

# Thinking about the environmental history of Scotland and Denmark since 1600

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## Introduction

I need to begin these remarks with a confession as to my own very incomplete knowledge of the state of environmental history in Denmark. I have read, with great attention, the work of three Danish scholars whose focus has been on the period since 1600: Thorkild Kjærgaard, whose book, *The Danish Revolution 1500-1800: An Ecohistorical Interpretation* (1994), I found stimulating and provoking – particularly the first half – though I believe that many Danish historians now regard it sceptically; Bo Fritzboøger, *Kulturskoven: Dansk skovbrug fra oldtid til nutid* (1994), which I read rather slowly as my Danish needs improvement, but with great care as I myself am engaged on a history of Scottish woods: it is surely a model of what good woodland history can be; Kenneth Olwig's work on the Jutland heaths, *Nature's Ideological Landscape* (1984), which (taking an approach that owes much to modern American geographers), dealt with the changing meaning of a landscape particularly evocative to Danes.

To this I must add works on the history of biodiversity. Bernt Løppenthin, *Danske ynglefugle i fortid og nutid* (1967), was a pioneering study of Danish bird distribution since the last ice age; recent works have been in the "atlas" tradition pioneered in Britain, such as Michael Borch Grell, *Fuglenes Danmark* (1998), Michael Stoltze, *Danske dagsommerfugle* (1996), and Ole Fogh Nielsen *De danske guldsmede* (1998). As studies of birds, butterflies and dragonflies they concentrate on the more recent past.

I am aware that there must be many Danish scholars in these and other aspects of the multi-faceted subject of modern environmental history

of whose labours I am unaware: but at least my ignorance gives me an excuse to start by proposing four areas where we could look at Danish and Scottish experience in parallel – the history of soil fertility in organic agriculture, exemplified by Kjærgaard; the social and cultural history of woodland use, exemplified by Fritzbøgger; the history of attitudes to nature and landscape, exemplified by Olwig; and species history. In each area it seems to me that there is scope for fruitfully comparing and contrasting Scottish and Danish historical experience, possibly even for formal joint research programmes between scholars in each country.

## 1. The history of soil fertility

To put it very simply, the Kjærgaard thesis is that Danish agricultural soils were suffering from acute and accelerating stress on the eve of the great agrarian reforms of the eighteenth century, caused essentially by deforestation since the sixteenth century, rising water tables and nutrient depletion: the introduction of red clover saved the day by restoring accessible nitrogen, assisted by other aspects of the agricultural revolution such as better drainage, cheap iron ploughs and a rationalised policy of woodland conservation. I confess to having doubts as to whether the cause adduced by Kjærgaard is sufficient and I see his contribution also within a context of British debate on medieval English history and the so-called Postan thesis, which raised the question as to how far the manorial fields were suffering from exhaustion as early as the fourteenth century. This problem has recently been addressed by a group of scholars working on Cuxham in Oxfordshire, analysing chemical inputs and outputs from the wonderfully detailed English agricultural records, and concluding that if there was a problem with manorial sustainability it was probably related rather to phosphorus than nitrogen.

Kjærgaard's work struck a chord for me, contemplating the shortcomings of Scottish agriculture at the start of the eighteenth century. His argument implied that seventeenth-century Denmark was poor and getting poorer, because it was an agrarian country depending largely on subsistence farming and there was a deteriorating soil base to support it. But Scotland was poor and evidently getting poorer, too – it probably had a greater rate of emigration than any other seventeenth-century European state; its wage rates were stagnant or falling



