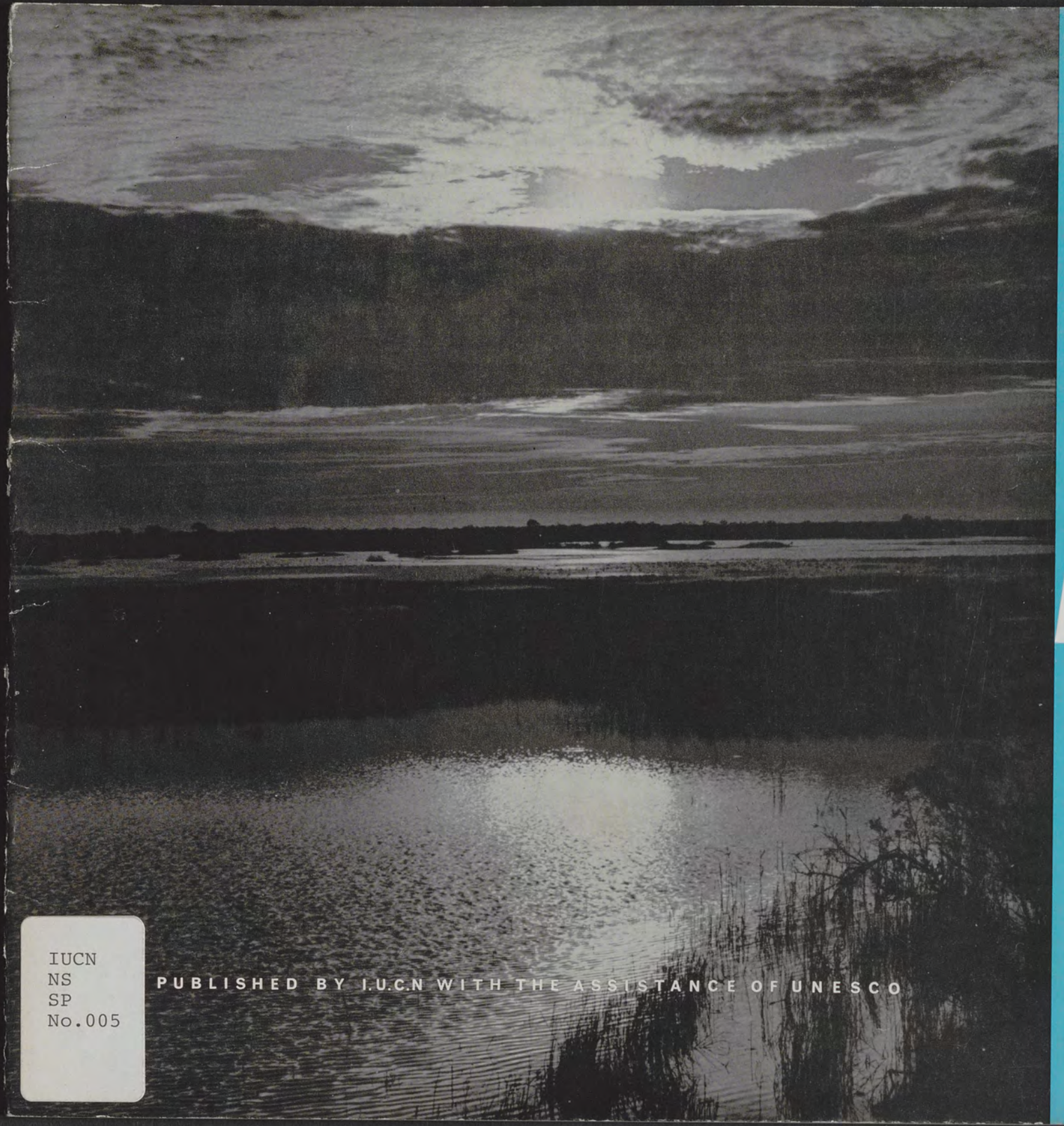

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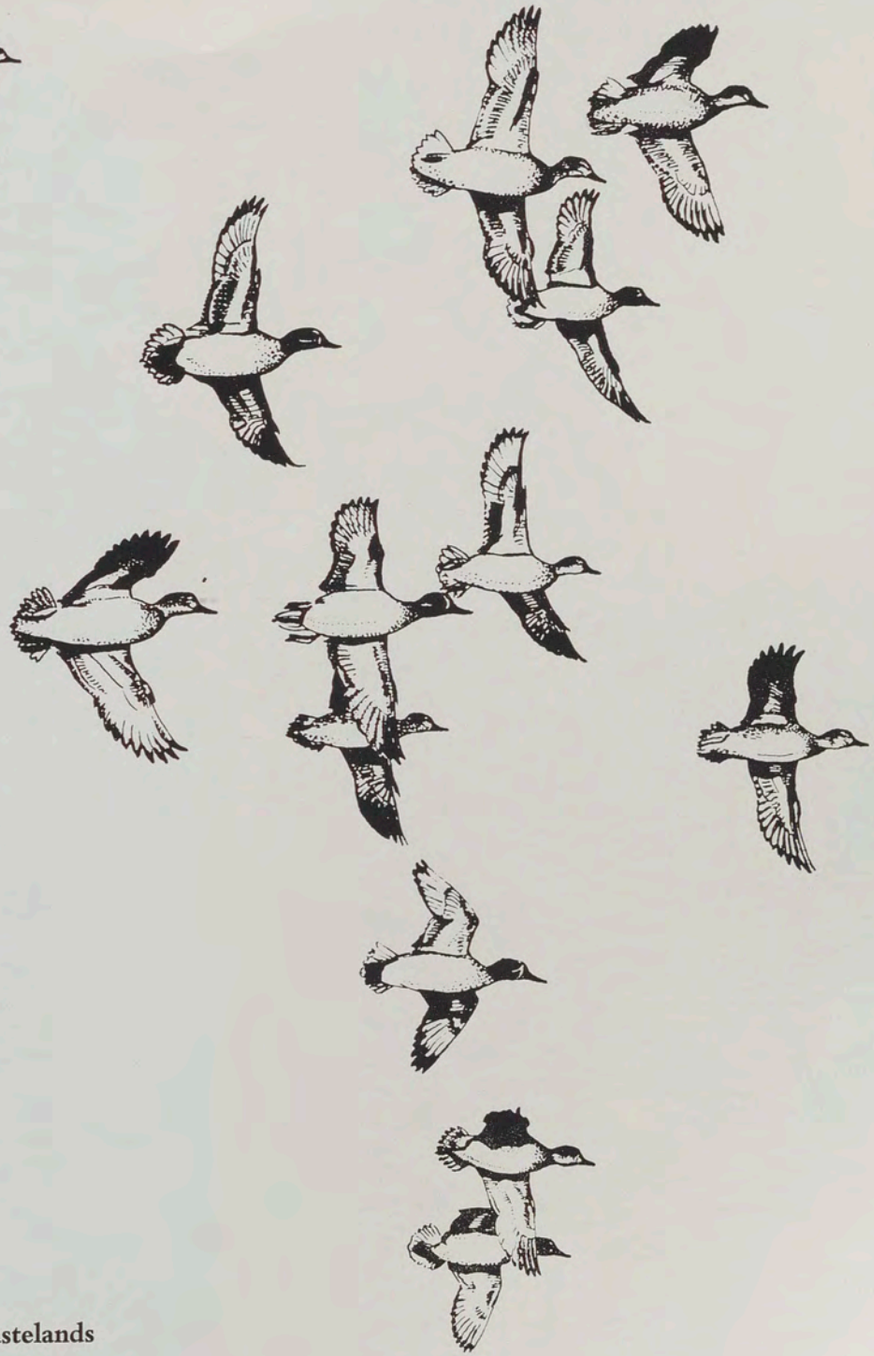
LIQUID ASSETS

