

NATURE IN FOCUS

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NATURE IN FOCUS Number 19

EDITORIAL	G. Stewart	1
CHANGES IN THE FOREST STANDS AND SOILS OF EUROPE	J. Pelisek	3
NEW LAND, NEW FORESTS, A NEW NATURAL ENVIRONMENT IN THE NETHERLANDS	A. J. van der Poel	8
FORESTS AND TOURISM - THE SITUATION IN ITALY	V. Benvenuti	11
CONSERVATION IN GREECE - PROBLEMS AND ACHIEVEMENTS	B. Antipas G. Muller	15
TOO MUCH TRANSPORTATION ?	P. G. Gyllenhammar	22
TRANSPORT - A CHALLENGE TO MODERN SOCIETY	I. Gardiol	24
News from Strasbourg		26
Notes		27
Zusammenfassungen (German Summaries)		28

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PHOTOGRAPHS

Cover: Mildew on the inner surface of bark of a birch tree, Finland.
Dr. Oscar Forel.

Page 1: Forestry Commission, London; Page 2: Eric San-Servan/Explorer; Pages 4 and 5: Prof. Dr. Ing. J. Pelisek; Page 6: Preston/Barnaby's; Page 7: Clyde/Barnaby's; Page 9: VVV Urk; Pages 9 and 10: A. J. van der Poel; Page 11: R. Serafina, Milan; Page 13: Stig T. Karlsson; Page 14: U. S. Forest Service; Page 15: P. Broussalis, Athens; Pages 16 and 17: D. Bernfeld; Pages 18 and 20: G. Moissidis; Page 19: Schutze-Westnum/WWF; Page 21: Ron Pametter/Barnaby's; Page 22: Bill Coward/Barnaby's; Page 23: G. Hallo/Jacana; Page 24: UNESCO/F. Bibal; Page 25: Unione Nazionale Consummation, Rome; Page 26: Institut de Mécanique des Fluides, Université Louis Pasteur, Strasbourg; Page 27: Barnaby's; Page 29: Jan van de Kam.



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EDITORIAL

The concern being widely expressed for the future of the non-renewable natural resources of the world has highlighted the importance of the renewable resources, and of the latter there is none more important than the forest. But along with the recognition of the importance of the forest as a resource for the production of wood as a vital natural material for man's use, is the increasing realisation of the high value of environmental and other benefits which the forest can yield. Forests and woodlands are beautiful and they play a unique part in the visual satisfaction of the landscape; their value for recreation is now almost universally recognised; and of course, forests have a special role in the conservation of nature.

Managing forests for the most efficient production of wood can conflict with the other uses of the forest, and perhaps more important, there can be conflicts between the other uses themselves. I should like to consider the particular case of nature conservation and the conflicts there may be with different uses of the forest, and how conservation might be integrated with the other demands made on the forest.

Dick Steele, of the Natural Environment Research Council, has described wildlife (nature) conservation as being "concerned with maintaining a representative variety of plants and animals, interacting freely with each other and with the environment. It thus seeks to preserve biological diversity under free-living conditions." When we seek to reconcile the production of wood with nature conservation, we

are immediately faced with the conflicting aims of uniformity and diversity. As for agricultural crops, the most efficient and economic production of wood tends towards uniformity of product, in size and quality, and of course in the use of a very limited range of species. Further, when the crop is mature, economies favour large areas of felling in one place in order to reduce harvesting costs. This trend towards uniformity of management clearly conflicts with the needs of nature conservation, which ideally are met by small scale, diverse and complex systems of management. One method of resolving this conflict would be to say that the aims of commercial forestry and those of conservation are too far apart to be brought together and that certain areas should be set aside where the production of wood by the most economical methods is the sole aim, and that in other areas the needs of conservation should hold complete sway. This solution seems impracticable at the present time in the highly industrialised countries of Western Europe. Increasing prosperity, better education, and a rise in the time available for leisure, are bringing more and more people out of the towns into the countryside. With this development comes an inevitable increase in pressure and diversity of demands on the land itself, and an increase in the amenity and conservation values associated with forests. These values will be paramount in some situations and less important in others. However, they will exist to some degree in all situations in developed countries and therefore cannot be ignored in forest mana-

gement plans. It is our duty to see that the fullest productive use is made of the land but at the same time to ensure that it is protected from misuse. Therefore, the better approach is towards the multiple use of forest land, and to having plans of management which attempt to evaluate and reconcile the functions of timber production with nature conservation and other uses. If we accept this idea that to have only a single use for a piece of land is wasteful, how can we integrate commercial forestry and nature conservation? It can be done in two principal ways. First of all, the forester must not be too greedy. He must not expect every area of every forest to produce the highest possible yield of timber. He must be prepared to leave some of the poorer areas unplanted, and especially to leave patches of low quality hardwood scrub. He should not attempt to plant rocky outcrops. He should not assume that every wet hollow must be drained and planted, and he should be generous in leaving areas as small open spaces within the forest. Nature conservation values can be greatly improved by quite minor sacrifices in cost-efficiency and timber yield. The second point is that he should avoid extremes of management — too large felling areas, too large even-aged blocks (a particular, but inevitable, problem in Britain's new upland forests) and too large areas carrying only one species. In short, the forester should steer a middle course in most management decisions; in doing so he will retain more flexibility which is just as necessary for forest management itself as for



"It must be the aim of every forester to integrate nature conservation and timber production in a balanced way into the general pattern of good land use and sound management."

nature conservation. His precise course will vary with different situations depending on the relative weight placed on the several aims of management.

Any conflict of commercial forestry with recreation is relatively small. Except for areas managed intensively for recreation, little alteration to normal forest management is necessary to meet the needs of visitors. Indeed, the fact that normal forest work is going on can be an added attraction.

The conflict between recreation and nature conservation can be much more important. However, the two need not be incompatible given proper care in zoning the forest. Visitors can be guided to selected parts of the forest by the provision of attractive features with good access. In this way people can be led away from fragile areas, or from sections of the forest where conservation objectives must have priority. Successful integration of recreation and nature conservation can be achieved in most forest areas, provided there is a carefully prepared plan embodying good zoning, along with firm management control.

The forest provides a large reservoir of wildlife and as European countries become more industrialised and more urban, the importance of this reservoir increases. The forest can provide as quiet and as lonely a place as can be found anywhere. It offers us the invaluable natural resources of wood and at the same time it can play a vital part in nature conservation. It must be the aim of every forester to integrate nature conservation and timber production in a balanced way into the general pattern of good land use and sound management.



CHANGES IN THE FORESTS STANDS AND SOILS IN EUROPE

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Soils are formed through the gradual physico-chemical breakdown of rock, by the combined activity of atmospheric conditions and micro- and macro-organisms. This process is influenced by the topographical and ground water conditions present and of course by human activity.

Although many different types of soil exist, each one displays definite physical, chemical and biological properties and a definite productivity. An equilibrium normally exists between a soil and the environment from which it was formed so that any changes in the latter naturally produce modifications in the former and thus also in its productivity. The most important of these changes occur in the composition of the microorganisms which in turn affects the major bio-geo-chemical cycles and other elementary biochemical processes in the soil. Such a disturbance may not only upset the equilibrium of a soil but also that of a whole landscape.

Other factors such as rock, etc. are relatively stable and rarely undergo significant alteration.

One of the main causes of the above changes is human activity, which can strongly influence the structure and composition of a soil, particularly on arable land. Agronomic farming involving the annual cultivation of land and the application of large quantities of commercial fertilisers is largely responsible for the types of arable soil currently found in Central Europe, most of which were originally forest soils.

It is possible to trace the formation of and changes in these soils by comparing study plots with soil profiles in wooded areas where the structure of the forest stands has been preserved more or less in its natural form, and with soils which have undergone agricultural treatment.

The effects of human activity have been materially different in forest soils as compared with agricultural soils. The results of research obtained so far show that in Europe important alterations in the forest soils have occurred mostly in the region of Central Europe and that these are mainly due to changes in the forest stand structure when the original mixed forest crops were replaced by plantations of either spruce or pine monocultures.

The structure of European forest stands experienced appreciable changes during the Quaternary Period. In the Early Quaternary, the Pleistocene, the whole of North Europe was under ice, the glacier reaching deep into Central Europe as far as the Bohemian Massif range and the northern foothills of the Carpathians. The near-

by Alps were also under glaciation. Thus areas under forest became confined to the southern part of Central Europe only, which also meant considerable reduction in the number of existing forest tree species. As the glacier retreated northwards, forest species gradually filled up the vacant spaces in the centre and north of Europe.

During this post-glacial period both the soil and climatic conditions were changing and thus also the structures of forest stands. The following major stages in the development of forest stands have been recognised for the post-glacial of Central Europe up to the present time :

- 9000-8000 B.C. :
1. Arctic tundra with groups of birch and pine.
- 8000-6000 B.C. :
2. Pine stands intermingled with birch and willow.
- 3. Pine stands intermingled with hazel.
- 4. Oak forests (mixed stands comprising oak, elm, lime, ash and maple).
- 6000-2500 B.C. :
5. Spruce forests (retreat of the mixed oak stands followed by considerable expansion of spruce, beech and fir).
- 2500-500 B.C. :
6. Spruce fir forests (further expansion of spruce, beech and fir : this is known as the Atlantic period).
- 500-700 A.D. :
7. Mixed stands consisting of fir, beech and spruce (a natural and gradual retreat of beech and fir).
- 700 A.D.-the present time :
8. Spruce predominating, with pine on drier localities ; the period of forest stands under the influence of human activity.

The interval between about 700 B.C. and 500 A.D. may be taken as the comparative basis for estimating existing changes in the forests and soils of Central Europe. The vertical zonality of soils and vegetation has been determined for this and subsequent periods in Czechoslovakia, ranging from the lowlands to the mountain regions (see next page).

Elevation (m) Zone
 100-250 River lowland hydromorphic soils inundated with forests.
 150-300 Chernozems largely covered by oak stands — the oak vegetative zone.
 200-350 Lowland brown forest soils largely under the oak vegetative zone intermingled with hornbeam.
 250-550 Lowlands and foothills illuvial podzol soils largely under the transition vegetative zone of oak and beech.
 400-900 Ochre forest soils largely under the beech vegetative zone.
 800-1200 Rusty forest soils largely under the vegetative zone of fire and beech.
 1100-1500 Chocolate-brown forest soils largely under the vegetative zone of spruce, beech and fir.
 1000-1800 Mountain podzol soils: in the lower regions under the spruce vegetative zone, in the upper regions, under the dwarf-pine vegetative zone.
 Above 1800 m.: Sub-Alpine darkbrown and sub-Alpine grey soils above the timber line, covered by grassy vegetation. Detritus and stones.

Each of the vertical soil or climato-soil and vegetative forest zones features distinct water and air dynamics and temperature regimes as well as chemical and biochemical properties and productivity. Thus each zone has its own set of ecological conditions for the forest stands and is at the same time characterised by the rainfall accumulation.

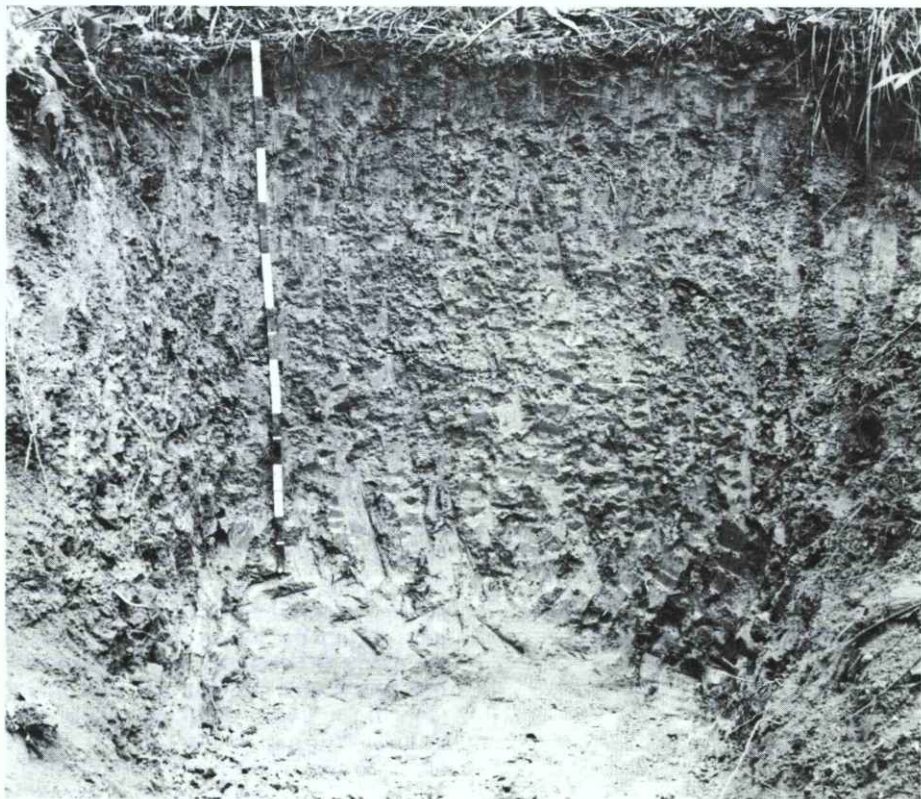
The most significant alterations in the structure of forest stands can be detected in Central Europe; in Czechoslovakia this is especially the case in the lowlands and foothills with elevations of 500-600 m.