for a century after 1650; the people's diet between 1600-1750 contained less meat and more oats than before, which most people would regard as a fall in the standard of living even if it may imply healthier eating habits. What if Kjærgaard's argument could be applied equally to Scotland? In this case, recent deforestation was implausible, but a long-term failure in sustainability in peasant agriculture (particularly on marginal lands) was not. Often, observations on the poor performance of Scottish farming by later eighteenth-century agricultural improvers have been put down to their wish to emphasise their own achievements by denigrating the practices of their forerunners, or alternatively explained as the description of a husbandry not needing to improve output above subsistence since the market was not available to dispose of a surplus. But it may be that such accounts simply describe the shifts of a peasantry unable to do better on a stressed and deteriorating soil. Clearly the Scots (like the Danes) very successfully cured the problem in the later eighteenth century, and red clover was again an important part of the explanation, though liming and other calculated forms of soil improvement probably deserve at least equal weight. Since the soil of most of Denmark is basically calcareous and that of Scotland largely acid, the emphasis on lime in Scotland is understandable.

The problem lies in proving any thesis relating to nutrient depletion in soil. How do we know whether Danish or Scottish soils at the start of the eighteenth century contained less nitrogen, potassium or phosphorus than earlier, or if later soils contained more? The kind of input-output analysis carried out at Cuxham – and even that was suggestive rather than conclusive – certainly cannot be done from Scottish farm manorial or state documents, and I doubt if it could from Danish equivalents. Can archaeologists and soil scientists come to our rescue by the scientific analysis of buried soils, for example beneath datable buildings and enclosure walls? Can we find representative and datable soil profiles of the seventeenth and eighteenth centuries, and compare both their structure and chemical analysis? I put this question to my friend and colleague Professor Donald Davidson of Stirling University, who replied that it had never been done before but that it was not necessarily unfeasible. Most work on buried soils has been related to prehistory, but Professor Davidson's own detailed work on the medieval and early modern soils of Shetland and Orkney is paralleled to a degree by work on similar medieval plaggan soils in the Netherlands and in Denmark (by Professor Stoklund among others) and shows the potential for ap-

plying this science to historical problems. Investigations at a single site like Papa Stour, where undisturbed soils around an ancient farm settlement can be located, and shown to have been deepened and enriched for centuries, are necessarily different from investigations of a range of sites occurring almost by chance in the landscape under walls and buildings. Problems of typicality and sampling would arise: but nothing ventured, nothing won.

## 2. The social and cultural history of woodland use

Here one is struck equally by contrasts and similarities of national experience to which Professor Jeff Maxwell has already alluded, and a rich field for comparative environmental history suggests itself.

In both countries, in the first place, there was a gradually increasing sense from the late Middle Ages that there was a need for more wood cover, and for that which existed to be better treated. In Scotland, this manifested itself in desultory legislation enjoining owners and tenants to plant trees and threatening punishment for damaging plantations, between the fifteenth and the seventeenth centuries, which failed to prevent a steady decline in woodland cover until it reached, probably, a low point of about 4% of the land surface in the middle of the eighteenth century. By then, however, though the state had ceased to concern itself in the matter, individual improving land-owners had begun to consider the reforestation of Scotland as a kind of patriotic virtue. The history of Scottish forestry in the modern sense begins with the writings and plantings of such nobles as the Earl of Haddington in the 1730's and the strenuous efforts of the Duke of Atholl later in the century – he who not only introduced the larch to silviculture, but allegedly fired cannon loaded with tree seed bombs, to burst on the inaccessible precipices of his estate. Meanwhile, throughout the country, landowners responded to rising prices for charcoal and tanbark by unilaterally excluding peasant animals from their broadleaf woods, and introducing relatively sustainable regimes of fencing and cutting coppice on rotation. In the nineteenth century, the landowners were patrons of the great seed collectors and explorers like David Douglas, who alone was responsible for introducing from North America the Sitka spruce, lodgepole pine and Douglas fir, the three most valuable exotic species in modern forestry in northern Europe. Individual lairds themselves often



went to great personal efforts to re clothe their lands in trees, but, thanks to the decay of the old coppice system as prices sank for charcoal and bark, at the end of the Victorian period it is doubtful if there was any more land covered in wood than there had been around 1750. It was left to the twentieth century, and to the example set by the Forestry Commission established by government in 1919, to increase the proportion from 4% of the land covered by wood to the 19% at which it currently stands.