The protection of Nature was a concept unthinkable to our forebears of a hundred years ago. Nature was hostile, the traditional enemy of man. One had to clear forests, reclaim marshes, cultivate, "put to good use", take possession of a small part of the earth's surface. There remained an inexhaustible supply of uncultivated, virgin land. So man set out to conquer the globe, and he circumnavigated the earth. He took possession of it and occupied it almost completely. And then he realised that the earth is neither unlimited nor inexhaustible; that rich soil can suddenly become desert, that forests can disappear for ever, that rain need no longer fall, that the air, the sea and the earth, with all their inhabitants, can be polluted and become sterile. He also realised that, if too great a harvest is taken of the animals that inhabit the earth, certain species, even the commonest and most useful, can vanish utterly. I need not list the host of examples of such destruction; they are no credit to human intelligence and foresight; they are tragic, lamentable and irreversible. But the lesson has not been lost. It has at last been understood that natural treasures are as much a part of the inheritance of humanity as any artistic treasure; in the words of my favourite saying 'it is as stupid to drain the last of our great marshes, with their wealth of wildlife, as it would be to demolish the Cathedral of Chartres—to plant potatoes'

COUNT LEON LIPPENS



This is a plea to everyone whose work has a bearing on the future of marshes and wetlands in Europe, a plea that you will at least pause and consider your plans in the light of our arguments. We maintain that wetlands are a natural resource, comparable to forests and farmland, and essential to many activities—a resource so valuable, and now so scarce, that every effort must be made to preserve what still remains.

By wetlands we mean all areas of marsh, and all stretches of water less than twenty feet deep (six metres), whether fresh or salt, temporary or permanent, static or flowing. Important categories include estuaries and coastal shallows, brackish and saline lagoons, natural and artificial lakes, complexes of small ponds or pot-holes, reservoirs and gravel pits, rivers, swamps and flood-meadows. Together these various habitats support a vast and specialised range of plant and animal life, the full value of which is only now being realised.

The preservation of wetlands is vital from four points of view:

Ethically, we are answerable to future generations for what we do to the natural world around us. Just as we have no right to prejudice the health of unborn babies through radio-active fall-out, so we have no right to destroy and extinguish the natural world with its flora and fauna, which is the rightful heritage of generations to come. Man alone has the power to change his environment to suit his needs, and this, in itself, imposes a moral responsibility.

Aesthetically, there are powerful arguments in favour of saving our wildlife and wild places. People *enjoy* animals, find them beautiful and exciting to watch, and derive re-creation from their study. Refreshment also springs from the natural beauty of empty places, the sight and sound of water, the sweep of marsh and sky.

Scientifically, our wetlands provide an almost unlimited field for education and research. Amongst their special characteristics, fitting them for natural laboratories, are the wide diversity of plants and animals, the complex relationship between communities, the high rate of productivity, the rapid changes in natural succession, and the subtle differences which result from the interplay of physical factors.

Economically, we believe that wetlands can best be used by exploiting their natural assets. Already the provision of water for industrial and domestic use has become a major problem, as pressing in some countries as the problem of feeding human mouths. In wetlands we have not only a natural reservoir of water, we have also a great potential source of food, untapped as yet, which science must, of necessity, explore within the next decade.

Wetlands are never wastelands

WETLANDS AND RECREATION

In countries where the standard of living is high, the majority of people attach as much importance to the cultural aspects of life as to purely material gain—and rightly so, since this is the outlook of a truly civilized society. We believe, therefore, that one of the strongest reasons for preserving wetlands is their aesthetic appeal and the opportunity afforded for recreation, education and research. In industrial districts, in particular, the proper use of leisure is already an urgent problem, and one that will surely increase as automation grows and hours of work shorten. It is, in fact, accepted that some of the new 'diseases of civilization' are engendered solely by boredom and the unrelieved tensions of city life. Recreation has thus become an essential part of our pattern of living, and one that we cannot afford to ignore. We must also recognise that wetlands provide one of the most popular, varied and valuable outlets for leisure activities. Some of us may not perhaps approve of certain sports, but is it not better that people should be out and doing something, rather than waiting passively to be entertained?

Fishing, with a charm and peacefulness all of its own, has more active participants than any other pastime. In America the latest estimates suggest that more than 20 million people go fishing, on the average about 18 times a year. Britain has upwards of a million amateur anglers; Holland 650,000; Denmark 100,000, and Finland at least 250,000.

All these fish solely for sport, and rely on WETLANDS for their recreation.

Shooting is also a popular sport. In America nearly 2 million people hunted waterfowl during 1960, and spent an average of seven days apiece at their chosen sport. France has 600,000 wildfowlers, Holland 20,000, and both Denmark and Finland have upwards of 100,000 sportsmen, most of whom shoot wildfowl at some stage during the season. In Britain more than 300,000 people are licensed to shoot, and many of these are likewise potential wildfowlers.