Within this range the original forest stands consisted largely of mixed broadleaf forests with predominance of oak or oak + beech intermingled with other broadleaf species, these being mainly hornbeam, lime, ash and maple. These were then gradually replaced by spruce monocultures and occasionally by pine monocultures on sites poorer in minerals. The majority of these changes occurred during the Middle Ages, in connection with the development of the mining industry (13th-16th centuries) and in the 19th and 20th centuries.

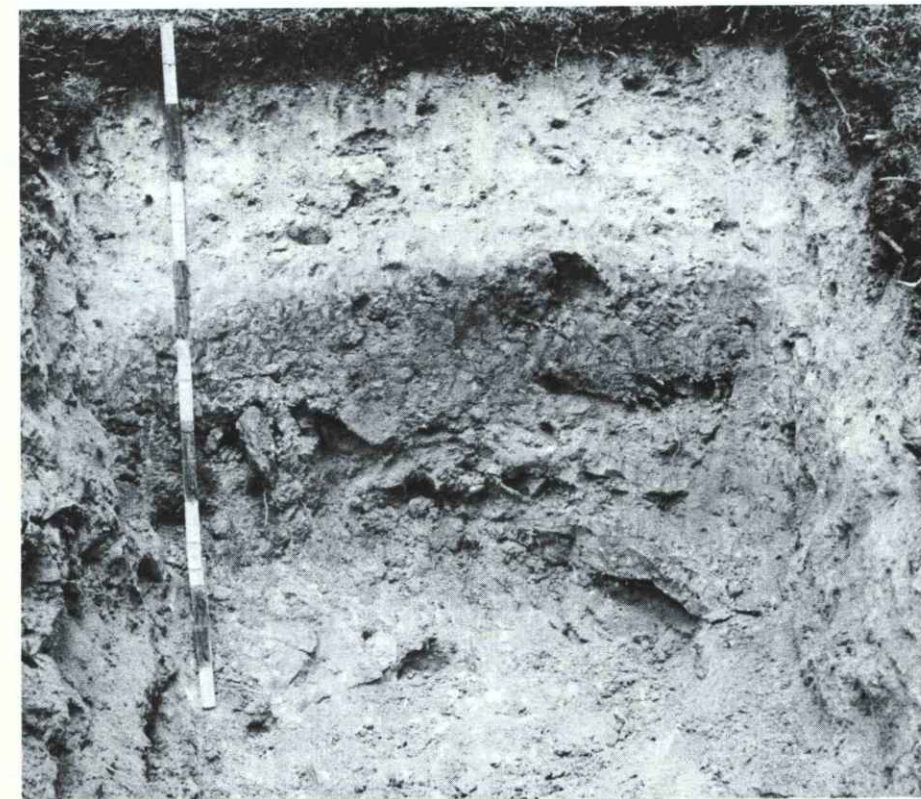
The changes in composition of the forest stands were reflected in the forest soils, where productivity was invariably decreased with reciprocal changes in the health condition of



Above and below: a brown forest soil on loess under a natural mixed broadleaf stand (oak and hornbeam and beech) in the foothills of Czechoslovakia.



Above and below: a podzol soil with superficial raw humus and a strongly leached and impoverished top layer, derived from original brown forest soil under the degrading action of spruce monoculture in the foothills of the West Carpathians, Czechoslovakia.



stands. Thus the original brown forest soils under the mixed broadleaf stands changed under influence of the spruce monocultures to podzol soils with accumulations of superficial raw and acid humus and other undesirable properties.

This particular transformation has been the object of study primarily in Czechoslovakia, the German Democratic Republic, the German Federal Republic, Poland, Sweden and also in the Soviet Union since spruce produces a highly important raw material for the pulp and other industries. Research undertaken by the author between 1960 and 1972, together with the results of earlier studies and the experience of forestry practice revealed a certain degradation of the forest soils under spruce monoculture in the lowlands and foothills. (These studies were conducted on comparative study plots using the vertical soil zonality as a basis, over a range from the valley floodlands to the high mountains, on various sites in Czechoslovakia.) This was indicated by the occurrence of deteriorated water and air regimes in these soils, particularly in the top layer. Distinct differences could also be detected in acidity, the top soil layers having high pH levels compared with those found under mixed broadleaf stands. The highest pH differences were found in the superficial humus. This is due to the raw humus accumulation under the spruce cultures.

The so-called available nitrogen in the soils under spruce monocultures revealed markedly reduced levels when compared with those in the topsoil layers under broadleaf stands as did also the readily available forms of nutrients (calcium - CaO, potassium - K₂O, and phosphoric acid - P₂O₅) which showed differences of between 30 and 50%.

However these studies suggested that it was in fact possible to grow spruce over a range from the high mountains to river valley situations without the risk of soil degradation, but only on certain sites and in certain proportions in the forest stand structure. The criteria determining both site and proportion depend on two high important factors: the annual dynamics of the soil moisture regime and the supply of plant nutrients in the soil. Thus an increased soil moisture content during the summer season in the soils of valleys, lowlands and foothills allows greater admixtures of spruce to be included in the broadleaf stands without the risk of adverse effects to the soil. For the lowland oak vegetative zone (100-250 m.) an admixture of 20-40% spruce in the broadleaf stands

was shown to cause no deterioration in soil conditions on the moister sites. In the oakbeech vegetative zone (250-500 m.) admixtures of spruce from 30 to 50 % were likewise found to have no detrimental effects. In the upland zone (500-800 m.) this was the case for admixtures of spruce of 40-65 %; in the lower high mountain zone (800-1100 m.) for admixtures of 60-90 %; while in the upper high mountain zone (1100-1200 m. and over) pure spruce stands showed no adverse effects on the soil conditions, spruce being a natural species to soils of this range of elevation which is accordingly known as the spruce vegetative zone.

Increased proportions of spruce in the forest stands of Czechoslovakia, as well as of Central Europe, are highly important with respect to national economy. The ideal situation is a higher production of the tree volume in forest stands without a simultaneous reduction in the productivity of forest soils. The degradation process in soils under spruce monoculture in the Czechoslovakian lowlands and foothills involves not only a reduction in tree volume production but also a deterioration in the water regime. It has been estimated that such spruce monoculture is capable of retaining, within the crown layers, 30-40 per cent of the total annual precipitation (which varies between 500 and 600 mm. for this region) compared with 20 % by mixed broadleaf stands.

Thus the soil surface under the spruce monoculture receives only some 300-350 mm. whereas under the broadleaf it receives 400-500 mm. As a result the soil under the former not only has a very low moisture level during the growing season (the period of maximum rainfall) but also undergoes a distinct reduction in retention capacity i.e. permeability to precipitation received. Reductions in retention capacity to the lower limits of 15-30 % have been recorded for the topsoils under spruce monoculture on the lowlands and foothills, in comparison with mountain regions where this species occurs naturally.

In addition to the direct influence of the spruce monocultures, other factors may also degrade the forest soils and reduce their productivity. These include deforestation of large areas, grazing cattle, removal of the surface humus layer, pollution from industrial emissions, both gaseous and solid, such as the oxides of sulphur and nitrogen and flying ash.

This anthropogenic degradation of soils results in the accumulation of raw acid humus, an increase in the rate of podzolisation and formation of soil conglomerates or ortsteins, fur-

ther compaction of the soil profile, a reduction in the physiological depth of soil available to the root system, the presence of some toxic compounds (such as ferrous compounds) and a reduction in productivity. Deforestation and intensified soil erosion by running water and by air represent special situations in the soil degradation process.

The consequences of all the soil degradation processes described manifest themselves as follows: the forest stands produce lower increments and fewer branches. This is followed by decay of the stems until finally no increments at all are produced. This frequently makes both regeneration of forest stands, whether natural or artificial, and reforestation, impossible. These signs can be seen quite easily in the lowlands and foothills of Czechoslovakia, both under spruce and pine monocultures. Under the latter soil degradation is more distinct and intense, with the subsequent formation of firm layers of conglomerate or ortstein. These layers then impede development of the root system in forest tree species. Pine stands are low in height and produce no increments. It goes without saying that the production of tree volume in such stands is also low.

The author studied the bio-ameliorative action of broadleaf tree species on degraded soils under pine monocultures in Czechoslovakia from 1965 to 1972. Results revealed rising bio-ameliorative effects with greater proportions of broadleaf species in the stand, in the following sequence: oak, hornbeam, beech and lime.

In Sweden, the wood and pulp industry forms a vital part of the national economy. Natural waterways are used to transport the felled wood from the forest to the factory.



In central Europe the territory of Saxony (German Democratic Republic) represents a particularly convenient region for the introduction and expansion of spruce monocultures. Research by Meyer in 1959 in this area produced the results given below which indicate the diminishing annual increments and the average stocks of tree volume per hectare:

1847-53 stock 152 cu.m.;
increment 4.7 cu.m.

1864-73 stock 177 cu.m.;
increment 6.1 cu.m.

1874-1903 stock 189 cu.m.;
increment 6.1 cu.m.

1904-1913 stock 185 cu.m.;
increment 4.6 cu.m.

1924-29 stock 170 cu.m.;
increment 2.5 cu. m.

Thus over a period of 50 years the increment appears to have diminished by more than one half of its initial value.

Similar studies by G. Mierlich (1970) compared changes in a pseudogley soil on loessal loam under spruce monocultures with another soil under a stand of oak and beech. A number of differences were observed between the properties of soils under spruce and those under the broadleaf stands. More specifically, the former showed mainly increased acidity, accumulation of raw superficial humus, diminished gross pores and overall compaction of the soils, with distinct leaching and impoverishment of the top A₂ horizon. The nitrogen was also reduced due to the reduced rate of microbial activity; this decrease, under spruce stands, varied within 10-20 %. In addition, a reduction in readily soluble



Many countries have learned to pay the heavy price of deforestation, the result of often thoughtless action in the centuries gone by-when at the same time empires were built and continents discovered.

nutrients could be detected in the topsoil layers. In general, these results suggest the existence of typical degradative processes in the soils under spruce monocultures.

B. Ulrich, E. Ahrens und M. Ulrich studied the differences between sites under two different species — beech and spruce, also in the German Federal Republic. They reported increased acidity of the soil under spruce throughout the entire depth of the soil profile and a accumulation of raw surface humus and true humus which was nearly double that found in the soil under broadleaf species due to

reduced mineralisation of the humus. Higher C/N (carbon : nitrogen) ratios could also be detected, and consequent aggravated conditions for nitrogen nutrition in the topsoil layers. The phosphoric acid (P₂O₅) regime was similarly disturbed.

In Belgium, Manil investigated the extent to which it is possible to deviate the structure of forest stands from natural conditions with special regard to the cultivation of spruce monocultures. He showed that the degrading action of spruce on major soil properties was a highly limiting factor and that this might be overcome by the application of commercial fertilisers.

Troedsson studied the effects of spruce monocultures on forest soils in Sweden in 1972. He concluded that the process of podzolisation in brown forest soils tends to become intensified with increasing age of spruce monocultures up to the level when a distinct podzol soil develops.

To sum up, studies conducted so far on the degrading action of spruce monocultures on European soils show that spruce monocultures exert degrading effects mainly on soils of lowlands and foothills, i.e. those outside the area of the natural occurrence of spruce species.



NEW LAND NEW FORESTS A NEW NATURAL ENVIRONMENT IN THE NETHERLANDS

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A Unique Nation

From the point of view of its natural environment, the Netherlands is unique. For centuries it has actually created this environment through a combination of land reclamation from the sea and careful cultivation of its vulnerable lowlands. Now, having achieved many benefits from rural, urban and industrial development, advanced technology and socio-economic progress, it is beginning to create "natural" areas to meet the growing demands for open space for recreation as well as for nature conservation.

The need for "natural" areas

The reasons for the shift are found in the geographical situation and history of the nation *sui generis*. It lies not only in the heart of one of the world's most prosperous and densely populated regions, but also in the delta of the river Rhine, which flows into the most prodigiously navigated sea in the world — the North Sea. In this water-dominated country 13 million people inhabit an area of 4,084,000 hectares, which means a density of 389 people per square kilometre. (In 1889 this was only 80 per sq. km.; by 1945 it was already 279 per sq. km.) Previous estimates predicted that the population would stabilize at approximately 20 million by the year 2000, but more recent trends suggest a population of 16 million as being more realistic.

