big-city bureaucrat who transforms the same farm into a second home? (And what a piece of luck if he disrupts only the interior and respects the roof.) It seems that there are rarely any points of agreement between different people's ideas about "rural architecture". Confusion reigns at every level: it has not even been possible to agree on the meaning of the concept. To some it means architecture adapted to agricultural requirements, to others it means all the appurtenances of rural life in its broadest sense. This is more than a slight difference, since the former are interested only in farms and their outbuildings, while the latter extend their concern to everything in the countryside, including churches, cemeteries and even *châteaux* which once had a role to play.

Nature conservation has its at least equally ardent supporters, and it may even have started earlier. We have been protecting sites for a long time but for half a century such protection was timid and almost shamefaced. It was often the work of brilliant idlers who found a cheap form of specialisation in this unregulated and apparently easy field of activity. Today we are far removed from such genteel

amateurism. Biologists have not proliferated because their science has always been an arduous one, but protectors of the environment have become a multitude. Riding the crest of the wave, they are now an electoral force. Suddenly all the professional politicians have revealed themselves as ardent defenders of nature, all the more easily since they have found that the disappearance of one ecosystem favours the birth of another, equally fascinating. The confusion that besets the conservation of rural architecture is nothing compared with the chaotic situation of ecologists and other protectors of the Environment. I have deliberately capitalised this vague word. One example will suffice: it is the hunters' associations which claim to be the most effective protectors of nature, as if it were logical to preserve animals the more easily to kill them.

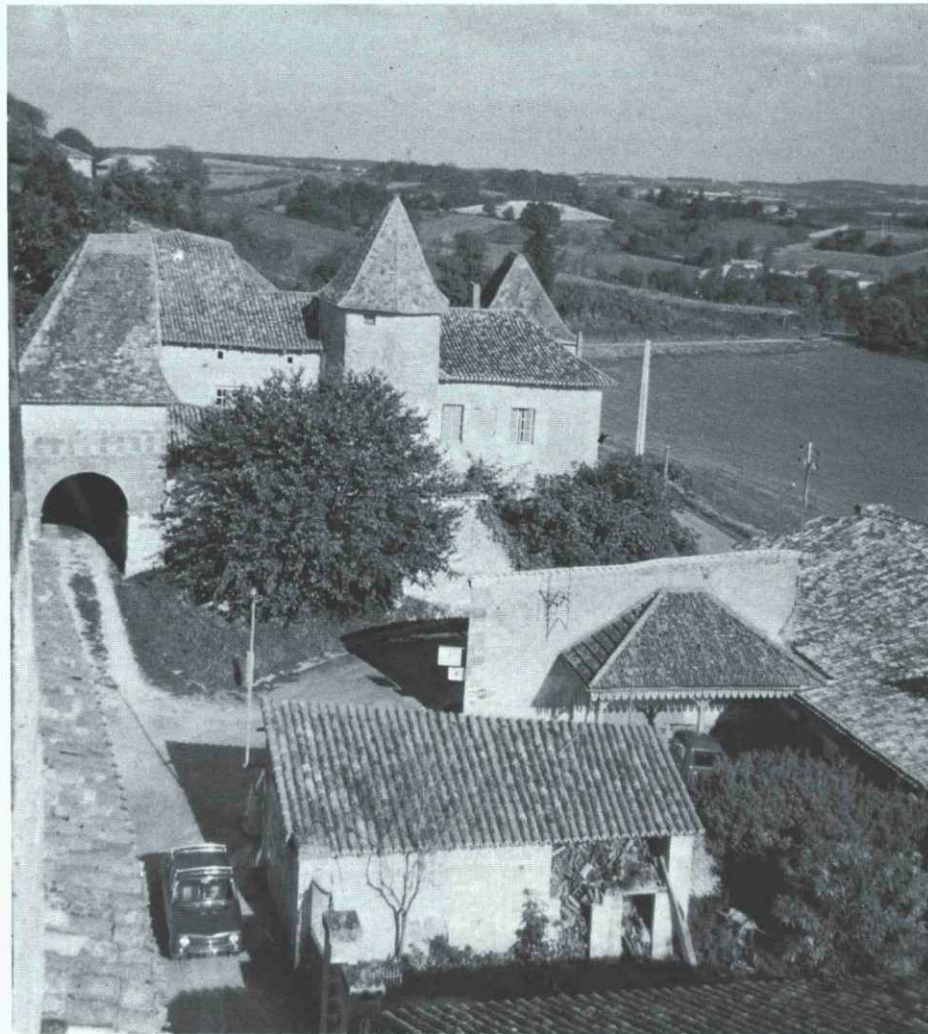
Such divergent viewpoints lead, on the one hand to folk museums or even eco-museums, which give the appearance of being much more serious, and on the other to nature reserves where hunters are reviled but which no one can get into any more. Such activities and such forms of protection are no doubt charitable works and I am only too glad to encourage them — provided, however, that museums do not spread like a cancer and that the reserves do not turn vast areas into barren tracts. Let there be no mistake, these dangers are not entirely fanciful. Please do not forget that I speak as a professional. But do not these conservation measures neglect what is essential to conserve? Has not our appetite for specialisation diverted us from the real question? It seems to me that that is the case, and I shall attempt to prove my point by means of a few illustrations within the space permitted by this article.

A man-made phenomenon

First of all, it should be mentioned that the most beautiful rural architecture is the old-style architecture. The intrusion of modern agricultural techniques has resulted in a collection of hideous forms to which previous centuries were not exposed: grain silos in the form of huge cylinders, water towers raised to the required height on concrete struts, ugly reservoirs, those astonishing cattle-sheds which the animals never leave, fed through tanks which are also cylindrical, not to mention the rash of industrial materials such as sheet-metal, asbestos-cement sheet, plastics, machine-made tiles, and so on *ad infinitum!* Let us make no mistake about the age of the rural buildings whose charm we savour. Rarely does a thatched farmhouse date back further than the 19th century. Generally speaking, such structures are more perishable than stately buildings. Cheaper materials were often used, timber, cob and daub infillings, roughcast stonework, etc. Building techniques were more primitive. Such buildings were often doomed to demolition to make way for new ones. Nevertheless, up to about the mid 20th century, these farms and their outbuildings (cattle sheds, barns and other out-houses including kilns, mills, presses, storerooms, etc.) maintained a general harmony with the surrounding landscape which today seems almost miraculous.

Originally the materials came from the earth itself. Stone for the walls, when needed, was taken from the cellar or from no further away than the local quarry; beams came from the nearest forest, and the straw of wild rye provided thatch. The architectural styles themselves were the fruit of a humble yet precious wisdom accumulated over generations. In sunny climes, bays were narrow, in lands subject to violent winds (mistral, föhn or tramontana) the walls standing in their way had no openings. This was truly popular architecture, where houses were built by those who were to live in them or at least on their direct instructions. And the source of the materials together with the traditional styles ensure that they blended naturally with the landscape.

This point bears emphasis. The cultivated landscape is itself a man-made phenomenon. Not that man was initially concerned with its harmony. His main wish was to make his fields fertile and as easy to work as possible. Hence the construction of terraces in mountainous countries and a thousand and one inventions which have moulded the shape of our lands. Even in flat countries care has been taken of the channels which enable water from heavy rains to run off into watercourses and rivers. Nature itself has become humanised to a large extent, at least in Europe. It is centuries since this continent abandoned crop-growing on burnt land, and intensive cultivation of the soil after clear-



Lusignac in Dordogne, France — with its mediaeval castle, the village decorates the varied countryside (Photo Ministry of Culture and Environment)

ing. Our forests themselves have for a long time been under the watchful care of our foresters. One day when I was admiring the chalk cliffs in the lower valley of the Seine at Roche Guyon, which fall away not into the water but on to meadows tonsured like English lawns, the peasant farmer who was with me remarked that they would not have that look of green velvet if they were not cropped by the sheep from his pen. There are countless such examples.

Landscapes should be kept alive

What has to be conserved, therefore, for those concerned with rural architecture, is not just a particular style, even if extended to its immediate context; it is the harmonious integration of these buildings into their general setting. What must be saved is the total environment. This is all the more imperious a necessity since in most cases the buildings themselves have no great artistic value, as witness their dismal appearance when transplanted to another setting. The Basque villa, the Tyrolean chalet and the Norman farm all

had their day and invaded landscapes which were fundamentally alien to them. We have seen what this could lead to. It might be replied that such villas or chalets were bad imitations, but the ethnologists are fond of this type of transplantation — they move authentic houses. Everywhere rural life museums are springing up which are veritable hospitals of our conservation mania; worse still, they are necropolises, since these dead houses are no longer inhabited, the mills do not turn and the presses no longer press. They are, it seems, tourist museums. There is room for doubt since people have no natural liking for dead cities and it takes a peculiar taste to enjoy being in a cemetery.

Thus, if we wish to keep rural architecture alive we must also conserve its setting, not of course in every detail, but in spirit, and this requirement has very specific consequences. First of all museums very rarely meet the necessary conditions. Moreover they cannot cope with the problem. Even if the number of museums were multiplied — which is perhaps not very desirable — how would one save everything of interest? The very term "living architecture" rules out this solution. It would be cruel to make present-day people live in the uncomfortable conditions in which peasants lived in former times. The second consequence is that the acquisition by city-dwellers of country houses as holiday homes or even permanent homes is only a makeshift. Townspeople will no doubt maintain the house and the small garden they will plant beside it, or even a park, but they will be useless in the fields. Townspeople in the countryside, even if they settle there permanently, behave like

parasites. No doubt it is better to see farm-houses occupied by hermit crabs than to see them fall into ruin, but even so this is still a makeshift. Their intrusion is beneficial to society only if the agricultural activity of the area is sufficiently entrenched to absorb them. The dramatic decline in the number of farmers often lends value to this inflow of idlers (only from the agricultural standpoint, of course) but it is important to bear in mind that this can only be one contribution to solving the problem and that the takeover of farms by townspeople could be dangerous. This is true in areas near cities, where settlement can lead to the elimination of the agricultural population.

