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**Naturopa**



# Naturopa

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This symbol for the Council of Europe's nature conservation activities also illustrates the Centre's campaign on the conservation of wildlife and natural habitats which was launched in 1979 and which will continue, because of its great success, until the end of the year 1981.

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## Green stones

Could we exist shut up in our towns, as we are most of the time, unless we had some contact with nature? Is it possible for man to conceive a balanced and happy life that does not obey the laws of nature? Is it right for us to live, as individuals, nations and races, by offending and mutilating nature and causing animal and plant species to vanish forever from the face of the earth?

The answer must be NO; nobody can have the right to do this. No nation or people must endanger its own environment, if only because by doing so it is endangering its own existence.

Especially in our towns, it is essential to remember that however impressive human wealth may be, in music, architecture, literature and religions, human beings are still dependent upon nature.

What is more, nature is amazing and wonderful; it must be not simply respected but admired and loved as well. For these reasons, we have devoted this issue to "Nature in town" as a "green" contribution to the European Campaign for Urban Renaissance launched by the Council of Europe.

The next issue of *Naturopa* will look at sources of energy and their impact on our environment.

H.H.H.



# Editorial

(Photo Council of Europe)

## The European Campaign for Urban Renaissance

The readers of *Naturopa* may wonder why an essentially urban campaign, such as the European Campaign for Urban Renaissance, appears in a review dedicated to the protection of nature.

Perhaps a reference to a seminar organised jointly last year by the European Institutes of Environment and Human Rights might provide part of the answer. During that seminar, I defended the position that the attitude of mankind towards environment is anthropocentric and cannot possibly be otherwise. This, in my opinion, implies that we have to consider the right to a satisfactory environment as an integral part of human rights, a position which has already been adopted in several European constitutions. Furthermore, it was my thesis that demographic patterns and the development of an industrial civilisation would tend to make the right to a proper environment one of the most important of human rights. Indeed, the most important of human rights ought to be the right to remain human.

To a certain extent, the ecological movement is a simple fight for survival, not necessarily in the physical sense — for the prophets of doom are almost certainly mistaken in their forecasts regarding physical resources — but, rather, in the psychological sense. The vast majority of the European population lives in cities and urban life is becoming increasingly less human and will continue to do so whilst the present pattern of concentration of population in large cities remains.

The Council of Europe's Campaign for Urban Renaissance, launched last October in London, fully recognises this problem and makes a serious attempt at tackling it.

The improvement of the quality of the urban environment ranks first among the five principal themes of the campaign. This includes policies for noise abatement, the reduction of air pollution, the provision of parks and other open spaces, the creation of pedestrian areas, etc.

Clearly, there is a contradiction between, on the one hand, the ever-increasing desire of city-dwellers for closer contact with nature and, on the other, the overall growth of population and the decline of agricultural population in particular. There are, however, reasons to be optimistic, the most important being — perhaps paradoxically — technological progress.

The Industrial Revolution led, in the nineteenth century, to heavy concentrations of the labour force in towns, where factories and dwellings coexisted in a frequently unhealthy atmosphere. The new industrial revolution which we are witnessing at present is, in developed countries, largely based on a clean industry: electronics. New developments in the computer industry have made it not only possible but also desirable for large firms to spread production centres, in order to avoid the risk of large concentrations. Instant access to information, through what has been called "telematics" (i.e. telephonic transmission of computerised data), is leading to completely revised

takes cannot easily be corrected. However, as we are all aware, there still exist vast open spaces in most European towns, which have been abandoned in anticipation of further building. We are equally aware that even spaces earmarked for community use lack the necessary facilities, because of insufficient means or inadequate planning by local authorities. In the meantime, many children are without parks or sports fields, playing on waste ground, whilst elderly people, for their part, lack pleasant places to stroll and to meet.

European towns must fight back and the Campaign for Urban Renaissance will help them to do so in several ways:

— It will encourage reflection and discussion about the town and its role in present and future European society. We have often made mistakes in the past, simply because we did not know what we were aiming at.

— It will try to awaken the interest of the public, both as individuals and as associations, and to promote their involvement and active participation in the improvement of the urban environment.

— It will encourage the application of the relevant current legislation or the promotion, where necessary, of new legislation.

— It will also try to increase the share of national resources allocated to the protection of urban environment.



European citizens are increasingly aware of what they dislike about their towns. They are less aware, however, of what they would like those same towns to be. We believe that one of the most important things that will emerge from the collective effort of reflection will be the need for a much closer integration between cities and nature, thus reversing the trend towards the destruction of nature that the growth of modern cities has implied in the past.

Thus, for the future, there exists the possibility of more evenly distributed populations, cleaner towns and a much closer contact with nature for most people. In the meantime, however, we must improve what we already have and there is, indeed, plenty of scope for improvement. In most cases, our towns are less adequate now to human life than they were fifty years ago. Land speculation and mistaken urbanistic concepts have made it possible for steel, glass and concrete to invade what were once open spaces, small, individual dwellings or even parks. Some of these mis-

Eduardo Merigo

# Life in the city

Max Nicholson

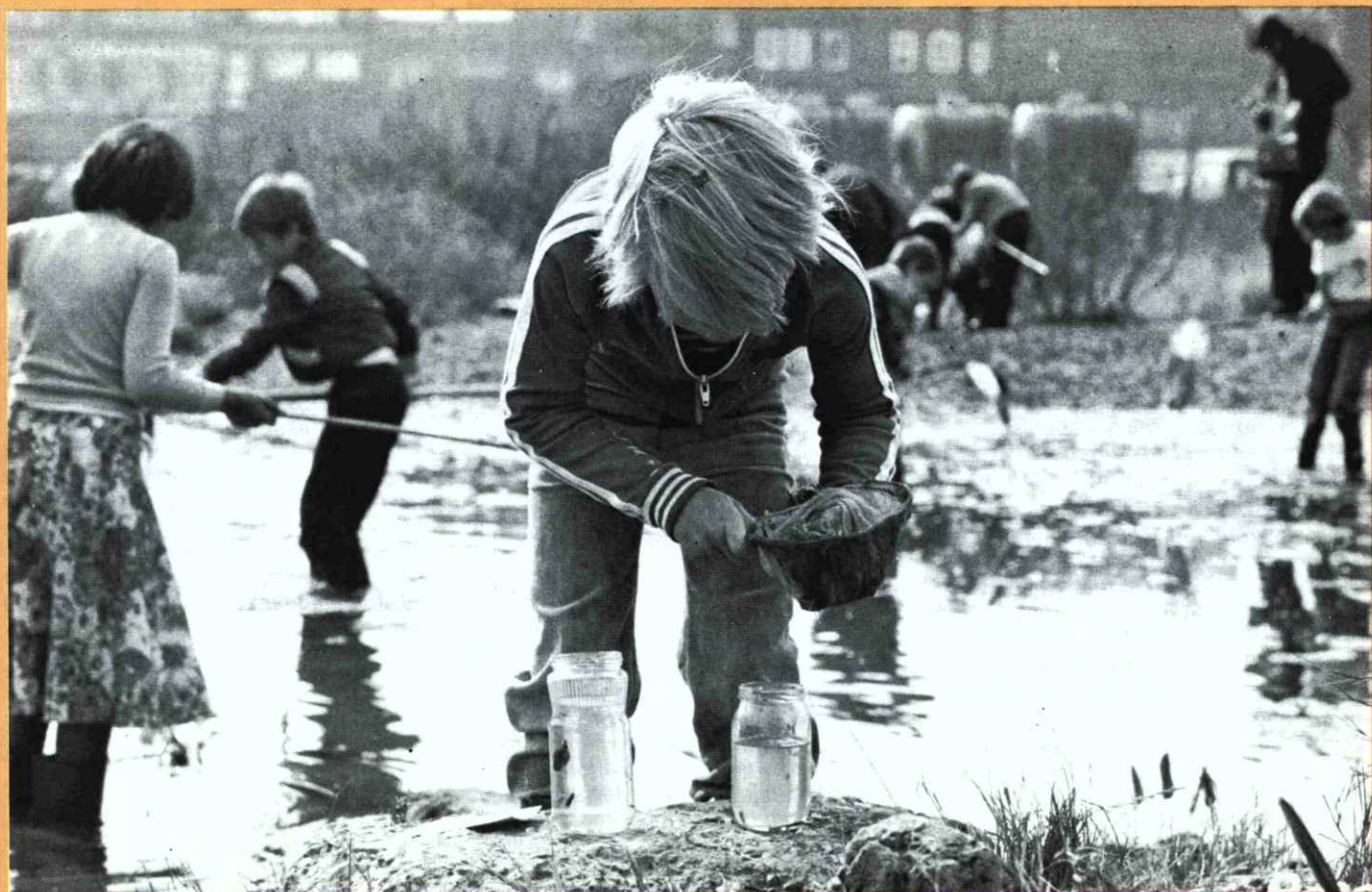
## Fauna and flora in towns: a complex problem

Towns are limited areas on which a mass of structures and other artefacts has been superimposed on the soil or rock, displacing a large part, but rarely all, of the pre-existing fauna and flora. Captivated by such demonstrations of his cleverness, man tends to overrate the importance of

his own contribution, and to minimise the natural resource which he has temporarily exploited. Only when nature hits back with some seismic, volcanic, tidal or other ecocatastrophe, or when the transience of empires confronts us with former cities reduced to overgrown ruins, does the impermanence and incompleteness of man's tenure become starkly apparent to all.

Within living memory some European cities, not least London and Berlin, were introduced by aerial bombing to curious revelations on these lines. Unsuspectedly rich samples of flora and fauna sprung to life in craters and on piles of rubble, or around newly created pools of water. Naturalists became aware that many of the supposedly lost pre-urban species had either been lying dormant or had

(Photo Ecological Parks Trust – Lyndis Cole)



once more found suitable places to colonise from outside. This recognition, however, was not immediately followed up because it coincided with a great wave of post-war concern to understand and conserve surviving natural areas, often far away from built-up settlements. Quite naturally and properly, priority was accorded to these. Only now, after the first wave of ecological studies and conservation projects on natural and semi-natural areas, has attention begun to shift to the contrasting problems of the cities. Indeed, it may be argued that until knowledge had been accumulated of such natural situations, no sound basis could exist for tackling the more complex and messy problems of urban ecology and its application in practical conservation.