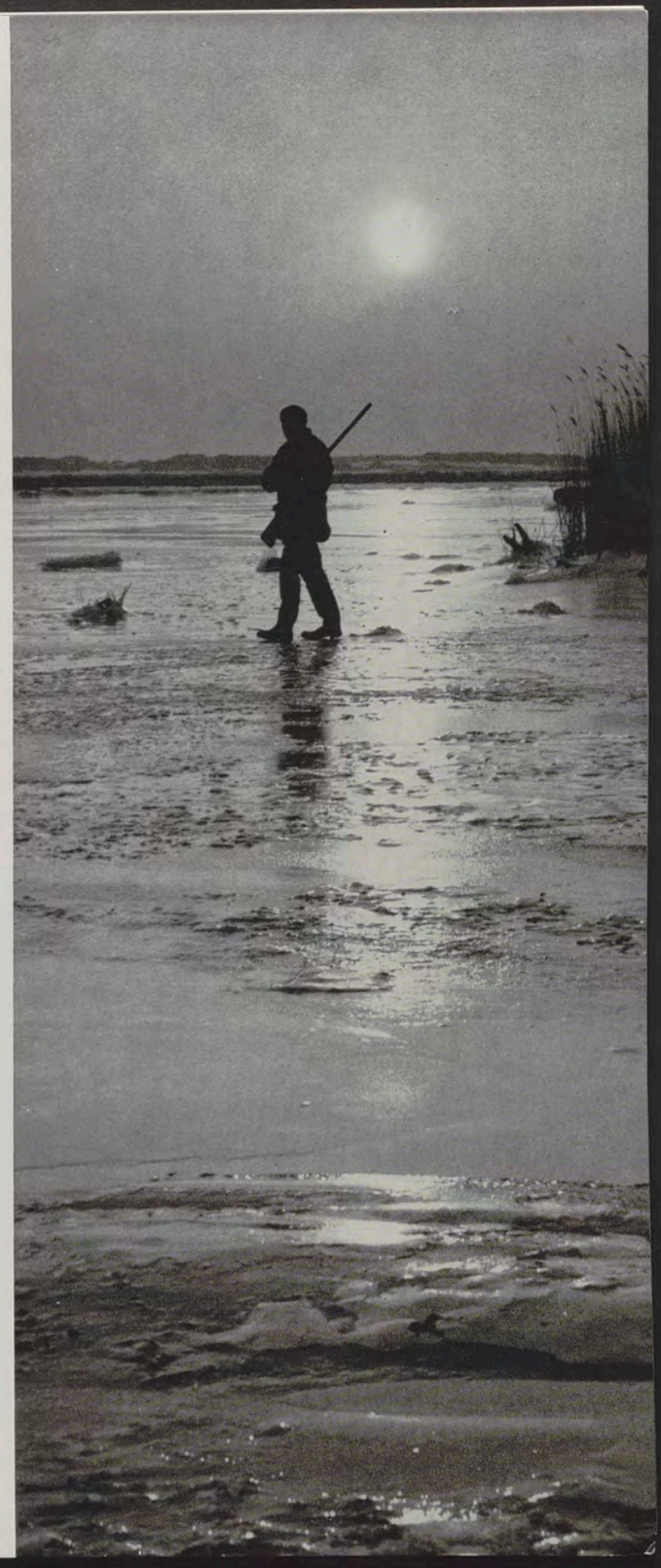
All these shoot solely for sport, and rely on WETLANDS for their recreation.

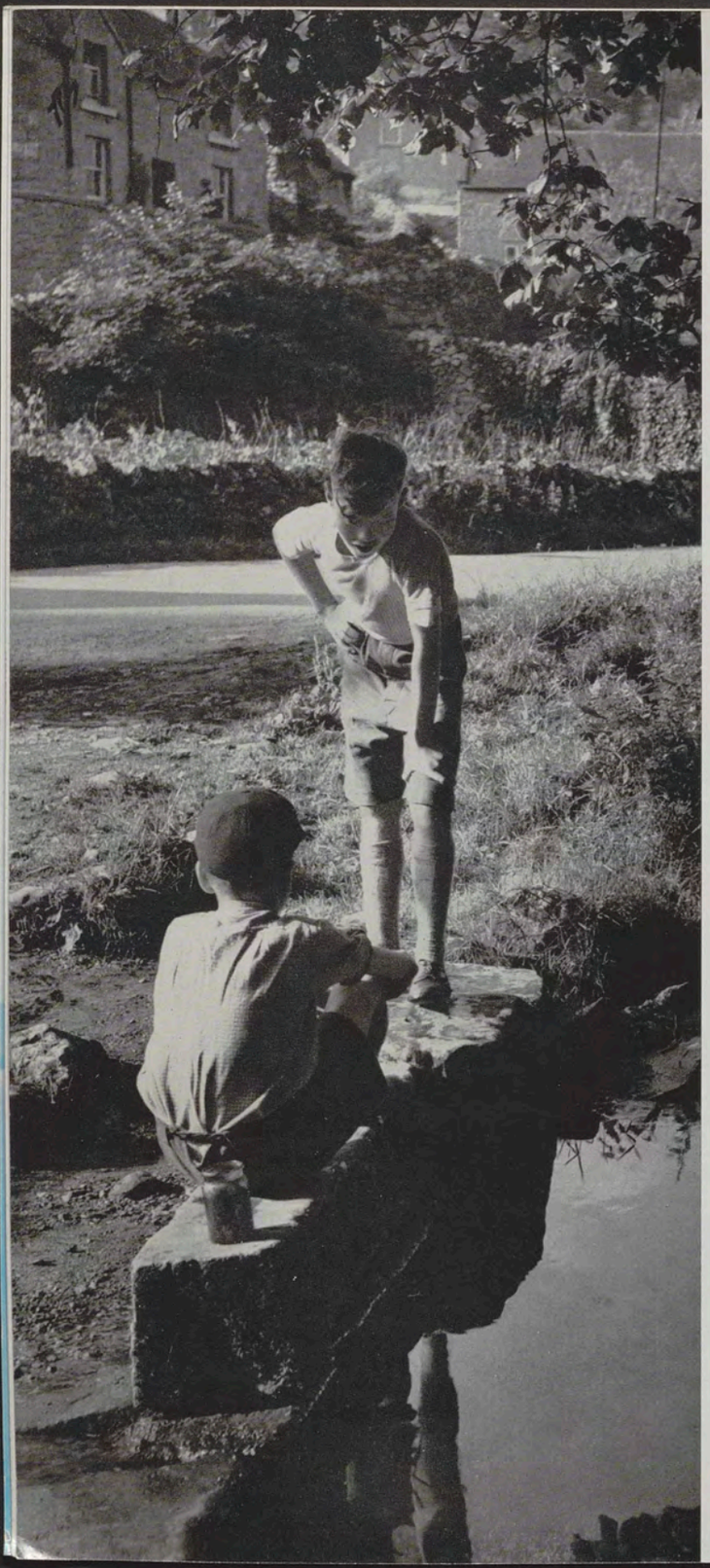
Sailing, in all its forms, has flourished greatly over the past ten years, especially in north-west Europe. In Britain the Royal Yachting Association has over 17,000 individual members, and 1,181 affiliated clubs, the total number of enthusiasts being perhaps half-a-million. Swimming, canoeing, water-skiing, aqua-lung diving and hydroplaning are also popular pastimes.

All these are WETLAND recreations.

Watching Birds is another hobby which gives pleasure and interest to many thousands of people, and millions more would miss the sight and sound of birds as a background to everyday life. The wetland birds, and notably the ducks and geese, have long been favourites, due partly to their grace and beauty, partly to their wildness and freedom, and partly to the magic of the places in which they are found. The number of people who enjoy seeing them is beyond computation, but we gain some idea from the crowds that show their interest and appreciation. In England the captive collections of waterfowl at Slimbridge and Peakirk attract 180,000 visitors a year; in Belgium the waterfowl gardens at The Zwin are equally popular; and in Scotland last year more than 20,000 people travelled from far and near to view a pair of nesting Ospreys. Only a few of these visitors are experts on birds, or even interested in birds as such; for the most part perhaps they are seeking to escape from the confines of everyday life—to sense even briefly the wildness and loneliness of empty places.