Towards a new society?

The task before us, if we wish to conserve this profoundly humanised natural setting which is the very face of Europe, is to find ways of enabling our farmers to live comfortably in houses which do not belie their origins and to continue to practise a form of agriculture which benefits the land as a whole. To this end it is necessary to take stock of the situation of both agriculture and the rural architecture to which it has given rise: the latter is caught between the accelerated industrialisation of cultivation techniques for which traditional architectural forms are no longer adequate, and the corresponding decline in the population of the countryside, both of which factors doom an enormous architectural heritage to obsolescence and extinction, just when, by an astonishing paradox, the world population is increasing at an alarming rate.

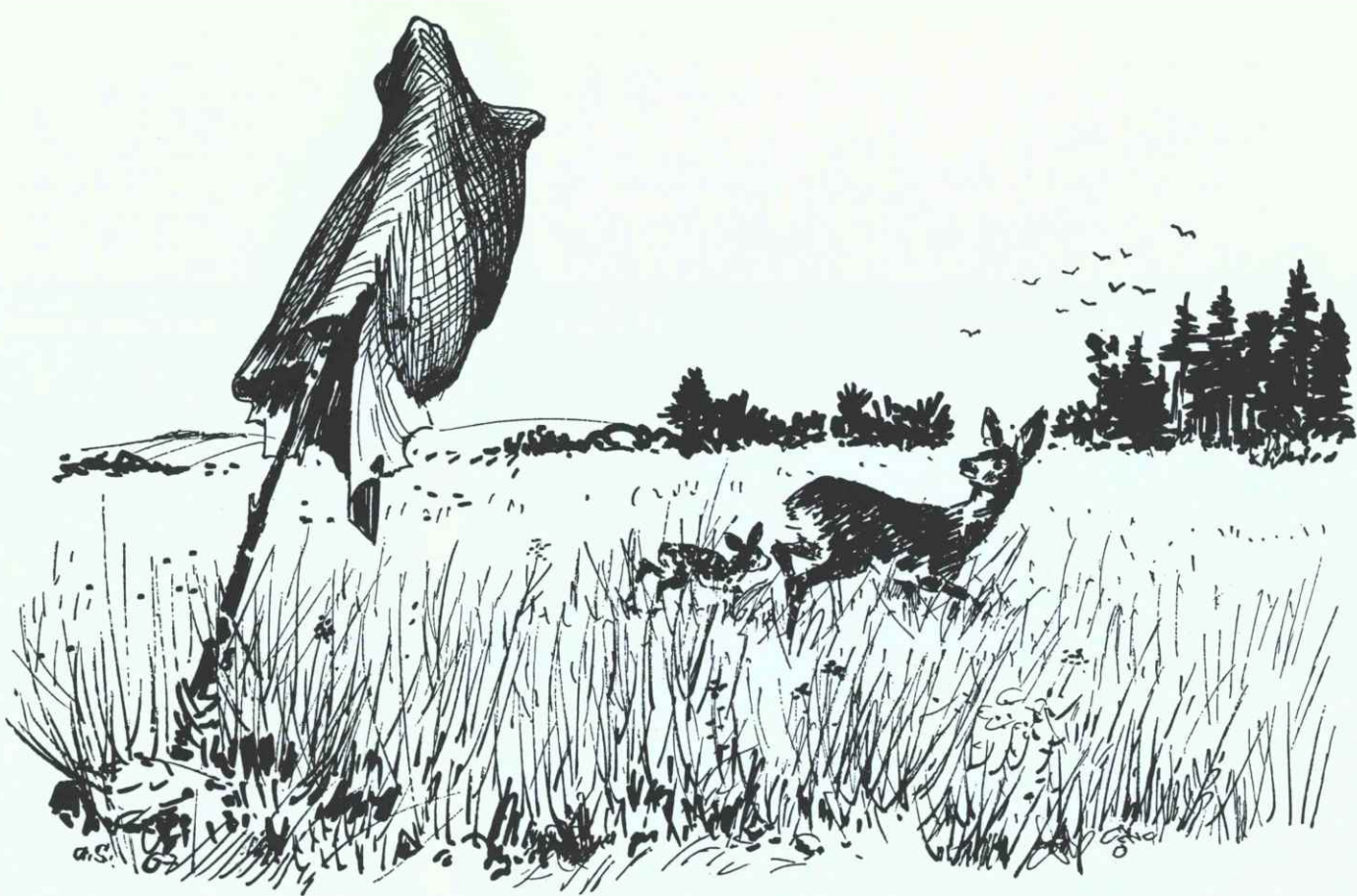
Does this mean that we should revert to

the plough and discard the tractor? Certainly not; the progress of modern society which has greatly diminished man's physical toil, are lasting achievements of our civilisation. We shall not revert to outmoded practices but can we not conceive of an escape from the law of maximum return, and promote those traditional agricultural techniques which had the merit of keeping the landscapes in good order? The Swiss authorities have concluded agreements with their farmers to this end. Would it not be worth-while to extend, systematise and considerably develop this initiative, timid though it may be? Let us make no mistake, we are advancing towards a completely different society, less concerned with profit and less attached to financial wealth than the present one. Do we not see it germinating in these young people who turn their backs on the consumer society and seek novel life-styles in confused experiments? No doubt these experiments have not produced very pleasant results or very solid social structures up to now, but should they not be encouraged rather than dismissed as marginal fantasies doomed to failure?

The simple premise that traditional rural architecture can be conserved only in its context, i. e. that of a natural setting totally colonised by man, has led me to broad philosophical conclusions. Nevertheless, we must go back to such simple and general concepts if we are to avoid the partial solutions advocated in all sincerity by the most well-intentioned people. Neither museums nor nature reserves solve the far greater problem of the conservation of all man's works. And that is what is at stake. J. H.



Marais Vernier in Normandy, France — the roof will be newly thatched (Photo Ministry of Culture and Environment)



Claws of progress

Heinrich Wolf

The animal world is an integral part of the environment in which man lives and has his being. While animals are far less predominant features of the visual landscape than vegetation, that must not make us overlook the very important function animal life fulfils in the countryside. Indeed, both large animals and to a much greater extent small ones, from insects and worms down to the tiniest organisms, play a decisive part in maintaining the balance that makes for a healthy landscape.

But what is the situation nowadays as regards ecological balance? Can we even still speak of a healthy landscape? The reader will be able to answer these questions for himself at the end of this article.

Death-dealing poison

Since the second world war over one million tons of DDT have been sprayed over the fields of the earth. It can be traced in the bodies of Eskimos in the Arctic as well as in the penguins of the Antarctic for the sea contains huge quantities of it. Via food chains (e. g. water, plankton, small animals, fish, birds, man) these substances, which are alien to the body, increase constantly in amount in all organisms. They are stored in the fatty tissues and all similar tissues in the body, where they are only very gradually broken down,

the process lasting ten years or more. Whole populations of sea birds have become extinct because pesticides have collected in eggs via the food chain to such an extent that the embryos can no longer develop. In the worst cases birds that have been poisoned by biocides cease to breed. Thus the grebes affected by DDT in Lake Clear in California did not begin to breed again until nine years after the last use of DDT. Parathion poisoning in Holland in 1960 caused the death of some 200 000 birds. As a result of poisoning with chlorinated hydro-carbons contained in industrial effluent, a colony of sea swallows in the Netherlands was reduced from 40 000 breeding couples (1954) to 650 couples (1965). The catastrophic decline of many bird species in Sweden resulted from the introduction of methyl-mercury compounds in agriculture in the 50s.

Some animal species are deprived of all their sources of food by the excessive generalised use of pesticides. Other generally harmless insect species are also killed off by such random poisoning and with them the animals that live on them, in the first place our song-birds and bats. Scientists at the Radolfzell bird sanctuary on Lake Constance found, at the institute's field station, that of the twenty-seven bird species observed between 1968 and 1970, twenty-six had declined in

numbers. Fourteen of them had been reduced by more than 50% and four by more than 66%. In England between 1968 and 1969 alone, and on the basis of a count carried out throughout the country, the common whitethroat decreased by 77%.

The use of chemical substances in nature has provided us with a wealth of bitter experience. Thus in the Federal Republic of Germany we welcomed the ban on DDT which came into force on 1 January 1971. Unfortunately the step was taken at least ten years too late because this poison (dichlor-diphenyl-trichlorethane) and the whole group of chlorinated hydro-carbons have become in the meantime omnipresent in the earth and in living bodies.

Even though in the future we cannot, in our intensive economic systems, abandon the use of chemicals, it must still be our aim to limit their use to a minimum and to reinforce *biological* methods of control. The latter methods of control employ living organisms for the active reduction or destruction of harmful animals and plants, either by direct action or by means of specific protection through the creation of essential living conditions. The most hopeful prospect lies in the extensive protection of natural enemies.

Oil pollution

The harm caused to the bird world through the effects of oil (glueing together of the feathers of sea birds generally resulting in their death) has caused the process to be described in German as *Olpest* (oil plague).

Pollution of the sea through oil has in recent years reached horrifying proportions. The damage done to animal and plant life is incalculable. Bird life is particularly affected. Sea birds, above all, suffer the greatest losses through the effects of oil. There is no doubt that the drastic decline of several species of sea birds, in any case becoming rarer, is to be attributed to oil pollution. The total number of sea birds destroyed on Europe's coasts through oil pollution has probably now reached the million mark. And it must be remembered that these include some populations which are very small in number and which are therefore seriously threatened with extinction. When birds are covered with oil their insulation system is disturbed and they are forced to raise their metabolism so that the necessary body temperature is maintained. In the process the fat reserves are immediately reduced. The result is general exhaustion of the animals which can lead to clear symptoms of starvation. The birds naturally try to get rid of the oil on their feathers, so that it gets into their digestive system and frequently poisons

them. Where birds survive their fertility is in many cases subsequently disturbed. How, in fact, can we help birds that have been picked up in a condition of severe exhaustion? It is important above all to keep them warm, and to remove the oil by *mechanical* means and to give them fresh food. Use of detergents for removal of the oil from the feathers is not recommended because together with the oil, natural impermeable substances are removed from the skin which the bird, because of severe weakening, cannot yet produce in adequate amounts. Where infections occur it is important to keep the birds clean and give them food rich in vitamins.