The situation in Denmark is interesting because of the more serious and sustained intervention by the state from a much earlier date. Although even at its nadir the extent of woodland cover was probably a rather larger proportion of the land surface in Denmark than in Scotland, the sense of a crisis in wood supplies was much greater in Denmark. As early as 1681 it was forbidden by law to convert Danish woods to any other use – this, of course, does not mean that such conversion did not happen thereafter, but a statute of this sort was quite without parallel in Scotland, then or later. In the eighteenth century the leadership in modern forestry was associated with the so-called Gram-Langen reforms on crown land, encouraged by the great noble bureaucrats like Reventlow but essentially state-led rather than estate-led. The critical statute of 1805 altered the basis of woodland law, abolished rights of wood pasture, and in many respects put the landowner in the driving seat in forest management. Yet it also constrained what he could do in important ways: it was declared, for example, that all areas with mature trees (*overskov*) in 1805 should remain wood for ever, (a more effective repetition of the 1681 act). Danish law also protected the rights of public access to private woods: in Scotland, the purported and traditional “right to roam” is claimed over open land, but not over wood.

So one interesting question for comparative forest history relates to the relative role of the state in Scotland and Denmark. It is tempting to argue that the political ideology of the land of Adam Smith was different from that of the land of Count Reventlow, but that would be too superficial if only because Smith’s free trade ideology hardly took root in Britain before the middle of the nineteenth century.

I would like to suggest two better reasons. The first is that the need for wood always had much greater urgency in Denmark than in Scotland. Scotland did not really have so urgent a need of wood for fuel – it was a land abounding in peat and coal, and only quite locally (for example on east Loch Lomondside) did peasants feel themselves to be

dependent on wood fuel. The biggest cities – Edinburgh, Glasgow – were black with coal-smoke from early modern times. Even the demand for charcoal for the eighteenth-century iron industry was trivial compared to further south – the Forest of Dean and the Weald in England supported several times as many blast furnaces and forges at any one time as the whole of Scotland. For Denmark, on the other hand, wood was often the only practicable fuel available, apart from, in places, inferior turf. Certainly wood was the only fuel possible to warm most people in Copenhagen, and the law of 1805 was triggered by a panic over a fuel shortage in the capital the previous winter.

Then there was the question of ship-building wood. Given Scotland's scrubby west-coast oak and knotty pine, England had more or less written her off as a supplier of naval stores, after experiments in the seventeenth century. The building of the frigate *Glenmore* from Speyside pine in the 1780s was not repeated again by the Royal Navy after its one serious eighteenth-century venture into the same matter. So Scotland was under no pressure to produce military timber, though patriotic lairds in the Borders encouraged by their neighbour Admiral Collingwood planted, after Trafalgar, avenues of what are still referred to in that region as "Collingwood oaks". In Denmark, the Admiralty traditionally reserved oaks in royal forests for building warships (it was still reserving 3,000 in 1965), but in practice most naval timber came to Denmark from its dependency in Norway. However, when the Norwegian part of the realm was handed to Sweden in 1814, the Danish state began again to take very seriously the need to grow its own naval timber, not of course foreseeing how quickly technology would change. So the intervention of the state in Danish woodland history is partly explained by the greater importance of wood as fuel and as military supplies compared to Scotland.