Ever since the middle ages there has been a tendency to put almost every acre of the available space in the Netherlands to some purpose — be it agricultural, urban or industrial. Thus as many of the natural woodlands and meadow lands were progressively converted to these uses, by the middle of the 20th century only 7 per cent of the country still consisted of forests and natural open spaces. Now, however, increasing urban and industrial

developments and concurrent rising incomes and shorter working hours are creating greater mobility and more leisure time and thus growing demands for open space and recreation facilities.

The conquering of new land

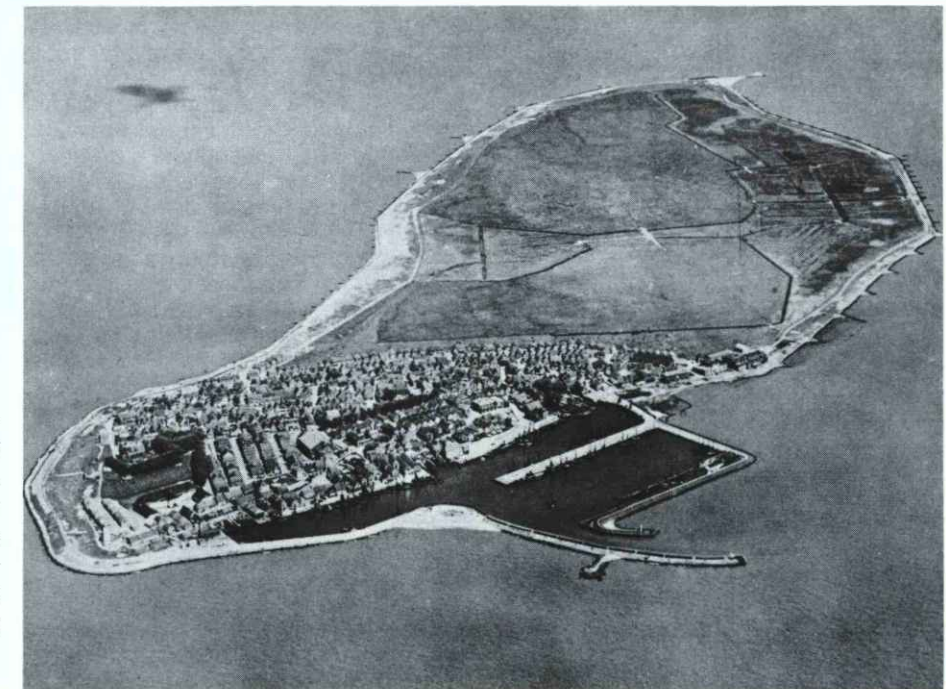
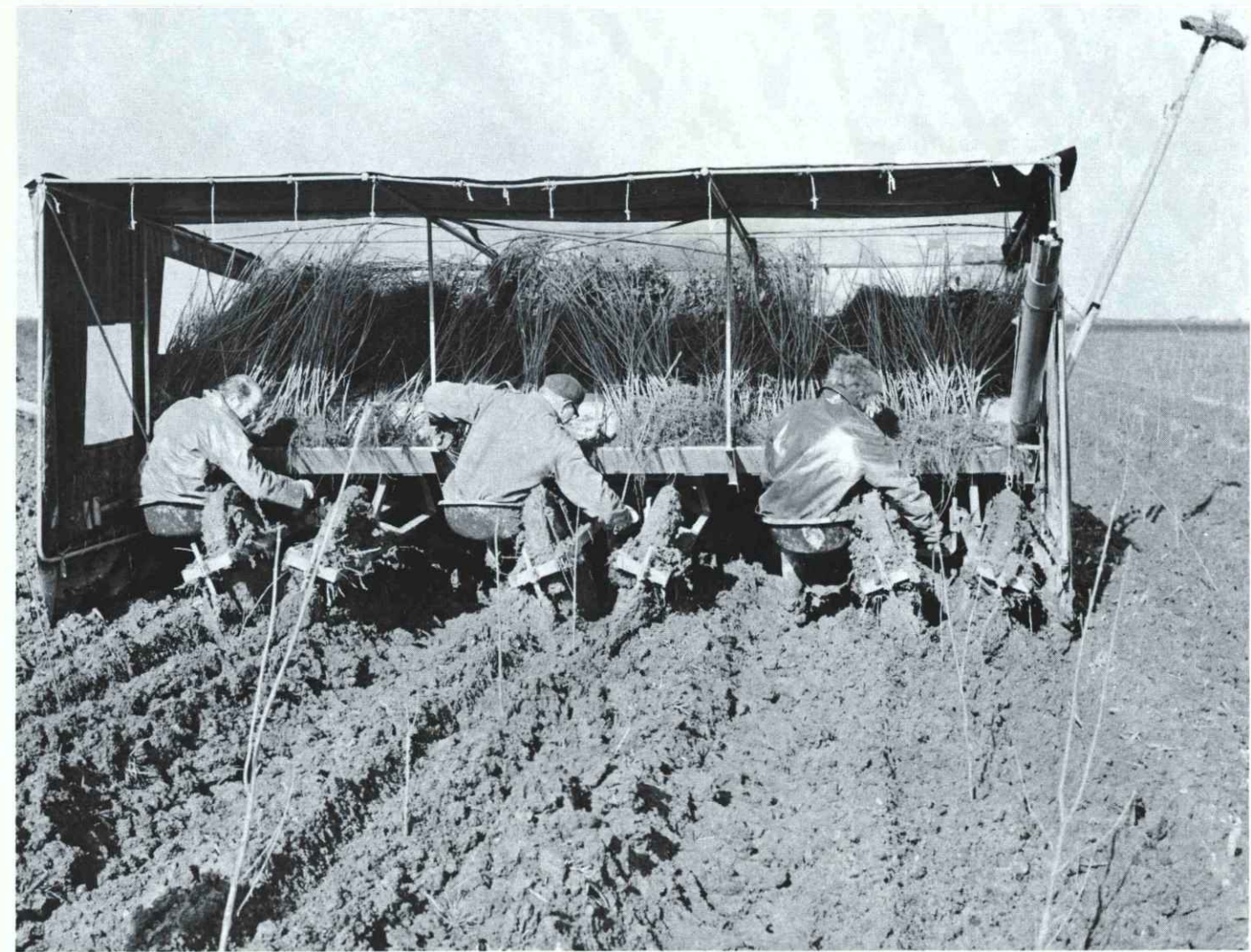
In this context, the Netherlands is fortunate in being able to conquer new space in a "peaceful" way by reclaiming the former Zuiderzee lying in the centre of the country. Here again we find the old struggle of the Dutchmen against the sea. The first plans for reclaiming the Zuiderzee were developed in the middle of the last century, but technical means for their realisation were unavailable. At the turn of the century Cornelis Lely unfolded a plan to dam this sea and to reclaim a part of it. In 1918 the government decided to carry out the gigantic project according to Lely's ideas. The plan involved the construction of a barrier dam from North Holland to Friesland and the reclamation of five polders. There were three main reasons for this reclamation project: greater protection against flooding; improved water control and an important increase in the acreage of farmland. During the fifty years or so since the project was begun, the Wieringermeer-

polder, the North East Polder, Eastern Flevoland and parts of Southern Flevoland have been brought under cultivation. The construction of the dykes of the Markerwaard has also been started. The trends in social developments are illustrated by the changing assignment of land uses to three of those polders. The reclaimed lands in the first two, Wieringermeer and North East Polder, were devoted primarily to a single-use agriculture. Only soils unsuited to agriculture were forested for wood production, which comprised 3 per cent of the former and 5 per cent of the latter polder. The start of the cultivation of Eastern Flevoland in 1957, almost 40 years after the government's decision to reclaim the Zuiderzee, can be considered as a turning point in new types of land use. During this period, more and more people have been asking for more space, not only for urban development and for traffic, but also for outdoor recreation, for areas in which to spend their leisure time. Development plans for the newer polders had to be adapted to these new social needs. This can be illustrated by comparing the various uses to which certain areas have been devoted in the different polders (table 1). There is a clear shift from agricultural to non-agricultural land use.

Table 1

Division of land use in the Zuiderzeepolders and period of reclamation

	Wieringermeer	North East Polder	Eastern Flevoland	Southern Flevoland	Markerwaard
Total area (ha.)	20,000	48,000	54,000	43,000	50,000
Dyke building	1927-29	1936-40	1950-56	1959-67	1941-?
Development period	1930-40	1942-58	1957-	1968-	1982-?
Farmland	87 %	87 %	70 %	50 %	?
Residential areas	1 %	1 %	8 %	18 %	?
Canals, dykes, roads	9 %	7 %	6 %	7 %	?
Woods, nature-reserves	3 %	5 %	16 %	25 %	?



Where the waves have given way to agriculture and forests, the new land gained by the Dutch from areas that were previously sea and lakes is also some of their most fertile. More recently, however, parts of these areas are being set aside for recreational purposes. The above picture shows a specially constructed machine planting trees where a few years ago fishermen made their living.



The current policy of the 75 years old State Forestry Service in the Netherlands is to open up the forests wherever possible to the ever greater recreation-seeking public.

Afforestation of new land

The young soils to be forested have been under water for hundreds of years. These marine soils, in contrast to most of the world's other marine soils, all fall in the range of lime-containing to lime-rich. Because of the generally high clay content the area is suited to afforestation with broad leaved species.

In practice afforestation starts after four or five years of State-run agricultural exploitation. The cropping scheme includes mainly cereals and rapeseed. This choice of field crops conditions the soil for normal arable farming and for afforestation. For each afforestation project a plan is made by a landscape architect. This is based on recreational demands, silvicultural requirements and wood production possibilities. The aim is to create a well-balanced forest — a combination of open spaces and dense stands and with trees of many ages and species; a forest which in its totality forms a permanent enterprise with a sound biological base and a good economic structure. With the final object in view we must turn back to the initial phase, the moment of

planting. In the beginning only a small area is planted with species with a long rotation, such as oak and beech, because they define the forest type for a very long time.

During successive working periods of about ten years the area of the trees with a long rotation can increase. In the initial phase the larger part of the area is afforested with various cultivars of poplars. This tree species has excellent pioneer qualities and its short rotation guarantees a flexible management.

The programme of the reclamation authority now includes the afforestation of about 1000 ha./year until about the year 2000. This planting of forests is no longer limited to those soils that would give low agricultural yields. Forest culture has become a purpose in itself, not only for wood production but also for outdoor recreation and for the creation of more nature reserves.

The need for nature reserves

The last purpose is felt equally necessary in this rapidly urbanising country. Wild life reserves are also no longer

seen as a luxury but as a necessity. The building of a differentiated environment has become an important aim. The following nature reserves have been completed in the polders:

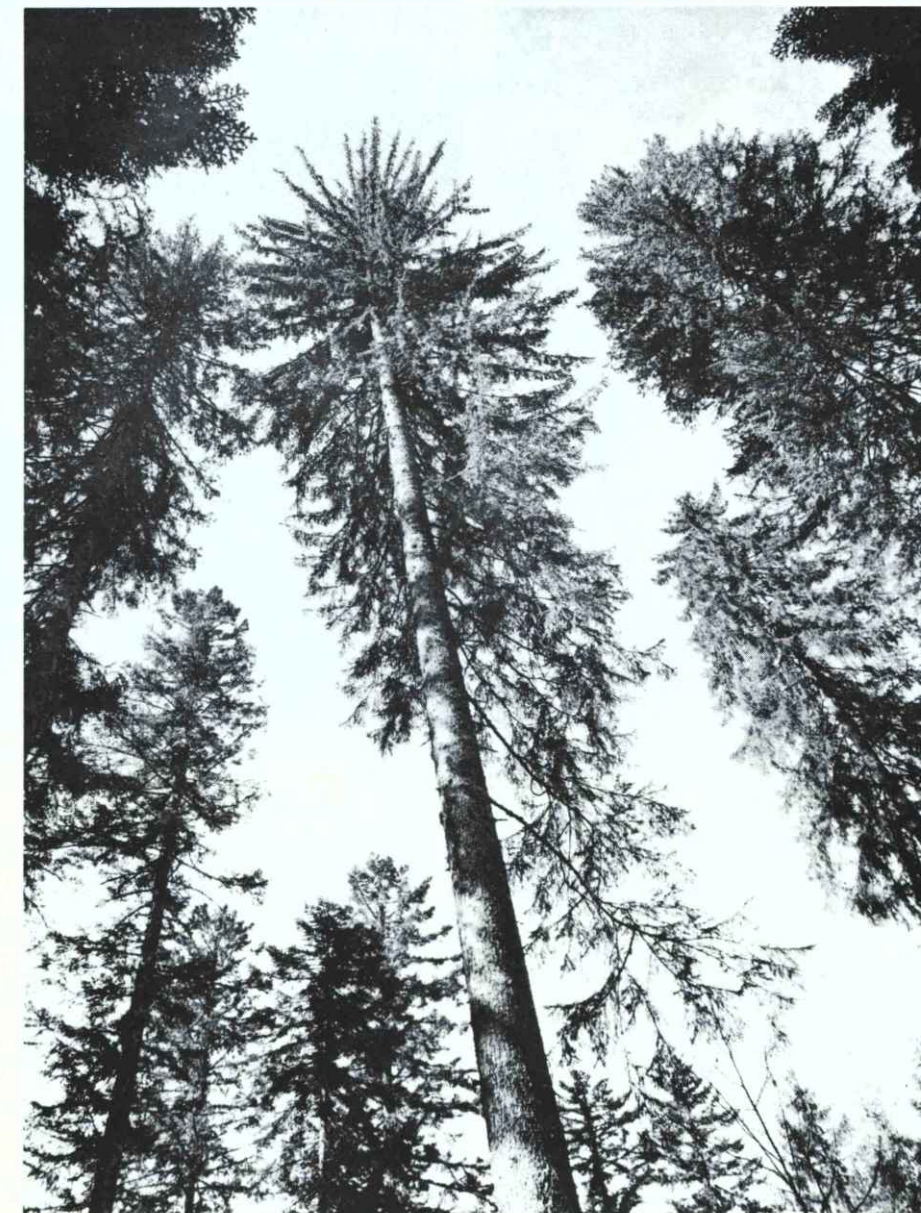
- An ecological reserve covering 60 ha., where plant and animal life can develop undisturbed.
- A meadow bird reserve, a stretch of land of 200 ha. where the water level is controlled. The water can be kept at a high level by means of weirs.
- A migratory bird refuge (40 ha.) with a bird ringing station.
- A reserve for wild geese (1200 ha.).
- A reserve for birds of prey.

