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## Forests in Relation to Landscape and Amenity [and Discussion]

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## Forests in relation to landscape and amenity

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The development of multi-purpose forests is now recognized as sound land use.

While timber production remains paramount, increasing attention is given to other benefits which forests can confer on land and community.

The values in the countryside of shelter, conservation and recreation, and the improvement of urban life by the transformation of industrial waste land to town forests, are tangible contributions to the quality of life. Forests sympathetically planned and managed also enrich the visual landscape; plantations can be shaped to accord with the topography, their margins merging easily into the surrounding landscape pattern. The retention of indigenous species within the forest boundary serves both conservation and beauty, and felling can be planned to avoid unsightly scars.

By these methods of management, forests can be developed in a way which will help to overcome the impoverishment of the landscape currently caused by reduction of tree cover over much agricultural land.

## THE LEGACY OF HISTORY

Few people today think of forests as the natural plant cover of the British countryside, yet it is only the over-clearance of trees through the centuries which has produced the wide treeless spaces of our highland areas which are now considered natural. While this outlook often causes opposition to afforestation, it can also result in happy surprises when the unfamiliar attributes of a forest are discovered.

The prejudice against forests has been increased by the concentration, from the 1920s until a few years ago, on economic timber production as forestry's only aim. This attitude contrasted with that of the eighteenth and nineteenth century landlords who took a much wider view and considered game conservation and the enhancement of their properties quite as important as timber production. This resulted in the mixed forests and the well sited small woodlands which add so much to the beauty and livable quality of our inherited landscape. In lowland Britain the small woodlands were linked by a network of hedges and hedgerow timber, with here and there well-timbered parkland, giving a generally wooded appearance to a countryside which was in fact mainly agricultural. The last 30 years has seen a reduction of hedgerows and the rate of their present removal, added to the depredations of elm disease, is leaving some parts of the countryside with hundreds of hectares of almost treeless agricultural land.

In the highland areas of Britain a different process has been at work. The estate woodlands of the past tended to be small by modern standards, and often of mixed species. Some of these woodlands continue to be managed in the old tradition, but in many cases the conifer content has been greatly increased and in acreage the small, mixed woodlands are far exceeded by the large, intensive, timber producing forests of the Forestry Commission and the commercial forestry firms. The results of these changes has been a concentration of trees in certain areas of intensive afforestation mainly in the highland areas and a denudation of the better farming land in lowland Britain.

So long as the afforested areas were looked upon solely as timber factories this coarse-grained

division of the rural land into specialized timber production and specialized food production may have been economically sound, but it tended to squeeze out other values such as pleasant living conditions, conservation and beauty of landscape. It has also removed shelter to the great detriment of exposed areas. In an attempt to restore these values, the historic concept of a multipurpose forest is re-emerging with renewed force and an extended range of purpose. Timber production remains, in the majority of cases, the prime purpose, but to this main purpose others are added in varying degree. These may be considered under three headings: (1) the improvement of the quality of the environment; (2) the conservation of wild life; (3) the provision of recreation.

This paper deals specifically with the quality of the environment but the three aspects are closely linked and indivisible.

#### AFFORESTATION AS A MEANS OF IMPROVING THE ENVIRONMENT

The loss of trees in the countryside, the spread of urbanization and the extent of derelict land needs a positive policy of large scale planting to restore a landscape which now, over large areas, appears bleak and disintegrated. This policy should apply to both town and country, and in particular to those tracts of fragmented and waste-land, visually and ecologically debased by past mis-use, which have neither true urban nor rural qualities.

Forestry, used as a positive element in planning, can enrich the quality of life by improving the environment for living in terms of physical well-being, visual beauty and recreational opportunities.

Forests and all types of tree cover can improve living conditions in many ways. Besides their visual value, they provide shelter, shade and a sense of place and containment which is conducive to the concept of a home. This may be related to the well-known preference of edge noticeable in the inclination of people to gravitate to a tree or the edge of a wood, on a picnic site.

The desire to live in the vicinity of trees can certainly be seen in the almost universal historic planting of trees in relation to dwellings particularly if these are isolated in open country. Their value under urban conditions is even greater.