Electrocution of large birds

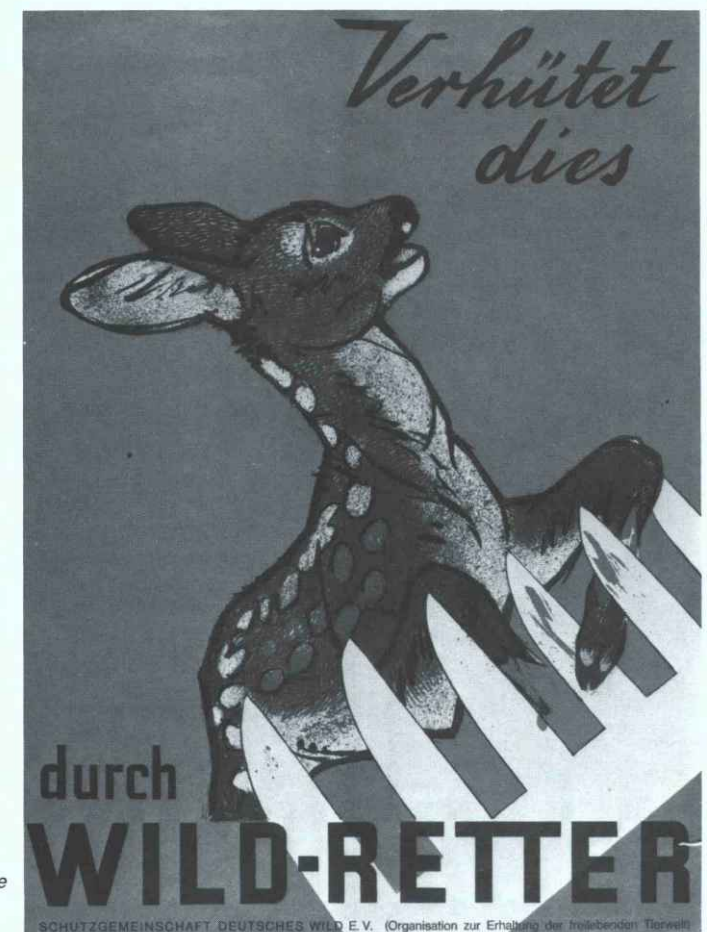
In the Federal Republic of Germany many large birds die by electrocution. This is the fault of certain pylons used to carry medium-tension overhead cables that are so thoughtlessly designed that large birds, when landing or taking off from a perching position, can easily come into contact with the live cables. Some pylons are made of reinforced concrete or metal with insulating supports. These are tension-reducing or transforming pylons on which the cables are particularly close to the horizontal supports.

Beneath these death-traps storks, various kinds of owl, kites, buzzards, eagles, falcons and ravens have all been found. For example in the case of the stork, more than 50% of the birds that had been ringed in north Germany and returned there met their death; another 25% were killed by flying into the cables. In one West German district, twenty-five falcons died in this way within the space of two winter months.

The German Association for the Protection of Birds and the *Freilebende Tiere* working party of the German Association for the Protection of Nature have in recent years made an urgent plea for the following:

1. The erection of pylons of the type described above to cease immediately.
2. All cable-carrying pylons which constitute a danger to large birds to be either insulated or modified so that they are no longer dangerous. This is particularly urgent in areas where eagles, owls and falcons are to be found.
3. All pylons to be built to specifications complying once again with the terms of the old paragraph 19 of VDE 0210 which reads as follows "The horizontal supports, insulating supports and other features of high-tension cable carriers shall be designed in such a way as not to allow birds

Second and last article on the losses of game and other wild fauna – such accidents may often be avoided



German poster on the prevention of game losses during hay-making, published by the Schutzgemeinschaft Deutsches Wild e. V.

Claws of progress

any opportunity to perch near to the live cable". A paragraph to this effect for the protection of birds is to be re-introduced in the next edition of VDE 0210.

Death from mowing machines — "Mähtod"

In the Federal Republic of Germany, year after year, for every 100 hectares of grassland an average of two fawns, seven young hares, four pheasants and three partridges are slaughtered or horribly mutilated by the blades of mowing machines. For the whole area concerned in the Federal Republic of Germany, amounting to three million hectares, this gives the following frightening figures: 50 000–60 000 fawns, 180 000–210 000 hares, 120 000–160 000 pheasants, and 60 000–80 000 partridges, which fall annually victims to mowing machines. These losses have risen considerably in number in recent times because more and more rotary mowers are being used for cutting hay. These modern mowers work at a con-

siderably greater speed than the lateral ones so that their cutting power is greater, and mowing proceeds faster, with greater danger to animal life.

The German Association for the Protection of Game, in conjunction with the Federal Ministry for Food, Agriculture and Forestry and the Society for the Protection of German Fauna has made unceasing efforts in past years to find ways of preventing this annual slaughter. Their joint consideration of the problem was directed principally towards remedying the situation by fixing protective devices on mowing machines. The Board of Technology and Building Construction in Agriculture (KTBL) is pursuing its study of how to reduce the loss of wildlife due to mowing. Unfortunately as yet there has been no positive result. It is accordingly worth-while recommending some simple methods that have been tried in the past and have given good results:

— warning the local sportsmen (game-keepers) in advance when the various strips are to be cut so that they can go over the area with their dogs;

— mowing fairly large swathes round the edges on the previous evening — the mother animals frequently leave the disturbed environment with their young during the night;

— setting up a number of scarecrows for game, also on the previous evening. These scarecrows for warning off game animals consist of a stick about two metres high, stuck in the ground and with an old paper bag tied on top. It is sufficient to place two or three of these every hundred metres along the area to be cut.

The doe is frightened by the sudden appearance of the strange object and, fearing for her young, moves off with them to the forest. If cutting does not occur at the expected time for some reason or other (e.g. weather) then the scarecrows must be taken down and put up again the evening before cutting, for deer are particularly quick to realise that they are harmless and move back into the field the next day;

— mowing, wherever possible, from the middle of the field outwards. The animals are thus driven outwards and not forced into the one remaining "island" in the middle;

— stopping before cutting the last swathe to look through it for animals hiding there;

— using the so-called "game-life saver" to drive out any game that may still be hiding. This is a device that is easy to handle and which can be fixed readily to the mower. It consists of a horizontal arm, a sheet of plastic, emery paper, probing rods, hanging chains and bells and weighs altogether only 8 kg. When it meets an obstacle it simply swings backwards and then returns to its original position through the action of a spring. It is fixed to the side of the mowing machine and probes the full width of the next strip to be cut. The German Association for the Protection of Game has had this device tested by professionals in a number of plentifully stocked game areas. It proved very effective in saving the lives of animals and birds and also very easy to use.

An even simpler device for the protection of animals which one can make oneself consists of a light bean-pole about six metres long which is fixed to the back of the tractor so as to stick out sideways from it. On the outer half of the pole a number of empty tins, each containing a few stones, are hung on strings so as to pass through the upper part of the grass to be cut. If the pole is long enough the tins go through the grass twice and the animals are driven out of each strip before the blades come to it. H. W.



Born in May, these young roes have found death instead of shelter
(Photo C. Thiermeyer)



Perish in silence

Anton Lelek

The human way of thinking tends to a certain pragmatism and man's attitude to water and consequently to fish does not deviate much from his approach to other common things. Thus: water is good and useful — let's use it! It is almost constantly in movement, it dilutes, it is not absolutely transparent, it can carry and hide a lot. Most wonderful for a pragmatic thinker: water has always helped itself: it purifies itself from within — but not indefinitely. From time to time water has to be used directly for drinking. When it has a bad taste or when it smells it will be properly purified; for swimming it will be cleaned a bit less while for other purposes water will be treated accordingly — and for the fish will be left the remaining "stock" of water.

The environment and the fish fauna itself are not universally deteriorated: however, if nothing is done soon, all attempts to restore the fish fauna may come too late.

Catchment areas, a possible background

As fish have always followed the water courses and never the reverse, it seems thus inevitable to write the simplified history of the recent catchment areas, to link it with fish distribution and to answer some of the intriguing questions as to why the fauna in some parts of Europe is richer than in some others.

We have to start from the late tertiary when Europe was connected by land with North America. This connection was probably of little importance for fish distribution; perhaps only *Percidae* may have dispersed over a North Atlantic land route some time at the end of the Cretaceous or beginning of the Eocene. Separation of the fauna between east and west was caused by the past "Ob-Sea". After its drying up, during the late Oligocene,

there arose the first chance of exchange of fauna in both directions. In the southern part of Europe the past "Mediterranean Sea" extended somewhere from the Rhône River as far as the recent Aral Sea. Its branching in the northern part created the "Sarmatian Sea", which was only slightly salty, thus making possible contact between Europe and Siberia. Sometime near the end of the Tertiary and beginning of the Quarternary the "Sarmatian Sea" was divided by the rise of the Carpathian Mountains which resulted in creation of the Pannonian Sea. Both slightly salty primaevial seas, the Pannonian and the Sarmatian could probably be crossed by freshwater fish both eastwards and westwards.