For many people a broad sweep of marshland is the loveliest of all landscapes, and the glimpse of a skein of ducks or geese in flight a thrilling and unforgettable sight. If you doubt this, think of the number of homes in which pictures of marshland and wildfowl are given pride of place; consider also the folly of destroying the natural resource from which this pleasure and inspiration springs.





And this our life exempt from public haunt
Finds tongues in trees, books in the running brooks,
Sermons in stones and good in everything.
I would not change it.

SHAKESPEARE: AS YOU LIKE IT

SCIENCE AND EDUCATION

One of the features of the present age is the speed with which Man is changing his natural surroundings to suit his every whim, regardless of the damage and loss that results to the native flora and fauna. Biologists are especially aware of this, and their warnings grow more and more urgent. To them the study of Nature is more than a hobby, it is a discipline aimed at extending the science of life in all its aspects. Much of this work is pure research, with no immediate application—a cultural activity, comparable to the highest forms of art, and an end in itself. Nevertheless, this academic work has time and again led to great advances.

In wetlands we have vast opportunities for research, both pure and applied, a new field which has scarcely been touched upon, not through any lack of interest but because of the very complexity of the problems. By nature, our marshes and estuaries are the frontier between the two great ecosystems of land and sea, the area in which the controlling forces of each combine to produce a whole new range of conditions. No two marshes are quite the same. Everywhere there are gradients of salinity, temperature, depth and current; differences in geological formation and topography, degrees of alkalinity and many other factors, interacting to produce almost endless variation. It is only now, after nearly a hundred

years of studying the separate problems of marine and terrestrial biology, that we start to understand these much more complex inter-relations. One thing is obvious: the problem of using our wetlands to best advantage is a biological problem, and in reaching a solution we must follow biological principles.

The educational value of wetlands is no less important. In every marsh and pond there exists a microcosm of the world around us, a community, complete in itself, from which to learn the elements of ecology, zoology and botany. But, unless the 'class-room' lies close to the school, the studies made there will be superficial and lacking in continuity. This also applies at the higher levels of education, and in research. It is useless, therefore, to set aside just one or two places as wetland 'museums'; what we need are natural living examples in every district.

This same principle is reflected in the current programme of wildfowl conservation. The policy here is twofold: firstly to maintain the stocks as a safeguard against extinction, and secondly to retain the species in at least their present distribution. These are quite separate requirements, the former being a moral obligation, and the latter both an aid to conservation and a valuable amenity. Take for example the White-fronted Goose which winters, 50,000 strong, along the plains of north-west Europe, relying for its feeding grounds on stretches of splashy pasture. In most of its main resorts the species is well cared for, and in general shows no sign of decrease. Its distribution, on the other hand, is increasingly restricted by the drainage of many of the smaller marshes, and if this continues the flocks will in time be limited to a dozen major strongholds. People who wish to see or study the birds will then be forced to travel long distances, and the species itself will be much more vulnerable to changes. With nowhere else for the flocks to go, the loss of even one of the strongholds could prove disastrous.

The burden of these arguments is the same throughout: wetlands are not anachronisms of interest only to the dilettante; they enter, directly or indirectly, into the lives and future of us all. By destroying them we become the poorer both in substance and in spirit.

The Avocet, which had not bred in Britain for 100 years, has now returned, encouraged by the scientific management of a National Nature Reserve

Careful and repeated sampling of the complex wetland communities is essential before such areas can be used to best advantage

The drainage of shallow lakes and marshes has long been regarded as a step towards national prosperity, a view upheld by the yields of grain and the head of stock, which provide the visible proofs of success. Were this the full reckoning the case for development would be unassailable, at least from the economic viewpoint; as it is there are many reasons to suggest that conversion to agriculture is neither the wisest nor most economical means of utilising the wetland resource.

Drainage schemes, undertaken at public expense, are in effect a form of farm subsidy, and as such should be compared with other methods of stimulating agricultural production. Politically, such subsidies have certain advantages: drainage projects are often spectacular; the wresting of land from water is an obvious achievement; and in short the tax payer has a visible return for his money. There is also the underlying notion that something positive has been done to stave off the threat of world starvation. If, as seems likely, this latter argument is the one that carries the greatest weight, there are several approaches to it. In some districts the improvement of marginal wetland may well seem the only practicable means of increasing agricultural yields, but taking the country as a whole there are greater opportunities. If food production is the sole aim, then almost certainly there are other, better uses for subsidies than local schemes of this nature. In Holland this principle is already recognised, and grants for reclamation and land improvement are restricted to areas suitable for arable farming;

THE ECONOMICS OF DRAINAGE

The arteries of an estuary (opposite) bring the waterborne nutrients into intimate contact with soil, light and air. Such areas are amongst the most naturally fertile in the world . . .

the taking in of further pasture is no longer considered economic.

It follows therefore that drainage schemes designed to benefit agriculture must not only be 'worthwhile', they must be more worthwhile than any other project with the same end in view. They must also take into account the natural wetland assets which are going to be destroyed, and more especially the long-term effects of tampering with the water-table. This particular aspect is important, because the changes are often gradual, and the full effects may not be felt for 20 or 30 years. That is why so many projects fail to maintain their early promise.

From the international viewpoint it seems unlikely that the reclamation and 'improvement' of the last remaining marshlands of north west Europe can make any marked contribution towards famine relief. With surpluses here and shortages there, it is clear that the problems of distribution and payment are as much a limiting factor as the problem of production. Improvements in agriculture are needed not so much in Europe as in the famine countries themselves, where the opportunities for progress are so much greater. We must hope, however, that those who plan this development will avoid the mistake made in Europe for the past 100 years, the mistake of ignoring the intimate relationship between the water resources and the **long-term** productivity of the soil.

. . . provided the system is entire

O, it is excellent
To have a giant's strength; but it is tyrannous
To use it like a giant.