The ability of trees to reduce pollution and improve atmospheric conditions is well known and makes woods in the vicinity of towns particularly valuable. As well as the cleansing action of photosynthesis, the leaves serve to filter out dust from the atmosphere and the deflexion of wind dissipates pollution. Wide belts of close-foliaged trees also reduce noise.

Trees also have the visual attributes of giving apparent space to a cramped and overcrowded view by absorbing scattered structures and reducing the impact of an overbuilt environment. A good example of the exploitation of this visual attribute can be seen in Hamburg. The view across the river from a well-treed, sylvan park is extended to the far side of the water by a belt of trees planted on the river bank to screen an industrial development, which without the trees would have extended the industrial area into the park.

Another, very different, example can be seen in the Surrey Green Belt. The general view is of a peaceful green countryside, covered by a network of small woods and spinneys. Yet within the tree cover there is an amount of building which if seen in open countryside would make this tract of land appear suburban if not urban. This is not an argument for filling forests with dwellings but rather for surrounding dwellings with forest. Practices in Scandinavia are some-

times quoted in favour of the former policy, but conditions in these countries are very different. Sweden has vast areas of forest and a very small population; there is no risk of over-populating her forests. Here there is a very grave risk, and the policy should be to extend forests into urban development rather than to spread urbanism into our already meagre areas of afforestation.

#### WOODLANDS AS A VISUAL ELEMENT IN THE RURAL SCENE

While the physical benefits which trees contribute to human living conditions are greater than is usually realized, their more obvious contribution to the pleasures of living is the beauty which they add to the landscape. There are two aspects to their visual quality: the interior view, seen from within a forest and the exterior view, seeing trees, whether singly, grouped or as forests, as elements in the pattern of the landscape.

The form and stature of trees and the three-dimensional solidity of forests make them a strong positive element in any scene. They may appear as the main pattern in a relatively featureless landscape, either as shelter belts, hedgerow trees or small woodlands in an agricultural countryside or as a larger forest lying within a landscape of low elevation. Alternatively they may accentuate the topography of a more strongly marked landscape. This relationship of trees to land-form produces some of the most satisfying landscape patterns, and contradiction of their correlation with topography, by planting without reference to the grain of the land, has been the chief cause of ugly afforestation during the last half-century.

There are many notable landscapes in Great Britain whose character is intensified and enriched by a logical relation between forest, land-form and climate. Typical examples include forests clothing the steep sides of valleys, sheltering agriculture in the level valley floor, and checking erosion and run-off on the steep scarps. In landscapes of low elevation hilltops may be afforested, giving shelter to farmland on the lower slopes and in the valleys, or the mirror image of this may be seen, for instance in Devon, where woodlands fill narrow rocky valleys between well-farmed rolling hills and plateaux.

These are broad patterns dictated by topography, land-use and climate, but within each there is a more detailed relationship of trees to land. The relationship of the forest's outline to the shape of the ground, to the skyline of the hills and the tilt of the strata, the merging of the forest's edge into the open ground and the recognition of outcrops, streams and ground modelling can make the forest accentuate the richness and character of the landscape's features, giving them new meaning and intensity. On the other hand, by ignoring them the forest can blanket out interest and diversification and reduce the view to monotony.

A decision on the visually desirable extent and form of forestry in a particular landscape involves an analytical assessment, whether or not this is formalized into a code. Various methods of landscape classification are now being developed. Whatever method is used, the individuality of every landscape must be appreciated to avoid the danger of losing character and sense of place through over-reliance on broad categories.

Topography of the landscape, and the constraints imposed by climate, are the basic and enduring factors. To these are added the patterns developed by vegetation, cultivation and other human activities. Forests should always give expression to the basic character, but they must, to some extent, modify the acquired characteristics. In both respects the landscape analysis should identify the attractive qualities of a landscape, and the effect which afforestation will have on them. In the wilder landscape there are likely to be special features such as

waterfalls, spectacular rock formations and viewpoints whose attractions could be obliterated by the forest, but which might equally be made more attractive seen in a glade within a forest setting.

In the more humanized landscapes, a problem of scale may arise. The English landscape for the last two centuries has owed much of its attraction to the interlocking, small-scale pattern of field, copse, hedgerow, farm and village, producing a scene of combined harmony and intricacy, in which small woodlands rather than forests were appropriate. Now that this scale is increasing, larger woodlands will not only appear appropriate, but will serve to restore a balance between the now larger villages and roads and the countryside.