Urban ecology rests on the same principles as ecology in any other context, but it differs in having been and still being exposed to externally enforced changes much more drastic, rapid and continuous than in natural conditions, save in such exceptional places as unstable river channels, accreting or eroding seacoasts, or the foot of a glacier during a major climatic change. Urban sites may at short notice be built up, cleared of buildings, redeveloped, left vacant, kept undisturbed behind fences, or overrun by miscellaneous more or less destructive humanity and its pets and equipment. They may also be exposed to pollution of many kinds and degrees, invasions of escaped or introduced species, games and digging, which may open up many kinds of underground pollutants from the past. Both in time and in space urban habitats often allow insufficient undisturbed periods for ecological succession to work itself through, and are, therefore, more difficult to interpret. Practical problems such as trespass, encroachment, vandalism and incompatible neighbouring activities can also be frustrating to the investigator.

## Some examples of urban environment protection

Until recently, therefore, urban natural history has tended to concentrate disproportionately on the wildlife of public or sometimes private open spaces under a permanent management regime. The recently abolished Committee on Bird Sanctuaries in the Royal Parks of England (principally London) was responsible for a long-term programme of observation, record-keeping and modest improvements of habitat and protection which was accompanied by a marked diversification of bird life, partly assisted by other factors such as drastic reduction of particulate air pollution. A more experimental ecological approach was adopted in some parks in The Hague and other Netherlands cities, but the peculiar traditions of city park design, planting and



A bomb-site in London before . . .



. . . and after its restoration  
(Photos Ecological Parks Trust – Lyndis Cole)

management, and the scale and pattern of human use, render such sites atypical, however keenly a naturalistic solution may be sought. The limited size of certain cities, such as Reykjavik, with immediate access to outside natural areas, can enable the artificial creation of such an uncommon feature as a ternery on an islet, or the maintenance of a happily preserved relic of swamp or natural woodland. In West Berlin a fresh start after wartime destruction has produced over the past thirty years in Grünewald a remarkable renewed park woodland, singularly free in most parts of exotic trees and shrubs, but unhappily still subject to severe pollution of its watercourses. In England, in the Midland city of Stoke-on-Trent, land use consultants designed for the City Council a series of new natural-type open spaces, greenways along disused railways and blueways along canals, including nature reserve areas, amounting in total to more than 600 ha, largely on sites of former mineral extraction in the heart of the city. An even more difficult ecological reclamation project has been the Swansea Valley scheme in South Wales, designed and supervised from the neighbouring University College. In Berlin, under Professor Herbert Sukopp, Professor of Urban Ecology at the Technische Universität, an expert team has long been at work surveying the ecology of plants and animals on various unused or derelict lands, and has published a series of valuable papers: an important technical meeting on the subject was held in Berlin in September 1980.

In London the new Ecological Parks Trust, under my chairmanship, got possession in 1977 of a valuable area of nearly 1 ha by the Thames just above Tower Bridge, and has there developed a combined programme of ecological investigations, conservation management experiments and trial field studies for schools and higher education. These are giving interesting results, carefully documented in the Trust's reports on this William Curtis Ecological Park.

## Life in the city

gin to create a demand for at least partial substitute facilities in urban areas, if only on the fringe, where they can be reached much more economically and frequently. The fact that urban sites often call for much outdoor work or preparatory clearance, pathlaying, planting, fencing and other tasks is no longer an obstacle, now that conservation volunteers have shown how popular such outlets for youthful energies can be under the right leadership and harnessed to some worthwhile visible result. An added dividend here is the reduction in vandalism when a city farm or ecological park is seen locally to be the pride and joy of some young people's group, rather than of an impersonal authority.

### Vacant land must be used

In economic terms, and against a background of dwindling rates of population growth in Europe and less expansion of large-scale industry, it becomes evident that many towns have swallowed up space which looks like being surplus to foreseeable requirements, but which cannot in good conscience be left derelict indefinitely, especially when towns are still absorbing good land from agriculture outside. While high land values and the unpredictability of future requirements usually rule out freehold acquisition of vacant urban land, it is potentially available on some form of occupational tenure at a token rent, on condition that the owner can resume possession at reasonable notice if and when it is definitely needed for building, and the necessary permissions and funding exist. Indeed, many organisations holding a bank of land for the future would find it both politically advisable and even a saving on maintenance to allow occupancy for a suitable period to some responsible local citizen group.

Culturally many townspeople, especially those living in dwellings without their own gardens, feel increasingly deprived without access to any space where they can go and do something or nothing, especially if it is related to some leisure interest. The growing incidence of leisure and the increase of retired people add to this problem, but also expand the potential for taking care of such sites existing just round the corner. Negatively, more and more people are growing critical of land remaining neglected and unused, when so many could make good use of it given the necessary organisation and leadership. As a focal point of social life and of psychological satisfactions there can be few rivals to a place where something admirable is happening out of doors in the immediate neighbourhood of home. The unanimity with which so many families undertake tiresome and expensive journeys out of towns at every leisure opportunity points to a need, part of which could be better satisfied within the

towns by making the best use of available space, and incidentally saving energy.

As there are in many cities plenty of vacant plots or areas unlikely to be developed for some years, and plenty of local people who could make good use of them, it might at first be supposed that this is an opportunity for local initiative. While that may sometimes be the case, it is frequently not so simple. Even experienced operators, familiar with countless nature reserve acquisitions and successful management in the countryside, find it far from easy to repeat the process in inner cities. Holders of land may be inaccessible or unforthcoming about their intentions, and promising areas may be available, if at all, only on prohibitively difficult conditions. Local authorities may shrink from giving simple authorisations for fear of blocking some politically preferable alternative use later. The whole idea of ecological studies and nature conservation on such urban areas is utterly strange to most people, and is not easily explained in convincing terms to the average townsman. Perhaps the worst barrier is the army of technical obstacles, legal, administrative, ecological, educational and others, which have to be faced at the early stages, not to mention funding. The potential support is enormous, but to convert it into practical backing is a serious task, in view of the number of problems which must be solved simultaneously to launch even a modest new project.

There can be little doubt that, once the necessary expertise has been developed in communicable form, and public opinion has been adequately educated, local groups will be able to enter the field with fair prospects of success. Without wishing to be discouraging, it is only honest to say that at this early stage the field is one primarily for rugged and resolute pioneers. Nevertheless, it may not be too optimistic to suggest that two or three more years will see us through that stage, so it is not too early for interested persons and groups to begin exploring possibilities. Indeed, critically constructive discussion is one of the most urgent needs, and evidence of demand will invariably be helpful. The more voluntary effort is available the more economical the project will be, both in capital and running costs; an enterprising, reasonably experienced and qualified group which is sufficiently dedicated might reduce funding needs to a very low level. From the standpoint of public policy the provision of more "lung" for a city, the stimulus of healthy exercise and educational effort, the provision of accessible open space at rock-bottom maintenance costs, the lift to morale both of participants and neighbourhoods, and the broadening of ecological competence should amply repay the modest costs. The last reason for inaction is a fear of being unable to afford it; the opportunity is such that at its price we cannot afford not to take it. E.M.N.

Apus apus, a summer visitor to towns, where nesting sites are becoming increasingly scarce (Photo NCC)



## Looking ahead!

Daniel L. Leedy  
and Aelred D. Geis

### Perspectives, concepts, and values

Viewed broadly, wildlife includes not only undomesticated terrestrial vertebrates but also fish and other aquatic vertebrates and invertebrates which are colourful or important components in the food webs of many higher organisms. Wildlife, along with plants on which animals ultimately depend for food, is an inherent part of the environment. Aside from hunting and fishing, man, over time, has had tremendous environmental impact through agriculture, industrialisation, and urbanisation. He has caused or hastened the extinction or extirpation of some plant and animal species. We need not dwell on habitat destruction or degradation caused by such activities or events as deforestation, overgrazing by livestock, stream channelisation, wetland drainage and land-fill projects, pollution stemming from domestic, agricultural or industrial sources, and soil erosion and sedimentation. Not all of man's impact on the environment has been harmful, however. New habitat has been provided for some species and we believe that, with planning, advantage could be taken of additional opportunities for enhancing wildlife in the course of development.

About three-quarters of the people in the

United States and Europe live in urban situations where land use is intensive and where land values are high; hence, let us consider some of the reasons for planning for wildlife in these areas. Until recently, most people have considered urban wildlife to be a nuisance. Since the late 1960s, however, there has been a growing appreciation, both in Europe and in the United States, of the value of a high-quality environment containing desirable wildlife, clean water and pleasing vegetation. Evidence of this interest is shown in the greater popularity of backyard feeding stations, increased membership of private conservation organisations, and increased expenditure on binoculars and natural history publications. The emphasis on urban wildlife research and management has shifted from methods for controlling nuisance species to the more positive benefits of wildlife. Studies have indicated that urban residents, especially those in the suburbs, enjoy the opportunity of observing wildlife and have considerable interest in doing something to enhance wildlife. Wildlife values are manifold, including aesthetic, economic, ecological, educational, practical and scientific. Wildlife is a part of our heritage and is deeply engrained in our various cultures, providing, especially in earlier times, both food and clothing. Also, we



where the emphasis is on maintaining open space areas in closely cropped grass. Consideration of fish and wildlife use of sediment ponds and storm wastewater and other water control facilities can enhance conditions for fish and wildlife and add to the amenities of an area.

### Wildlife management approaches

Wildlife must have food, cover, water and space in which to live and reproduce if it is to survive. The principal objective in wildlife management is to satisfy these requirements for the desired species. Effective wildlife planning and management requires knowledge of the recent historical ranges and local occurrence of wildlife species, the status of existing wildlife in an area, the extent to which the requirements of the desired species are being met, and the potentials of the area for existing and other desired species.