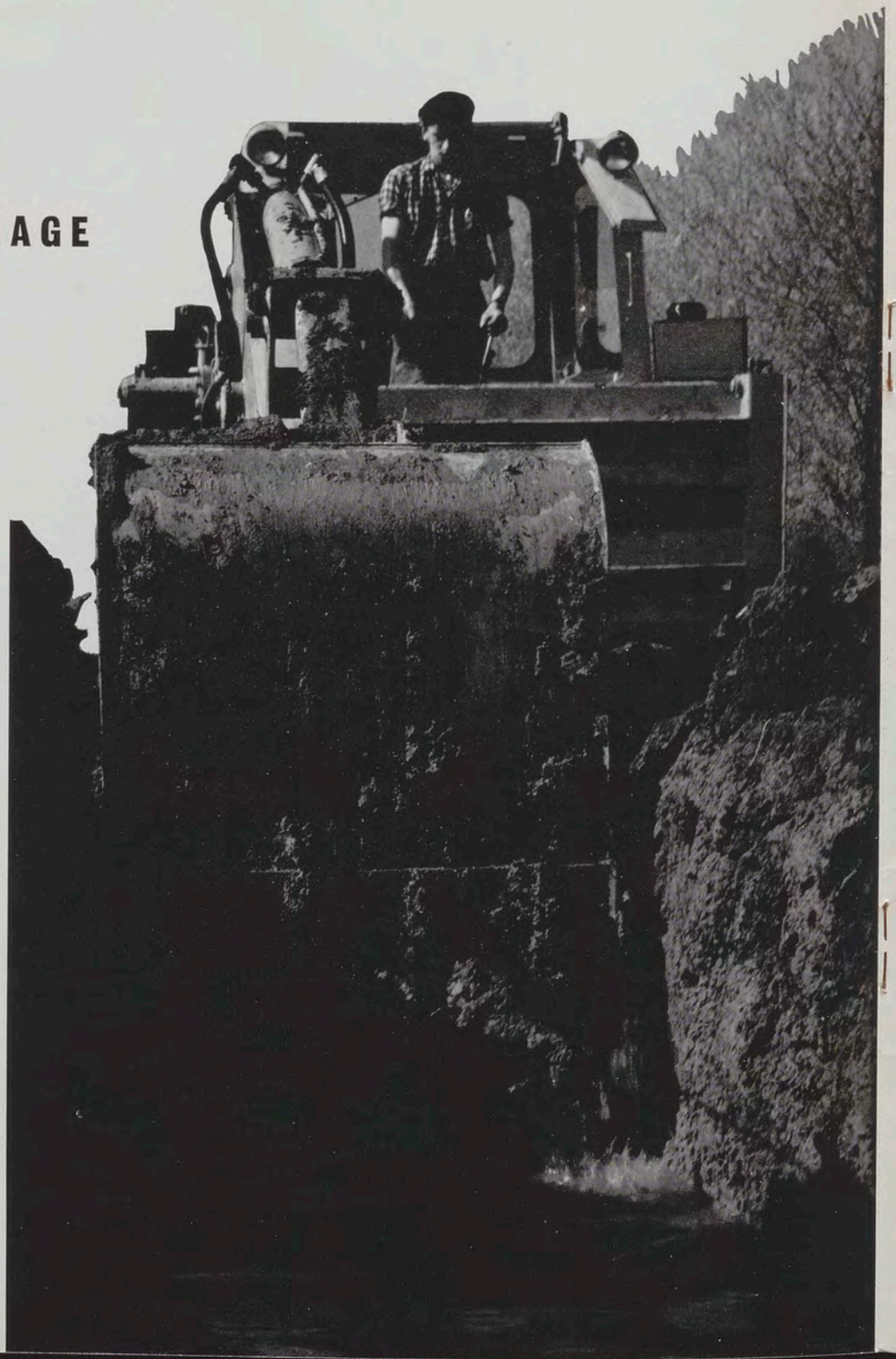
SHAKESPEARE: MEASURE FOR MEASURE

THE DANGERS OF DRAINAGE

A plentiful supply of fresh water is one of the most valuable assets a nation can possess—but at the same time our settled communities demand that water shall be kept safely in its place. Until recently this second requirement was regarded as all-important, and the drainage authorities, as agents of the public, have been limited in their mandate to flood prevention, control of pollution, and improvement of fisheries. Now the emphasis is changing, and the primary problem is no longer the rapid disposal of water, but its conservation to meet the huge and growing demands of industrial, agricultural and domestic users. This new task is not made easy by the long years of drainage and 'land-improvement', but at least we can learn from experience and avoid the mistakes which have led to the present difficulties.

The one vital lesson is that all drainage schemes are followed inevitably by repercussions further downstream, the effects being felt eventually by a whole range of apparently unconnected interests. This means that the farmer who sets out to improve his own few acres is likely to cause a quite disproportionate amount of trouble and expense to many other people. He himself cannot be expected to foresee these effects; it is therefore the duty of those who advise on such projects (and encourage them with subsidies), to ensure that due thought has been given to every possible contingency. This cannot be done unless the river basin is considered **as a whole,** with all its diverse problems, interests and requirements.

Examples of the unforeseen results of drainage are found in almost every river system of Europe, and in many cases the ill-effects are still accumulating, since the cure to one problem is often the cause of several more. Usually the trouble begins with, or is aggravated by, the drainage of marginal land on the upland gathering grounds, where the rainfall is heaviest, and the soil remains wet for most of the year. These boggy areas can often be 'improved' without much difficulty to



provide good summer grazing, and possibly some arable, but by doing so the run off of rain and melting snow is greatly hastened. In their natural state such areas serve as regulators, absorbing water during wet periods and releasing it slowly in times of drought; drainage destroys this function and results in a much wider variation in river level along the middle and lower reaches. Sudden spates become more frequent, the volume of floodwater increases, and the farms and townships of the valley are faced with new threats of flooding. To correct this the river is embanked, and the channel may be straightened to help the water away. This in turn causes flooding downstream, and eventually the river is 'corrected' along the greater part of its length. The riverside communities have thus had forced upon them a stereotyped landscape, with fewer amenities and a greater poverty of plant and animal life. The embankment of the river also prevents the low-lying fields from draining naturally, and so a new system of ditches and sluices is needed to keep them clear of water.

With the risk of flooding removed, it is tempting to improve the drainage still further, and to use as much of the low-land as possible for arable farming. This in itself is reasonable but, due to the sharper drainage, the loss of top-soil through erosion is proportionately greater. Erosion also results from drainage improvements along the sides of the valley, and, since the run-off is led to the river as quickly as possible, the particles of soil are never allowed to settle. Formerly, a good deal of this silt was dropped on the low-lying fields, where it formed a valuable fertilizer; now it is rushed to the sea and thrown down in banks and bars around the estuary, encumbering the channel and comprising a hazard to navigation. The loss of humus is especially serious because, unless great trouble is taken to replace it, the fertility of the fields is quickly reduced.

The rapid disposal of the surface water results also in a marked lowering of the river level during times of drought. This leads to higher concentrations of industrial and domestic waste, high enough in many cases to comprise a serious threat to fisheries and public health. The disposal of this nuisance entails either a complete revision of the sewage system, or the building of balancing reservoirs to maintain the flow. Both solutions are costly, and the latter may involve consider-

Above: An industrial desert, sterile, polluted, unlovely

Below: 'Foam is a fad'; latherless detergents are no less efficient

able loss of farmland. The low level of the river may also make it difficult to maintain a constant supply of pure water to all those who require it. In some districts this problem is met by building still more reservoirs; in others, much greater reliance is being placed on boreholes and artesian wells. There are signs, however, that in certain areas these subsoil resources are fast being depleted. The reasons for this are twofold: firstly the supplies take some long time to replace themselves, and secondly the rate of replacement is greatly slowed by the present policy of land drainage. Subsoil water depends partly on the presence of surface water in swamps and lakes, the water being forced downwards and outwards under its own pressure into places not otherwise reached. If the surface water is removed by drainage, the effect is obvious. Subsoil water is also replenished by the infiltration of rain through the top-soil, but if the fields are honeycombed with land drains (or worse still covered with houses and roads) the water can no longer permeate; instead it is rushed to the river and thence to the sea.