#### LANDSCAPE CONSIDERATIONS IN AFFORESTATION

The importance of studying the relationship of forest to landscape has been highlighted by the opposition of amenity societies and National Park Authorities to afforestation in many areas of outstanding natural beauty. These disputed areas are often in hill country where afforestation, particularly if combined with hill farming, can be a good land-use, ecologically, economically and socially. The problem is whether or not it can also be a good land-use visually and serve the interests of those wishing to enjoy the beauty of a comparatively wild landscape, whether by simply looking at it, or by walking through it.

Within some National Parks, agreements have been reached to exclude forestry entirely from some areas, to limit it strictly in others, and in a third category to allow it without check. This blanket zoning does not take sufficient account of the possibility that some degree of afforestation may be desirable in the majority of landscapes provided its form and siting fits into the topography and landscape pattern, and does not obliterate features of special interest and beauty. This reservation would exclude forest from certain landscapes, such perhaps as the Moor or Rannoch, where a unique character would be obliterated. But cases for complete exclusion are comparatively few, particularly in areas where the hill-tops are above the planting line.

In the majority of landscapes some tracts of forest, especially on steep scarplands, add to the appearance, and certainly to ecological health, provided the area of afforestation is not great enough to destroy the open character of hills, the sense of space, and the beauty of ground modelling which are the particular attractions of the landscape in many of our National Parks.

Many of the hills of the Lake District are examples of subtle ground modelling whose response to the changing light is bound to be obliterated by tree cover. The more broadly modelled hills of Northumberland have less to lose, and more to gain, by partial afforestation. But in all border-line cases there is a conflict between the relatively small, irregularly shaped and loose-edged plantations which will look right in the landscape, and the economics of timber production in which larger blocks and shorter fence runs are preferred.

A further problem is that the forest shape which will look right in a hilly landscape seldom coincides exactly with the acquisition line. In seeking the best compromise in achieving an acceptable shape, two outlines have to be considered. The line of the fence, whether or not all the land within it is planted, will be visible, because the ground vegetation will change within the fence, through the exclusion of grazing. This line should therefore in itself be sited to be as far as possible sympathetic to the landscape. But within this, a stronger demarcation will be made by the forest, with its strong change of colour and vertical dimension – and this can more easily be adjusted to merge into the surrounding landscape.

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Exclusion of grazing encourages the growth of indigenous species within the forest fence, provided seed parents are present. Where they are absent, initial planting of suitable species is necessary. But planting the crop-tree right up to the fence, at uniform spacing, produces a hard, wall-like effect, which both looks unnatural, and lessens the ecological richness of the all-important edge. A looser planting overcomes both these drawbacks and allows the outer trees to become better furnished. This treatment of edge need not be confined to the perimeter, but should also be adopted along rides, water-courses, and other unplanted features. It should also be run back into the main plantation to avoid the effect of a thin fringe. This breaking into the forest block can often be achieved along the line of a rock ridge or gully.

While it must be accepted that care for the landscape both visually and ecologically demands certain concessions from maximum economic operations, many practices of the past, which were damaging to the landscape, have now been found unnecessary. In general these have been discontinued, but unfortunate cases still occur. Vertical rides and parallel bands of larch for firebreaks were two of the commonest, and the results of these practices can still be seen on many hillsides.

## FELLING PROBLEMS

The same care is needed in the pattern of felling as in planting. In both cases the problem may be most difficult in hilly country, where the forest is seen, almost in plan forms, laid out on a hillside. In felling, the risk of wind-blow must always be considered, and this too is a particularly strong restraint on the exposed hillsides of north Britain. A severance line must be found which will both look right and withstand wind-blow. Fortunately the two requirements often coincide. The hard wall formed by a straight, vertical cut gives full exposure to the wind.

Sometimes it is possible to leave crops on the lower slopes and in the valley to grow on into the next rotation, forming a strong base to the new plantation and forking up into the young crop, perhaps following and accentuating some topographical feature. Often some configuration on the hillside will indicate a good line of severance. Throughout the operations retention of groups and drifts of indigenous growth will serve equally the interests of conservation and the appearance of the landscape. Where felling coups are to be spaced over a period of years the appearance must be foreseen not only of the original coup but of subsequent ones which will be taken before the replanted first coups have matured sufficiently to register as woodlands in the landscape.