The primary approach to wildlife management is habitat management, particularly as related to vegetation and water. If reconnaissance surveys of an area reveal that food scarcity is a factor limiting the presence or abundance of a desired wild-

have a moral responsibility for maintaining and enhancing wildlife. Some studies have suggested that time spent in natural surroundings is an innate need of humans and is beneficial to their health.

Management for wildlife in urban areas has many indirect benefits too, for example, an environment conducive to fish and wildlife productivity (because of good water quality, diversity of vegetative cover and other characteristics) will probably be a more pleasant place in which to live than one non-productive of wildlife. Property values are likely to be higher and costs of maintenance lower, other things being equal, in developed areas with natural vegetation than in communities



In addition to the management of vegetation and water, other wildlife management approaches should consider the establishment or protection of natural areas to serve as wildlife refuges or sanctuaries, zoning regulations and restrictions on uses of areas, programmes for controlling nuisance species, stocking of fish and wildlife, artificial feeding, and the erection of nest boxes and platforms for certain birds, such as raptors.

Requirements differ for each species, and opportunities and methods for management can best be identified and described by biologists. For municipalities and communities desiring to promote fish and wildlife as a part of nature conservation, it is important that biologists and ecologists participate from the beginning of the

life species, the planting of food crops or the selection of shrubs used for landscaping, which are especially valuable as wildlife food, may provide the missing or deficient habitat component. If an urban pond is too acidic to support fish, addition of lime to the pond may render it productive. If food and water are present but are separated by a wide expanse of closely clipped grass, establishment of hedges for vegetative travel lanes from wildlife coverts to the water or food is likely to increase their use.

Research has shown that habitat diversity influences the diversity of wildlife. If food, water, and various kinds of vegetation are found in proximity to extensive edge habitat, conditions for wildlife are likely to be favourable, assuming that the area is not subjected to too much use by people and by free-roaming cats and dogs. Wooded areas that include ground cover, one or more layers of shrubs and saplings, and coniferous and hardwood trees of different ages, contain more species of wildlife than parklands or plantations characterised by a few species of uniformly tall trees, little ground cover and the absence of shrubs and intermediate layers of foliage. The European practice of using shrubs to cover narrow strips of urban open space is preferable to the use of mowed grass, which is often the case in the United States. Also, parks providing natural meadows and shrubs and wooded areas, in addition to formally maintained areas, are highly desirable.

This kind of park is much more commonly seen in Europe than in the United States, where the typical urban park vegetation consists of mature woods and mowed grass.

Clean water, whether in the form of natural lakes, streams, canals, reservoirs or ponds, can add to the diversity of the habitat and hence the diversity of wildlife in urban areas. Productive natural areas should be preserved to the extent possible in developments; pollution should be controlled and consideration should be given to fish and wildlife values of man-made water areas.

planning and decision-making process along with city managers, economists, engineers, landscape architects, lawyers and representatives of other disciplines. The biologist's participation should continue beyond the planning stage to include implementation, operation, and maintenance functions. It should be recognised that wildlife is different from other "site resources", such as soil and vegetation, because it is mobile and secretive. Some species occur in a given site only during migration, whereas others may hibernate during a part of the year.

### Considerations for wildlife in urban planning

Opportunities for incorporating wildlife considerations into the site designs for new residential developments are greater than for urban renewal projects. With new developments, a stream, wetland or a unique biological community may still be present, and possibilities may exist for

(Photo United States Fish and Wildlife Service)



#### Steps for integrating wildlife considerations into the plan

1. Determine through studies, contacts with authorities and available publications and reports, the nature of the existing environment, including the status of wildlife and the presence of any unique biological communities or endangered species, and the possible environmental impact of development.
2. Inform the public of these findings and determine through public meetings and other means the desires of the public and city officials regarding management options that are present.
3. Determine the potentials for wildlife management, including the contributions or detractions that adjacent sites or land uses may have for wildlife.
4. Identify probable limiting factors for preferred species.
5. Determine what needs to be done to enhance conditions for wildlife, such as creation or maintenance of sufficient open space, development of impoundments, or the planting of shrubs.
6. Formulate a plan for wildlife.

7. Integrate wildlife considerations into the conceptual and preliminary designs in such a way as to minimise damage to existing wildlife habitat, to avoid unnecessary human disturbance and to enhance wildlife habitat.

8. Review the architectural design with a view to avoiding unnecessary nesting or roosting of house sparrows, starlings and pigeons on buildings where they are not wanted.

9. Review the development plans in the light of regional planning efforts, and also ensure that the development site includes no habitats of threatened or endangered species, that development will not destroy unique biologic communities and that other valuable habitats proposed for building sites will not be eliminated in favour of one of lesser value.

10. A logical outcome of environmental studies involving co-operation and interaction of ecologists, planners, lawyers, civic officials and the public is the enactment of local ordinances on public acquisition of land and conservation easements designed to regulate development and protect the environment.



**Partial checklist of sites and actions for wildlife planning considerations**

**A. In developing areas:**

1. Preserve, to the extent possible, the original vegetation, freeflowing streams, lakes, wetlands and unique biologic communities.

2. Maximise open space areas by encouraging planning unit development and cluster-type housing.

3. Avoid or restrict construction on flood plains and encourage their use for wildlife and recreation where possible.

4. Select plants with recognised wildlife value, preferably native, for landscape use, street trees and parkway plantings.

5. Diversify and improve open space areas through creation of impoundments, varied vegetation and travel lanes for wildlife.

6. In vegetation management, rather than frequent mowing to maintain closely cut grass, consider less frequent mowing to permit development of more forbs and shrubs of value to a greater variety of wildlife.

7. Establish vegetation quickly at construction sites and use sediment ponds and other methods for controlling erosion and sedimentation.

8. Design sediment ponds and storm water management systems so that they will have continued use for wildlife.

9. Route highways so as to avoid destruction of valuable wildlife habitat and to have minimal impact on streams as a result of run-off and pollution. Design water-filled borrow pits so that they will be useful to fish and wildlife. Assure that bridge and culvert construction does not block passage of fish.

10. Locate and maintain airports in such a way as to avoid unnecessary hazards caused by wildlife.

**B. In developed areas:**

1. For replacement or new plantings on such sites as cemeteries, golf courses, institutional grounds, parks and street-side plantings, use plants of known wildlife value, preferably fruit- and mast-producing species that, in combination, provide food and cover throughout the year. Consider also herbs and flowers attractive to butterflies.

2. Consider the following as ways of providing more space for vegetation and wildlife: more efficient parking, including multi-storey buildings in which the top decks are used for plantings and open space; developing rooftop gardens; adapting school grounds for broader functions; converting vacant lots to vest-pocket parks and, where possible, connecting them with larger open space areas; encouraging the use of backyards as open space; developing highway cloverleaf exit areas for wildlife; and, perhaps, closing off little-used streets or alleys for wildlife and recreation use.

3. Examine possibilities for wildlife use of existing highway, railroad, and utility rights-of-way; ditch banks; steep slopes and embankments; sand, gravel, chalk, and marl pits and

quarries; bridleways and footpaths; walls, hedges, fences and windbreaks; and waterways of all kinds.

**C. In urban renewal projects:**

1. Attempt to preserve and enhance any open space presently existing, and, if possible, create more in such a way as to connect with large designated open space areas which are secure from future development.

2. Consider the need for reconditioning soils in severely disturbed areas before landscaping. Plants in boxes or containers placed on pavements or sidewalks, and flowers in hanging baskets are better than none; but plants in a natural setting are better for wildlife.

3. Clean up and renovate deteriorated waterfronts and explore possibilities of creating ponds where none exist. Sometimes additional aquatic habitat can be provided by widening canals at intervals to form ponds.

4. If reflective glass is to be used in buildings, landscape architects should know that trees and shrubs on the surrounding grounds should be positioned so that there is a minimum of reflection of the vegetation on the glass, thereby decreasing the danger of birds flying into the glass.

5. Design and construct buildings without the holes, ledges and protection so attractive to nuisance birds.

6. Establish gardens in which consideration is given to selecting species of flowers and other plants especially attractive to butterflies, which can brighten the environment for central city residents.

protecting the resource. In renovating an existing development it is likely that such sites will have been disturbed. Probably in either situation, however, the land will be very expensive and there will be competing interests for use of the land. Space will be at a premium; hence consideration must be given to the best use of available space for wildlife in the face of other land uses. Often there are exciting and very real opportunities to improve conditions for wildlife. Keeping in mind the previous discussions of wildlife requirements and management approaches, we present some planning suggestions and a checklist of actions that may be taken with respect to selected sites or areas that offer

opportunities to benefit wildlife if incorporated into the planning design.

**Conclusion**

Urban areas need not be devoid of desirable forms of wildlife. Some cities have diverse and interesting wildlife populations, but these populations are usually present because of fortuitous circumstances rather than by design. There is growing public recognition of the values of wildlife and of opportunities for enhancing wildlife in urban areas. These areas can be excellent wildlife habitat, often supporting richer and more varied

wildlife populations than occurred before development. To ensure such populations deliberately it is necessary to consider wildlife in the multitude of decisions reached in designing and managing urban areas. By providing rich, desirable wildlife populations in developed areas, we also provide humans with a better place to live. A greater involvement of biologists in the design, maintenance and management of urban areas will aid greatly in creating and maintaining an urban environment more favourable for both humans and wildlife.

D.L.L. and A.D.G.



(Photo OW Archief - The Netherlands)

# A balance between land and water

Henk Heida

Amsterdam, the capital of Holland though not the seat of the national government, is located in a low-lying area near the North Sea and IJssel lake. Most of it is built on a polder, which is an area of former wetlands enclosed by dykes and artificially drained. The river Amstel crosses the town from south to north, flowing into the IJ. It is around its mouth that the oldest remains of the early medieval inhabitants have been found and it is only this part of the town which clearly lies above sea-level.