Without any doubt geological changes and climatic fluctuations during the Pleistocene era already played the decisive role in the recent wholesale fish distribution. The main reason for the limited or poorer fauna in the northern part of Europe was the glaciation which virtually eliminated the fauna already established. As far as north-west Europe is concerned, the retreat of the ice was followed by colonisation from the continent of Europe. Between the end of the Tertiary and Quarternary four major glaciations with recessions and periods of warm cli-

The faunal life of our rivers depends on the health of the water and its flora (Photo A. Lelek)



mate between them played their part, particularly during the second one, when the ice-cap came furthest south. However, the glacial ice has never spread over the Alps and Carpathian Mountains. The areas south-east from the Carpathians as well as the Alps created refuges for the survival of some elements of the pre-glacial fauna. Obviously, this is the reason why the Danube catchment area is much richer than the catchment areas of the Rhine and/or the Elbe rivers. For details see Thienemann (1941), Banarescu (1965) and Balon (1968).

Diversity of the fish fauna

The area considered here covers the continent of Europe, Iceland, Ireland and Britain and extends as far eastwards as the watersheds of the Black Sea from the north. It also includes streams leading into the Mediterranean Sea from the north, western Turkey and Greece.

The overall diversity of freshwater taxa in this area counts over 300 fish cyclostomes of twenty-eight families. The background information was provided by Banarescu & coauct. (1971), Ladiges & Vogt (1965) and numerous faunistic contributions elsewhere. In an attempt to look closer into

this diversity of fauna (n = 321 taxa), we may further divide it into an indigenous (*autochthonous*) group — 93% and an introduced (*allochthonous*) one — 7%. When we separate the fish taxa according to preference for running waters including flood plains, backwaters and adjacent swamps, this category comprises 73% of the indigenous species. A small but important group, mostly Coregonids and Salmonids — 6%, is confined to lacustrine environments, particularly to natural or man-made lakes. The last group of indigenous fauna (14% of taxa) occupies the estuaries; it lives more or less permanently in brackish water. The main part of the introduced species live in streams and their surroundings — 6%, while very few taxa live in lacustrine environments — 1%. Judging the fauna according to the number of species in general, we may feel satisfied. However, considering the scarcity and patchy distribution of many species, the future of fauna then looks rather gloomy.

In addition, it is extremely difficult to prove absolute extinction of one particular taxon. Exceptions provide only relicts with very limited areas of distribution, e.g. *Romanichthys valsanicola* from the Percid family. This species, described first in 1957, is probably extinct because of landscape changes some years later.

Three selected catchment areas

The number of species of one particular stream as it used to be for some 100 to 150 years compared with the recent occurrence of taxa indicates the first changes. An attempt has been made to compare the primary occurrence of indigenous species in the rivers Rhine, Elbe and Danube with that of the last ten to fifteen years. Within the whole river system, omitting natural lakes, there has been little decrease of indigenous species. In the Rhine, formerly inhabited by forty-four species, eight fewer species were found (18.2%). The Elbe, originally inhabited by forty-eight species, has six taxa less (12.5%). In the Danube, inhabited by eighty-two species, there has been no loss until now. The vanished species are mostly anadromous salmonids (Atlantic salmon *Salmo salar*, Sea trout *Salmo trutta*, Sturgeon *Acipenser sturio*) in both Rhine and Elbe, two further anadromous clupeids (Allis shad *Alosa alosa*, Twaite shad *Alosa fallax*, Houting *Coregonus oxyrhynchus*) and two small cyprinid species.

Tracing the species distribution in particular river sections, only a few changes were recorded in the upper stretches of streams. The most important changes in the fauna are observed in the central stretches of the streams classified as Epipotamon and Metapotamon (Barbel and Bream zone). In the Rhine, approximately in the middle of its course (about 500 km), there were formerly thirty-nine

species of fish — the recent number being only sixteen; for details see Lelek (1976). A similar situation was observed in the Elbe. The stretch between the confluence with the Vltava (Moldau) and the Ober-Elbe, formerly occupied by forty-two species, revealed only twenty-seven taxa now. In the Danube, in its stretch between Austria and Hungary (around 1800 km), no loss of any taxa was noted.

The simple presence of all fish species in the above-mentioned stretch of the Danube is no proof of stability of the fauna there. Some of the local species, e.g. Sterlet (*Acipenser ruthenus*), the largest of Danube Sturgeons *Huso huso*, the Zingel species *Zingel zingel* and *Zingel streber* are only very rare remains of formerly abundant species. The solitary occurrence of some species cannot replace the former balanced multispecies populations.

Man's interference

Many years ago a stream provided connection between the sea and its spring area. Ecological groups of fish established proper zoning there and each taxon fitted into its habitat. There were no barriers for both anadromous and cathadromous species. Fluctuations of water level were more or less regular and seasonal. Flood plains were adjacent to the main stream; backwaters, pools and meanders were plentiful. The density of human population was low, there was little or no pressure on the aquatic communities, land alterations and over-fishing were non-existent. Our ancestors cropped the stable mixed-fish populations; fisheries did not influence the fish stock or the well-behaved ecosystem. This paradise, however, even in the middle ages no longer truly existed. The growing human population demanded more to eat, desired larger or better quality fish. There are many records describing sophisticated medieval fishing methods. Fisheries thus very slowly caused the first changes in the fish stock, influencing the abundance of some highly prized species, e.g. Sturgeon, Salmon; however, the fisheries themselves were not responsible for the eradication or extinction of freshwater species. Expanding agriculture protected itself against regular floods; easy-to-dry swamps were drained to gain fertile land to grow crops. The use of streams as transportation ways was increasing. All activities leading to harnessing the streams resulted directly or indirectly in environmental changes: large shallow areas with fluctuating water levels were getting smaller. Later on, when the streams were converted into proper waterways, furnished with locks, dams and weirs, together with increasing municipal and industrial pollution, the first irreparable changes and losses of fauna elements were almost inevitable. Attempts to "improve" the fauna with



Where will fish live, find their food and their spawning grounds? Management of a river in the Federal Republic of Germany (Photo A. Lelek)

alien species (eighteen species were introduced into running waters and five species into the lakes) proved a failure. Some of the introduced species established themselves in Europe as "coarse fish", e.g. Pumpkinseed *Lepomis* sp., Catfish *Ictalurus* sp., and many others. Artificial redistribution of European taxa into alien catchment areas within the continent has met with only limited success, e.g. Pike-perch *Stizostedion lucioperca*, Wels *Silurus glanis*. The most common foreign species, Rainbow trout *Salmo gairdneri*, did not establish itself fully as an integral part of the fauna except in some places in southern England. Its recent distribution depends on hatchery-raised stocking material. The Brook trout *Salvelinus fontinalis* did make slightly better progress.

In the cold salmonid reaches the "management" promoted the use of electric shock to remove undesired fish species. Indigenous taxa, e.g. Bullhead *Cottus* sp., and to some extent Minnow *Phoxinus phoxinus*, suffered the most. At present, the unstable monospecific populations of stocked Brown trout *Salmo trutta m. fario* reflect the management efforts of different anglers' clubs.

Adaptable species selected by the changed environment

Generalisations are difficult to make as we know that occurrence, distribution, density and survival, as well as reproduction of fish are governed by a complex of ecosystem factors. To consider all possible factors seems beyond the capacity of one person and is outside the scope of this paper. Let us consider one possible pattern in the life history of fish which can, to some extent, synthesise the mode

of fish reproduction and the quality of environment: it may be called "reproductive strategy".

Looking at the community of fish inhabiting a stream or its integrated section some 100 years ago and comparing the same section now, we come to the known conclusion: valuable and sensitive species have vanished, coarse fish are present, often on the increase. This fact cannot be easily explained by the "poor" quality of water and lack of oxygen, as we used often to hear. If we adopt the technical approach and concentrate on water quality and treatment plants we shall have, without any doubt, cleaner water; however, very little would be done for the conservation of fish.

Years ago Kryzhanovsky stated "... adaptations of fishes for spawning and development reflect not only the essential factors of all the other intervals of life. These adaptations mark the biology of adults, define the type of migration, invasions, abilities and limits of distribution". Instead of explaining the reproductive strategies in detail, an attempt will be made to put our common species of fish, both endangered and expanding, into certain unifying categories according to their habits — also called guilds; for details see Balon (1975).

The guild of open-water spawners release their non-adhesive buoyant eggs scattered in open water. For their development are needed well saturated and steady oxygen conditions as the embryos have no special respiratory organs. The loss or scarcity of these environments in the completely changed lower reaches of our large streams offers a possible explanation of the disappearance of the Shads *Alosa alosa* and *A. fallax*. These stretches are overloaded with organic material and many other non-specified pollutants.



1



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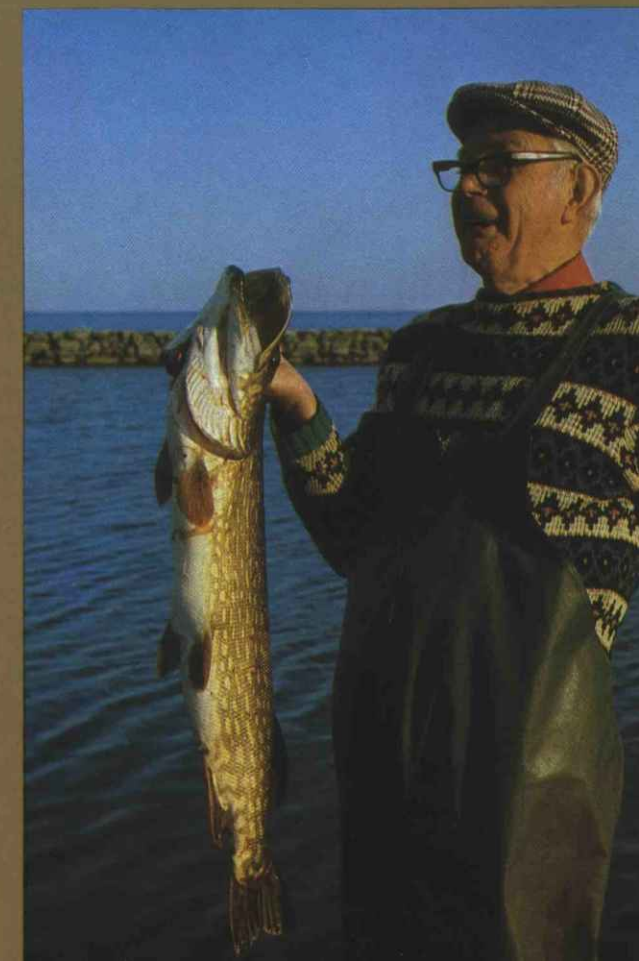
6

dead water?
living waters!