This drying out of the land is becoming a serious threat to agriculture in several parts of Europe. In the badly affected areas quite short periods of drought are enough to cause anxiety; dust-storms are common; and worse still the fertility of the fields is beginning to decline. Because of this, many farmers are building their own reservoirs to replace the natural reserves of water which they themselves have helped to dissipate. In America they are even re-flooding some of the drained marshlands.

The reclamation of coastal and estuarine marshes has equally undesirable effects. It is now recognised that estuaries are amongst the most naturally fertile areas of the world, much more productive, acre for acre, than a field of wheat. The wheatfield, of course, produces more food for human consumption, because at present only a very small part of the estuarine production reaches human mouths. The potential is nevertheless there, and, by interfering, we are throwing away the opportunity of exploiting new sources of food. On land, a crop is grown and harvested in the same field; in tidal estuaries there is constant movement and,

Cattle and corn are not the only measures of fertility. Biologically, a salt marsh is more productive, acre for acre, than reclaimed land

although the harvest may be gathered in the deeper water, the primary source of productivity is centred in the marshes and mud-flats. Estuaries must therefore be regarded as single units, comprising not only the mud and sand flats, but the marshes, the creeks, the open channels and the seaward approaches. If some of these components are cut off and reclaimed for agriculture, we must accept the loss of the basic energy on which much of our fisheries depend.

These chain reactions, set in motion by ill-considered drainage, are the strongest possible argument for reappraising the present policy of 'land-improvement'. Farming has made great advances during the past century—advances which have made it possible for us to expand our population and to raise our standard of living to new levels of prosperity—but paradoxically it is these same advances which threaten to deprive us of all we have gained. Water and food are both essential to us and the one cannot be considered except in context with the other; if more food now implies less water in the years to come, we can look forward not to better harvests, but to drought and famine. Mankind has already ruined the fertility of large areas of the northern hemisphere through wrongful husbandry, and the deserts and dust-bowls of his making continue to encroach. Only by placing the **long-term** productivity of the soil above all other issues can we hope to avoid the same mistake.

THE LESSON OF EXPERIENCE

Some of the long-term damage arising from the drainage projects of the past could not perhaps have been foreseen, but in many cases there were consequences which could, and should, have been realised at the outset. All too often the value of the natural wetland assets was totally ignored, the merits of a project being assessed solely by setting the estimated costs against the probable increase in the value of the land. Errors in calculation were also common, and looking back it is clear that many projects should never have been undertaken.

A classic example of this is found at Hornborgasjön in central Sweden, where stubbornness and blind optimism have impoverished the community for 150 years. In its natural state the lake here covered some ten square miles to a depth of 3-6 feet; the vegetation was luxuriant and the wildlife richer than anywhere in the country. Drainage was attempted first in 1803, then in 1850, and again in 1874, each time with heavy loss, and yet in 1903 a further scheme was begun at an estimated cost of S.Kr.250,000. The profit promised was S.Kr. 600,000, this being the capitalised value of the increase in the agricultural yield. At the end of thirty years less than half of this profit had been realised, and the capital outlay had risen to 10 times the original estimate. Despite this yet another project was started in the 1930's, and by 1958 the expenditure had reached a total of S.Kr.4,000,000. Today Lake Hornborgasjön is still a marshy expanse, still liable to heavy flooding, and still far short of showing the profit promised 60 years ago. Even had this materialised, it would scarcely have met the current cost of maintenance, let alone the interest on the capital invested.

In addition to these losses, there were other debits which ought to have been obvious from the outset. At that time there were 17 professional, and a hundred or more part-time, fishermen on the lake, earning an annual income which was later estimated as equivalent to the interest on S.Kr.800,000—a sum, in fact, exceeding the expected profit on the reclaimed land. The lake was also an excellent centre for wildfowl, the finest in the country. It served moreover as a natural reservoir for the hydro-electric power stations further downstream. With the lowering of the water table and the rapid run-off of the spring floods, this reserve was dissipated and in 1932 it was held that water power to the value of S.Kr.1,000,000 had been lost since the project began. This in turn led to long and expensive law-suits.

These misfortunes were not, you will note, the outcome of one unlucky error, nor the work of one or two misguided persons. The history of the drainage of Hornborgasjön is packed throughout with bitter experience, but despite this people appeared again and again to continue the project over five generations. In doing so they chose to perpetuate the errors of their predecessors by ignoring all aspects other than the problems of drainage itself.

The lesson is obvious: the planning of such projects demands much more than technical ability; it requires also an understanding of the natural assets inherent in all marshes and wetlands—an understanding broad enough to foresee the full extent of the losses that are going to be incurred. Drainage itself should be thought of as a form of surgery, a painful operation only to be undertaken in the last resort.

THE CONSTRUCTIVE USE OF WETLANDS

The loss of the natural assets and the other long-term effects of drainage are not the only aspects to be taken into account in assessing the merits of a project. It should also be considered whether the money earmarked for drainage might not be better spent on exploiting the existing resources, either as a tourist attraction or to produce a harvest as profitable and useful as an agricultural crop. Fish-farming is an obvious possibility, and experience in Central Europe reveals that the yield of food per acre is substantially greater than that obtained from wheat. Some of the less palatable fish such as perch, roach and ide, are also being used with success as a winter food for pigs. Experiments in one small area of southern Sweden have resulted in an average annual catch of 70,000 kgs. of these three species, enough to provide the full requirement of animal protein for the production of some 400,000 kgs. of bacon. Weak stock shows considerable improvement in growth and health on this diet, and the only difficulty has been the administrative problem of distributing the fish while still fresh.

The advantage of projects such as these is very considerable: the development can be spread over many years if need be; work can be stopped at any stage without losing the benefits already obtained; and the capital outlay and upkeep is relatively small, because clearly it is easier to exploit a resource than to impose some other usage.

Wetland districts may also be developed to provide attractive holiday centres for people with a wide range of interests; indeed, this line of development is likely to bring greater local prosperity than any other enterprise. With most agricultural crops, only a proportion of the retail price accrues to the farmer, the remainder being absorbed by carriage and more especially by various middlemen, living well away from the district. In the tourist trade overheads of this nature are negligible, and the incoming money circulates freely within the community. One recent survey showed that the currency brought into a tourist district

passed through the hands of no fewer than 15 people, before its ultimate expenditure elsewhere. This explains a common anomaly: the fact that attractive tourist centres are able to expand profitably, despite quite short seasons, whilst agricultural and forestry enterprises, with apparently larger and more regular markets, remain much less prosperous.