Because of its artificial drainage system, Amsterdam contains many canals, ditches, ponds and small lakes. The total length of all waterways amounts to about 400 kilometres, of which only the town canals (75 kilometres) are navigable. The total surface area covered by water amounts to about 900 hectares, or 9 square kilometres. The main function of

the canals and lakes being water storage and drainage, it was certain that other functions would develop and, depending on location and waste load, in many instances were going to play a more important role than the primary one. Such functions were related to recreational purposes such as boating, angling, bathing and swimming, but also to more unpleasant ones like waste-water discharge and transport.

**To maintain water quality**

In order to achieve a balanced situation with regard to the many different functions, the City Council deemed it useful to have a full-scale information system concerning water quality. This began back in the early 1920s. The system consists of some 80 water-sampling points, which provide data on oxygen, nitrogen, phos-

phorus and other parameters, colibacteria included.

On the basis of a purely functional approximation, all existing waterways and lakes have been classified into five different water quality categories, which are:

1. water in protected nature reserves;
2. water in nature reserves where recreation is allowed;
3. water which has a primarily recreational function, such as boating, angling and swimming;
4. water intended for navigational purposes, like freight shipping and land irrigation, and at the same time used as a treated waste-water discharge and drainage system;
5. water still in use for the discharge and drainage of untreated waste-water, for instance from storm sewers and industrial outlets.

As it is impossible to present within the scope of this article a detailed description of existing water quality in relation to quality standards which concern the indicated categories, it may be sufficient to note that the water quality of the vast majority of sampling stations still does not comply to all standards concerned.

Considering water quality and related problems, it should be borne in mind, however, that, apart from rain, the greater part of the surface water present in the Amsterdam canals originates from the river Rhine. This occurs in three different ways: in the first place through nightly intake, for refreshment purposes of the inner city canals, of water from the IJssel-lake, which is fed by the river IJssel, carrying Rhine water; in the second place through the Amsterdam-Rhine Canal, which is also mainly fed by the river Rhine; and thirdly through the river Amstel which, though mainly fed by polder drainage water, still contains water of Rhine origin.

Penetrating and flowing through the many canals, ditches, ponds and lakes of Amsterdam, most of the surface water gradually tends to be polluted by waste-water from various sources.

Dating back to the time of the first human settlements in the early Middle Ages, most canals in the inner city are heavily polluted by direct discharge from individual dwellings and commercial buildings. In order to maintain a reasonable water quality, in compliance with established standards, the intake of a huge amount of IJssel-lake water is necessary every night. As a result, the contents of all inner city canals are completely replaced every second night and consequently the oxygen saturation level is high enough to allow a number of fish species, such as roach (*Rutilus rutilus*), minnow (*Phoxinus phoxinus*), and eel (*Anguilla anguilla*), to survive. Another consequence is that certain algal species are introduced from the IJssel-lake, among which is the blue-green

alga *Microcystis aeruginosa* which is the cause of a very conspicuous algal bloom in the canals during the summer.

### Recreational aspect

The canals in the peripherally situated, newly constructed residential areas all have a more recreation-orientated character, though again the primary function of storm water storage and drainage should not be forgotten. Because of the fact that they are all located in areas which have a so-called separate sewerage system, untreated or even treated waste-water is unlikely to deteriorate water quality. The recreational function of these canals is mainly aimed at enlivening the neighbourhood scene and at angling and boating.

In order to fulfil these goals, water quality has to comply with more stringent quality standards than the canals situated in the inner city. And it generally does. Oxygen saturation level, oxygen demand, phosphorus and nitrogen content and the number of colibacteria are of such a character that more sensitive and demanding fish species remain. Carp (*Cyprinus carpio*), tench (*Tinca tinca*), perch (*Perca fluviatilis*) and pike (*Esox lucius*) are to be found, along with the more common species already mentioned above. Moreover, many plant species occur along the banks in shallow waters, such as, for instance, great reed-mace (*Typha latifolia*) and reed (*Phragmites communis*). But, surprisingly for some, rarer, ecologically vulnerable species such as sweet flag (*Acorus calamus*) and flowering rush (*Butomus umbellatus*) are also to be found.

Unfortunately, in some parts of the outlying canal system, occasional discharge of low oxygen content polder drainage water takes place which may cause an imbalance in the existing situation. This may lead to such a low level of oxygen saturation that fish-life is threatened or even killed in great numbers. In such cases all municipal institutions involved (i.e. Laboratory for Environmental Health Research, Public Sewerage Department, Public Cleansing Department) try, by means of mutual co-operation and assistance, to cope with the problem within the shortest possible time. One of the most effective ways of saving the situation in most cases is the inlet of better quality water from nearby places.

Water quality in ponds situated in parks tends to be somewhat lower than in the canals because of the regular fall of leaves from deciduous trees, which gives rise to organic pollution and which after decay enhances the state of eutrophication and consequently the development of algal blooms.

A phenomenon of a particular character which has suddenly arisen over the last ten years is botulism in waterfowl, mal-

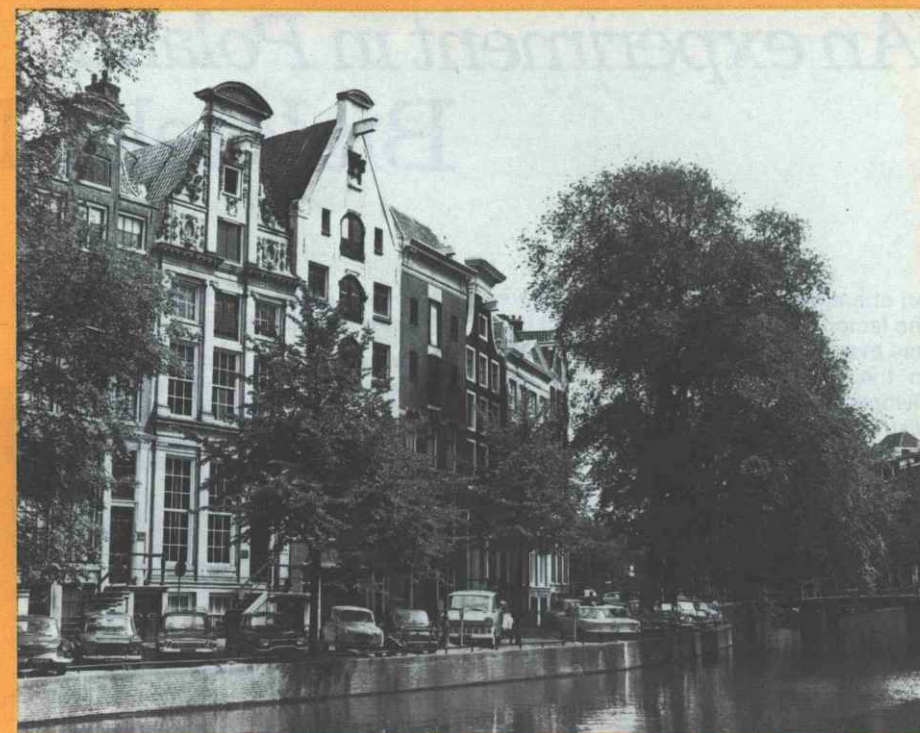
lards (*Anas platyrhynchos*) being the principal victims. In contradiction to what most people expected to be the case, knowing that botulism bacteria only develop in anaerobic conditions, there is no relationship at all between outbreaks of botulism and existing water quality. On the contrary, heavy outbreaks of botulism in most instances took place in canals and ponds of quite good water quality, thus indicating that the disease has more to do with transmission of toxin by carrion than with water quality. Therefore, the fight against botulism was totally concentrated on the quick and complete removal of all dead bodies floating in the water or lying on the banks.

### Water

The lakes in Amsterdam, four in number, are of a maximum size of 100 hectares. All except one came into being as a result of deep sand digging and therefore maximum depth is around 40 metres. As a result, they develop very distinctive stratification during early summer, which gradually disappears in late autumn. At the same time, anaerobic conditions in the deep water layers develop and persist during summer and autumn, preventing most living organisms from penetrating. Only some species of mosquito larvae and tubifex worms can survive in the oxygen-depleted mud at the bottom, being of no use to predatory fish, however. In order to maintain a satisfactory population of fish in such deep lakes a large littoral zone is necessary. In Amsterdam the deep lakes meet this requirement. In order to prevent water quality deterioration of the lakes, any kind of direct waste-water discharge, whether treated or untreated, is not allowed and almost impossible in practice, apart from wilful violation of existing regulations, which occurs very rarely. Nevertheless, high quality standards, which are aimed at for boating, swimming and bathing, are not always met, mainly as a result of polluted rainwater drainage, ship-waste discharge (both of commercial and recreational character) and bathing activities themselves. The lakes, furthermore, serve as resting places for migratory birds such as widgeon (*Anas penelope*) and common teals (*Anas crecca*) in autumn and spring.

From an ecological point of view, the most valuable stretches of water are situated in the rural surroundings of Amsterdam, in the north. In a landscape dominated by low-lying wet meadows and peat bogs, several shallow small-sized lakes are to be found, containing somewhat brackish water. The whole area is to be looked upon as a nature reserve and many parts of it are legally protected against human intervention. However, because of nearby camping sites and intensive cattle breeding on large farms, untreated waste-water from human and animal activities does eventually penetrate, causing fecal

This view of Amsterdam symbolises a few of the main activities of the Council of Europe: 1970, European Nature Conservation Year; 1975, European Architectural Heritage Year; 1980, European Campaign for Urban Renaissance (Photo VVV Amsterdam)



coliform and organic waste pollution, which stimulates eutrophication and, by consequence, massive algal development.

Biologically speaking, the water quality of the shallow lakes may be characterised as beta-mesosaprobe. In order to improve existing conditions, technical measures are in preparation, involving on the one hand the removal and concentration of all camping activities to a specially constructed site, provided with a sewerage pressure pipeline, and, on the other hand, more rigorous provisions concerning animal waste discharge. All these efforts are meant to achieve a state of equilibrium between land and water regarding nature conservation.