3



5



7



(Photo F. Vollmar, WWF)

Perish in silence

The guild of spawners depositing their eggs initially on rocky or gravel substrate: these eggs soon become buoyant, as do the newly hatched individuals. Their respiratory organs are only moderately developed. Lack of this spawning ground may be responsible for the disappearance of e.g. Sturgeon *Acipenser* sp. Houting *Coregonus oxyrinchus* and Burbot *Lota lota* from the streams as well as of some coregonids from the lakes.

The guild of spawners depositing their eggs for the whole incubation period on the rock or gravel: hatching starts early, larvae are photophobic and hide under stones. Harnessing of the larger streams changed the river-bed morphology so much that spawning grounds for many formerly very common species are rare now, e.g. Barbel *Barbus barbus*, Nase *Chondrostoma nasus*, Schneider *Alburnoides bipunctatus*. In many lakes, owing to eutrophic conditions, followed by increased bottom siltation, the suitable spawning substrate for coregonids have disappeared, particularly for Pollan *Coregonus lavaretus*.

The guild of spawners depositing their adhesive eggs on submerged plants or any other objects protruding into the water column from the bottom or from the banks. The larvae possess moderate embryonic respiratory organs. Some of the most common species can exploit this limited diversity of mostly artificial spawning places. They have virtually occupied whole river stretches, e.g. in the rivers

Rhine and Main in Germany. To name the most successful species: Roach *Rutilus rutilus*, Common bream *Abramis brama*, Bleak *Alburnus alburnus*, Dace *Leuciscus leuciscus* and Perch *Perca fluviatilis*. They comprise over 90% of the fish population by number as well as by weight. The leading species is the Roach, see Lelek (1977).

The guild of spawners depositing their adhesive eggs on permanently submerged plants, on grass in flooded areas or on plants growing in water-bodies connected with the main stream. The most important species of this group are Pike *Esox lucius*, Common carp *Cyprinus carpio*, Tench *Tinca tinca*, Rudd *Scardinius erythrophthalmus* and among loaches Spined Loach *Cobitis taenia*, Schlammpeitzger *Misgurnus fossilis*. This group of spawners is rather endangered as submerged waterplants are scarce in larger streams. Successful reproduction depends on their reaching quiet pools adjacent to the main stream. At present most of the desired species of this group have to be stocked. This seems also to be the main reason for unbalanced populations with a lack of predators, particularly the commonest one, the pike.

The guild of spawners depositing their adhesive eggs on the surface of sandy bottoms or roots above the sandy substrate, mostly adapted to running waters. Examples of our representatives are the Gudgeons *Gobio* sp. and Stone Loach *Noemacheilus barbatulus*. Lack of this substrate made these species, once very common in many rivers, rare and in the Rhine and Main locally absent.

The guild of spawners which excavate hiding places for eggs in gravel, bury them after fertilisation. The most typical are the salmonids, Grayling *Thymallus thymallus*, Zingel and Streber *Zingel* sp. Within this group of species it is not only the lack of suitable spawning places. They are often prevented from entering small tributaries. In addition, the water quality plays, in the case of salmonids and Grayling, a decisive role. This is why salmonids are now dependent on artificial stocking.

To conclude this attempt to demonstrate some examples of essential spawning requirements it seems clear that water quality itself cannot save the fauna. The whole issue is more complicated than expected as many fishes must have both — good water quality and adequate habitat.

Improving, restoring and conserving our fauna

Fish was and remains a valuable resource from many aspects:

1. As a food, fish is in demand in all parts of Europe. Wherever deterioration of waters proceeds so far as to change the flavour of fish, the demand drops. A substitute for natural waters has been found when rearing fish.

2. As a source of information indicating the quality of the environment. The fish, being the last link in the aquatic food-chain, provide sensitive and measurable indices of the state of long-term pollution e.g. heavy metals, insecticides or radioactivity.

3. As a source of amenity, recreation and sport. Instead of a long essay of interest only to anglers, a simple note: fish leaping for insects on the water surface contribute more to our feeling that we live in a healthy nature than a notice-board "Nature Park".

4. From the scientific point of view it is generally agreed that fish have to be protected and conserved. However, the fish is much handicapped in comparison with other more conspicuous creatures, say birds, butterflies or mammals — it is not seen. From the cultural point of view, some fish species and populations are the proof of our past geological history, e.g. Char *Salvelinus alpinus*, coregonids in the Alps and the north of Europe, *Zingel* and *Aspro* species in the Danube and the Rhône, not to mention small loaches and cyprinids. It seems to be necessary to conserve these in the same way as any other cultural assets and as a source of genetic material.

To do so effectively should be the task of the coming years. Protection of fish by law, i.e. forbidding some particular species to be caught, has only a very limited impact. To conserve a locality with a fish population of a rare species may be a small contribution to the whole solution. To be sure that fish survive in their biotope, there must be guarantees: pollution sources have to be eliminated from the whole stretch of river, no land improvements may be made and last, but not least, no management attempts (stocking, poisoning, electro-fishing, angling) may take place. In other words: to conserve fish species or populations requires conservation of an integrated section of the watershed — a task of international importance and guarantee of permanent success.

A. L.

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Burning tropical rain forests in the Ivory Coast (Photo U. Rahm, WWF)

Growing awareness World-wide responsibility

John Burton

Conservation begins at home and concerns us all — but where does it end? Although it may not be immediately apparent, Europeans, Japanese, Americans and the other wealthier people of the world can be held directly responsible for the rarity of many animal and plant species, often in far off corners of the world, where animals and birds are hunted and trapped and whole forests are felled at an ever accelerating rate.

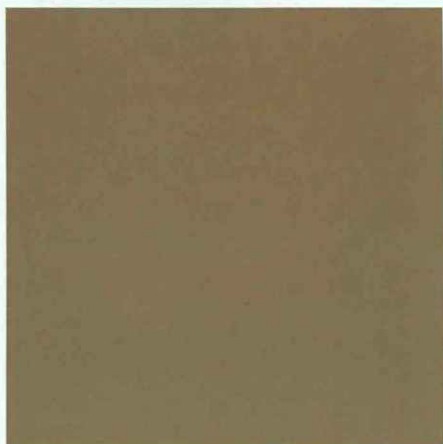
Traditionally man has treated wildlife as a resource which can be mined. Like a mine, once exhausted a new one can be started somewhere else. But we are at last acknowledging that, just as with mineral resources, all the world's resources are

Colour photos central pages

1. A. Lelek
2. S. Karlsson
3. A. Lelek
4. Olle W. Nilsson
5. A. Lelek
6. John G. Walmsley
7. Olle W. Nilsson

finite. Unlike mineral resources, however, wildlife can be managed to produce a sustained yield, thereby becoming effectively limitless. Why then does the plundering continue almost unchecked? Why are the big cats killed for their skins, turtles for their shells, and elephants for their ivory, in too large numbers to sustain this pressure?

It is all too easy to blame the destruction on the local peoples. But whereas this is done in some cases to feed hungry families, often greed for cash is at the origin. This latter demand, often from our continents, for skins and feathers, ivory and rare wood and shells, stimulates and sustains the poaching and hunting, fishing and cutting of the forests.

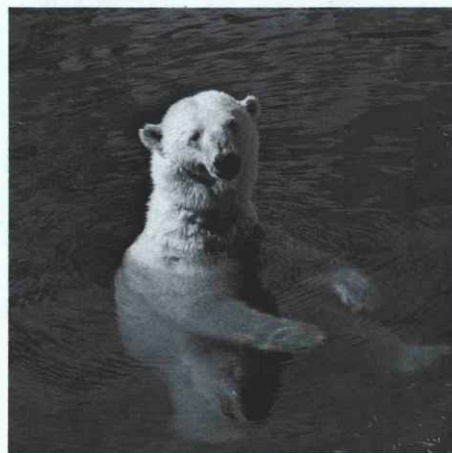


60 millions was soon reduced to some dozens. Man had apparently lost touch with nature and its laws. But already then a warning note was sounded: Chief Seattle, in 1854 in his now famous letter to the US Government under President Pierce, wrote, "I am a savage and I do not understand any other way. I have seen a thousand rotting buffaloes on the prairie, left by the white man who shot them from a passing train. I am a savage and I do not understand how the smoking Iron Horse can be more important than the buffalo that we kill only to stay alive . . . For what ever happens to the beasts soon happens to man. All things are connected."

Shortly, some people were beginning to realise the long-term implications of the destructive attitude to wildlife, although it took a long time for this newly awakened consciousness to have any effect; it is arguable that it still has not had any real effect. Even in our own continent the destruction of wildlife continues: migrant birds are trapped and shot in abusive numbers, the rivers and sea polluted, and goats and sheep graze already denuded hillsides.