All this, reserves and the forest, will contribute to an overall improvement of living conditions by providing an opportunity for recreation as well as playing an important part in the development of a new landscape and in the conservation of wildlife.

FORESTS AND TOURISM

The situation in Italy

Dr Valerio **BENVENUTI**
Director General,
Ministry of Agriculture and Forestry,
Rome



The current rapidly growing interest in the forest was long foreseen by foresters but even they did not anticipate its present dimensions. For among the many and varied reasons responsible for this increasing concern — such as ecological requirements and economic demands — by far the most striking is due to the modern tourist. Man's ever-stronger urge to return to nature has led to a mass invasion of the forest where he can discover the unique qualities not present in any other aspect of nature: pure air, greenery and tranquillity.

The sea is polluted and noisy: the beaches are as crowded as the towns. However, in summer as in winter, at weekends and public holidays, the people from industrial towns flock to the forest. The rush to the forest would almost seem to be a vital need. In Italy between 1957 and 1972 the number of motor cars rose from 1,600,000 to 13,500,000, roads from 60 km. to 95 km. per 100 km², with an increase in the last five years of 1,000 km. each year. The number of tourists rose from 110 million in 1958 to 263.5 million in 1972. Campers increased by one million a year between 1964 and 1972: in 1972, the number of campers on camping grounds in Italy rose to 18 million. These few but highly significant figures illustrate the pressure imposed by this increase in tourism on the forest and other natural sites in general, but more especially on forests for the reasons given above. (Table A.) This situation raises the question as to whether our forests have the capacity to absorb such a vast human influx without serious risk. What are the prospects?

Wooded areas in Italy represents 20% of the national territory, a little over 6 million hectares, a percentage only slightly less than that of other countries in western Europe. Unfortunately our forest heritage is rather poor in quality. If we take the average yield per hectare as a significant parameter of deterioration, we find that in Italy it is 58 m³/ha. compared with 93 in Germany, 81 in Belgium, 75 in France and 61 in the Netherlands. Of our 6 million hectares of forest, only 20% or a little more are ready to absorb recreational tourism today.

Since the war, 43 million m² of tourist accommodation has been built, which represents 1.5 million units and 7.12% in surface of all private construction in Italy.

The current situation and future prospects of this new social and economic function of forests determine our programmes, namely, extension of wooded areas, improvement of existing woods, adaptation of forest legis-

Table A

Wooded areas of regions offering tourist, recreational and outdoor activities in 1972

Region	Total area concerned (ha)	Percentage of area utilised	Extent of tourist development			
			Maximum (1)	Average (2)	Minimum (3)	Purely natural (4)
Piedmont	23,052	20.7	2,080	6,562	113,437	973
Valle d'Aosta	26,200	36.1	11,015	1,185	14,000	—
Lombardy	49,571	10.3	1,865	5,224	41,422	1,060
Trentino-alto Adige	576,901	96.9	13,905	61,270	501,416	310
Veneto	43,946	16.9	1,507	3,185	34,227	5,027
Friuli-Venezia Giulia	58,189	20.7	1,590	2,440	52,711	1,448
Emilia-Romagna	40,336	11.3	4,121	10,156	16,562	9,497
Tuscany	237,320	27.3	14,968	43,906	174,880	3,566
Umbria	12,066	4.8	3,882	4,189	3,995	—
Marches	10,595	7.1	114	350	9,325	896
Latium	83,614	23.1	8,484	3,407	71,723	—
Abruzzi	11,119	5.5	774	2,301	5,375	2,669
Molise	3,573	5.5	330	930	1,835	478
Campani	9,963	3.6	2,410	1,042	6,241	270
Apulia	12,823	13.8	8,743	1,704	2,178	198
Basilicata	14,452	8.5	95	1,300	1,063	11,994
Calabria	35,576	8.9	4,845	7,124	23,607	—

(3) **Minimum** - a natural wood where tourism tends to be occasional and sporadic
 (2) **Average** - a wood with facilities where tourism is fairly well developed
 (4) **Purely natural** - a completely natural wooded reserve

lation and administration, rigorous protection of the forest heritage and above all a campaign to educate people to respect forests.

The exodus from poor mountain regions (Table B), in particular the abandonment of many areas in the central Appennines, will perhaps make it possible to extend the wooded areas. Estimates show that it would be possible to forest 3 or 4 million hectares but in view of the enormous technical and financial requirements this would involve, it would seem more realistic to improve existing forests that have deteriorated; although here again the financial burden is not negligible. Conversion and reforestation have always been carried out by the Forestry Department in accordance with the financial means available. Between 1961 and 1971, 155,000 hectares were replanted and some 70,000 hectares improved at a cost of 79,000 million Lire.

Table B
 Percentage variations in total population distribution in Italy between 1951 and 1971

	Urban areas		Rural areas
1951	31 %	1951	69 %
1961	39 %	1961	61 %
1971	49 %	1971	51 %

This means that an ever higher percentage of urban population is finding it necessary to escape from its everyday environment from time to time in search of nature.

The Azienda di Stato per le Foreste Demaniali (Department of State Forests) has done valuable work in managing the state-owned forests, setting an excellent example of good forest management.

We ourselves are planting trees on abandoned lands to extend the forest in suitable areas. A concentrated effort is being made to draw up ratio-



How many millions of Europeans have found peace and tranquillity, shelter and comfort under the many trees bordering the Mediterranean !

nal development plans for privately-owned woods. We are everywhere seeking to ensure good land use by means of carefully selected seeds and plants.

An Act on seeds and plants for reforestation was promulgated some months ago in accordance with the directives of the EEC. It is now being implemented and will be of great value.

Recent forest legislation is sound and has provided valuable experience and results, but certain aspects of it need to be modernised, and it should be

made simpler and clearer and available means of intervention and enforcement increased. Forestry problems need large-scale intervention by all public authorities, both of the state and of the local authorities. Private action cannot achieve the desired goals without such intervention; consequently laws, public works programmes and financial and technical resources are needed. Even good legislation and suitable financial resources would be ineffective without administrative and technical organisations capable of implementing the

various measures rapidly and efficiently.

The Forestry Department has never failed to carry out its duties: there is no lack of testimony to this from the administrations of European and non-European countries. Their staff are capable and unstinting and their structural organisation is efficient. But it needs to be better adapted to new demands, regard being had to the powers of the new regional authorities. In order to initiate action by public bodies we need modern laws for the protection of forests, which will

allow access to them and at the same time prevent and penalise their abuse. A larger number of technical specialists are needed to protect all the wooded areas.

Much still remains to be done in Italy to achieve this aim. We shall pursue it patiently and tenaciously, bearing in mind all aspects of the problem. As foresters we have always considered one of our primary activities to be to find land for reforestation, to put in the considerable sums required and to ensure sound management of existing forests. But frequently, for various



Forest fires are most often caused by imprudence rather than by deliberate malice although the latter has been known to occur. Each year countless fires destroy hundreds of thousands of hectares of European forests, leaving devastation, misery and sometimes loss of life in its wake. Between 1961 and 1971 there were over 36 000 fires in Italy, destroying 385 000 hectares and causing damage amounting to some 142 000 million lire.

conflicting reasons of economy, we have encountered great difficulties. The belief, which is spreading, that the forest has an increasingly decisive social function to perform has finally eliminated many obstacles.

But all this would be in vain without clear, strict and modern legislation and forest administration by the state and the regions.

This must be accompanied by a mass education campaign to teach people to know, love, protect, respect and draw benefit from the forest. There is no doubt that today's revived love of nature will make it possible to preserve it for generations to come. New methods of propaganda and public education must be found; the schools and traditional media such as the press, television, cinema and advertising must be mobilised in order to reach the towns, whether large or small, industry, welfare organisations, and the bureaucracy. Such awakening of consciousness is necessary today,

perhaps more than ever. As foresters we are preparing to meet these tasks for which we are now responsible. We are calling for more technical forestry schools, of which there is a shortage in Italy.

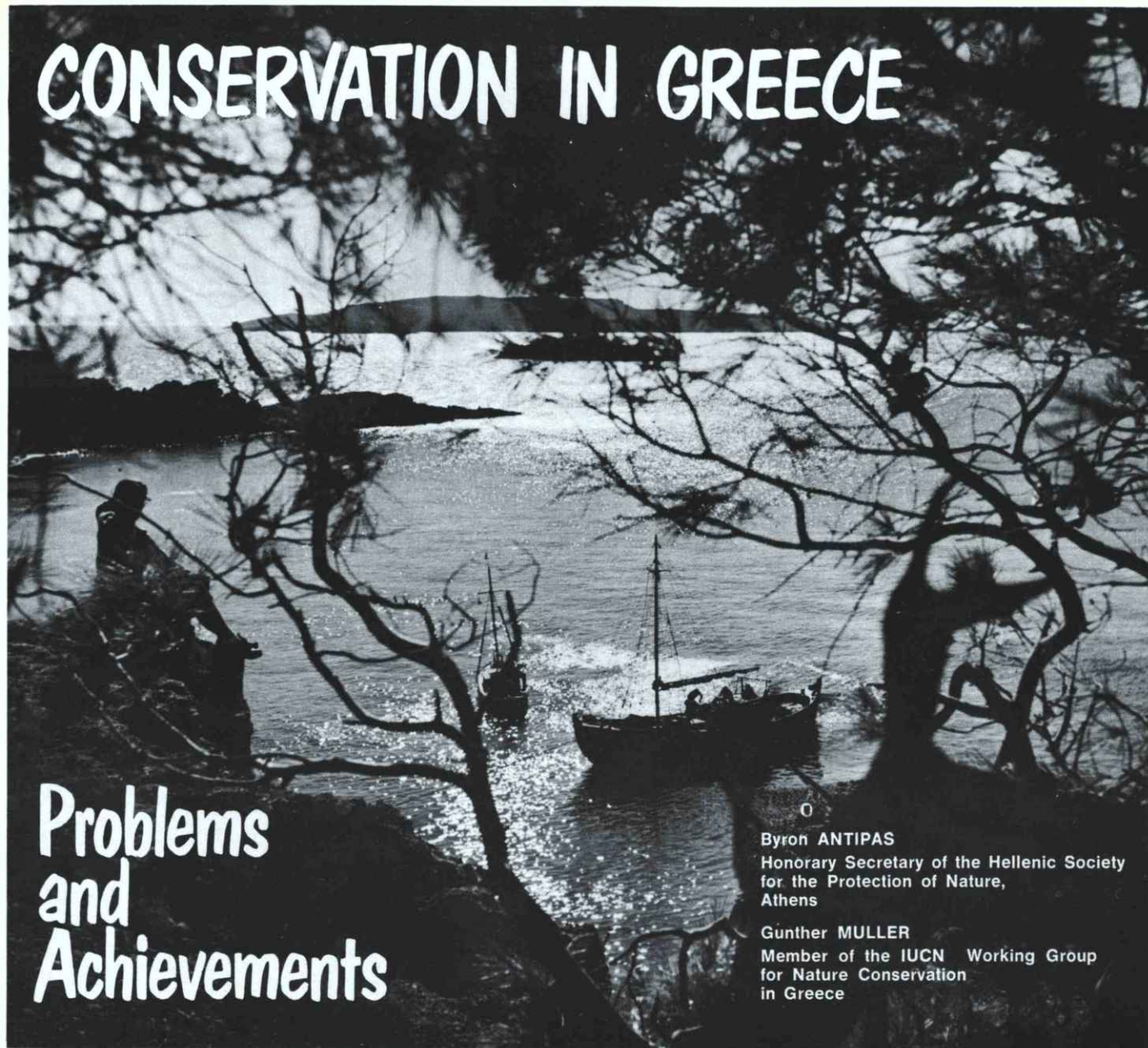
If we are to meet the various requirements arising out of the forest's attraction for tourists, our actions must be directed along these broad lines.