A distinctive type of surface water present within the city limits concerns the harbours and North Sea canal. Because of the continuous inflow of seawater, as a result of seagoing vessels passing through locks at IJmuiden, the fairly deep canal and adjacent harbours (about 24 metres deep) possess a stable two-layer system, consisting of heavy seawater in the lower layers and lighter brackish water in the upper ones.

Because of bacterial activities which break down organic waste material, the bottom layers are found to contain virtually no oxygen and therefore no fish or other higher organisms. The upper layers, on the other hand, are of a more satisfactory quality, containing all common fish species, especially pike-perch (*Lucioperca lucioperca*), which is very popular with angling enthusiasts, although sometimes unsuitable for consumption because of a smell of phenol. The construction and

regular operation of a large pumping station at IJmuiden during the last few years has had a positive effect on the indicated two-layer system by gradually diminishing its salt content and, as a consequence, its stability. This may ultimately lead to a total disappearance of the anaerobic state of the bottom water layers, enabling other organisms to live there.

It is remarkable to note that the daily inflow of diluted, untreated sewage, emerging from the inner city canals as a result of the nightly water refreshment activities, only slightly affects the existing water quality. Nevertheless, if only for aesthetic purposes, the construction of a sewerage system in the inner city area is now in progress, reducing existing waste-water discharge by more than 90 %.

H.H.

# An experiment in Poland

Maciej Luniak

## Białoleka Dworska

An attempt is now being made to observe the factor "nature" to a larger extent than has ever before been the case in Poland, in the residential district of "Białoleka Dworska" in the suburbs of Warsaw. This district will cover an area of 2 square kilometres and is planned for about 25 000 inhabitants. Now it is occupied by scattered suburban buildings and farms. Part of its surroundings is covered with forests. Construction work was started in 1980 and the project will be finished by 1985. The designing body is headed by Professor Halina Skibniewska. The project is financially supported by the Polish Association of Housing Co-operatives and is considered a research programme of particular importance.

The project was preceded by scientific research to characterise the ecophysiological conditions of the area and its surroundings: geomorphology, geology, hydrobiology, climate, soil, real and potential plant cover and fauna. The research was done by specialists invited to co-operate with the planning body. The data thus collected made it possible to formulate some recommendations for planning the estate and deciding on ways to carry out the project. These recommendations were centred on the natural conditions of the future estate, including animal communities desirable both for

ecological reasons and for the well-being of its future inhabitants.

A certain number of factors taken into consideration for the realisation of Białoleka Dworska are to be stressed here. The green areas will be located on the present wooded patches, most of which will be preserved; a continuous network of green areas will be connected to the adjoining forest. Such "ecological corridors", enabling local animals to migrate, will be at least 30 m wide; a stream crossing this area in the past will be restored and a system of ponds and wooded areas will be established along its course, forming a belt of parkland — the main axis of the green area pattern in the estate.

Efforts will be made to develop a luxuriant vegetation (for example, plants creeping over buildings), the species composition of which will correspond to the site conditions. Conventional gardening will be limited. In particular, leaf litter will not be removed and chemical plant protection will not be applied.

Refuges for animals are planned in the form of small islands in ponds, or refuges safe from the threats created by man or dogs. Artificial breeding sites will be provided for birds (nest boxes, niches in buildings, heaps of stones).

Attempts will be made to reduce the destructive effects of such factors as lights and traffic. Two underground passages under the main road are designed to enable local migrations of animals, especially mammals. Some animal species will be introduced, mostly fishes and small insectivores, carnivores and rodents. If necessary, animals will be supplied with additional food, for example fishes, or birds and roe deer coming from the adjoining forest in winter; watering places will also be established.

Particular attention will be paid to avoid destruction of the habitat during the construction work. Most of the wooded areas will be fenced off, some earthworks will be carried out without heavy machines, soil from excavations will be stored so as to do the least harm to soil fauna. Efforts will be made to create an atmosphere of interest in nature and its protection among the inhabitants: appropriate information will be provided and a nature protection club will be organised.

The objective of the "Białoleka Dworska" experiment is not only to design a "sound residential estate" but also to gain general experience on how to design towns in harmony with nature, how to organise co-operation between town planners and nature scientists, how to stimulate friendly relationships between town inhabitants and nature. This will be a long-term experiment which will continue for at least ten years after the termination of the project. Thus it will be possible to follow the practical results of the proposed solutions. Some of them will probably fail, others will be improved. But apart from the extent to which the "Białoleka Dworska" experiment will satisfy our expectations, one thing is already sure — the first step has been taken to encourage animals in the town. M.L.



(Design  
De Beukelaer)

## Fauna-roads: outline of a solution

Hans-Joachim Mader

The damage which the building of roads and railways can do begins with their direct and immediate effects: the loss of biotopes, the absorption of land, the destruction of plant and animal life in the building process, animal deaths caused by road and rail traffic, the severance of traditional animal routes and noise pollution of the immediate environment.

To these must be added the indirect, longer-term effects: the disruption of microclimates, air pollution, the pollution of wayside watercourses, the extension of human influence into adjacent areas, the fragmentation of animal communities, the arrival of outside species and the limits imposed on the expansion of local species. Finally, long-term effects include the disappearance of isolated animal communities, disruption of the balance between species in areas which have been cut off, the genetic differentiation of isolated communities, the development of zonal biocenoses and distortion of the pattern of species.

Even in economic terms, an overdeveloped road-system may do more harm than good, since the steady erosion and threat to the survival of unspoiled ecosystems necessitate a series of costly counter-measures.

A new approach is required, questioning both the scale and actual utility of schemes which result in destruction of the landscape within a given area or along a given axis. It is clear what the first step prefacing any radical development scheme must be: a critical, forward-looking (not necessarily growth-orientated) analysis of needs, based on realistic assessment of what the area lacks.

Since the potential effects of any major linear incursion on the landscape are immensely varied, the second preparatory step will inevitably be a biological and

It cannot be denied that town-country communications and the transport of information, energy and raw materials are now wholly dependent on roads, railways, canals and power-lines. Nor can it be denied that these extensive linear incursions on the ecosystem generate a whole series of factors which disturb plant and animal life and have lasting effects on the structure and interlocking functions of biotopes and biocenoses.

Thus conflict is programmed from the outset and appears inevitable. Linear development spreads its mesh across the land, and it becomes steadily harder to find extensive, unspoiled, undivided areas, where nature still holds sway.

Under these circumstances, the search for guidelines and standards to ensure that minimum damage is inflicted on plant and animal life in the planning and construction of these axes becomes an urgent matter.



ecological survey of the area, pinpointing the dangers to which animals and plants are currently exposed within the types of biotope and area involved, and analysing the various types of damage which are likely to result from the scheme with reference to the continued existence of the ecosystems affected.

Current planning and building practice could be much improved, in a way which would far surpass any local and technical efforts at conservation, by integrating major and, if possible, minor linear development projects within a supra-regional scheme, which would ban all development of the remaining unspoiled areas and, ideally, extend these regeneration zones in the borderland lying just beyond the fragmented spatial mosaic of the heavily developed urban centres. These areas, which should be regarded as permanently indivisible, would have to be representative of the region's main types of ecosystem. Animal communities that require an extensive living area would then be guaranteed a chance of survival as well. These protected zones should cover at least 10 % of the national territory, thus ensuring that the types of reserve required by rare species are also preserved to an adequate extent in the long term.

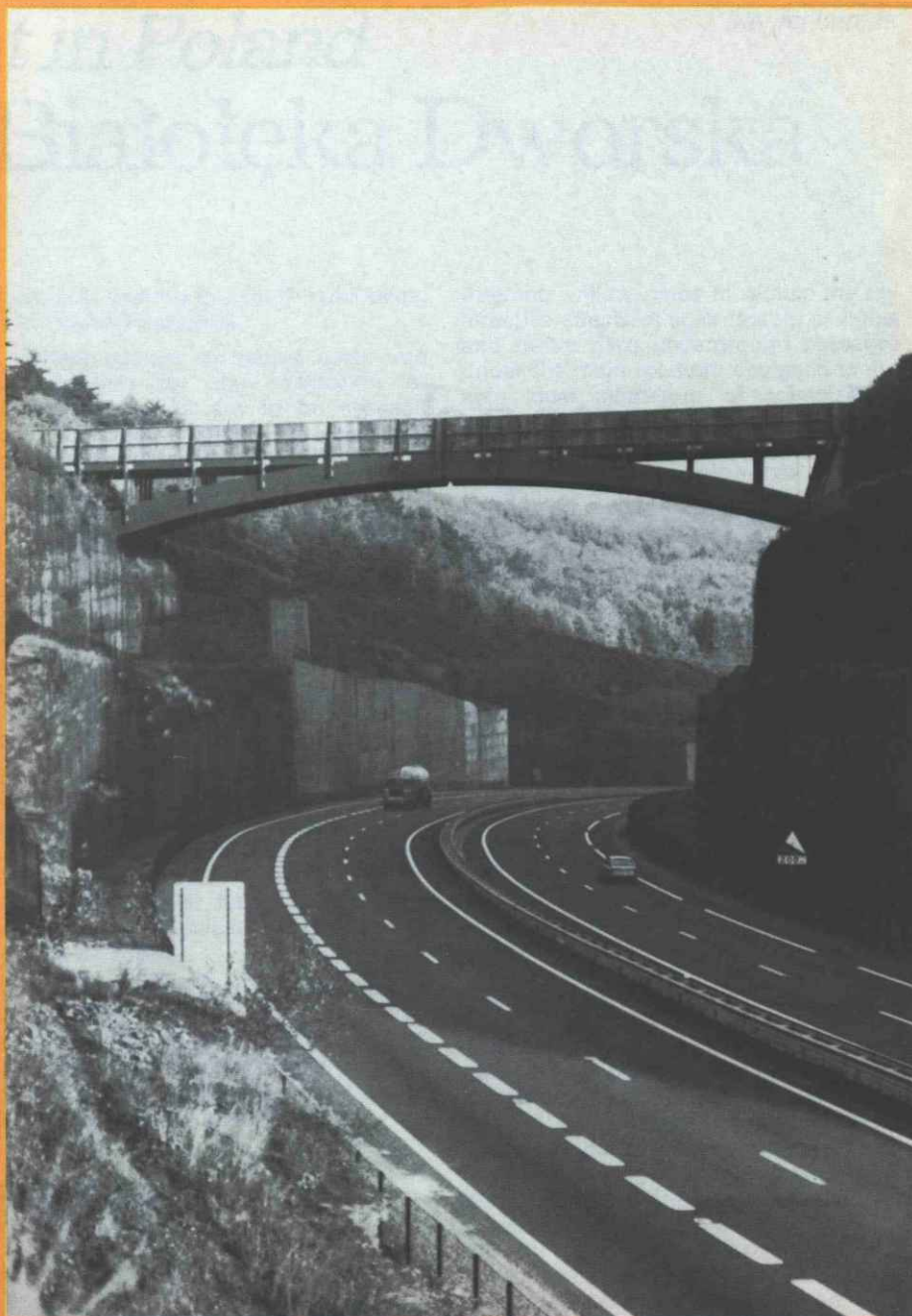
Various measures which are less costly and thus suitable for short-term implementation have already been proposed in connection with specific road-building projects. With the help of these measures, an attempt should be made to prevent irreversible, long-term damage to plant and animal life or, when species have already begun to migrate or die out, to slow down the process.

