Preface

Knut Fægri

Like H. G. Wells' conception of peace ("Joan and Peter"), the cultural landscape can only be understood by its antithesis: untouched, unspoilt nature. The realization of this dualism is the basis for understanding and appreciating either.

To Medieval man nature was hostile, forbidding. His world was the patch of friendly, cultivated ground, isolated in a fearful, dangerous matrix. On the whole, this sentiment also prevailed during the following centuries, only to be changed by Rousseau and his romanticist followers. And we should not forget a contemporary of the great Jean Jacques: Linnaeus, to whom Nature certainly was neither foreign nor hostile, even though, as a good child of his century, he relished the sight of well-cultivated land.

The realization that nature was a positive factor, indeed so much so that it should be protected against the depredations of man, most remarkably did not originate in densely built-up Europe, where nature really was endangered, but in the USA which at that time had plenty of it. Nature became something to be cherished and protected. Later, the idea was also adopted in Europe, not least in Linnaeus' home country, where the Linnaean philosophic tradition is so important even in today's intellectual life, and where Rutger Sernander was one of the original banner-carriers. Under his enthusiastic aegis (e.g. Sernander 1919), 'natural' Swedish landscapes were protected as memories of an idyllic pastoral period past. Les temps perdus.

Only when natural successions started their own course inside the carefully protected and fenced-off areas and turned them into impenetrable wildernesses did the realization gradually develop that the borderline between cultivation and nature had, perhaps, been wrongly placed. Man's influence was wider and subtler than originally thought, and the landscape in general was far from being unadulterated nature. The concept of the cultivation landscape was born as a landscape in apparent equilibrium, where man's influence was only one of several equally strong influences.

In the end, it was realized that, even in Scandinavia, a virgin landscape was a fiction. With some small and doubtful exceptions all vegetation types were created or modified by man. The degree of modification varies, from the open arable field with its heavy machinery to the grazing areas in the mountains and the deep forests, although just there one might perhaps find areas that had never seen an ax or a (man-made) fire. Instead of conceiving of the Scandinavian landscape as a vast 'natural' area with small cultivated patches, the

idea developed that the whole fjord or the whole valley is one great cultivation effect. The emphasis shifted from the alternative cultivated/uncultivated concept to the idea of a gradient of human impact. The task of defining and preserving this gradient is a challenge to modern nature conservation (Fægri 1954a, 1962).

Long before this had been realized, there was a desire to reconstruct the history of the cultivation landscape, which in the thinking of those days meant the open fields and pastures in contrast to the closed forest.

When and how did what happen? Based on Firbas' pioneering papers (1935, 1937) we started in a primitive fashion to play with 'cultivation pollen' and forest density in our pollen diagrams (e.g. Fægri 1940), but it was Iversen's landnam paper (1941) that gave the answer, or at least a preliminary answer. During the war years there were few opportunities to test his conclusions against uncontaminated or undisturbed nature - a scarce commodity in Iversen's native Denmark. However, during the last 40 years, pollen analysis, plant ecology and - not least - prehistoric archaeology have contributed to the recognition of the borderline, or rather the transition zone, between uncontaminated nature and what eventually became known as the cultural landscape.

Exactly when the term cultural landscape was first coined I do not know, nor is it very important: it came by itself. It certainly was not common before the Second World War, but it is found in, for example, a Swedish dictionary of 1939 as a term with predominant scientific use. In post-war dictionaries it is frequent. According to information from Norsk språkråd (the Norwegian language council) it was first recognized as a Norwegian word in 1960. It should be kept in mind that *kultur-* in Teutonic languages is very versatile and easily used as the first element in compounds with native words. A pre-war Danish dictionary lists 71 such compoundings and that list would be far from complete today. The term *kulturlandskap* or *Kulturlandschaft* would therefore immediately present itself on the day the concept had become so well defined as to need and justify a term of its own. The difficulty - if any - is that it is formally so commonplace as to be taken for granted, like *heath* or *forest*.

The 'natural' landscapes of preceding generations are now understood for what they really are: relics of earlier types of land-use, which were maintained by extensive methods demanding little machinery and much manpower and which therefore became uneconomical. At one time they were essential for extracting a livelihood from a not too cooperative nature. By abandoning these methods and discontinuing traditional land-use, the landscape was left to regenerate in response to other uses or non-use. A landscape is dynamic, it does not remain the same when conditions change. Therefore the remains of the old landscape types are important as records of what once constituted

major parts of the land, and in the best Sibylline traditions, such records become more precious the scarcer they are. The remains still with us carry some of the information necessary for understanding the composition and structure of yesteryear's vegetation and for understanding the successions that occurred after the old techniques became obsolete.