It is also explained, I suggest, by the different ownership position of woods in Denmark and Scotland. In Scotland the legal situation was simplicity itself: the landowner owned all the woods, and ordinary tenants, while they might by tradition be allowed to pasture their animals in the woods, to cut firewood or fell branches and trees for building or for tool making, had absolutely no rights in law to carry out any of these activities. When, after about 1760, Scottish lairds decided, in the face of rising prices for charcoal and bark, to enclose their woods, evict the goats, cattle and sheep from them, and to sell to the tenants (if necessary) the timber they had simply helped themselves to before, they



needed no law to help them to do it: the lairds' *dictat* legally removed the traditions of centuries. In Denmark, by contrast, legal rights to wood were a mass of complexity. Some landowners owned them as absolutely as in Scotland, but a commoner situation was for the peasants to have legal rights both to pasture in the woods and to cut the understorey trees (*underskov*) but the lords had the ownership of the high timber (*overskov*). It is not surprising that, when pressure for resources was on, as it was in the eighteenth century, *underskov* was not allowed by the peasants to grow back to *overskov* once a tree had been felled by the lord, so control over the woods began to pass to peasants: in the lords' view, the forests were of course being mismanaged and kept as scrub. The only way out of this *impasse* was to change the law: the statute of 1805 extinguished grazing rights in the wood and effectively transferred control over wood management exclusively to the lords, though with quite generous compensation to the peasants, which allowed them under some circumstances to transform existing areas of *underskov* to pasture or to arable fields. The details as explained by Fritzboøger are complex, but the point is clear: the existing law was so complicated that the state had no option but to step in with statute to change it. There was no such need for a change in the law in Scotland, so the state did not become involved.

A further intriguing point of contrast is the right of access to woods in the two countries. In Scotland, once the landowner decreed the woods shut, no-one could enter them without his permission unless an existing right-of-way such as an old cattle drover's road crossed them, and even then the landowner sometimes attempted to deny access, especially when in the nineteenth century sporting rights became of significant value. Poaching and trespass became big issues. In Denmark, as I understand it, a long-standing right of access to the woods for recreation or to gather berries was enshrined in law, and landowners could only shut their woods for very specific purposes, such as on days when a shoot was actually taking place or when there was a high risk of fire in dry weather. In Scotland, therefore, the tradition of using woods for recreation is recent and poorly developed, except now on the Forest Commission's property. But in Denmark the tradition is old and very highly developed; Danes spend on average 30 hours a year in the woods, and twice as many Danes go to the woods (public and private) as to their public libraries, and four times as many as to their theatres. The relative cultures of woodland recreational use is something else to probe, measure and compare.

### 3. The history of attitudes to nature and landscape

Consideration of how the public perceive and use woodland leads very naturally to our third topic, focussed on Olwig's study of the changing attitudes towards nature and landscape encapsulated in the history of the Jutland heaths. Olwig's work should be read not only by historians and geographers but by everyone concerned in countryside and conservation planning in north-western Europe. The story it has to tell is at once fascinating, subtle and sobering. Very much to simplify, the broad expanses of the Jutland heaths were discussed in the eighteenth century in terms of a dispute as to whether their inhabitants were full of Gothic virtue because far from the corrupting city, or souls degraded by their savage environment and by their distance from a benevolent improving centre. The parallel between the contemporary Scottish debate about the Highlanders is obvious, and there are links and cross-overs. For one thing Montesquieu's ideas about the influence of environment on people were enthusiastically received in Denmark because he located the seat of primitive virtue in the northern environment of Scandinavia: but they also resonated in Scotland, where Macpherson's *Ossian* appeared to corroborate the notion of virtue nurtured in the Highland wilderness. Ossianic notions in turn resonated back in Germany and Scandinavia (as Dr. Fellows-Jensen has demonstrated at this meeting in relation to personal names like Oscar and Selma). At the same moment as some Danish intellectuals were planning the reclamation of the heaths, others were admiring them as cultural reservoirs of an ancient primitive and virtuous people, in the same way as the heaths' archaeological remains preserved traces of an ancient past. Again, the parallel with the Highlands, simultaneously praised as romantic and wild by intellectuals and subjected to clearance and improvement by practical men, is very close. The ambiguity of Walter Scott towards an area at once "the fairy ground for romance and poetry" and the "subject of experimentation for professors of speculation, political and economical", is paralleled in the ambiguity of Jutland's greatest writer, Steen Steensen Blicher, torn between admiration of the wild landscape and sympathy for the people who had to live in it.