In lowland forests the chief effects of felling will be seen from within. With the growing use of forests for recreation this aspect is of great importance. Excellent results are now being achieved by felling in informal shapes related to the land-form instead of in the rectangles which were once accepted practice.

Thinning and brashing into the forest edge bordering on to the coups gives visual penetration, lets in light with advantage to conservation and strengthens the crop against wind blow. Felling, far from being a defacement, can be used positively to open up views and create glades. The retention of wind-firm groups or drifts of the old crop adds interest and gives form and perspective to the views within the forest. This will usually give a better appearance than leaving a scattered overstory of often unstable trees. A firm overstory, however, of something over 70 trees per hectare can look effective and be ecologically desirable.

The eventual establishment of a mixed age forest is desirable in the interests of the landscape, but there can be great variation in the size of the age groups making up the mosaic of the forest.

At the smallest scale there is the natural forest of regeneration; at the larger scales, each age group may be many hectares in extent, and in these cases the areas of different ages should merge into each other, with promontories and groups of more mature trees breaking into the younger crops.

Once a forest is established on good landscape principles it is comparatively easy to maintain its character by felling and replanting in sympathy with the established pattern. The harder task is to convert forests planted on the old rigid system into acceptable forest landscapes. This transition is however taking place in many of the forests planted in the 1920s.

As in all ecosystems, complexity increases with age, and management can either increase this maturing process or take the ecosystem back to immaturity at each rotation. There can be no doubt that the former system of management is in the interests of amenity as much as of conservation. The establishment of a network of ecological corridors, conserving cover for wild life, along such features as water-courses and rock ridges, could also be a great landscape asset. There is a typical example of this where Offa's Dyke passes above the forests of the Wye Valley.

#### THE EFFECT OF SPECIES ON THE LANDSCAPE

In any consideration of the contribution which forests make to the beauty of the countryside and to the enjoyment of life, the choice of species must be relevant. Yet, in the context of timber production, is this not as if one asked the farmer to select his crops for the pleasure of the passers-by? The question is worth asking for both its implications, for where methods of farming are genuinely inimical to the long-term welfare of the countryside, he too should indeed be questioned.

There are, however, substantial differences between the two cases. The long time-scale of forestry means that the choice of species should give more weight to the long-term welfare of the landscape both in terms of fertility and of amenity, particularly as the short-term advantages may no longer be valid when the crop is harvested. Furthermore, forest working methods make it relatively easy to accommodate volunteers or colonies of indigenous but unremunerative trees, within the main crop of a timber-producing exotic.

The recent Forestry Commission policy on hardwoods has made it possible to ensure that every forest shall be an asset to the landscape. In the kinder hardwood areas this will come almost naturally. In more difficult areas where the introduced conifer remains at present the only species for a reasonable timber crop, good results can still be achieved, with thought and care for the characteristics of the landscape.

The visual contribution which different species make to the landscape are governed by the following factors: (1) colour and seasonal change, (2) form, (3) compatibility with their surroundings and the homogeneity or variety which they impart to the landscape.

The particular values of the indigenous or long-established hardwoods in the landscape is their natural compatibility with a scene to which they are native; their colouring which harmonizes with the surrounding vegetation, and gives the beauty and interest of seasonal change; their shape which is usually, when mature, broad or rounded; their texture which, particularly in winter, is permeable rather than opaque.

Larch shares all the attributes of the hardwood trees except their shape.

The spruces have none of these attributes but they have their own beauty. They give a year-round depth of colour and within a crop nearing maturity there is a great beauty of trunk

and stature. Spruce forests appear more compatible in the large scale northern landscapes, such as the Border country, than in the softer, smaller scale mosaic landscapes of the south. Seen as the main matrix of these northern forests they form a distinctive and acceptable landscape provided some seasonal change and lightening of the unbroken dark green can be given by flushes of larch and a leavening of the native birch, rowan, sessile oak and alder.

Mass production of either agricultural or forest crops tends to obliterate the sense of place and individuality which make one landscape different from another. The retention of this macro-differentiation between one part of the country and another is as important as the provision of micro-variety within individual forests.