An excellent example of this usage of wetlands is provided by the Norfolk Broads. These comprise a series of shallow lakes, interconnected by waterways and marshy valleys, with large expanses of reed-bed round about and rolling farmland beyond. Altogether there are 38 lakes, totalling 1,600 acres, and 93 miles of navigable channel, mostly with public right of access. A hundred years ago the marshland economy depended partly on grazing and fishing, partly on reeds for thatching, but mainly on the export of forage and litter to London and elsewhere. With the disappearance of horse drawn traffic this trade ceased, the reed-beds encroached, and large areas became overgrown with alder. Such areas were useless as they were, and vastly expensive to reclaim: indeed, the costs of maintenance were so high that even existing fields were often allowed to revert. In the meantime, however, the Broads were becoming more and more popular as a centre for boating holidays, and by 1938 the summer influx of visitors was estimated at 80,000. Since then their numbers have increased to at least 250,000; some 5,000 craft are offered for hire; and the season extends almost throughout the year.

The amenities afforded by the Norfolk Broads are possibly unique, but many examples on a smaller scale spring instantly to mind. People enjoy playing with boats, they enjoy fishing, swimming and camping, and more and more of us are spending active holidays, exploring our own and other countries. Above all we enjoy being near water.

Above: Fish-farming is a simple and profitable use for wetlands

Below: Poplars are a profitable crop, in steady demand, and showing a relatively quick return

THE CONSERVATION AND MANAGEMENT OF WETLANDS

The ethics of conservation are simple enough: Man alone has the power to order the animal kingdom, but in wielding this power he has moral responsibilities. He may use, but he may not destroy—destruction is no more his prerogative than creation. And yet in the past hundred years the world has seen the final extinction of more than a hundred species of birds and mammals, each the irreplaceable product of tens of thousands of years of evolution. Some have been lost through wanton killing, some through apathy, but most through lack of understanding. Conscience-stricken, we are now striving to save another hundred species from a similar fate in the next few decades—and a thousand or more from approaching the last slope to obliteration.

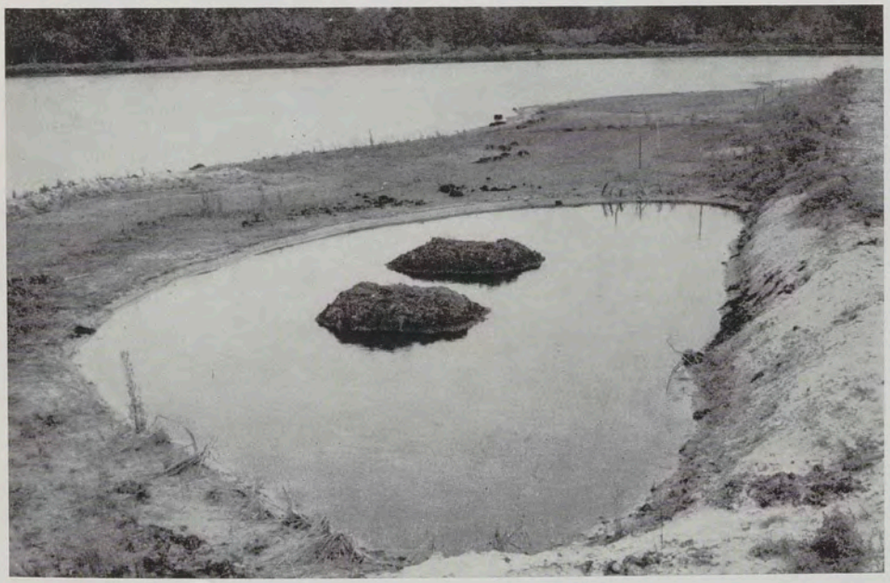
Conservation involves more than a mere curtailment of killing. Most species are much more threatened by the loss of their natural surroundings, the habitat to which evolution has suited them, and without which they cannot survive. The provision of living-space is thus of prime importance, although with some of the less adaptable species even this may not be enough. By altering our own environment to suit our human needs and comfort, we have already upset the ecological balance over most of the world's surface, and directly or indirectly introduced a new and often hostile set of factors. To safeguard the threatened species we must not only set aside reserves to provide the living space, we must also 'manage' these reserves and try to re-establish the conditions that obtained before man began to intervene.

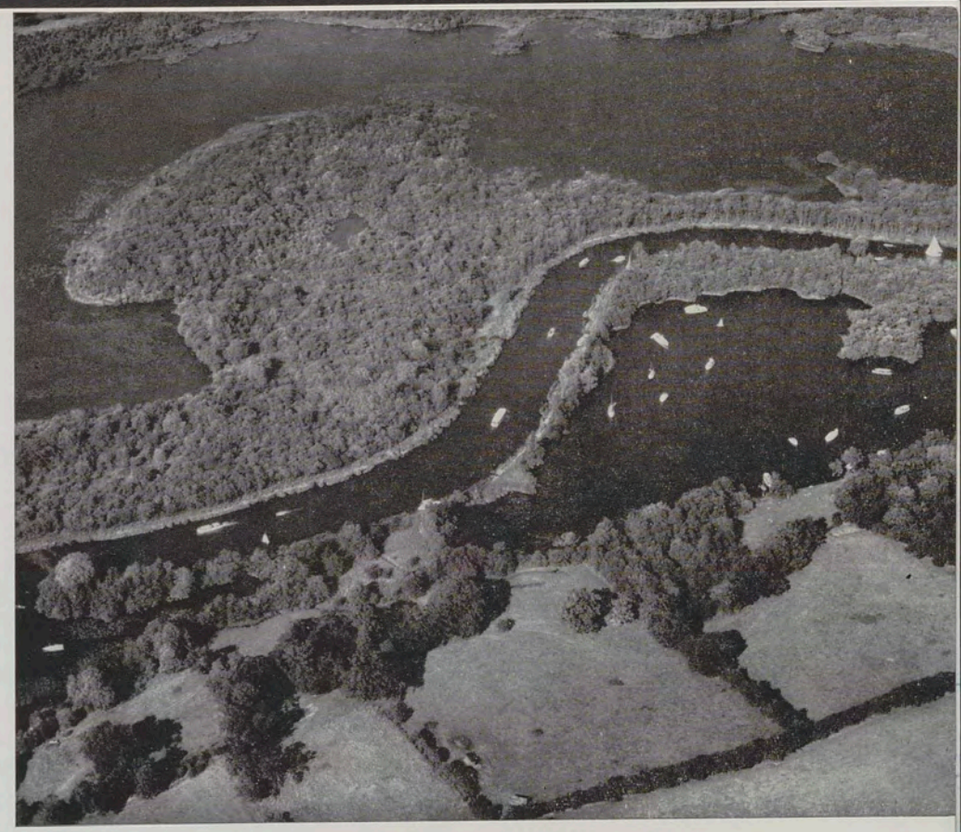
Wetlands pose special problems in this respect. They are dwindling faster than any other ecological system; they are vulnerable to many abuses; and greatly in demand by various conflicting interests. The wildlife interest, being the least able to tolerate interference, demands very special consideration, but at the same time some compromise with human requirements is essential. Industry and agriculture, recreation and tourism, hygiene and transport, all these have pressing claims, and each in turn seems more important than the rest. To satisfy them all may seem impossible—and so it is if each is taken separately—but with thought and goodwill a compromise can often be arranged. Many activities are compatible, and the sharing of sites presents no problem; others are in conflict, and, in the absence of alternative sites, it may be necessary to confine them to separate sectors, or to different seasons of the year. The wildlife interest, itself compounded of many conflicting facets, is often the most difficult to accommodate because of its rigid requirements, but even so it must dovetail in with the rest. Only thus can we hope to preserve it against greater and greater pressures.