### Wider roads, not new ones

From a conservation standpoint, it is better to widen existing minor roads than to build parallel new ones, even when verges with extensive and varied plant-life are destroyed in the process of adding new lanes. Investigation has shown that roadside wildlife consists in the main of adaptable, non-specialised species of animals and plants, which return when the new verges have been laid out. This general rule might be waived in cases where old and valuable trees line the road.

The extension of existing roads has the advantage of ensuring that various types of damage are not inflicted anew, that no new areas are cut off and that land-loss is minimised. Since metalled paths in forest areas act as frontiers or barriers for many surface species, it must be assumed that existing roads have already divided the original animal communities and that widening will do no further damage.

Widening and the heavier traffic that goes with it do, of course, intensify existing harmful factors. This is probably unavoidable.



An example of a bridge for game (Photo G. Teton)

### Concentration of communications axes

From a conservation standpoint, it is frequently better to concentrate axes than to select new itineraries which depart from previous routes. Here too, it can be argued that this merely contributes one additional linear source of pollution in an area which has already been affected, while preserving other areas which are still largely unspoiled.

Admittedly, there are special situations in which the concentration of axes does appear to cause major problems for animals. Thus, low-lying areas and plains along rivers and watercourses, which carry a heavier volume of traffic than other types of biotope, are precious and exceptionally vulnerable elements in the overall ecosystem network. The regular migration of many animal species to and from the water is a typical feature of the areas adjacent to rivers and lakes, and this pattern is partly or wholly disrupted by riparian development.

If, on the other hand, extensive unified areas are affected by a given project, it is safe to assume that animal interests are better served by the concentration of axes than by the selection of a new, independent itinerary. As with the widening of existing roads, the main point here is that concentration leads to no further increase in the number of isolated animal communities. To a lesser degree it can also be argued here that the laying-out of roads in close parallel reduces land-loss.

It must be assumed that the areas adjacent to an existing road have already suffered a comparatively high degree of damage. This being so, it is probably better to construct an alternative parallel road, even at the cost of cutting the intervening area off from its surroundings to a greater or lesser extent by isolating it on both sides, than to risk encroaching on hitherto unspoiled territory.

### Action to reduce isolation

There are three main types of action which can be taken to reduce isolation:

#### 1. Selection of routes, to avoid direct contact between animals and traffic

This chiefly involves the avoidance of particularly endangered areas or animal communities by taking the road through less sensitive territory. This generally makes for a longer, and thus a more expensive route. In such cases, the higher emission levels which go with longer routes are the price which must be paid for preservation of an environmental unit. Horizontal re-routing can, of course, be avoided by relying on tunnels or viaducts. Viaducts are costly to build, result in higher noise-levels and frequently detract from the visual amenities of the surrounding area. Tunnels are also costly to build and consume considerable quantities of

energy for lighting and ventilation purposes. The use of decentralised, alternative energy sources might help to balance this defect and at the same time give a clear indication of the authorities' willingness to respect environmental requirements in their planning schemes.

New technologies, involving the construction of "covered surface tunnels", might well represent an acceptable compromise, since this type of tunnel probably costs less to build and requires less energy to operate.

#### 2. The provision of crossing places

Seasonal migrants, such as the amphibians which migrate in the spawning season, and species which follow certain routes at daily or less regular intervals, either from habit or from genetic conditioning connected with specific biological functions, are seriously affected when new roads sever these routes. Provided that biologists familiar with the area and representatives of the nature conservation authorities are involved in the planning process, areas of conflict can often be predicted and located when routes are first being considered. At sensitive points such as these, passages and tunnels must be provided so that amphibians and other animals can cross. Provision of this kind must also be made in areas where adjacent biotopes have passed through a series of successive stages which suggest that migrant species are likely to arrive.

#### 3. Natural buffer-zones

Peripheral communities and the natural pattern of transition from one ecosystem to another give examples of ways in which the transition from the road to its hinterland can be softened. A high degree of spatial and structural diversity is characteristic of peripheral communities in nature. The natural pattern of transition is based on a copious intermingling of components and structural elements drawn from each of the neighbouring ecosystems and extends across a broad intermediate band. Where roadside ecosystems are concerned, however, the trimming of trees and bushes, the cutting of grass and the use of herbicides make the transition a sharp one.

In contrast to the situation which prevails in natural transitional zones, where microclimates shade progressively into one another, microclimatic thresholds are created, with widely varying effects on the animals concerned. In nature, transitional zones cushion the impact of neighbouring animal communities on one another to a considerable extent. Species living in these zones display a high degree of ecological adaptability and this, combined with the presence of copious resources, makes it possible for rival species to move apart or, by dividing resources, to establish separate ecological communities.

A foundation for the existence of an independent, self-supporting plant and animal

community can be established or preserved in areas bordering on roads by careful planting, following the pattern of existing growth, or, better still, by preserving some of the original plant and structural features and protecting them carefully during the construction phase. Competition between species will then automatically ensure that endangered species from biotopes bordering the road are excluded from the danger zone.

This effect can be further enhanced by introducing additional structural elements. Thus the conformation of banks can also be varied within a limited space, and irregular stones and hardwood trees can be used to achieve further spatial and structural variations at appropriate points, although road safety requirements must obviously be fully respected.

The indications given here provide a mere rough outline of action which can be taken to protect animals and plants. They should not disguise the fact that every road-building project is necessarily a potential source of conflict in specific areas – conflict which can only be resolved with the help of constructive co-operation between planners and conservationists.

H.-J.M.

When we talk about areas with an exuberant wild flora and fauna, most people immediately think of virgin nature, rustling forests, silent moors and marshes, unending shores or desolate mountains, but in reality there is also a rich fauna and flora produced through human activity, namely in the gardens of residential suburbs around towns. During the last century, explosively increasing urbanisation resulted in thousands of hectares being turned into building sites, and on these territories enormous areas have been created where plantations and the microclimate together have attracted many wild animals — especially birds — and often remarkable wild plants are also to be found, particularly amongst the trees and bushes.

In the same period an increased and more rational utilisation of the forests in many parts of Europe has resulted in difficulties for many birds in finding suitable biotopes, such as the hole-nesting birds who have become homeless because old, decayed trees are no longer tolerated in today's well-ordered forests. The bird fauna which has immigrated to our gardens has, from the beginning, claimed people's attention and many efforts have been made to attract more birds into the gardens at all seasons. In reality, the garden owner can do quite a lot to encourage a fixed bird population in his garden but naturally local conditions come into play, just as the possibilities vary according to the area.

### Trees as shelter

Already at the elaboration and planting stage of a garden, birds can be taken into consideration, for the trees and bushes planted will play a decisive role in determining which species will appear in the garden. Of course, there are only a few people who are able to lay out their gardens on behalf of the birds, but there exist some individual plants which are attractive to them and which can be planted in a garden that has been planned with only aesthetic considerations in mind, thus making the garden even more attractive to its owner.

All the year round birds need shelter, both from the weather and from enemies. Therefore the garden of a bird-lover should always contain a number of evergreen trees and bushes. Spruces of any kind are very suitable, because they both give shelter and are excellent nesting sites. The more tangled and prickly species such as the common spruce (*Picea abies*) and the white spruce (*P. glauca*) are especially appreciated by the birds. The cone seeds of spruces are also an attractive food. When the spruces have grown tall the birds still appreciate them, even if other species also find shelter and nesting sites in them. Therefore people ought to hesitate before cutting down



(Photo Pierre Pilloud - Jacana)

trees which really have become too big. If there are old trees on a newly built housing site, as many as possible should be left, irrespective of whether they are evergreen or deciduous. It only takes a moment to cut down a tall tree, but it will be decades before a new one grows.

Evergreen bushes, for example white cedar (*Thuja occidentalis*), juniper (*Juniperus sp.*), cypress (*Chamaecyparis sp.*) and holly (*Ilex aquifolium*) are also good for the birds and ought not to be missing in a bird-lover's garden. Foliage bushes such as guelder rose (*Viburnum opulus*), privet (*Ligustrum vulgare*), sea

# Let the birds in!

Sigurd Rosendahl

buckthorn (*Hippophae rhamnoides*), firethorn (*Pyraecantha coccinea*) or wild rose (*Rosa rugosa* or other), which give food to the birds in the form of fruits, should not be missing from the garden either, where they also add a special charm thanks to their coloured fruits and beautiful autumn leaves. If you want espalier or climbing plants up the house or elsewhere in the garden, it will be to the greatest benefit of the birds and it is more or less indifferent what sort of plants you choose.