The micro-variety can be seen in mixed woodlands containing perhaps several species of hardwoods and a proportion of conifer. These woodlands are nearly always beautiful in themselves and full of naturalist interest. But there would be a loss of large-scale variation if all forests were to be similarly mixed. For instance, the distinctive character and striking beauty of the pure beechwood would be lost.

To attain true variety at all scales we need some mixed woodlands, some pure stands and many different types of forest predominantly of one species but with some degree of mixture. This maintenance of variety at all scales is as important for the visual landscape and its enjoyment by people as it is for encouragement of a wide range of habitats.

The patterns of species mixture used in new plantations have a strong influence on the landscape, sometimes an influence which gradually grows out as the forest matures, sometimes a permanent one. The most damaging pattern is that of wide vertical stripes, particularly when seen on a hillside, or rigid rectangular blocks. Wherever one pure block adjoins another the two species should be merged into each other, as would occur in natural woodlands.

#### THE LANDSCAPE WITHIN THE FOREST

The sense of being contained within a landscape, rather than standing without and looking at it, is a unique attribute of the forest. This sensation can be provided by any species, providing it is nearing maturity. The aisles of the beech or the strong arcades of oak or the great pillars of Douglas or spruce are equally magnificent. To enjoy them to the full, one should be able to walk through them for long enough to register the experience. This suggests that a long drift is more valuable than a compact compartment, and should influence policy in the long term establishment of new forests and the regeneration of old ones, guiding all operations from planting to felling.

A visual analysis of most landscapes other than those demarcated by man, reveals that they are composed of elements in long drifts, or flattened triangles rather than of shapes approximating the square or circle (there are, of course, exceptions, such as the Drumlin landscape of small rounded hills). The prevalence of this characteristic reflects the form of underlying strata and the linear form of valleys. It is therefore not surprising that these same shapes are often the most compatible forms for the forest.

Elongated shapes have an additional relevance within the forest. All views to walkers within the forests are kinetic, and must therefore be considered in four dimensions, instead of the three dimensions which are adequate for static view points. This fact needs to be appreciated in designing the landscape along forest walks.

A thicket stage crop of any species is generally considered dull and the lengths of walks



through such crops should be as brief as possible. Even so, the walk can be made much more interesting if a few groups of mature trees from the previous crop or indigenous volunteers can be left by the ride side. Wide verges breaking back into the crop also add interest if they are encouraged to develop a native flora. The effect of this is striking in some of the Downland forests where the wide rides are now only close-mown down the centre while at each side the vegetation is cut at varying intervals to encourage different types of arrested climax of the chalk flora. In their turn, the flowers encourage the chalkland butterflies which have diminished on the open downland owing to arable cultivation. The chalkland is particularly suited to this treatment, but on clay soils the same type of treatment could encourage primroses, and the poor, acid soils will often develop wild broom, heather and rowan, if sufficient light is admitted.

This treatment of rides, deliberately to encourage forest flora and wild life, will in itself give interest to any forest walk, but in addition walks should be planned to give a variety of experiences. Stream-side walks are always popular, so is a walk along a ridge or hillside giving good views. Where the ground drops sharply towards the view, a small amount of thinning or clearing may open up wide views. A view is almost always improved when seen through the framing of tree trunks so that thinning or high pruning will often give good views without appreciable loss of crop.

Forest management for conservation coincides in almost all respects with that required for landscape values. The avoidance of long straight rides, thinning out the crop edge to admit light, retention of volunteers, formation of pools and deer lawns, give all that is needed for a forest landscape of the highest order, provided that additional thought is given to the visual composition, in the shaping of the pools and the siting of the rides.

#### FORESTRY IN AGRICULTURAL COUNTRYSIDE

Changed farming methods make a change in the appearance of the agricultural countryside inevitable. But unless the loss of trees caused by the removal of hedges, and the death of elms, is made good in one form or another, the appearance, living quality and conservation content of the landscape will suffer.

It is interesting that up to 12% of the valuable reclaimed land in the newest Dutch polders is being planted as woodland. In France and Germany, projects for the re-casting of agricultural units include substantial tree belts. These are much further apart than our traditional hedgerows, but they are considerably wider.