We are aware of the inherent danger of this invasion of nature, peaceful though it may be, it jeopardises the land, the purity of the water and the soil, the undergrowth, the flora and fauna, the delicate balances of the forest. Fires are the greatest hazard; in our country they destroy forests faster than we can replant them. Between 1961 and 1971 there were over 36,000 fires in Italy, destroying 385,000 hectares and causing damage amounting to some 142,000 million lire. They are frequently due to the presence of tourists. The government is seriously concerned about this very real scourge

and is framing a law to give us the legal, technical and financial means to combat this phenomenon which, with the increase of tourism in the forest, could constitute an extremely serious threat. It is for this reason that I lay great emphasis on teaching the masses to know and love the forests, as an effective and proven means of action. But it is not my belief that the tourists will destroy the forest. I am not a pessimist, quite the contrary.

I face this extraordinary challenge with confidence. It is like a forester's dream come true, this new-born passion for trees. I am optimistic because love of nature enriches even the most insensitive and brings out a protective feeling for these splendid creations of nature that are trees. This is why tourists themselves will protect the forest; we foresters will not resent their presence. Together we shall pursue our task with greater courage and enthusiasm.

CONSERVATION IN GREECE



Problems and Achievements

Byron ANTIPAS
Honorary Secretary of the Hellenic Society for the Protection of Nature, Athens

Gunther MULLER
Member of the IUCN Working Group for Nature Conservation in Greece

The natural beauties of Greece have long since been appraised by the many travellers visiting it during past centuries as well as by those who visit it today. Protection of the natural environment is also not a new concept in this country. The ancient Greeks considered the trees and springs as sacred and wild animals as enjoying the protection of the Gods, and severe laws were decreed to ensure that these principles were respected. Its geographical position at the meeting point of three continents has made Greece a refuge for many animal species, and also a place where plant

species of Europe, Asia and Africa converge. Many of these have undergone important changes, either because of climatic influences or isolation, resulting in some particularly interesting endemic species and subspecies. The actual abundance of the Greek plant species is due to a long history of local geological changes and to the highly varied land formations which offer a corresponding number of different biotopes. Greek botanists have, up until now, identified well over 5,000 species, which is more than the combined total in France, Switzerland and Belgium. Fur-

thermore, about 600 of these are endemic, a number rarely surpassed in any other European country. In the neighbouring Balkan countries only 136 endemic species are to be found in Bulgaria, 97 in Yugoslavia and 12 in Albania. One realises with what a rich treasure Mother Nature has endowed Greece.

Although formerly, rare plant habitats were only accessible to a small number of botanists, to a still smaller number of mountaineers, and to those few country people who gathered medicinal plants, about 150 species have disappeared from the end of the 18th

A FUTURE FOR OUR PAST



Piazza Maggiore, Bologna

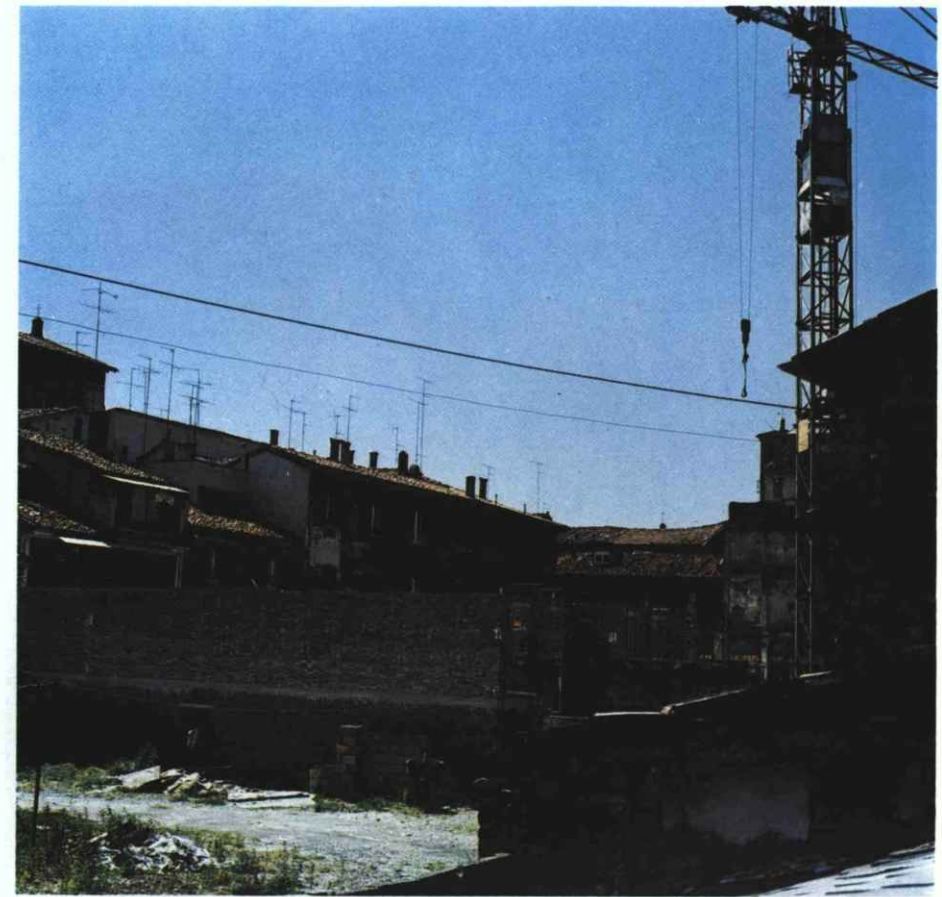
1975 will be European Architectural Heritage Year. Taking part will be not only member states of the Council of Europe but also Greece, Spain and Portugal and certain Eastern European countries. In order to grasp the meaning of this campaign it is necessary to know its true objectives. In effect this campaign will take the quality of human surroundings — an objective rendered necessary by the transformation of our industrial society. Much use is made today of the word "environment" and the campaign aims precisely at the improvement of the urban and rural environment that we know to be so seriously threatened and of which the

heritage of the past is a long neglected valuable part. Conservation of the architectural heritage has passed the stage where monuments in isolation are the focus of attention. Developing from the notions of ensemble and historic quarters a more complex concept of "integrated conservation" has been reached. This concept puts the conservation of the architectural heritage firmly within the context of urban planning and in the last analysis within the realms of regional planning. Furthermore, it is now appreciated that it was never enough simply to preserve walls but to ask what the problems are of the people who live within them.

We now know — and this is the essential message of the European Year — that it is not enough to master the technical, administrative and legislative difficulties when it comes to preserving the past architectural heritage but as a corollary to be equally aware of economic, social and environmental problems. It is here wherein lies the chief significance of practical examples is designed to show national and local authorities and the public that the conservation and restoration of old buildings and ensembles, and their adaptation to the need of modern life are an essential part of every programme of urban and rural and environment planning.

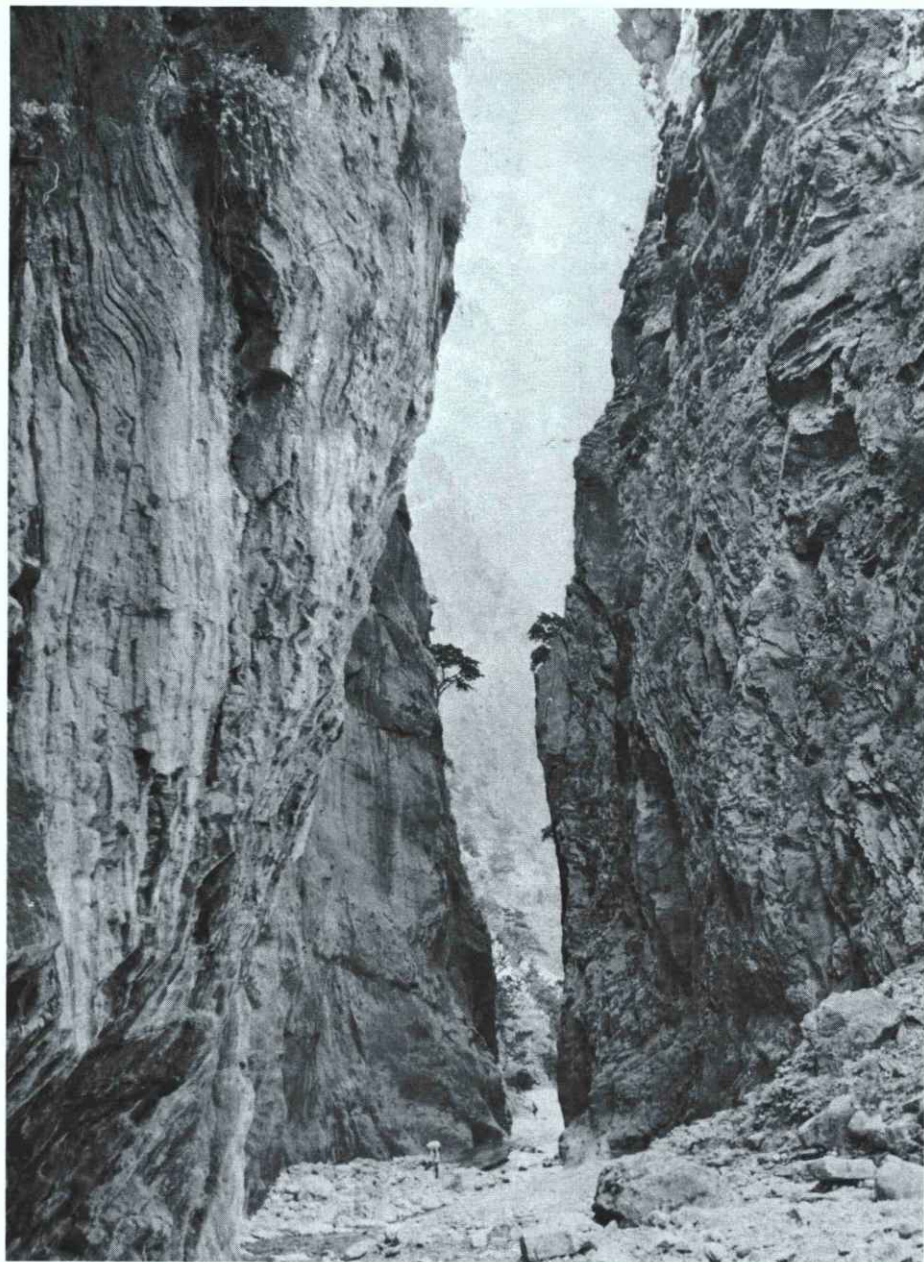
By highlighting the economic, social and political realities of a number of concrete examples the programme intends to spell out the new doctrine of "integrated conservation". There are about 50 Pilot projects spread throughout Europe and they have been selected on the strength of being typical examples and typical situations. They also illustrate the important problems encountered by conservation in Europe when it ceases to be "art for art's sake" but becomes an integral part of an urban policy. Bologna is one of these projects and it is here that the second symposium organised by the Council of Europe will take place from 22-26 October 1974 (the first was held in Edinburgh). The Bologna symposium will take as its theme "Social costs of integrated conservation".

San Leonardo — operational block of the historic centre of Bologna. During restoration operations the residents will be temporarily re-housed in new buildings constructed in exactly the same style as their ancient dwellings. When restoration is completed, the residents will have the choice of either returning to their original homes or remaining in the new buildings.



A typical example of Bologna's numerous streets with their characteristic arcades.





to the end of the 19th centuries. Today, owing to the general development of the country, including the construction of roads leading to the more inaccessible regions, the expansion of grazing areas and the indiscriminate establishment of touristic installations and activities, the dangers of complete annihilation of a still greater number of rare plants have multiplied. Only a very few specimens still remain of the once rich mammal population. In ancient times the existence of lions in the mountains of the Pangaion, Beles, the Pindos range and Mount Olympus, is mentioned by several

authors, as eg in Xenophon's "Cynegeticos" (Treatise of Hunting) and in Herodotos. Pausanias speaks of the bears that roamed Mount Parnes, ie not more than 30 km. from Athens. As late as a century ago, there were many deer, roe-deer and wild boars to be found in the hills of Attica. Besides the biological reasons, the interference of man has also played a role in the disappearance of these and many other wild animals. Two of the remaining mammals, for whose survival endeavours are being made, are the boar, which is still found in some mountainous areas in

the north, and the Mediterranean monk seal, in the Greek archipelago. These species are becoming increasingly rare in the European zoogeographic area, and any effort towards their survival is most valuable and welcome.