Hedges provide very good nesting sites and it is in fact astonishing how many birds you can find breeding in cut hedges. You may use common hawthorn (*Crataegus monogyna*), hornbeam (*Carpinus betulus*) or beech (*Fagus sylvatica*). If you have a slope in your garden, or an area which is not directly incorporated in the garden, or an area which is inapt for gardening purposes because of the soil conditions, swampy ground or other reasons, you can arrange your own small private bird sanctuary where you can plant all sorts of bird-attractive plants.

Besides the above-mentioned plants, you could also have mountain ash (*Sorbus aucuparia*), elder (*Sambucus nigra*), wild cherry (*Prunus avium*) and alder buckthorn (*Rhamnus frangula*). These four trees bear particularly attractive fruits in the autumn, but spindle-tree (*Euonymus europaeus*) and bird-cherry (*Prunus padus*) also have fine fruits. All sorts of spruces and pines, birch and hazel bushes are welcome in such a bird paradise, where all the plants may grow closely together as in a wilderness, and birds will soon appear in such a tangle.

### Fresh water facilities

In many areas birds have difficulties in getting water. As one of the conditions for rich bird-life in the garden is that the birds always have fresh water available, you should therefore find a place for a bird-bath. Very fine bird-baths can be bought, but it is also easy to build a low cement bath, where they can bathe and drink. The bird-bath must be put in an open place so that they have a view on all sides, but it must not be too far from shrubs or small trees to which they can fly for safety if a cat appears. After having bathed, many birds become rather waterlogged and it is therefore important that they can quickly flap into a bush to shake themselves.

Once a week the bird-bath must be thoroughly cleaned — especially in warm weather — and it is important that it be filled up with fresh water every day in the summer. On the other hand, in winter it is no use giving the birds water in those parts of Europe where frost and snow prevail. Lukewarm water may even be dangerous for them on very cold days, as the water tempts them to bathe, after which drops of water may freeze in the

plumage, often resulting in death. In dry areas a bird-bath may also tempt rare birds, and in many cases a bird-bath attracts birds that do not normally stay in the garden for very long to stay and breed.

### How to feed them

In many parts of Europe the winter is so severe that a lot of birds suffer greatly. In such areas it is all-important to feed the birds in the hard season, and it is vital to go on feeding the whole winter once you have started. Even short periods without food may be fatal to birds which have become used to finding food in a certain place. If you wish, you can also feed the local bird population in areas already amply supplied with food, in order to get more birds into your garden, and feeding can take place all the year round for the same reasons. In this way you hold the birds closer to the garden and, moreover, you will have a good opportunity to watch them. It is important to use only fresh and suitable food. You can feed on the ground or by means of various containers and feeders, but a food table it to be avoided, unless it is made of washable material and is carefully kept clean. If this is not done, bacteria and infections from excrements are easily spread and the kindly meant feeding may result in a catastrophe to the birds' health. The best thing to do is to feed on the lawn or the terrace after having swept away the snow, and at the same time you can place feeders around the garden. You must always lay out food in places in such a way that there is a free view to all sides, so that the birds are able to notice approaching enemies in good time.

The food may consist of many different things, but wheat, oats, sunflower seeds, apples, fat and tallow are some of the best things. Good supplements are household waste, breadcrumbs, cheese and boiled potatoes, provided that the food is fresh. In winter, in many shops, you can buy special seeds intended for wild birds, but if you have an opportunity to make your own mixture it is often better than the one you buy, in which you often find a great quantity of unsuitable seeds. A good food mixture is as follows: 25 % sunflower seeds, 25 % yellow millet, 20 % crushed maize, 15 % wheat and 15 % oats. If you have the opportunity of providing seeds from weeds (for example from a mill or a farmer), it is good to add some, if you are not afraid of the consequences if the seed germinates and grows in the spring.

Balls or rings of fat with seeds melted into them can be bought in many places. Tits especially appreciate this fatty food, but a poultry carcass gives just as much pleasure to the birds if it is hung in a tree. A coconut shell filled with seeds (e.g. sunflower or hemp seeds) is also good to hang up, or you can fill it with a special food-mix made up of 50 g of raisins, 100 g of white breadcrumbs, 150 g of poppy

seeds, 50 g of grated hazelnut or walnut kernels, mixed together with 1 200 g of melted unsalted suet or tallow. This mixture can also be poured over the Christmas tree after Christmas, be melted into a plant-pot or other such container: there are many possibilities. If it is too difficult to make this mixture you can also mix equal proportions of sunflower seeds and wheat bran together with melted suet and a little fat. Fat or palm-butter alone can also be used. Such a mixture can also be poured over a large fir cone which has been left near a radiator for several days to open the scales.

In a time when old, hollow trees have become a rarity, many hole-nesting birds are now homeless, and therefore it is very valuable and successful to put up nesting boxes for many species of birds, but if you have a few pieces of wood you may make the boxes yourself. If you carry out some of my suggestions, there is no doubt that your garden will, after some time, become inhabited by a large bird population. Such a wealth of birds will not only be a source of happiness to you, as a garden owner, but also the effort will be of great value to those species which have become more or less homeless in today's well-trimmed forests. S.R.

# Greeneries . . .

Rune Gerell

## Parks in towns — why?

As in most highly industrialised countries, the Swedish population has moved into towns and this rapid expansion of urban and suburban areas has brought about many problems in town planning. The road and rail networks have often guided the planning, and after housing and service facilities have been established, only small areas have been left for green spaces.

Many towns in Sweden are surrounded by natural forests, thus reducing the citizens'

claims for more parkland. In cities and larger towns, however, natural recreation areas are so far away that only car owners have the opportunity of visiting these places. So one would expect a demand for compensation in the way of new and better parks in these densely built-up areas, but, remarkably enough, very few citizens have made such proposals. Those people who need recreational areas nearby are those living in blocks of flats, but mostly they are concerned about other problems more important than the quality of their outdoor environment. They also

(Photo Lennart Norström)



think of nature as something outside the town, never within it.

Wildlife in towns — why? I think we need nature as much in the cities as in the countryside. The presence of wildlife reminds the town-dweller that a world of nature still exists. Contacts with birds and mammals make us understand the significance of the loss of an animal species, and the risks of environmental pollution.

## Evolution of green areas

During the last two decades the character of the green areas in Sweden has changed. At the beginning of the sixties they consisted mainly of old "distinguished" parks and the greenery in residential neighbourhoods. Today, green areas are much more diversified, including open areas close to blocks of flats and along drives, sports grounds, etc. Information on the size of urban open spaces in Sweden is incomplete; different estimates point to the order of about 250 000 hectares. The total cost of the management of these areas is estimated at about 1 000 million dollars a year and these high costs have forced many park administrators to look for cheaper alternatives.

During the building boom in the sixties, the area of open spaces increased rapidly, but owing to lack of money it was not possible to keep the quality of new parks equal to that of the attractive older parks. A new design was developed, characterised by vast lawns and low, prickly shrubberies. The initial costs of such simplified parks were low compared with those of traditional parks, but the running costs have become increasingly heavier year by year.

In view of the needs of wildlife, we know that the more diversified the habitat, the

richer the fauna. Concerning bird fauna, the diversity of species will increase with the spatial heterogeneity. This means that the number of bird species is usually higher in a forest than in a shrubbery, which in turn is richer than a meadow. But not only is the vertical variation of vegetation structure important. The patchiness, here defined as the horizontal spatial heterogeneity, is probably still more important. Combining these two factors, the ideal bird habitat is a mosaic landscape where as many vegetation layers as possible are represented.

As far as green areas in town are concerned, there is no reason why one should not adopt these principles when designing a park. In the Netherlands, natural areas have been established based on the main principles of plant sociology, knowledge of plant communities and their changes. Thus wild ecosystems or natural plant communities have been of great importance in influencing the choice of species and vegetation structures. Compared with traditional parks, natural plantings of trees and bushes have obtained a considerably more closed character. An attempt has also been made to take into account the preferences of wildlife species when designing new parks.

## Birds and mammals

Breeding bird censuses in urban areas have shown that the number of pairs often exceeds that of natural habitats while the number of species is low, especially in the centre of the town, where bird fauna is dominated by a few species originating from mountain and desert regions, thus indicating a lack of sheltering vegetation and water. However, the location in an urban environment is not the only factor responsible for differences in the variety of birds. The condition of the vegetation and the size of the park also seem to be important factors. The management of the park often prescribes selective removal of all or part of the vegetation in various strata, especially in the shrub layer. Moreover, the size of the park restricts the number of bird species in so far as some species need large home ranges.

As regards mammals, the conditions for living in urban habitats have probably worsened due to the increasing traffic load. The circular enlargement of towns will create a need for new ring-roads which will turn the town into an impregnable fortress for most mammals. Apart from this obstacle, the dimension of the park and its vegetation structure are the most important factors affecting the composition and the size of mammalian populations.

The isolation of parks from the surrounding natural habitats is hard to correct in already built-up areas, but in the process of planning new communities, wildlife considerations should be incorporated. A

corridor system of green areas might also make it easier for the town-dweller to walk or cycle to the country.

## New considerations for the future

To sum up the prerequisites for wildlife in towns, the parks, especially the larger ones, have a great potential for housing a diversified fauna. To foster such a fauna the present rules of designing parks based on a garden approach will have to be changed into new ones based on ecosystem considerations. This does not mean that our parks should be turned into "jungles". The new parks should be characterised by great structural diversity, both vertically and horizontally, and the selection of shrubs and tree species should be made with regard to natural plant communities.

Compared with traditional parks, setting up such new parks will cost more money, but, considering the management costs, the latter will be cheaper in the long run. Moreover, harmony with nature will also create an environment of high quality for the town-dweller. R.G.



# Telford New Town

*Chris Walker and Robert W. Tobin*

New town planning offers tremendous opportunities for avoiding many of the worst problems associated with urban and industrial development. Areas of open space and wildlife habitats can be incorporated at the design stage, either by including existing semi-natural vegetation or by creating habitats in areas which have no intrinsic interest. New habitats, with their associated plants and animals, though beneficial, are rarely an adequate substitute for those which are already established, so it is particularly important that existing areas of high nature conservation value are incorporated into new town planning in such a way that their interest is maintained. The fact that the rapid development of new towns does not allow the gradual adaptation of wildlife to new conditions must also be taken into account.