The relative advantages and disadvantages of shelter belts on farms is currently a matter of argument, and must vary with climatic and soil conditions and the type of farming operation. There are certainly cases of soil deterioration due to removal of shelter. The advantage of trees to the appearance and conservation values of the landscape is indisputable. Where shelter-belts are planted, their contribution to the landscape is influenced by their shape, siting and species. Well-known and very successful examples are the beech belts on the Cotswolds and the fine-shaped belts on the Pentland Hills.

Although a certain number of hedges have to be removed to make fields large enough for working, there is a limit beyond which there is little or no gain in increasing the size of fields, and therefore a proportion of the hedges could remain, and hedgerow timber might be re-established if more care were taken in manipulating the mechanical hedge cutters. There are also boundaries to tracks and lanes which could be planted with little loss to agriculture. An

incentive, either through the high price of specialized timber or by subsidy, might make the farmer willing to take the necessary extra trouble. One may also hope for the same willingness to make small concessions in aid of a better environment as we expect from foresters and, indeed, industrialists. Landowners who look on the land as a home as well as a productive resource have shown the great possibilities of introducing small plantings within agricultural land.

The planting of larger woodlands on good agricultural land is likely to meet opposition in the present world food shortage. But there are areas of poor land which might be better under woodland, and a great number of small triangles and corners cut off by the boundaries of roads or other development which could well be planted with trees. Worked out quarries are often easier to restore to trees than to agriculture and many small woodlands which are a feature of the countryside are on old workings. However, the proposition that all waste land should be planted would be unsound from a conservation angle, as the countryside is already too much denuded of natural habitats such as wetlands and chalk and limestone pavement. In all operations on our over-used land, all interests should be consulted to arrive at the best balance.

Possibly the largest area of potential woodland in the lowlands lies within the common lands. Now that grazing has been withdrawn from many of them, they have grown into gorse and bramble scrub, and while some of this should be retained as a natural habitat, considerable areas would be of greater benefit to the public if they were planted as woodlands.

Within the farmlands themselves, small copses of trees sheltering the buildings would make the greatest contribution of all to the appearance and living conditions of the farms. This is a widespread traditional practice and constitutes the most attractive landscape feature of otherwise open landscapes, such as the Lincolnshire Fens.

A very large area of new woodlands is being established along the motorways. The trees planted are nearly all indigenous, and it is intended that they shall develop into complete woodlands, rather than parkland plantations. Their visual and conservation contribution should be considerable. Now that the passing of the steam train has reduced fire risk, some planting on railway land should also be possible.

Industry in rural areas also gives an opportunity for planting indigenous forest trees. This policy is already being carried out in connexion with power stations and reservoirs, and could be extended to include factories which, if planted at all, are often given an inappropriate garden setting.

The difficulty of finding large areas for afforestation in the agricultural landscape makes it necessary to take every opportunity to plant even small groups of trees which, in the aggregate, will give the generally wooded appearance once given by our hedgerows.

#### WOODLANDS IN THE URBAN SCENE

While there is a historic tradition of trees and woodlands in the rural landscape, which we can strive to revive, extend and adapt, there is no such historic equivalent for our towns. In the urban scene we have to break new ground, and evolve a new concept. Yet the contribution which woodlands could make to our urban environment is almost greater than that in the countryside.

We have much to learn from the continent in this matter: France, Germany and Denmark

all appear to set more store by trees than we do, while the Amsterdam Bos is a remarkable example of highly valuable land, in a crowded country, being used entirely as a recreational forest.

By contrast, in Great Britain town forests are seldom included in the urban park-system. Yet they have a particular merit in providing an element of natural environment for the city dweller which acts as a release from the stresses of city life. They are also able to absorb crowds and give a sense of peaceful, visual containment in a way which treeless open spaces cannot do.

Holland Park, a remnant of the medieval hunting forest, is one of the few woodland parks in Inner London. It provides peaceful recreation and wild life interest within beautiful surroundings to a remarkable degree for so small a space, making a far greater contribution than if it were open space.

Many of the new towns have incorporated woodlands in their open space systems and a recognition of their value should lead to an accepted policy for their inclusion in urban expansion and redevelopment plans for all towns. One of the woods incorporated into the plan of Harlow is used by schools for naturalist studies, and this educational aspect is one of the great benefits of town forests.