When speaking of nature protection in Greece, we are referring to the times subsequent to the country's liberation from foreign domination which took place gradually from the 19th century to our own times. In the first years of national independence, the destruction wrought to the land by the long period of struggles was of such magnitude and the population's economic level so low, that all natural elements were exclusively considered as wealth producing factors. On the basis of this attitude, the first legislation issued by the government was solely aimed at the protection of only such natural resources that could constitute a capital for the national economy. The aesthetic and scientific sides of the protection of nature was, as a rule, ignored and neglected. This state of affairs endured for 150 years, and traces of such an attitude are still to be found.

A substantial change took place a few years before the last war. It is all to the credit of the farsightedness of the Greeks and their governments that the institution of national parks was created in this country, much earlier than in other European countries who, after all, were not faced with the same kind of difficulties.

In 1937, thanks to the initiative of the Hellenic Alpine Club, Law-Decree No. 856 "on national parks" was published, which set the basis for the protection of natural beauties etc. Following this law, the first two national parks of Olympus and Parnassos were created in 1938. Then the difficult years of the second world war and of internal strife intervened, which did not allow the continuation and realisation of the conservation programme. There are today in Greece, nine national parks, created by law, covering a total of 94,500 hectares. Five of these, viz Olympus, Parnassos, Oeta, Aindos and Vikos, are concerned with the protection of mountainous regions of central Greece, with their rich natural setting. Three other parks were created on the islands of Crete and Cephallonia; and one in the northernmost region of the country — on the borders of Greece, Yugoslavia and Albania — in the magnificent region of the Prespa lakes. This last is the most recently created national park, particularly important for its extremely abundant population of rare waterfowl. Since ancient times Greece has been



A rare moment, the dramatic silhouette of the Cretan Goat (Capra aegragus cretica).

rich in wetlands, where a great number of bird species have found their optimal breeding range and hundreds of thousands of geese, swans and ducks from northeastern Europe are concentrated during the migration period.

After the Danube delta, the Camargue in France and the Coto Donana in the Guadalquivir delta region in Spain, the Evros delta, in north-east Greece, rates among the more important regions for the breeding and wintering of European waterfowl and birds of prey. Of the latter, up to 29 different species have been identified making this region the most important in Europe for this most endangered bird group. Of further interest is that of the about 600 birds ascertained in the whole of Europe, 380 are found in Greece, of which no fewer than 300 are to be found in the Evros delta and the neighbouring mountains.

Equal to the importance of the Evros delta another outstanding wetland is to be found in the north-eastern corner of Greece — the Mikra Prespa lake, a real bird paradise where ornithologists from various parts of the world are carrying out extensive studies on the 180 different species of birds living there. But the most unique aspect of this lake is its pelicans. Both European species, the white pelican and the dalmatian pelican (about 300 pairs) are breeding there, together with numerous cormorants, herons, spoonbills etc. all rare elsewhere in Western Europe.

These two examples alone show the necessity of preserving the Greek wetlands and their bird populations; this constitutes one of the primary aims of the Hellenic Society for the Protection of Nature (a private organisation) whose efforts first enabled the army to assume, in 1970, the protection of

birds of the Mikra Prespa and of their biotope, until the recent creation of the Prespa National Park, which now fulfils this aim.

Such efforts have also received much valuable help from the Ministry of Eastern Macedonia and Thrace whose decisions have created a fully protected area around the Evros delta. This is a first and indispensable step for the future establishment of the Evros National Park.

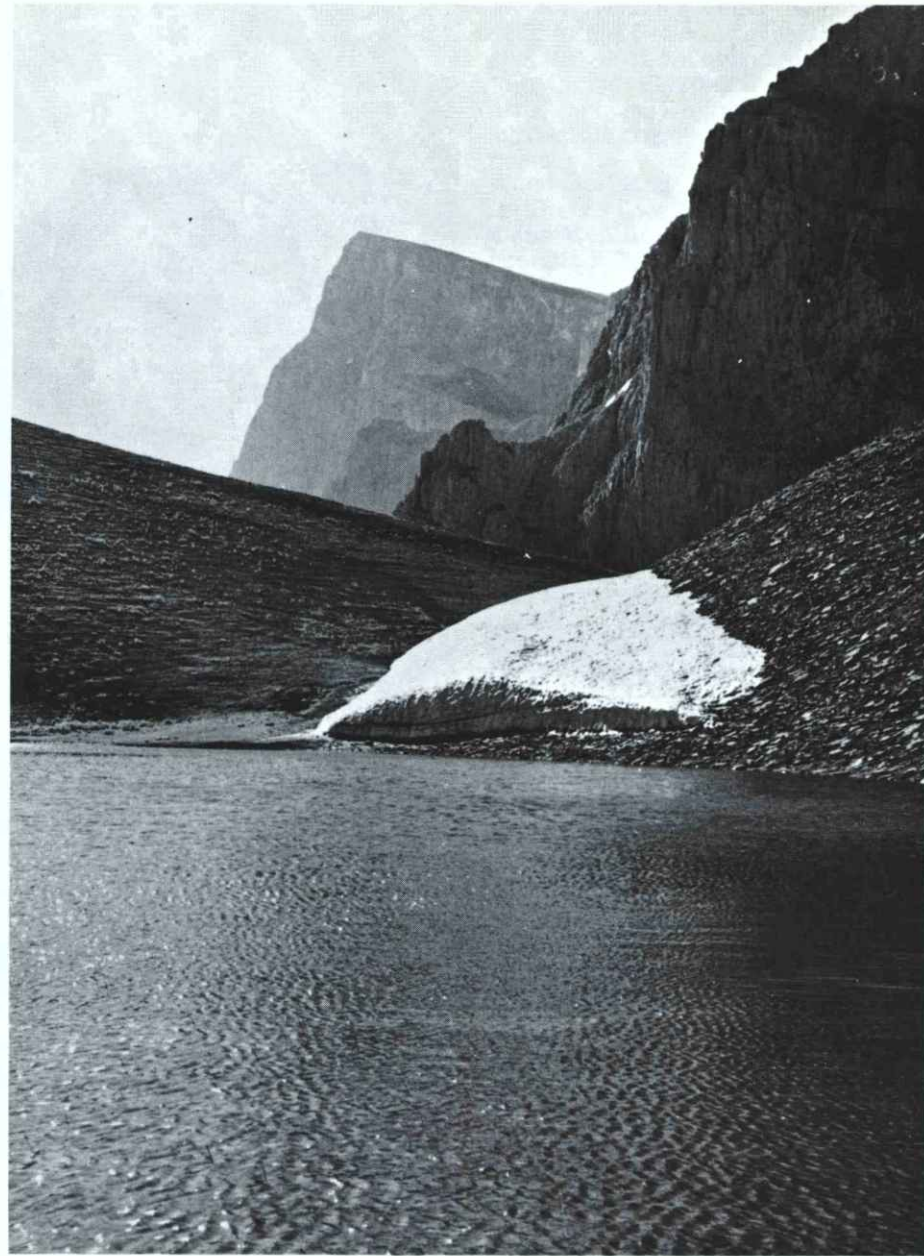
With respect to the aforementioned nine existing national parks, the protection they now offer is insufficient. Stricter regulations for their management and operation are needed, including more personnel with greater experience for their enforcement. Fortunately, dangers of damage from tourists are not a problem since the majority tend to favour the coastal regions. This, on the one hand, naturally raises conservation difficulties for the over

15,000 km. of Greek coasts, with their infinite variety of form and character. Regrettably little has so far been done towards solving this problem and it might even already be too late to take appropriate measures to protect the coasts and islands of Greece from the impact of mass tourism and industrial development.

Environmental education of children and the general public is another factor which is lacking in Greece. Little pertinent educational material is available and qualified teaching personnel are inadequate. The Hellenic Society for the Protection of Nature has been enlightening the general public, by means of lectures, publications etc. of its aims and trying to make it aware of the need to preserve our natural heritage for present and future generations. For financial reasons, these efforts have been limited, but have nonetheless met with great success. Besides the interest shown by government services in nature conservation in Greece, the role of private organisations should also be mentioned.

We have already mentioned the Hellenic Alpine Club, with its 50 years of productive life, and the Hellenic Society for the Protection of Nature. There are a few other organisations, among which an essential role is played by the Athens Society of the Friends of the Trees, and the National Landscape and Town Commission. The common aim of all of us is to co-ordinate and channel private activities and means towards the protection of nature.

International organisations have also contributed substantially to the protection of Greek nature, such as the International Union for Conservation of Nature and Natural Resources, with its special Working Group on Greek Conservation; the World Wildlife Fund;

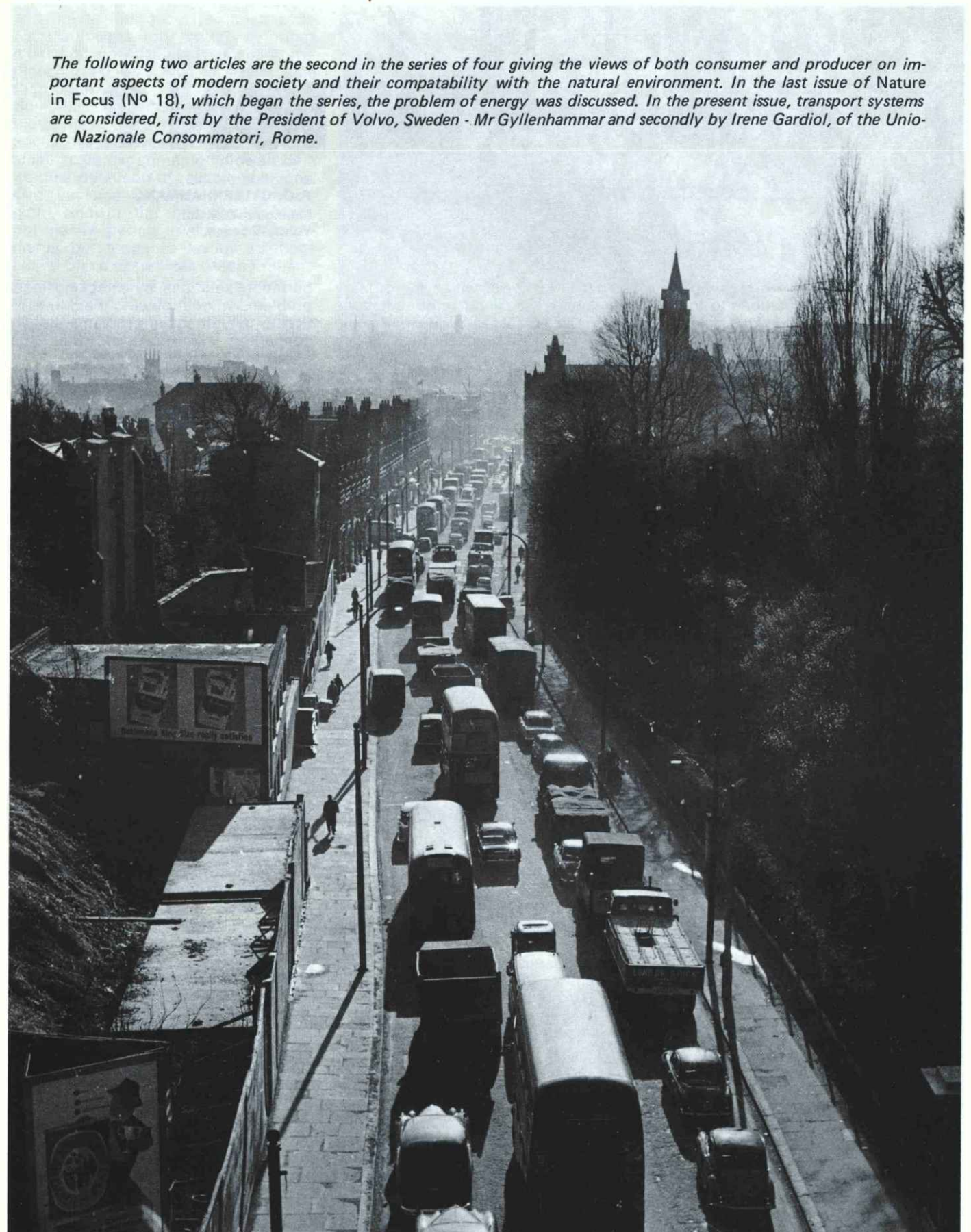


the International Council for Bird Preservation, a national section of which operates in this country; and the International Waterfowl Research Bureau. Representatives of the Food and Agriculture Administration of the United Nations have repeatedly served as

consultants for the Greek Government for establishing programmes on environmental conservation, as similarly, representatives of the US National Park Service, and by other international organisations for problems of pollution.