Rainforests

In general, Europeans are now trying to put right the damage done in Europe in the post-industrial era, but sometimes at



(Photo A. Rainon, "Jacana")

"All things are connected"

Having destroyed the forests of Europe, together with most of the larger animals which inhabited them, European colonists spread across the globe, often destroying other cultures which had arrived at some degree of stability with the natural environment; this is not to say that forests were not cleared and animals did not become extinct before the advent of European man — they did. Ever since the Stone Age, man's destructiveness has been accelerating, but from the late Middle Ages it went out of control. The expanding human population in Europe with its expanding economies, having plundered its own natural wealth, set off to exploit the natural resources of the rest of the world. This caused whole populations of animals to almost disappear; up to our times some of it still continues even after "independence day" in all but a few countries. There are many sad and well-known examples: less than half a century after its discovery, Steller's Sea cow was extinct, having provided food for the hunters who brought the Sea otter and northern fur seals to the brink of extinction. The Passenger pigeon which once darkened the sky became extinct. The Bison's original population of about

the expense of the rest of the world. While re-foresting Europe, we continue to import vast quantities of timber from the third world and then criticise those countries for destroying their tropical rainforests. We decry the destruction of, for example, the Indonesian forests but in 1974 alone Europe imported over 300 000 tons of wood direct from this country (see table).

Whales

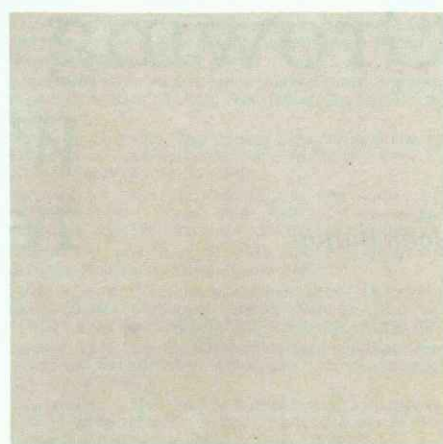
The material demands of the consumer nations continue to threaten one species of cetacean after another, and most of them are now in need of protection as, one after the other, they have been hunted to the verge of extinction.

Although most whaling is currently being done by Japan and the Soviet Union, much of the responsibility for the present predicament of whales may be placed on some European nations.

The FAO has produced detailed estimates of the world's whaling catches since 1930. The greatest destruction of whales since that year has been in the Antarctic.

The Norwegian pelagic whaling fleet, in the period from 1930 to 1970 (when Norway ceased whaling), took nearly 20 000 000 tons of baleen whales; the British fleet over 10 000 000 tons and the Dutch over 1 000 000 tons. In addition, over 10 000 000 tons were taken from land stations in the Antarctic, mainly by European based companies, to a total of over 40 000 000 tons. In the same period, Japan took just over 7 750 000 tons and USSR under 3 500 000 tons.

It was not until the Antarctic whaling operations were no longer economically viable that the European companies abandoned whaling. The Japanese and Russians, having different values for whales and whale products, are however continuing to hunt whales. But here it is arguable that the Soviet and Japanese fleets have,



to a large extent, been able to continue whaling because they have been able to export whale products to the Western world. The USSR exports of whale oils for four years (1969-72), for example, were worth over US\$ 25 million, and in the same period those of Japan nearly US\$30 million. Members of the European Economic Communities continue to import large amounts of whale products, and it is likely that such imports still play a significant part in the economics of whaling.

I have elaborated on only two examples of "faraway resources", rainforests and whales, which are being exploited indirectly by the industrial Western societies. Many other examples could have been named. In 1975, 76 838 Ocelot skins were imported into the United Kingdom, worth over £ 1 million, together with nearly 23 000 other skins, worth over £ 280 000. Probably including Margay and Tiger cat, these skins came mainly from Brazil, Surinam and other South American countries. In the last six months of 1976 over 3500 Tiger cats and about 750 Ocelots from various parts of South America were imported into the Federal Republic of Germany as well as 3000 Caimans from Colombia. In addition, over 2000 Ocelots, over 6000 Margay and over 6000 Tiger cat skins were transhipped through Germany.



Oceans

Let me then speak of perhaps the most important wildlife resource of all, marine fish, which most people seem to regard as being a resource like sheep and cattle. Unfortunately, all over the world fish

stocks are now plummeting as a result of heavy over-fishing and pollution. The North Atlantic Cod, Salmon and Herring are just three species with which we are directly concerned and which could have been harvested at much higher levels were we not so greedy and short-sighted — now their populations are nearing the



Killed by poachers for his ivory, Kenya (Photo WWF)

Table 1
Timber exports from Indonesia to Europe (1974)

Destination	Teak (tonnes)	Ebony (tonnes)	Junglewood Nes (tonnes)	Total
United Kingdom	124		1 185	1 309
Netherlands	2 628	14	6 704	9 346
Germany	1 312	543	17 410	19 265
Belgium/Luxembourg	20	18	5 274	5 312
Denmark	246			246
Italy	16		195 214	195 230
Norway	1 184			1 184
Sweden	320			320
France		148	71 321	71 469
Spain			1 569	1 569
Total	5 850	723	298 677	305 250



Silent protest: — dead whale's open mouth (*Balaenoptera physalus*)
(Photo John Grierson)

Growing awareness World-wide responsibility

danger point and measures for their protection are overdue. But don't we also share responsibility for diminishing stocks of fish and crayfish off the South American coasts when we import and consume these, and for the dolphins and porpoises that are destroyed in the process?

Management

My conclusion is that we must protect endangered species and can do so far more effectively by closing our door to their importation, in whatever form, rather than by trying to enforce anti-poaching laws elsewhere. The Washington Convention on Trade in Endangered Species of Flora and Fauna is a start, but only that. We must conserve the species of wild fauna and flora of the world, if possible before they become endangered. That is also our direct responsibility. We cannot continue to mine these living wild resources of the world. We can harvest some provided we have adequate knowledge and manage the stocks sensibly. That does not only concern the peoples elsewhere in the world but also us Euro-

peans. Our knowledge and wealth should not serve to deplete and impoverish; they should help make those stocks that can support it to become exploitable; they should help to protect those species which cannot be exploited from extinction.

J. B.

Laws of the environment

Sevinç Erçman

Introduction

Until the early 1970s, public concern was focused on environmental protection measures in the sense of pollution control and abatement rather than on nature conservation.

Since then, however, the latter concept has returned to the forefront and emergency action has been taken to change attitudes, particularly with regard to the protection of endangered species and the preservation of natural areas.

This change of emphasis stemmed from the gradual but progressive degradation of natural areas and habitats, the extinction of and the threats to various plant and animal species, and the exploitation or even pillage of natural resources without regard to their potential impact on Man and Nature.

International action

The manifold efforts for concluding a series of multilateral and bilateral international agreements and the promulgation of national legislation in this field illustrate this conceptual change. Examples of the international community's growing consciousness regarding nature protection are the following conventions and draft instruments: the Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitats, of 2 February 1971; the Washington Convention on International Trade in Endangered Species of Flora and Fauna, of 3 March 1973, the Oslo Agreement on the Conservation of the Living Resources in the Baltic Sea and the Belts, of 13 September 1973, the draft Bonn/IUCN convention on the conservation of migratory species of wild fauna, 1976, the draft European convention on the conservation of wildlife and natural habitats, the proposal for a Council directive on bird conservation of the Commission of the European Communities, December 1976. Furthermore, significant principles are laid down in some recent bilateral agreements, such as the Convention between Japan and the USA for the Protection of Migratory Birds

in Danger of Extinction and their Environment, of 14 March 1972, the Convention between Japan and the USSR for the Protection of Migratory Birds in Danger of Extinction, of their Environment and of their Habitats, of 6 February 1974 and the Convention between the USA and the USSR on the Conservation of Migratory Birds and their Environment, of 19 February 1977. Other conventions worthy of mention, the genesis of which pre-dates the Stockholm Conference of 1972, are the Unesco Convention on the Protection of the World Cultural and Natural Heritage, of 16 November 1952 and the European Convention on the Protection of the Archaeological Heritage, of 6 May 1969.

These conventions not only establish principles for the protection of endangered species, but also highlight a new "environmental awareness" and the urgent need for co-operation among nations.

Naturally, the conclusion of these instruments is only the first step towards achieving this objective. Their ratification and their strict observance by the parties, not only verbally but also spiritually, is of course of particular importance.

National measures

In Europe existing legislation on the legal status and the degree of protection accorded to the same plant or animal species differs, and management policies vary from one country to another. Thus there is a need for harmonised legislation. The afore-mentioned international conventions provide general guidelines which require the adoption of national legislation for their implementation. Nature Conservation Acts¹ generally comprise measures for the protection of natural areas, sites and species and sometimes also include regulations for hunting and shooting, as well as physical planning measures.

Measures for the protection of species

In most northern European states, and in the eastern European states where par-





ticular emphasis is laid on nature protection, there is a growing trend, particularly where animal species are concerned, to grant total protection to wild plant and animal species. Exploitable species, not totally protected, are listed in appendices to the nature conservation acts. Examples of this trend are found in the United Kingdom Conservation of Wild Creatures and Wild Plants Act, of 1975; the Irish Wildlife Bill, 1976; the Federal Nature Protection Act, 1976, of the Federal Republic of Germany; the Luxembourg Conservation of Nature and Natural Resources Act, 1965 (specific regulations provide for either integral or partial protection of rare and endangered plant and animal species); the Netherlands Nature Conservation Act, 1967, the Scandinavian Nature Conservation Acts (Iceland: 1970, Norway: 1971, Sweden: 1973, amended in 1975); the Swiss Federal Nature and Countryside Protection Act, 1966, which empowers the federal government to prohibit partially or totally the picking, destruction, exploitation, etc. of rare plant species. It should be noted in this context that owing to the special characteristics of federal legislation, the federated states (*Länder/Cantons*) are empowered to extend the lists to species other than those referred to in the federal framework acts.

As the concepts of wildlife protection and nature conservation are less developed in the southern European countries than in northern Europe, their legislative measures are less advanced. There is not only a lack of public awareness of the need for effective legislation and its enforcement, but also inadequate technology and a lack of sufficiently qualified staff.