The theme of the symposium on which this volume is based is the cultural landscape in general. The theme of the field trip associated with the symposium was the western Norwegian landscape, showing how people have, before industrialization, worked the whole landscape with the primary object of keeping body and soul together. In evaluating the methods and the economics of this management one should not forget that a variable, but always important part of the economic landscape of western Norway, is situated under the surface of the sea, and further in from the coast also in the lakes and streams.

The very strong west-east gradient of physical factors - topography, soil, climate, vegetation - has its natural counterpart in the change in the relative importance of fishing and sea-hunting from the outer coast to the heads of the fjords, where lakes and rivers are more important fishing grounds than the sea. Although horizontal distances are not very great, some 150 km, the transect covered by the trip traversed completely different landscapes with correspondingly different (pre-industrialization) economics. The vertical dimensions add to the complexity of understanding the dynamics of these landscape types. Lack of intimate ecologic understanding has lead to an unwarranted negative evaluation of many landscapes and their vegetation. The coastal ericaceous heath is a case in point. It has been almost unequivocally interpreted in the negative: only the investigations of the last decades have shown that, properly managed, the heath is a highly productive plant community. The snag is that, in the present economic climate, heath utilization does not pay: the yield/work ratio is too unfavourable.

Hopefully, the Cultural Landscape field trip (Birks 1986c) amply demonstrated the danger of evaluating phenomena in too simple a manner. Even within western Norway - and even more pronounced if eastern Norway is also considered - the difference between west and east is so great that one has to think in quite different ways. Schematicism is bound to block understanding. No text-book solution is available for western Norway because (1) there is no single solution, and (2) none of us who have worked in this landscape during the last 50 years, and are still continuing to do so, feel competent to sit down and write a precept for the ecological management of the western Norwegian landscape. The only thing that is certain is that one must approach the landscape with humility and an open mind. To come along with a ready precept, concocted in another area and hopefully eminently suited for that, is to beg for disaster. The primary demand is

to acquire an ecological feeling for the landscape - to which the mechanical solutions must be adapted.

Since the days of my predecessor Jens Holmboe (1906-1925) the Bergen Museum/University of Bergen Botanical Department has had western Norway as its major research area, trying to understand this very complicated landscape. Realizing that western Norway still, or until quite recently, could show modern examples of many old cultivation techniques, it was natural to invite colleagues to visit these sites as part of the 100 years jubilee of our institute, and to make their visit a combination of the general symposium and a demonstration of some field areas of possible interest. This would also give us an opportunity to demonstrate to and discuss with colleagues from other parts of Norway and from neighbouring countries the special problems confronting us - and them. In our rugged, varied landscape the effects of cultivation, as expressed in pollen diagrams, are much subtler than the almost brutal large-scale effects registered in more uniform landscapes elsewhere. The contrast between our presumed natural landscapes and the patches of cultivation was - and is - so striking that, 50 years ago, we never saw the need for a definition of what constituted the cultivated *vs*. 'natural' landscape. Today, the botanical, phytosociological and ethnobotanical definition of what constitutes the cultural landscape has been considerably sharpened and is still under active scrutiny. We hoped that by demonstrating the rather extreme western Norwegian landscape we may help to give that scrutiny more depth. Some of the problems met with and discussed are presented in this volume.

The old landscape of ecological economy cannot be saved entirely. Only small parts can be maintained, preserved and restored. To achieve this we must, through a thorough study of this economy, understand how the landscape functions and know the interactions of the multiple techniques in the day-to-day work in the field. They may look simple, but they embody millenia of experience.

Many scientists have contributed to the modern views of the cultural *vs*. natural landscape. In ending this introduction I should like to pay tribute to one botanist who has, perhaps indirectly, done more than anybody else to dispel the old belief in 'natural' landscapes: Lars-Gunnar Romell, a professed anti-romanticist and anti-Sernanderian, who nevertheless in innumerable papers and articles defined and defended "the landscape of the muzzle and the scythe" against unnecessary despoliation by the harsh machinery-harvesting and machinery-thinking of so-called modern agriculture.

Part One

The Present and Future

Introduction

H. J. B. Birks

Much of the traditional cultural landscape of north-west Europe is rapidy disappearing as a result of changes towards intensive modern agriculture or silviculture. Before any preservation of traditional cultural landscapes can be attempted, it is essential to document the present-day cultural landscape and to study present-day processes that influence the floristic, vegetational and ecological patterns that comprise it.