The following two articles are the second in the series of four giving the views of both consumer and producer on important aspects of modern society and their compatibility with the natural environment. In the last issue of Nature in Focus (N° 18), which began the series, the problem of energy was discussed. In the present issue, transport systems are considered, first by the President of Volvo, Sweden - Mr Gyllenhammar and secondly by Irene Gardiol, of the Unione Nazionale Consumatori, Rome.



TOO MUCH TRANSPORTATION ?

P. G. GYLLENHAMMAR
Managing Director,
Volvo, Sweden

No car manufacturer or municipality can develop lasting solutions to traffic problems — solutions which can satisfy the demands from all different levels of society — without mutual co-operation. Thus, in many countries as also in Sweden, a close collaboration has been started between government representatives, the municipalities and

the car industry, of which the primary objective is to find traffic solutions which can be tested on a small scale before they are applied to a whole community. In my opinion a trial procedure of this kind is very important. On the other hand, I find it difficult to accept the situation in which communities try to find traffic and trans-

portation solutions by attacking local problems without placing them in relation to overall social problems closely connected with those of traffic and transportation. In the developed society the organization of traffic and transportation plays an important economical and social role. It is therefore necessary



to tackle the problems pragmatically and not to introduce advanced technical solutions too rapidly. Priorities must first be evaluated and pilot studies carried out. This is easier said than done.

Sometimes it seems that it is more simple to make decisions regarding heavy social investments than to perform small scale experiments followed by a gradual definition of reliable solutions. The decision procedure in government and in the municipality does not easily permit trials and experiments but tends to favour solutions based on compromises which in themselves represent a balance of opinions of the different politicians. This decision procedure is still more complicated due to the fact that basic standards and evaluations can differ widely from politician to politician.

In some cases the problems caused by traffic and transportation in the form of accidents, congestion, pollution etc. have attained such proportions that the authorities have felt obliged to act swiftly by enforcing some kind of legislation to ease the situation. Unfortunately such action has often been taken a little too swiftly.

Thus the development of the various forms of traffic and transportation throughout the last few decades has taken place frequently without enough guidance and, in some cases, without sufficient or effectual regulations. The reactions from the community and from the politicians have often come at too late a stage.

Today we know that we must plan the development of traffic and transportation in a long-term perspective using periods of 15 to 20 years and in some cases with a time horizon of 50 to 100 years (regional planning, town planning, building of motorways, larger bridges etc.).

The traffic and transportation problems are "functions" of the level of development and the cultural patterns of society. Highly developed countries like the USA, Belgium, the Netherlands and Great Britain have acute traffic problems. Other countries are at an in-between-stage. An important expansion can be predicted with a high probability in both the truck and car traffic of countries like the Soviet Union and those countries closely linked with the Soviet Union. It is quite possible that China will also have to face an extensive traffic development within the not too distant future. Rapid, convenient, efficient transportation is a condition for economic growth.

However in achieving this consideration must be given to certain opposing



factors such as accident rates, scarcity of fuel, traffic congestion, air pollution and a spoiling of the environment. Some of these problems have already become severe in the central parts of certain metropolitan areas, for example, air pollution in Tokyo, Mexico City and similar cities is considerable.

But the car manufacturers are not the only ones with problems. Even air transport is entering a critical phase. Congestion in the air space above large airports such as Paris, London, Frankfurt, New York and Tokyo is already a serious issue and the risks involved are increasing all the time, not to mention all the other specific types of problems being raised and that will be raised by the very large and rapid aircraft of today and tomorrow.

On the other hand transportation by sea and by canal systems will gain in importance. It is possible that ships of considerable size will be able to go from the Mediterranean through Europe up to the Rhine within the foreseeable future. Pipeline systems will be further developed and extended and an increasing proportion of the transportation of oil and gas will ultimately be made through enormous pipeline systems controlled by advanced electronics. Trucks will also play a larger part in commercial transport, as railway systems in many countries are already experiencing economical difficulties. Private cars will survive due to their unbeatable versatility and flexibility. At the same time, public transport will also increase.

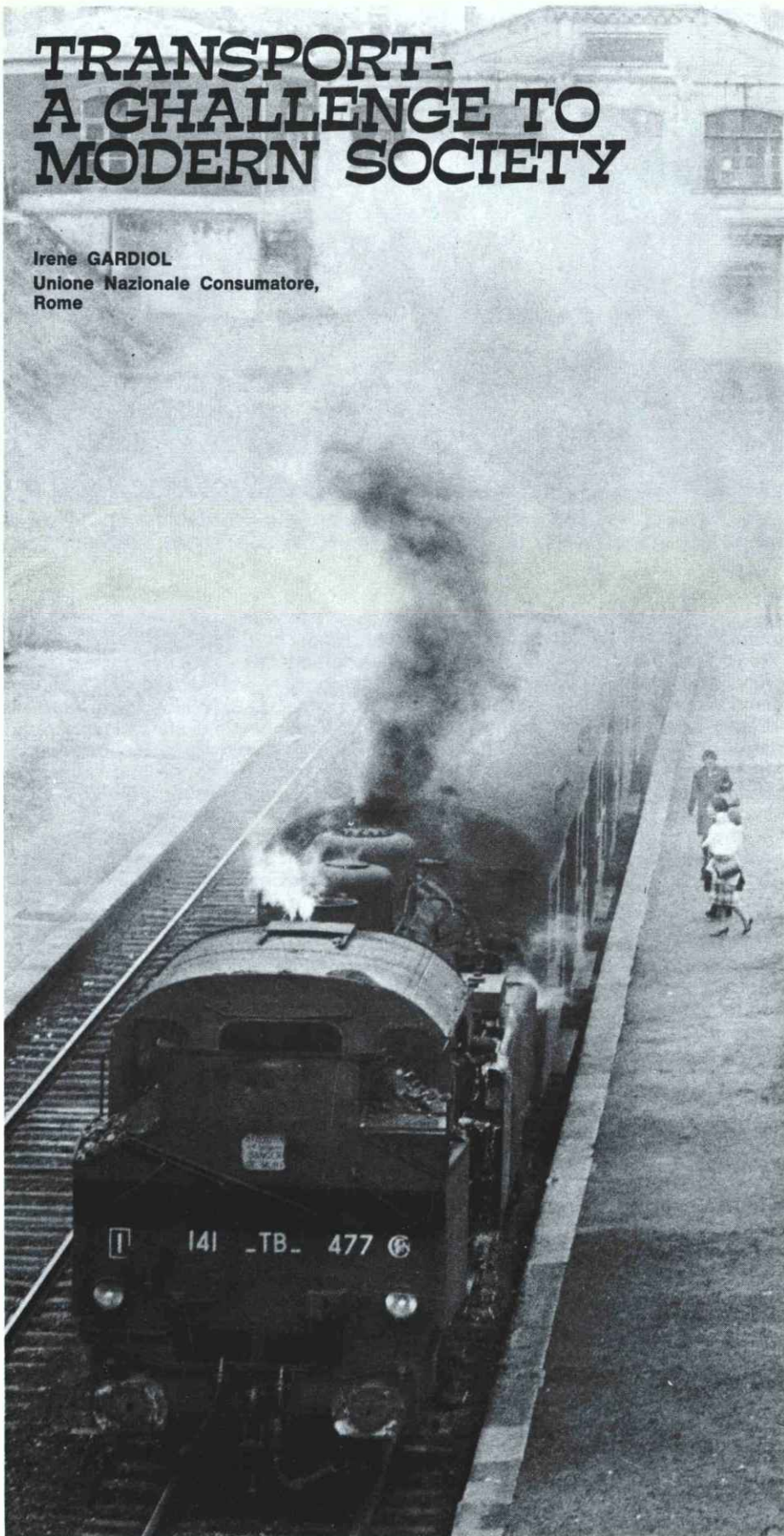
Hopefully the greater part of this development will proceed along more orderly lines than previously. This can be envisaged as follows: an increase in the number and efficiency of regulations for traffic and transportation by the governments; a greater protection against accidents, air pollution, congestion and traffic noise; a concerted effort by manufacturers all over the world to fulfil governmental, public and individual demands and requirements; a cleaner, safer, quieter and more efficient operation of cars and trucks; an increase in the prices of automobile products in order to meet the demands stemming from the need for clean air, clean water and nature conservation.

The seventies will start a new era of traffic and transportation.



TRANSPORT- A CHALLENGE TO MODERN SOCIETY

Irene GARDIOL
Unione Nazionale Consumatore,
Rome



John Stuart Mill, the philosopher and economist, urged in his "Principles of political economy" (1848) that, if the world's charms and beauty were to be sacrificed through man's endeavours to meet the needs of a growing population, it would be preferable, in the Community's own interests, to call a halt to development.

While recognising the doctrinal limits of Mills' theories, the prophetic nature of his writings has to be acknowledged as, more than a century ago, he pointed to the conflict there can be between man's harmonious development and the consumer society. Just like a number of contemporary economists and sociologists he shook that faith in Gross National Product which is still gaining ground in industrialised countries.

Raymond Aron, in his book "Les désillusions du progrès", says that the growing ugliness of towns cannot be included in calculating the GNP, by which we traditionally measure our living standards. Similarly we cannot put a price on the enjoyment we derive from the beauty of natural landscapes, nor is it possible to include this as a factor in what people earn.

Robert Heilbroner predicted that the worship of economic expansion per se, and production records, would be seriously questioned during the 70s.

Today the "zero growth" movement led by Galbraith in the USA (and the Club of Rome team) has established a place for itself in modern economic thinking. Several international organisations such as the Council of Europe, with its Consumer's Charter, the EEC, with its Environment Programme, and OECD, with its research into 24 social concerns, make "the quality of life" their priority objective.

Lecturing in March 1974, Prof. Petrilli, Chairman of IRI, the largest Italian holding company, warned against the risk of this conflict of ideas taking the form of systematic opposition to technological progress. Technology itself need not be questioned, but the findings of technological research have to be applied and geared to man's real needs.

An equally important development has taken place in the transport field. Increased opportunities for travel in an "industrial civilisation" have enabled man to broaden his views on life and the world, as well as heighten his sense of solidarity. The mobility of mankind furthers the exchange of ideas and culture and the breaking down of the mental and economic barriers that create discord.

However, instead of developing at a tempered and balanced rate, "con-



sumer society" is growing too fast, with a ceaseless proliferation of consumer goods geared solely to profit-making. This latter objective has also had repercussions on transport policy, since active encouragement of a public transport policy (ie use of subsidies) has been sacrificed in favour of expanding the number of private cars which has become the cornerstone of industrial development. This phenomenon has been particularly apparent in Europe since the number of cars increased eightfold in 17 years, whereas over the same period it only doubled in the United States. Everyone is familiar with the consequences of increasing traffic, in particular in towns where they can be seen in the form of increased levels of carbon monoxide and nitrogen, lead, benzopyrene, aldehydes etc. Technical remedies are known, although they are not always considered satisfactory. Clean petrol costs more, and a low octane-count petrol would entail radical chan-

ges in engine design. Excessive use of cars is also one of the causes of both chemical and aesthetic damage to monuments and historic districts of towns.

Those who profit from the present situation are in the main oil companies, garages, body work repairers etc., and the state (through the indirect taxation it receives). Transport developments have direct repercussions on regional planning policy. Tunnels, motorway interchanges, bridges and other civil engineering constructions unfortunately do not always fit into landscapes, and often irrevocably impair what were once quiet and peaceful regions. A coherent transport policy should meet certain basic social needs and upgrade the role of public transport. Likewise, efforts should be made to prevent waste and ecological damage. Regrettably, all these questions are extremely complex, and come up against financing difficulties, lack of

infrastructure, problems of comfort, safety etc.

The Bodson Report (1970) suggested that the EEC propose a second generation transport policy to meet one of the most dangerous challenges to modern society, ie to prevent an unprecedented economic recession by controlling the development of communications, which are the symbol and instrument of progress.

This challenge encompasses other aspects of this vast problem such as atmospheric pollution by aircraft. In this context we should note the United States' wise decision in 1973 to reject the SST supersonic aircraft project, which would have considerably increased the problem of atmospheric pollution. This is a first step in applying Galbraith's recently expressed view that we should question the principle that the objectives of the major corporations shaping our economic system are identical to those of the individual.



...NEWS...NEWS...NEWS...NEWS...NEWS...

FROM STRASBOURG

POLLUTION OF GROUNDWATER

Working Party : Rhine Valley water table

Within the framework of the efforts of the Committee on Science and Technology of the Parliamentary Assembly of the Council of Europe to strengthen the scientific co-operation in Europe was created on 28 September 1973 a Working Party on the Rhine Valley Water Table. This scientific working party concerned with the concerted, multi-disciplinary scientific study of the groundwater extending from Basle to Bingen, between the Vosges and the Black Forest and the ranges which form their extension to the north, along the axis of the Rhine River (see photo). The main purpose of its work is to compile an inventory of the aquifer and catalogue types of pollution in order to determine methods of protection and control.