## History

Telford differs from most British new towns because development is based on a group of declining industrial settlements, rather than on a rural site. It was developed around the existing towns of Wellington, Oakengates, Dawley and Madeley

which, together with smaller settlements in the area, had a population of 73 000 when the new town was designated. Most of the Designated Area had been greatly disturbed by coal mining and associated industry, and an estimated 25 % of the land in the new town was derelict. The development of Telford was, therefore, an opportunity not only to rehouse people from some of the overcrowded parts of Birmingham and the surrounding industrial towns, but also to rehabilitate and develop land which was regarded as useless and derelict. Development based on Dawley began in 1963, but in 1968 the Designated Area was expanded to include Wellington, Oakengates and adjacent agricultural land.

Sites of ecological interest were first identified by the Nature Conservancy and the Shropshire Conservation Trust in 1969, and a list of these sites and sugges-

tions for their management was appended to the design report for Telford, so making an ecological contribution to the master plan. Perhaps because the idea of including provisions for wildlife within a town was new, the Development Corporation was initially slow to take account of the advice provided and by no means all of the suggestions were adopted. Some of the listed sites had already been allocated for development and advice on the management of others was not taken. However, the Corporation is now showing a much greater willingness to take heed of ecological advice from other organisations, and since 1976 an ecologist has been employed in the Landscape Department. Recognising the deficiency in ecological information in the original plan, the Development Corporation has produced a consultative document entitled "The Open Space and Landscape Structure of Telford" which makes clear

recommendations concerning the conservation of existing habitats and the creation of new ones.

## Wildlife habitats on mining sites

In Telford many of the sites of wildlife value are on land which has been disturbed by mining, the varied topography which results from small-scale mining and the tipping of mine waste providing a variety of wildlife habitats.

The spoil mounds themselves may support heathland, acid or neutral grassland, scrub or woodland, depending on the nature of the substrate and the time which has been available for colonisation. The tipping of spoil has impeded drainage in some areas, leading to the formation of marshes and pools. In addition, habitats may survive from the farmland which existed in these areas before mining began, so that spoil mounds and other industrial features are superimposed on small meadows and hedgerows. Because most of the spoil mounds in Telford are comparatively small, usually flat-topped, and were deposited at least fifty years ago, colonisation by vegetation is virtually complete: there are very few of the huge, conical, unvegetated pit mounds associated with coal mining elsewhere in Britain.

Pit mounds, however, traditionally have an unfavourable image and the fact that land is classified as derelict is sufficient to convince many people of its worthlessness. Also the existence of uncapped mine shafts in these disturbed areas has often been used to justify reclamation. Consequently difficulties arise over conserving valuable sites even though the complex mosaic of habitats, rich in wildlife but usually lacking rare species, are attractive areas for field studies and non-intensive, informal recreation. Many areas of derelict land in Telford have now been reclaimed, some of them for housing and industry, but others to produce recreational open space of park-like appearance with a uniform bland topography. But the landscapes produced by mining are integral features of parts of Telford and are worth conserving for the con-



*Telford area before development  
(Photo NCC)*



Three small pools, originally formed by mining subsidence, have been made into a lake now used by a variety of waterfowl and waders (Photo NCC)

tribution they make to the character of the town. It is encouraging, therefore, that recommendations for the conservation of two recently identified and described sites of high scientific interest among these derelict mining sites stand a good chance of acceptance by the Development Corporation and could result in some parts of the areas being conserved as nature reserves and as areas for biological education.

### Two areas of ecological importance: the Severn Gorge and the Town Park

The Severn Gorge forms the southern boundary of the town and contains large

areas of steeply sloping woodlands. Although most of the woods have been much disturbed by past industrial activity, they are extremely rich in tree, shrub and herb species. The Gorge woodlands were the subject of a report produced in 1973 which identified problems and made recommendations for woodland management. The area is already subject to heavy recreational pressures which will intensify as the population of Telford increases. Interest in industrial archaeology in the Gorge, stimulated by the Ironbridge Gorge Museum Trust, has already resulted in a massive increase in visitors to this area and potential conflict exists between recreation and conservation. As a result of the 1973 report, the Development Corporation has established a nature trail

at Benthall Edge Wood, where the varied geology has produced a number of soil formations and vegetation types; the flora includes uncommon species, such as wild service tree (*Sorbus torminalis*), bee orchid (*Ophrys apifera*) and bird's nest orchid (*Neottia nidus-avis*). The Corporation has taken measures to avoid potential damage to the precipitous site by excessive numbers of visitors, by the use of properly constructed paths and steps. Discussions held between Telford Development Corporation, the Forestry Commission and the Nature Conservancy Council have resulted in a management plan which aims to enhance the ecological interest of Benthall Edge Wood, especially by the removal of sycamore (*Acer pseudoplatanus*), which is a strongly

invasive alien species in Great Britain, and by promotion of natural regeneration. Management of some of the woodland in the Severn Gorge is designed to enhance the habitat for the nightingale (*Luscinia megarhynchos*), which occurs here at its most north-westerly breeding locality in Britain.

The Town Park consists of 180 hectares of wooded pit mounds, grassland, lakes and abandoned railway lines adjoining the town centre, and the size of the park has enabled large parts of it to be managed informally for non-intensive recreation in semi-natural surroundings. The range of habitats in the park is just as important to many people who use it as the facilities for organised recreation and the exhibition area adjacent to the town centre. The park is an important site for the interpretation of natural history to the public, and six countryside wardens have been appointed whose functions include working with local schools to develop interest in the environment, recording flora and fauna and patrolling large areas of the town's open space in an effort to combat vandalism.

### Using open space

Educational use of open space in Telford is important and therefore, where sites are already used by schools, it is often easier to justify their retention. One area of pools and pit mounds has been used for field studies for several years, and is managed for conservation and education. But this site is of no greater intrinsic interest than several others which have been severely damaged by reclamation, or even in some cases destroyed. Sites which have a special value for wildlife can often accommodate some educational use, and it is particularly the case where rare or sensitive species are absent. With the growth of the population of Telford New Town, the need for outdoor educational facilities will increase and this is a good reason for retaining sites where so many different aspects of the environment can be studied.

Telford contains comparatively large areas of open space, and this fact alone should be sufficient to reduce the pressure for reclamation of derelict land of high scientific interest, as it is not essential to use every hectare as efficiently and economically as possible. All open space has potential for nature conservation, which can be realised through habitat creation and sympathetic management. There are a number of management principles, such as tree and shrub planting using indigenous species, which can be used to enhance open space for wildlife, and these are already in use on a large scale. The specific type of management depends upon the character and use of land and its proximity to houses, roads and industrial areas. Thus, although some

areas are managed formally, using mainly exotic species and cultivars to produce a garden-like effect, other parts of the town are now managed much less intensively, with infrequent mowing of grassland, encouragement of natural regeneration of trees and shrubs, and, if necessary, planting of indigenous species.

### Some problems

Although almost all areas of open space in Telford will be used to varying extents by the human population, the large amount of space available means that this need not always cause conflict with nature conservation. Problems inevitably occur in some instances, probably as a result of transplanting an urban population to a comparatively rural area: birds, especially, can suffer from disturbance and vandalism, and trees and shrubs are frequently damaged.

The conflict between water-based recreation, especially angling, and the conservation of open water and the associated swamps and marsh habitats is particularly difficult to resolve. Almost all the pools in Telford are heavily fished, and injuries to waterfowl, litter and trampling are serious problems. The need to exclude the public from particularly sensitive sites of special interest is appreciated but in practice this has not yet been attempted.

Education of the general public is vitally important if nature conservation principles are to be applied throughout the town. There are individuals and groups in Telford who are willing to oppose changes which threaten areas of interest to them, but it cannot be said that the majority of the inhabitants are yet greatly concerned with conservation. It should be emphasised that although new towns provide many opportunities for conserving existing habitats and for creating new ones, this requires biological information and ecological advice to be incorporated at the earliest stages of the design process. The widespread application of nature conservation to planning is a comparatively recent process but the concept has gained acceptance among many officers of the Development Corporation. Links between the Corporation and conservation organisations such as the Nature Conservancy Council and the Shropshire Conservation Trust are stronger now than ever before, and ecological considerations are given more weight in planning than at any time in the past. There is good reason then, to hope that the theory of conservation will come to be more widely practised, as a result of publicity, through the formation of local groups concerned with conservation and, above all, through an appreciation of the benefits of living in a town with such a wide variety of habitats.

### What Telford has taught us

Much of the development of Telford was carried out before nature conservation gained acceptance in urban planning. However, the experience which has been gained in Telford leads to a number of conclusions:

1. Information from ecological surveys must be incorporated at the design stage.
2. The most important wildlife habitats must be identified and provision made for their conservation.
3. Greatest possible use must be made of publicity and education to convince both planners and the public of the value of nature conservation.
4. Economic arguments (for example, low-cost maintenance) can often be used to support nature conservation.

C.W. and R.W.T.



(Photo Council of Europe)

## Trees in towns

Since it was founded in 1972 the ERA (Ecology, Research, Development) has been studying the state of health of roadside trees — by spot checks in various Belgian towns and regular, systematic inspections in Brussels — and has been considering whether and how trees should be maintained in towns.

This research has covered the following aspects:

- early diagnosis of the state of health of planted species;
- evaluation of changes in the growth environment of trees (soil, hygrometry, nutritional deficiency, etc.);
- consequences of soil asphyxiation;

- treatments to be applied when planting and transplanting;
- influence of pollutants and contaminants;
- fertilisation;
- phytosanitary treatments;
- rescue operations.

The results of this research have been presented in technical papers, publications and recommendations on the creation and management of planted areas in towns.

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(Photo Stefan Österblad - Fauna Foto Bildbyrå)

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