Opposite: Living space is all important

Right: A working compromise; wildlife and recreation, each with their own sectors

Below: Habitat improvement: a shallow pool dug by dragline near a gravel pit; above *before planting and* below, *two years later with wildfowl food plants well established*





Anything which results in the useless wastage of wetlands is to be deplored. The tidy-minded canalisation of rivers, streams and estuaries, the tipping of garbage and the thoughtless pollution of coastal and inland waters, the ill-considered drainage and development of marsh, lake and shore—all these combine to hasten the dreary uniformity which passes for progress. Do we really want to live alone on this Earth, in a vegetable garden, with only our cows and hens for company?

The conservation of wetlands is a moral, aesthetic, scientific and economic necessity

Wetlands are a natural resource, a part of our heritage; many millions of people find pleasure in wetland recreations

Wetlands are rich in opportunities for research and education

The use of wetlands to best advantage is a biological problem; in reaching a solution we must follow biological disciplines

Ill-considered drainage results in a chain of troubles; short-term gains are never worth a long-term loss

Water conservation is vital. More food must not imply less water

The mistakes of the past are all around us; remember Hornborgasjön

Wetlands are a natural asset. Exploit them . . . don't destroy them

Wetlands are never wastelands

The following organisations are eager to offer advice on problems of conservation:

DENMARK
Vildtbiologisk Station
Kalø, pr. Rønde

FEDERAL REPUBLIC OF GERMANY
Institut für Vogelforschung (Vogelwarte Helgoland)
294 Wilhelmshaven

GREAT BRITAIN
The Nature Conservancy
19 Belgrave Square, London, S.W.1

NORTHERN IRELAND
The Ulster Game & Wild Fowl Preservation Society
3 Donegall Square East, Belfast 1.

REPUBLIC OF IRELAND
An Taisce (The National Trust for Ireland)
19 Dawson Street, Dublin

SWEDEN
Svenska Naturskyddsföreningen
Riddargaten 9, Stockholm

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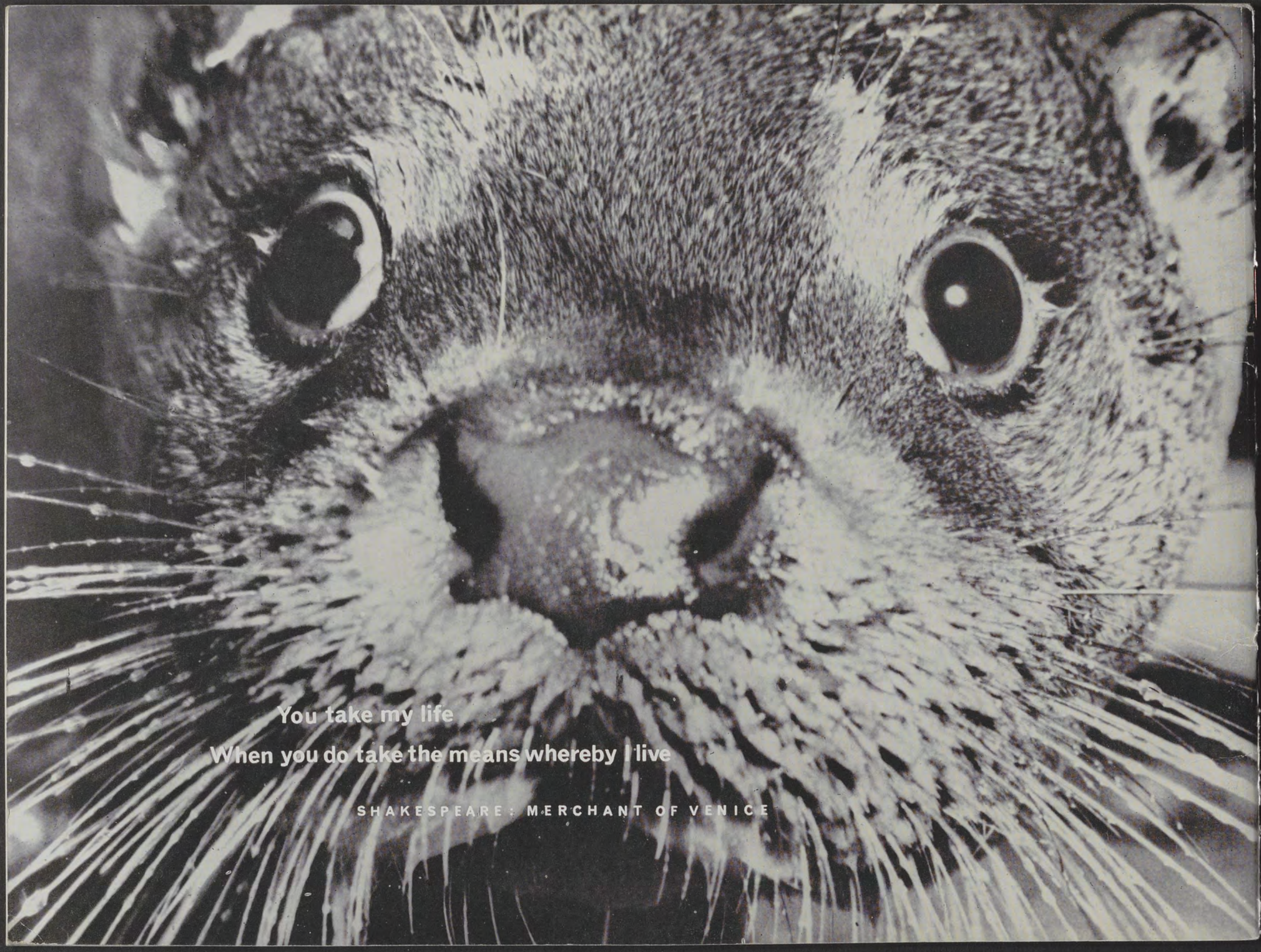
Conservation can be defined as the wise use of our natural environment: it is, in the final analysis, the highest form of national thrift—the prevention of waste and despoilment while preserving, improving and renewing the quality and usefulness of all our resources.

John F. Kennedy: Message to Congress, 1962.


You take my life
When you do take the means whereby I live
SHAKESPEARE: MERCHANT OF VENICE