Landscapes can be studied at many scales, ranging from the single element of the landscape mosaic such as individual meadows or woodland stands to the entire landscape mosaic consisting of different patches, corridors and matrix elements (Forman & Godron 1986). Different ecological approaches are appropriate and useful at different scales, and the range of methodologies represented by the chapters in this part reflect this diversity of scale. Descriptive plant sociology of the vegetation of a particular landscape element is one of the most used techniques in European vegetation science. Its use as a means of primary documentation is illustrated by *Hughes & Huntley's* extensive survey of upland hay meadows in Britain. They also use the newly developed and powerful multivariate technique of canonical correspondence analysis (ter Braak 1986) to explore hay meadows/management relationships and suggest that meadow/management patterns vary from area to area, a conclusion of considerable importance in devising management plans. Canonical correspondence analysis has very considerable potential in studies of past and present cultural landscape ecology because it allows vegetation/land-use relationships to be studied directly and simultaneously (Jongman *et al.* 1987).

Hauge similarly uses a descriptive phytosociological approach as a basis for vegetation mapping, monitoring and restoration of a small, typically steep meadow-forest area in western Norway. He combines these phytosociological data with historical information about past agricultural use to formulate a management plan for the area, involving traditional land-use, restoration of buildings, terraces and irrigation ditches, and tree pollarding. *Austad* describes and illustrates the diverse pollarding practices within different woodland elements of the cultural landscape mosaic in an area of western Norway where pollarding still continues, but as a rapidly dwindling part of the agricultural economy. She draws on her extensive field observations, discussions with farmers and documentary records to present insights into how almost all trees were harvested to their fullest as a source of winter fodder for animals and of wood products. Such intensive exploitation

must have considerable ecological impact at the landscape scale.

Rackham reviews the traditional methods of woodland and tree management in the British Isles and highlights the strong differences in tree utilization between the British Isles and, for example, western Norway presented by Austad and Hauge. By utilizing ecological, palaeo-ecological, archaeological, documentary and dendrochronological evidence, Rackham traces these fundamental differences back to important historical, ecological and climatic differences. The latter, for example, result in the overriding importance of collecting adequate winter animal-fodder in western Norway compared with the British Isles. The traditional uses of trees and woodland in Britain - woodland, wood-pasture and non-woodland trees in hedges - appear to date back to Anglo-Saxon times at least, if not to Celtic times. The British tradition of being "a nation of shopkeepers rather than peasants" has resulted not in local self-sufficiency but in trade, regional specialization and communication, in contrast to the remarkable self-sufficiency of isolated areas in western Norway.

A recurrent theme of all these chapters is the problem of preservation and maintenance of traditional cultural landscapes in the future, whether the landscape be woodlands, meadows or a mosaic of both. As Hughes & Huntley emphasize, conservation of the cultural landscape is not solely nature conservation, as it requires preservation of traditional land-use practices, buildings, walls and other components of the landscape mosaic, and of traditional ways of life. *Kirby*, a professional conservationist, discusses the very real problems of preserving traditional woodland management in Britain. He emphasizes that social and economic conditions are not the same today as when many traditional practices developed. He raises the key question - why do we wish to maintain traditional practices? Is it for purely historical or cultural reasons (e.g. Hauge's ecological museum and Hughes and Huntley's museum) or because of what traditional management produces in way of landscape features, including biota, aesthetics, etc.? If the latter, Kirby suggests that similar end-results could be achieved more easily and more economically with new management techniques than by re-introducing traditional practices. These are fundamental philosophical questions facing everyone concerned about cultural landscape preservation, and answers to them are required before embarking on management and preservation plans. In all probability, the answer will vary from place to place and from person to person!

Moving from the fine-scale of landscape elements to the cultural landscape as a functional whole, *Indrelid* discusses a single beautiful fjord-valley in western Norway. He shows how the farms in this valley are situated in 3 distinct topographical settings, each with its own agricultural advantages and disadvantages. He describes the basis for subsistence on farms in such an extreme topography as a steep west-Norwegian fjord and discusses the critical importance of infield and

outfield, and summer farms at or above the altitudinal tree limit. By analyzing historical records for farm economics in the last century, Indrelid shows how essential mountain summer farms were in providing fertile pastures for the period when the next winter's fodder was being grown in the infields and outfields. These records also show the importance of leaf- and shoot-gathering as winter animal-fodder. An important lesson for landscape ecologists from Indrelid's chapter is the need to consider the entire functional culture landscape rather than parts of the mosaic if the ecology of the landscape is to be understood.