A progressive approach towards conservationist policies started only in the early 1970s. But in spite of the adoption of some piecemeal legislation, in the majority of cases the application of legislative measures remains insufficient as inventories of species to be protected either do not exist or are incomplete, and usually no account is taken of the protection of the habitats of particular species.

However, recent legislation in the southern European states shows a considerable improvement. In some Italian regional laws, for instance, there is a trend to consider all animals other than exploitable species as protected; the latter are listed. Areas are established where hunting is prohibited. Another change is to be seen in the evolution of the old concept which considered certain animals as harmful.²

Similarly a preoccupation with the preservation of natural areas can be noticed in Spain. National parks are designated not only to satisfy touristic prestige (which appears to have been the initial reason for creating such areas) but also for purely conservationist reasons. The protection of wildlife, which until recently was of marginal interest, has gained in signifi-

cance since the Acts of 1966 and 1973 created thirty-four protected areas classified as game reserves. Autonomous management — a prerequisite of a modern system — of the statutory protected areas, e.g. national reserves, national game reserves, game sanctuaries, etc., was instigated by the establishment of a National Institute for the Conservation of Nature "ICONA".

The new Protected Natural Areas Act, 1975, which aims at preserving nature through the protection of areas of interest and value, proposes the creation of reserves of scientific value, national parks, nature sites of national interest, nature parks and natural monuments of national interest³.

Hunting legislation

Although the aim of some international and regional conventions was (among others) to induce a harmonisation of hunting laws in Europe, it cannot be said that this objective has been achieved.

The harmonisation of hunting laws faces greater difficulties than that of laws on the protection of species and natural areas as it is generally easier to pass measures for preserving landscapes or for protecting species than to bring about changes in the strong traditional, socio-economic interests connected with hunting. Nevertheless, a number of important elements related to hunting legislation can further harmonisation, such as the establishment of closed seasons subject to conditions laid down in each country's regulations, the definition of methods (bans, controls) and weapons for hunting, penal sanctions for violations of hunting regulations and the granting of hunting licences which may, as for instance in the Federal Republic of Germany, require participation in a course and the satisfactory completion of a qualifying test.

Some examples of recent measures

In Sweden, particular emphasis is placed on ecological considerations in the preparation of different plans concerned with nature conservation. For instance, amendments made in 1975 to the Nature Conservancy Act, with regard to forestry practice: clear-felling cannot be carried out until one or two months after a report has been made to the regional and/or local authorities. This gives the authorities time to check whether ecological considerations have been taken into account before permitting forest operations. The Cross-country Driving Act of 1975 which bans off-road driving and the use of snow-mobiles, and the Beech Forest Act, of 1974 also reflect the above-mentioned ecological considerations.⁴

The Nature Protection Act 1976, of the Federal Republic of Germany, gives due attention to balancing the interests involved in the exploitation of natural resources on the one hand and nature protection on the other. The act provides for the establishment of landscape programmes and framework landscape plans. These plans must indicate the present and the proposed situation of nature and landscape and the measures necessary for the protection and preservation of nature in general, and of the protected areas and wildlife in particular. The objectives of physical planning legislation must be taken into account in landscape plans and programmes at national as well as at *Länder* level.

In the Netherlands, the Ministerial Decree of 20 September 1976, on subsidies for nature conservation, aims at safeguarding privately-owned estates which cannot be managed adequately by private means. Accordingly the owner may apply for a subsidy; if granted, the state may require in return that all or part of the estate be made accessible to the public. This subsidy is thus a contribution towards the expenses which the owner might incur for the zoning, management and upkeep of the area.

The common right of access to private property is traditional in Sweden. However, the financing of the private owner's expenditure, not only in order to make his property accessible to the public but also to maintain it as a scientifically and aesthetically important natural area, is a novelty which contributes to the strengthening of nature conservation measures.

The new French Nature Protection Act of 1976 requires an Impact Statement Study, not only for public work projects but also

for any public or private plan or activity, and for urban development plans likely to affect the environment. Under this act "All planning projects carried out by public authorities which require an authorisation or approval, as well as urban development plans, must comply with environmental requirements".

Preliminary draft plans or projects which, owing to their significance or their influence on the habitat, may harm the latter or cause a significant change in the environment, must be accompanied by a special report, the so-called "impact statement report", indicating their consequences. A decree of the *Conseil d'État*, which should lay down the rules for implementing this article, should comprise, *inter alia*:

- the conditions under which the environmental requirements shall be taken into account by the procedures laid down in the existing rules;

- the content of the impact study which includes an analysis of the original state of the site and its environment;

- a study of the changes which might result from the project and the measures proposed to reduce, and where possible make good, any consequences harmful to the environment;

- the conditions under which the impact report shall be made public;

- the restricted list of works, which owing to their slight repercussions on the environment are not subject to the impact report procedure; and

- the conditions under which the Minister responsible for the environment shall be entitled, or may be requested, to give an opinion on all impact studies.⁵

Much could be learned from the enforcement of this provision which is, incidentally, in line with the Council of Europe Work Programme in the field of nature conservation. However, regulations to determine the act's scope of application are still to be issued.

As already mentioned, legislative measures for nature conservation are quite advanced, at least on paper, in the Eastern European countries. In this context, the Soviet Union's "Ecological reserve" system (a type of protected area which has no exact counterpart in any of the Western European states) should be mentioned. By establishing these ecological reserves, the status of which is defined in section 40 of the Fundamental Land Legislation Act 1968, area protection is used to safeguard sites which contain examples of the USSR's natural diversity and which are valuable for ecological and scientific research rather than for economic exploitation and recreational purposes. As a rule human activities of all kinds are prohibited in these areas. They are created to preserve natural diversity and are supposed to serve as basic "ecological study" tools for comparing the impact of human activities on the environment of unprotected areas and of areas closed to such activities. Two other important functions of these areas are to serve as genetic pools and to provide a stock of rare and endangered wildlife species. These areas are permanently staffed with scientists who carry out research, compile data and monitor wildlife in their natural state. They are administered by different governmental agencies in each republic and are supervised and co-ordinated at union level by the Central Laboratory on Nature Conservation and the USSR Ministry of Agriculture.⁶



Success — the law allows the safeguarding of our common heritage even if it is private property (Photo Wim K. Steffen)

Laws of the environment

Conclusion

In spite of the progress already made, more efficient measures must be taken if the protection of wildlife and natural areas is to be effectively guaranteed. They should particularly attempt to attain the following goals:

1. Revival and re-establishment of the original ecological structure of natural areas including measures for the revival of recently extinct animal species, as well as the recovery of destroyed and/or altered plant communities;
2. Carrying out of extensive research, collecting of data and monitoring of fauna and flora species;
3. Establishment of nature conservation plans based on scientific, cultural and economic requirements;
4. Rational management of natural resources to be undertaken from the viewpoint of long term viability;
5. Enactment of adequate legislation based on experience gained in countries which are advanced in matters of ecology;
6. Implementation of existing legislation both in spirit and letter including penal sanctions for violations of nature conservation legislation;

7. Introduction by way of legislation of an impact study system for nature conservation purposes which should include a post-project impact assessment and proposals for appropriate improvement and adjustments where required;⁷

8. Promotion of inter-regional co-operation, such as for the establishment of "red lists" of endangered species, evaluation of protected sites and landscapes, etc.

9. Systematic and permanent dissemination of information and education of the public to be carried out by authorities at national, regional and local level and in collaboration with voluntary nature conservation organisations;

10. Last but not least, giving due consideration to the role of nature conservation organisations not only for alerting and forming public opinion but also as pressure groups for the effective enforcement of nature conservation measures.

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Failure — the growing awareness towards the environment came too late for these birds
(Photo CCPO — R. Arnhem)



Scaling the heights

Gottfried Feurstein

tion of raw materials. It now seems that even more serious harm is liable to arise if areas are treated in purely economic terms, without any regard for their residential or recreational functions. The expression "nature conservation" is consequently rather misleading if stress is laid on the word "conservation". Planning aspects are just as important as protective ones. In other words, the idea of statically preserving this or that stretch of countryside should be ruled out. What is more important is to plan an area for future use and above all maintain it.

All these considerations apply especially to mountain regions, whose economic, ecological and recreational value is universally recognised as being of major importance.

In the protection of mountain regions an essential part is played by agriculture. Mountain farmers are not only producers of basic commodities; they also contribute to the preservation of their areas' biological, recreation and economic potential. Indeed, the farming of a region is the main precondition of its use for any non-agricultural purpose.

However, farming may often conflict with the other demands made on the area. This is a problem that varies considerably from one mountain region to another. It is at its greatest in places where tourism is highly developed. In such cases, official measures on their own cannot provide a solution. What is needed is close, broadly-

based co-operation between European and national authorities on the one hand, and local authorities and local residents on the other.

In 1974, in the course of the Council of Europe's many and varied activities in this field, the Council's Committee of Ministers asked its Committee on Co-operation in Municipal and Regional Matters to work out development strategies for tourism in mountain regions. As a first step, ten case studies were made of tourist development problems in selected regions.

Tourism as a motive force behind the development of mountain regions

The development of mountain areas depends to a large extent on tourism. It seems that in almost all regions, the introduction of tourism was the crucial stage for their growth. This is particularly true of regions in which the development of tourism did not occur until after the second world war. Here are some examples:

— The population of the Haute Tarentaise region in the French Alps dwindled between 1954 and 1962. Then, a reverse trend set in, and between 1968 and 1975 the annual rate of increase was 0.85%.

— In Großer Walsertal, on the far western side of Austria, where little development had occurred, the population was de-

Nature conservation versus growth

It is symptomatic that nature conservation problems are usually discussed after economic development questions (industry, agriculture, tourism, etc.). Indeed, in the past such problems were often subordinated to considerations of economic growth. In recent years, however, there has been a sharp increase in the importance accorded to the various measures that come under the general heading of nature conservation, a concept which has developed as a reaction against excessive economic exploitation of natural resources. Exponential economic growth has been making ever greater inroads into the countryside. Together with air and water pollution, damage has been caused by increased extrac-



clining until 1961. Over the last ten to fifteen years, however, the rate of increase has been 0.1%.