Although at present it is unusual to find woodlands within the urban fabric, there are many examples of town forests situated outside the city boundary. The best known is Epping Forest, owned and managed by the City of London, primarily for the benefit of London's citizens. Its amenity value is outstanding, not only in providing a fine woodland setting for a day out in the country, but also in forming a strong visual break between the scattered suburbs and the agricultural countryside. This woodland buffer between town and country is immensely valuable to both, and a considerable increase in the woodland areas of the Green Belts would improve both their appearance and their recreational value. At present, while existing woodlands are usually retained and sometimes managed for public enjoyment, it is rare to find new woodlands being planted with this object in view.

There are obvious impediments to the pursuit of such a policy such as the scarcity and high cost of land and difficulties of acquisition. But if the policy were to be accepted as desirable, opportunities could be found to implement it. The policy is already being implemented on some areas of industrial waste land, but there are other types of partially wasted ground which could be put to better use as woodland. These include worked out dry gravel pits, poor or fragmented agricultural land and, in many cases, overgrown common land.

There may be a disinclination on the part of local authorities to allocate land and finance to the planting of woods which will give little pleasure to the public for 15 or 20 years. However, good design in the allocation of areas of open ground and in planning wide and pleasant rides, which could be enjoyed from the first, could overcome this objection.

The fear of vandalism is another inhibiting factor, but there are ample examples to show that, properly dealt with, the danger can be largely overcome. When proposals were put forward for planting woodlands in the Lower Swansea Valley and on Kilvey Hill, as a first step to the rehabilitation of this area, fears were expressed that the trees would be destroyed as soon as planted. However, by engaging the local school-children in active participation in the planting, these fears proved groundless, and the children cared for the trees instead of destroying them.

## THE RECLAMATION OF WASTE LANDS

The difficulty of finding land for afforestation near towns certainly does not apply in areas where there are industrial waste lands. Here it is not a case of enhancing a landscape which is already beautiful, but of redeeming landscapes spoilt by men's past actions. The dual purpose is achieved of bringing fertility back to degraded land and of improving the environment, often where this is particularly desirable, on the outskirts of industrial cities.

Impressive work has been done in Germany in the Ruhr and Sarre regions, where opencast mining is immediately followed by the creation of recreational lakes and forests. This creative use of woodland making fresh lands for health and enjoyment should be widely extended.

Considerable planting on waste lands has been carried out in many of the northern industrial districts and in South Wales. An imaginative scheme for a forest park has been started at Stoke on Trent, but there are vast areas awaiting action. While the full enjoyment of these urban forests will take some time to materialize, the improvement to the visual scene is evident in a very few years, and can quickly improve the quality of urban life and bring fresh hope to the region.

The sometimes fantastic shapes of the spoil heaps can be exploited to create exciting landscapes. Some shaping is usually necessary for the sake of safety as well as to produce the best visual results, but if the area is to be forested, there is no reason to reduce them to a dull level. Almost all waste heaps except those which are toxic or still burning have been found capable of regeneration. Grey Alder, Robinia and Corsican Pine have been particularly valuable as pioneer trees. One of the earliest examples of planted coal bings is at Radstock in Somerset, where the wooded conical hills make a welcome feature in the landscape.

There is no reason why the vast areas of dereliction near industrial centres should not in the future become places of outstanding beauty. They can certainly also provide settings for country parks and the kind of recreational woodland created in Holland in the Amsterdam Bos.

A widespread form of dereliction is that of worked out minerals. The Thames valley and other gravel workings are now being at least partially converted to various forms of water-parks. If these could be set in a matrix of forest a magnificent new landscape could be created, instead of a series of isolated lakes.

With imaginative large-scale planning, afforestation could transform our fragmented landscape into a cohesive environment for living.

## THE COST OF FOREST AMENITY

Cost-benefit evaluations cannot be accurate when they deal with such necessarily subjective values as walking through forests and listening to bird song. But the costs can be identified and a useful judgement value can be put on the benefits, provided no mathematical accuracy is claimed for the results. The costs incurred for reasons of landscape and amenity can be either positive expenditure or loss of maximum profit. Positive expenditure will include planting unremunerative species, and the additional labour and administrative costs involved in planting and felling in accordance with landscape requirement as opposed to the more straightforward mechanistic methods. Loss of profit will result from planting less profitable species, and leaving certain areas unplanted. The latter loss of earnings can be minimized by leaving unplanted those areas where difficult conditions for growing or harvesting would in any case result in minimal returns.