Spectacular rates and extent of change in cultural landscapes are reconstructed from aerial photographs and computer cartography for southern Sweden by *Ihse* and from LANDSAT imagery for two areas in Hungary by *Lóczy*. Both chapters illustrate the complexity and challenge of documenting and interpreting changes in cultural landscapes. Ecology at the landscape scale involves interactions with descriptive community ecology, historical ecology and palaeoecology, geomorphology, archaeology, population dynamics, historical geography, pedology, sociology and ethnology.

There is more to cultural landscape ecology than description and documentation of patterns in time and space. There is consideration of underlying causal processes. Several chapters consider, in part, the interaction between patterns and processes (e.g. Austad, Hughes & Huntley). However, the 3 chapters by Emanuelsson, Olsson, and Dodgshon are explicitly process-orientated, *Emanuelsson* presents a model that relates human exploitation of the landscape to population size and soil nutrients, and emphasizes the critical importance of inorganic nutrients from manure and fertilizers in food production at different technological levels and of ecological control. The latter concept suggests that it is easier to maintain the *status quo* than it is to regain it, a lesson all concerned with landscape management should not forget. The interaction of nutrients, ecological control and climate can result in important geographical and temporal variations in land-use within a given technological level. This model requires careful testing both in space and time by means of quantitative ecosystem and palaeoecological studies, respectively. It has the potential of providing a much-needed conceptual basis for interpreting spatial and temporal patterns in cultural landscape development (e.g. regression periods) in simple ecological terms.

By combining the approaches of ecosystem ecology, historical ecology and historical geography, *Olsson* attempts to derive nutrient budgets and estimates of nutrient-use efficiency in the 18th century for two contrasting villages in southern Sweden. She shows that annual yield was greater with three-course rotation than with two-course rotation and that in terms of required manure and available space, the former was considerably more efficient. When these local-scale estimates are considered within the regional environment, geological and edaphic

factors appear as the major controls on agricultural development and patterns in the 18th century. *Dodgshon's* chapter reminds us that the cultural landscape consists not only of plants, vegetation, soils and manure but also of humans who similarly can have an idiosyncratic behaviour and complex ecology. He links ecology, agricultural history, sociology and economics to explain the patterns of farming in extreme marginal habitats in the Scottish Highlands in the 16th-19th centuries. These patterns with the development of outfields in the 16th century can only be interpreted against a back-cloth of population growth, a closed society and intensive use of labour. This chapter highlights the problems of interpreting changes in cultural landscape patterns solely in terms of conventional ecological factors.

The 11 chapters in this Part reflect the diverse approaches currently being used in the description, documentation and interpretation of present-day cultural landscape patterns at a variety of scales. They also illustrate the problems of understanding underlying processes over periods of 100-400 years. Such understandings are required today not only for achieving effective preservation of cultural landscapes in the future but also as analogues for interpreting changes in land-use practices over the long, palaeoecological time scales of 1000-5000 years that are considered in Part 2.

Tree Pollarding in Western Norway

Ingvild Austad

Introduction

In a strongly seasonal climate with a non-productive winter season, populations must store provisions for the lean periods. When people started to keep animals for domestic use (meat and milk production), winter fodder had to be provided for cattle. In almost all Norway, the winter is too cold and too long to allow cattle to graze outside throughout the year. Large quantities of fodder are required for the winter. The practice of collecting twigs and leaves for domestic animals is probably the oldest form of fodder harvesting. In contrast to collecting hay, which requires sharp sickles or scythes and a highly developed metallurgical technique, leaf fodder can be collected without tools (Reinton 1976). However, iron tools make such harvesting more efficient. Special knives, very similar to those used today in western Norway, have been found in archaeological deposits of Late Viking Age (Fig. 1). Material finds and illustrations in books, manuscripts and paintings from Medieval times back to the Iron Age show that this practice was common in much of Europe (Andersen 1985, this volume; Troels-Smith 1960), although perhaps not in Britain (Rackham this volume).

Information from preliminary work on new taxes in Norway from 1863 suggest that this management type was then common and widespread. This practice affected both the ecology and scenery of the cultural landscape.

Tree utilization was a result of experience handed down over generations. Combined utilization of different tree products (not only fodder), or the use of trees in particular ways throughout a season or life span can be found. All species of deciduous trees were used for animal fodder, also *Pinus sylvestris*, *Juniperus communis* and *Calluna vulgaris*. Although cutting trees for collecting animal fodder was widely practised in Norway, the choice of species, technique and utilization varied from area to area, as did the special names given to tree management. This chapter concentrates on pollarding in the fjord-districts of western Norway, mainly Sogn og Fjordane county.