Until 1970, the population of the Gwynedd County Council area in Snowdonia, Wales, was also declining. Since 1973 the situation seems to have been stable and this is particularly due to the structure of tourism in this region.

In many mountain areas tourism has been the motive force behind general development. Numerous sectors of the economy have been considerably stimulated by the receipt of orders from tourist firms — ranging from light industry and crafts to transport, commerce and similar suppliers of important services for visitors.

The chief beneficiary of tourist development is the building trade. Tourism is also very important in the expansion of demand in the retail trade, thanks to the requirements of hotels and the purchases made by their guests in local shops.

Conflicts arising from the simultaneous use of areas for residential and recreational purposes

Visitors treat tourist areas as places for recreation and leisure. This means they will use only a few of an area's facilities, though the demands they make on them will be heavy. The local population, on the other hand, uses the area for every part of day-to-day life — home, work, education, etc.

This twofold nature of demand is reflected in the provision of a wide range of primary and secondary facilities. And the further tourism develops, the sharper the distinction will be between facilities used by local people and those used by tourists. It occasionally seems that local inhabitants in tourist regions are by no means ready yet for the amalgamation that can be effected between their area's residential and recreational functions.

In this connection the labour market is even more important than facilities for tourists. Moreover, requirements and possibilities are very varied. Efforts are therefore being made to improve vocational training in order to create the conditions

in which the local labour force can be more closely integrated with tourism. In individual regions (e.g. Haute Tarentaise) there is an agreement in force whereby preference is given to local people in the filling of jobs and the award of concessions.

The vital problem concerning the further development of tourism in all regions is that of attracting young people to the tourist industry. In the first place, it is a problem of training. Unfortunately, however, in the less developed tourist regions only a small proportion of young people show interest in jobs connected with tourism.

In the more developed tourist regions this problem has been largely solved thanks to the provision of tourist-trade schools offering a wide range of courses.

One source of conflict, as well as a reason for inadequate integration of tourism into existing structures, is the implementation of large-scale projects involving considerations of economic viability. In the countryside, divided as it is into fairly small sections, local planning requirements and natural features allow of units of only modest size. Consequently the countryside often sets its own limit to the degree of concentration that is possible in tourism.

In tourist areas which are still not very highly developed, further development is sometimes hindered by a lack of overnight accommodation, inadequate catering capacity, a lack of holiday amenities

for visitors or inadequate transport facilities.

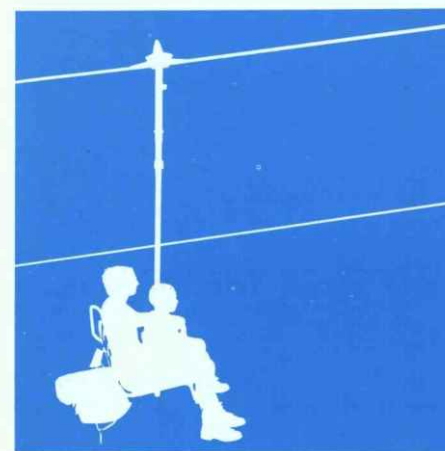
In almost all countries the proliferation of second homes is viewed with great reservations. Nowhere has a definite attitude been adopted to this problem. Second homes are regarded as necessary for the provision of the widest possible range of facilities for tourists, but a real impetus to tourism is seldom expected from them. Misgivings are also expressed with regard to the spread of scattered buildings throughout the countryside, particularly weekend cottages.

Real conflicts often arise in connection with the creation of nature conservancy areas and nature parks, as these usually involve restrictions on other forms of land use.

In spite of many attempts there is still no region for which clear limits to development have been laid down, even though it appears that the environment might soon reach saturation point in some regions. Such limits depend not only on the density of tourism, but also on various human behaviour patterns which cannot be comprehensively defined.

Principles for the development of tourism

The results of the ten case studies enabled an initial list of principles to be drawn up for tourist policy strategies in mountain regions. These principles have already been discussed by the appropriate committee under the Council of Europe's Committee of Ministers and proposed as the basis of a common European policy for tourism in mountain regions. However, they have not yet led to any definite pronouncements.



ate committee under the Council of Europe's Committee of Ministers and proposed as the basis of a common European policy for tourism in mountain regions. However, they have not yet led to any definite pronouncements.

Résumé of the suggested principles

- I. The new forms of society which are being brought into existence by tourism should be conducive to the development of individual personality.
- II. The constant process of renewal occurring in society as a result of tourism must not lead to any loss of cultural values or assets.



In winter, as in summer, the mountains become more and more popular. Roads, heliports, teleferics, entire towns, temporarily harbour the growing crowds. Can our mountains, with their vegetation and their specific fauna, support this enthusiasm and still keep their own identity? (Photo H. Truöl)

III. All initiatives and schemes connected with the development of tourism should be co-ordinated and directed towards a common goal.

IV. Tourist development must not lead to any monostructures.

V. The distinctive pattern of rural life, with its close human relationships, must not be disrupted by tourist development.

VI. Existing structures should be further developed and consolidated by means of settlement.

VII. Excessive demands on space must be avoided. The distinctiveness and diversity of the recreational facilities offered by nature must be preserved.

VIII. Alongside tourism, a special effort should be made to develop agriculture as an independent branch of the economy.

IX. The great hazards inherent in inadequate waste disposal and water purification arrangements should be kept in check.

X. Air pollution and excessive noise should be avoided.

In tourism, the most important role is played by people. An atmosphere must be created in which the visitor feels at his ease. Even a perfect tourist industry cannot be a substitute for such things.

A second consideration for a comprehensive strategy concerns space. The desire

to make use of whatever possibilities nature offers for tourism generally leads to the countryside being subjected to excessive demands which, as use grows ever more intensive, rise in geometric rather than linear progression. Hence the need for protective measures which, once introduced, must not lag behind the development of tourism but must be directed at the positive planning of the countryside.

The pressures resulting from tourism have widely different effects. For instance, a density of tourism such as that in the Kitzbühel area in the Tirol could in certain circumstances represent a great danger for a region like Haut-Val Maggia in Switzerland. Excessive damage usually occurs only over a limited area or in certain sectors. There is now a whole series of indicators which enable the natural conditions for the development of tourism to be assessed (climate, accessibility, topography, etc.); there is, however, no formula for judging an area's capacity for supporting tourist development. Consequently, in many cases, measures of a very pragmatic kind have to be adopted to ascertain the limits of tourist development. Such an approach nevertheless requires a strategy which will spare people, whether they be local inhabitants or holiday makers, from being sacrificed to purely economic interests.

Scaling the heights

Conclusion

The problems confronting tourist development in mountain regions are threefold:

— Excessively speedy growth of tourism usually makes too great a demand on the



(Photo Alf Stäger)

facilities which the local population can offer. The investment capital which in such cases flows in from other regions makes it very difficult to integrate tourism into existing economic structures in mountain regions.

— The natural features of a region form the basis of tourist development, but they also set limits, failure to observe which can have dangerous consequences for the ecological balance.

— The use of mountain regions as recreation areas very often leads to conflicts with their agricultural function. In regions where agriculture is abandoned there is the danger that the countryside will become less attractive and consequently lose its recreational value.

What should be done, therefore, is to encourage a type of tourism which is not harmful to the natural environment in mountain areas. Care should be taken to ensure that the economic effects of tourist activities are as beneficial as possible to the local population, particularly with regard to trade and crafts. As a rule, small and medium-sized tourist resorts seem most suitable in this respect. For this reason, the development of tourist centres should be controlled and geared to the development of the region as a whole.

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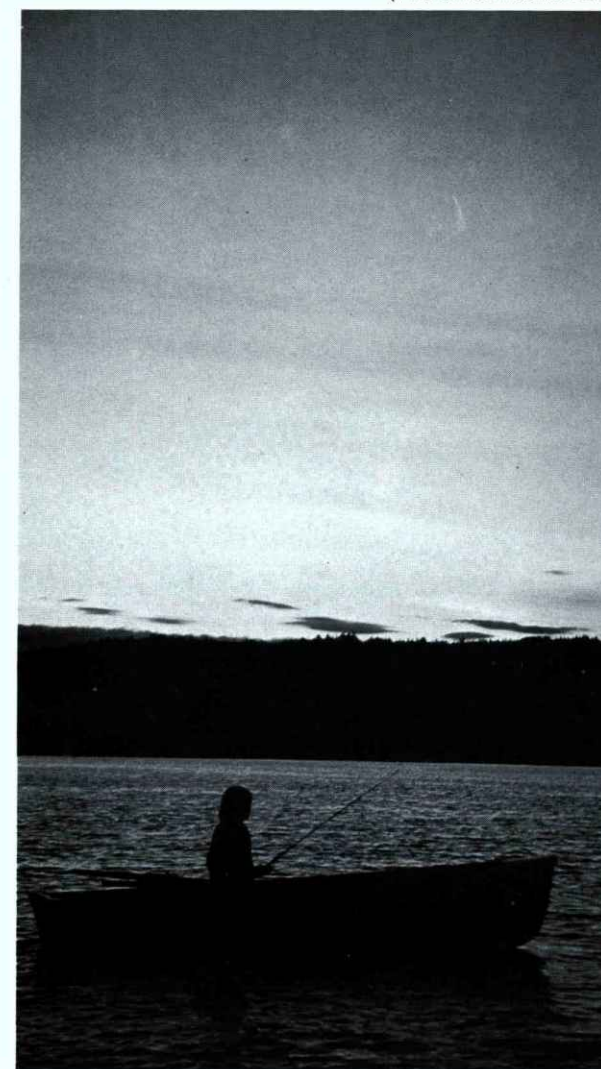
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(Photo Irish Tourist Board)



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