The benefits are more easily perceived than priced. The demand for opportunities to enjoy the countryside for quiet open-air pursuits is immense, is growing, and may become insatiable in a country as densely populated and closely developed as Great Britain. The present position in Japan, where pressure is destroying the accessible countryside, may be a warning of our future. Therefore a comparison of the ability of forests to meet this demand, and the cost of doing so, with other available resources may be more useful than an attempt at *per capita* costing.

The great advantage which forests have over other areas catering for countryside enjoyment is that the setting for this enjoyment is on land both purchased and maintained for a productive land-use. The whole area of a country park, on the other hand, may be devoted solely to recreation and is therefore providing its recreational service to the public at a far greater cost.

The footpath system, including the long distance paths, shares the forest's advantage of making visual use of land which is productively employed (usually in agriculture) but there is less control on the adjoining land-uses, and less opportunity of incorporating special features such as water and view-points in the area of public access. Far greater recreational use can be made of a network of ways, permeating great areas of countryside, than of compact parcels of land, fenced round and devoted solely to recreation. A further credit in the forest's account is that the path and bridleways are needed in any case for working purposes.

Taking these considerations together there can be little doubt that forest recreation is the most economical which the country can provide. There is also a sound economic argument for town forests. Once established, woodlands are cheaper to maintain than any other type of park or recreational land. We can therefore rest assured that the development of forests as part of our environment for living is as economically sound as it is aesthetically and scientifically desirable.

#### *Discussion*

D. R. JOHNSTON (*Forest Research Station, Farnham, Surrey*)

It is encouraging that from the point of view of forest management and economics there is little difficulty in reconciling the ideas of Dame Sylvia Crowe with those of practical management. It is fortunate that larch is a useful and economic species while birch and other indigenous species can often be obtained at no cost whatsoever. Indeed, far from involving an economic loss, the exploitation of the existing vegetation, or absence of it, on some topographic features can reduce establishment costs. Most foresters are now fully in sympathy with Dame Sylvia's concepts but it seems doubtful whether this is true of farmers. It seems that the destruction of hedgerows has gone beyond anything that could be regarded as necessary from an economic point of view. There is need for economic appraisal and education.

J. S. CRIPPS (*Chairman, The Countryside Commission, 1 Cambridge Gate, Regents Park, London NW1 4JY*)

The Countryside Commission asked a landscape architect and an agriculturist to do a study not of field sizes, but of the effect on lowland landscapes of technical developments in farming, including the removal of hedgerows and hedgerow trees. They investigated the facts and farmers' attitudes in a number of study areas in different parts of England, and they have come up with some interesting conclusions and suggestions. We shall be publishing their report and an accompanying discussion document in September; and we hope it will stimulate a great deal of discussion. We must accept change and not think too narrowly in terms of the

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traditional enclosure landscapes, despite their great popular appeal. So the report will be entitled 'New agricultural landscapes'. The subject has generated much emotion, but almost no analytical thinking until now. The study was an attempt to remedy this for the lowlands, and we have just started on a similar exercise in the uplands.

S. G. BOYCE (*U.S. Department of Agriculture, Forest Service, Asheville, North Carolina 28802, U.S.A.*)

The land use problems being discussed at this meeting are worldwide. Solutions developed in the British Isles could provide world leadership in land use and in forest resource policies. To emphasize the international significance of land use problems, I cite the following recent development: Italian and Japanese industries have purchased large tracts of land in eastern North Carolina for production and export of food to their home countries. Possibly Great Britain should consider purchasing portions of the 13 original colonies!

S. D. RICHARDSON (*Department of Forestry and Wood Science, U.C.N.W., Bangor, N. Wales*)

I am reluctant to take issue with Dame Sylvia Crowe because of my great admiration for her and for her influence on forestry in the U.K. I must, however, sound a warning against the overly glib acceptance of that forester's opiate 'multiple use'. This is a concept to which lip service is frequently paid but all too often it serves as an excuse for doing very little. I would emphasize that the cosmetic planting of hardwoods around coniferous plantations does not in my view comprise a multiple use of the forest resources.