There are 3 aspects to the problem :

- it is extremely urgent as it is a matter of protecting an exceptional natural resource against increasing pollution ;
- it is specifically European because of its geographical limits. Although shared by France and Germany (it is of interest for various reasons to the riparian countries, Switzerland and the Netherlands, and also to Belgium and Luxembourg) ;
- it offers an opportunity for pioneering because the methods and techniques used successfully in the particular case of the Rhine Valley will be capable of transposition to the study and monitoring of other groundwater.

The scientific motivations of the working party is based on :

- systematic research on the groundwater hydrodynamics ;
- study of means of controlling pollution ;
- continuous monitoring of resources and consumption ;
- centralisation, exchange and dissemination of research findings ;
- training of groundwater specialists.

For this 4 research groups have been set up :

1. *Research group* for the joint preparation of a composite map of the Rhine Valley between Basle and Mannheim ;
2. *Research group* to draft a handbook on the different cases of hydrocarbon pollution and ways of dealing with it ;

3. *Research group* on hydrodynamics and the physico-chemical and biological problems connected with the aquifer ;

4. *Research group* on the ecological problems of underground water.

These 4 research groups have begun the work entrusted to it in its own special field, maintaining and developing the contacts established bet-

The Rhine Valley between the Black Forest and the Vosges.



ween specialist services and laboratories in Switzerland, Germany, France, the Netherlands and Belgium, by means of exchanges of visits and publications.

The members began by discussing the work entrusted to Research Group No. 2, the preparation of a handbook. It was agreed that the handbook should be produced in separate parts. In this way, it would be possible to :

- bring out parts in order of the urgency of the problems dealt with ;
- bring the handbook up to date subsequently by means of supplements or appendices.

The first part, which could be produced very quickly, would consist mainly of the report prepared by the Bundesanstalt für Gewässerkunde in Koblenz under Mr. Schwille, on groundwater pollution by hydrocarbons. Additional material would be contributed by the other research groups if they wished, according to an already fixed timetable.

A second part was already planned, dealing with the typical and disastrous phenomenon of pollution of the Rhine water table by sodium chloride.

Another part with a geological and hydrogeological emphasis, would be a useful complement to the first 2 : it would contain a composite map of the Rhine Valley water table. The first maps of the Département du Haut-Rhin, showing water resources, water quality, water conservation and vulnerability, have been published recently by the SGAL.

A third part would provide a basic scientific introduction to these high-quality specialised sections. This part would be more widely distributed and provide the lay reader with an overall picture of the various geographical, geological, hydrodynamic, chemical, ecological and economic aspects of Rhine Valley groundwater pollution. The more interested or more knowledgeable reader would then be able to refer for more specific information to one of the specialised parts of the handbook.

NOTES

Fish otters (Lutra lutra) — victims of overhunting, pollution and loss of habitat. Efforts are being made in several countries to combat this problem by restocking habitats from which these animals have disappeared or where they are on the decline.



ZUSAMMENFASSUNGEN

VERÄNDERUNGEN IM WALD- UND BODENBESTAND

EUROPAS — p. 3

J. Pelisek

In den letzten zwei bis drei Jahrhunderten hat sowohl im Tiefland als auch in den Mittel- und Vorgebirgen Mittel- und Nordeuropas die Fichtenmonokultur zunehmend den früheren Mischwald verdrängt. Dieser Strukturwandel des Waldbestands oder die Abholzung von Waldgebieten und ihre Umwandlung in Ackerland haben zu spürbaren Veränderungen in der Bodenbeschaffenheit und damit auch in der Ertragsfähigkeit geführt.

Die Umwandlung des einstigen Mischwaldes Mittel- und Nordeuropas zu Fichten- oder Kiefernmonokulturen haben zu folgenden Veränderungen in den Böden des Tieflands und der Mittel- und Vorgebirge geführt:

1. Erhöhter Bodensäuregehalt.
2. Bildung von zu viel empfindlichem und säurehaltigem Oberflächenhumus.
3. Unterbrechung oder spürbare Reduzierung des Nahrungshaushalts der Natur.
4. Verminderte Stickstoffmineralisierung, d. h. geringere Erzeugung von den für den Waldbestand so wichtigen Stickstoffarten.
5. Geringere Mikrobentätigkeit und geringere biologische Aktivität des Bodens.
6. Geringere Podsolisierung, d. h. Absinken des Nährstoffgehalts der oberen Bodendecke und allgemeine Verdichtung des Bodenprofils.
7. Herabgesetzte Produktionsfähigkeit des Waldbodens.
8. Entstehung minderwertiger Waldbestände von geringem Ertrag und stark vermindertem Festmeterzuwachs.

NEUES LAND, NEUE WÄLDER,

NEUE NATÜRLICHE UMWELT IN DEN NIEDERLANDEN — p. 8

A. J. van der Poel, Wagenin

Früher wurden alle in den Niederlanden verfügbaren Bodenflächen landwirtschaftlich, industriell oder städtebaulich genutzt, so dass um die Mitte des 20. Jahrhunderts nur noch 7% der Gesamtfläche aus Wald oder Brachland bestanden. Mittlerweile geht man daran, « natürliche » Landschaftszonen zu schaffen, um dem wachsenden Bedarf nach freier Erholungslandschaft und besonderen Naturschutzgebieten Rechnung zu tragen. Ein Beispiel hierfür ist das der Zuidersee in neuerer Zeit abgewonnene Land (Zuiderseepolder), dessen Entwicklung diesen neuen gesellschaftlichen Bedürfnissen angepasst wurde.

Das Landrückgewinnungsprogramm umfasst auch die Aufforstung von zirka 1000 ha pro Jahr bis zum Jahre 2000; womit sowohl dem Erholungsbedarf als auch forstwirtschaftlichen Gesichtspunkten, der Holzgewinnung und der Möglichkeit, weitere Naturschutzgebiete einzurichten, gedient werden soll. Es wird angestrebt, ausgewogenen Waldbestand heranwachsen zu lassen, der sowohl Lichtungen als auch dichten Baumbestand mit Bäumen verschiedener Gattung und unterschiedlichen Alters umfasst, also Wälder mit gesunder biologischer Grundlage und guter wirtschaftlicher Struktur.

Auch Wildschutzgebiete gelten nicht mehr als Luxus, sondern als Notwendigkeit, und die Schaffung einer vielgestaltigen Umwelt wurde ein wichtiges Planungsziel.

DIE AUSWIRKUNGEN DES TOURISMUS

FÜR DIE WALDGEBIETE UND ANDERE BEREICHE

DER NATÜRLICHEN UMWELT — p. 11

Dr. Valerio Benvenuti, Generaldirektor, Minister für Landwirtschaft und Forsten, Rom

Das stets steigende Bedürfnis nach mehr Natur führte zu einem masslosen Anwachsen des Tourismus besonders in den Waldgebieten, wo reine Luft, Grünflächen und Ruhe noch zu finden sind. Die Zahl der Touristen stieg in der Zeit von 1958 bis 1972 von 110 Millionen auf 263,5 Millionen an. Allein die Zahl der Camping-Touristen stieg in der Zeit von 1964 bis 1972 um jährlich eine Million. Damit stellt sich die Frage, ob die Waldgebiete den Einwirkungen dieses Massentourismus gewachsen sind, ohne dabei zerstört zu werden. Etwa 20% der Bodenfläche Italiens sind Waldgebiete, die sich im allgemeinen jedoch in schlechtem Zustand befinden. Zwar besteht die Möglichkeit, neue Waldgebiete zu schaffen und/oder die zerstörten Gebiete wiederherzustellen, der finanzielle Aufwand ist jedoch in beiden Fällen, insbesondere aber im ersten, sehr hoch. Die italienische Forstverwaltung hat bereits eine Reihe wichtiger Schritte unternommen, die Neufassung der Forstgesetze aber, die Neuorganisation der Forstverwaltung, ein stärkeres Eingreifen

der zentralen und regionalen Behörden sowie die Durchführung einer Aufklärungskampagne über den Nutzen des Waldes (die auch zu einer Verminderung der Waldbrände führten könnte) bleiben die wesentlichen Aufgaben und Massnahmen, die weiterhin zu einem wirkungsvollen Schutz der Waldgebiete notwendig sind.

NATURSCHUTZ IN GRIECHENLAND

PROBLEME UND ERFOLGE — p. 15

Byron Antipas, ehrenamtlicher Sekretär der Hellenischen Gesellschaft für Naturschutz, Athen
Günther Müller, Mitglied der IUCN Arbeitsgruppe für Naturschutz in Griechenland

Seine geografische Lage am Treffpunkt dreier Kontinente, sein Klima und seine Geologen haben Griechenland über 5000 Pflanzenarten gegeben; von seiner einst reichen Säugetierbevölkerung ist allerdings wenig geblieben.

Naturschutz in Griechenland ist hauptsächlich mit der Zeit der Befreiung, vom 19. Jahrhundert an, verbunden. Zu den grösseren Erfolgen gehört ein Nationalparkgesetz (1937), seit dessen Verabschiedung neun Parks geschaffen wurden, für deren Betreuung allerdings noch strengere Richtlinien nötig sind. Griechische Küstengebiete leiden unvermeidlich Schaden durch übermässigen Tourismus und industrielle Entwicklung; Gegenmassnahmen sind dringend notwendig.

Sumpfländer, wie das Evrosdelta und der Mikra Prespa See (jetzt Nationalpark) sind bedeutende Brut- und Überwinterungsplätze für europäische Wasser- und Raubvögel. Die Hellenische Gesellschaft für Naturschutz, eine private Organisation, die ursprünglich für den Vogelschutz in diesen Gebieten verantwortlich war, hofft, das Evrosdelta zum Nationalpark zu machen. Sie spielt ausserdem eine bedeutende Rolle bei den Bemühungen, die Erziehung auf dem Gebiet des Umweltschutzes zu verbessern.

Internationale Organisationen, wie IUCN, WWF, ICBP und andere haben, ebenso wie offizielle und private Vereinigungen, wesentlich zum Naturschutz in Griechenland beigetragen.

ZU VIEL VERKEHR ? — p. 22

Direktor P. G. Gyllenhammar, Volvo, Schweden

Verkehr und Verkehrsprobleme sind Funktionen des Entwicklungsstandes und der kulturellen Verhaltensmuster einer Gesellschaft. Länder wie Grossbritannien, Belgien oder die USA haben akute Verkehrsprobleme, und auch der Flugverkehr gerät in ernste Schwierigkeiten durch Verstopfung des Luftraums.

Während bisher die verschiedenen Transport- und Verkehrsarten eher zufällig und kurzsichtig entwickelt worden sind, wissen wir jetzt, dass zukünftige Planungen langfristig über Zeiträume von 20 Jahren oder mehr angelegt werden müssen. Wenn man brückensichtig, dass Gütertransport über See und Kanal ebenso zunehmen wird wie Lastwagentransport, dass ausserdem der öffentliche Verkehr anwachsen und das Privatauto wegen seiner unschlagbaren Vielseitigkeit überleben wird, dann kann man sich die zukünftige Entwicklung etwa so vorstellen:

Eine Zunahme in Zahl und Wirksamkeit von Gesetzen und Verordnungen, ein verbesserter Schutz vor Unfällen, Luftverschmutzung, Verkehrsstauungen und -lärm; weltweit abgestimmte Bemühungen der Hersteller, öffentliche und private Forderungen zu erfüllen; ein sauberer, sicherer, leiserer und wirtschaftlicherer Betrieb von Personen- und Lastwagen und höhere Preise für Auto-Produkte, um die Anforderungen an saubere Luft, sauberes Wasser und Naturschutz erfüllen zu können.

EINE HERAUSFORDERUNG AN DIE MODERNE

GESELLSCHAFT — p. 24

Irene Gardiol, Unione Nazionale Consumatori, Rom

Der Autor erwähnt die Arbeiten von einigen Soziologen und Ökonomen, in denen die von der Ökologie aufgeworfenen Probleme in Bezug auf die wachsende Luft- und Wasserverschmutzung der übermässige Gebrauchskraft von Fahrzeugen, welche die Gebäude verschmutzen, die Stadtluft verpesten, die Gesundheit der Bewohner angreifen, die Flüsse und Meere vergiften, aufgeworfen werden.

Die übermässige Entwicklung der privaten Transportmittel, die hohe Kosten erfordern (Autobahnen, usw.), die Landschaft verunstalten, stellen nur für die Petrol-Industrie (Raffinerien, Auto-fabriken und Zubehörindustrie) einen wichtigen Faktor dar, jedoch die durch die Erhöhung des Stadtverkehrs verursachten Probleme bleiben ungelöst.

Der Bericht Bodson (1970) hat der CEE vorgeschlagen, eine neue Transportpolitik zu erarbeiten, die diese gefährliche Herausforderung an die moderne Welt lösen sollte, da dieses Problem wichtig für die Entwicklung der modernen Zivilisation und der menschlichen Gesundheit ist.

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