In Scotland, the Victorian interpretation of Scott and the romantic poets enabled the visitor to emphasise the wildness of Highland Scotland and to forget all about the people: as the crofters disappeared, this became progressively easier to do, until the Highlands began to be seen



as wilderness almost in the American sense, full of lonely places where the urban soul could be refreshed by the solitude, or by the physical challenge of the mountains.

In Denmark there was no clearance from the heaths, though they were no less sheep country: rather, population increased unhampered. Blicher ultimately resolved the ambiguity in his own mind by opting for the people – but for the people in their landscape setting. In doing so, he created a new type of interest for the landscape, as embodying the history of its inhabitants – a cultural landscape rather than simply a wild landscape. This was to have an enduring effect both on the perception and on the later use of the heaths.

The nineteenth century saw enormous change in Jutland – under Dalgas and *Hedeselskabet*, the improvers won, and the heaths largely disappeared beneath conifer plantation and arable cultivation, part of a great nationalist effort to compensate by reclamation for the loss of Schleswig-Holstein to Prussia: “What is lost without must be won within”. But when in the twentieth century the wheel turned again, thinkers like Jeppe Aakjær condemned Dalgas and the improvers for class-biased, technocratic vandalism and demanded the preservation of what was left of the heaths as a cultural landscape, a memorial to a vanished people.

The Danish conservation movement in the twentieth century, like that in Scotland and elsewhere in the western world, has been inspired also by a perceived need to provide open space for recreation, and by nature conservation considerations. Olwig indeed has serious and relevant criticisms of Danish conservation that we will also recognise in Britain, especially that it has been overly based on the idea of reservations (so that biodiversity outside reserves has been allowed largely to degrade) and that conservation has mistaken nature for a given thing rather than an active process. Most of the heaths are now vanishing under regenerated trees since nature could not be stopped in its tracks because conservationists wished to keep the cultural landscapes of Blicher and Aakær.

Where I think the Danish tradition may differ, at least in emphasis, from the Scottish, is, however, in the importance accorded to the idea of a cultural landscape. In Scotland, we eventually managed to elide the countryside recreation and nature conservation interest in the care of one body, Scottish Natural Heritage, but we have left Historic Scotland alone to wrestle with the human past. Until recently, the emphasis in Scotland has been on archaeological sites rather than on cultural land-

scapes. Orkney is an exception, where the setting of the sites – perhaps because they are so numerous – has been accorded sensitive treatment. Contrast that with the setting of the stone circle of Callanish in Lewis or of Sueno's stone in Forres and Balfarg in Glenrothes, or (until very recently) the treatment of most Scottish archaeological sites by forestry planters, such as the larch planted over the astonishing Neolithic *cursus* known as the Cleaven Dyke. Countryside planning in Denmark has, in my judgement, succeeded far better than its equivalent in Scotland because it internalised, early in its development, this idea of a cultural landscape as an integral part of the total man-made and natural heritage that needed to be preserved; and the Danes legislated accordingly.

## 4. Species history

Finally, it is worth taking a glance at the history of biodiversity. What impact have human economic activities and presumptions about nature had over the last four centuries over some of the other species that occupy or occupied Denmark and Scotland? Løppenthin's work on birds is one of the few in either country to attempt a long perspective on this for any group, though in both countries there are now well-based studies on changes in bird distribution over the last half century. Stoltze and Nielsen's studies of insects take a shorter timespan, dividing distribution maps into records before and since 1990, and there are comparable studies in the UK. Reading all this literature carefully, one is again struck by both similarities and contrasts. Some are no surprise at all. We would have expected, and we find, in both countries a decline in the birds of arable fields, such as skylark, corncrake, corn bunting and grey partridge, and a decline in the birds of farm wetlands, such as snipe and redshank, in the countrysides of agrichemicals and deep drainage that have arisen since 1945. We would have expected, and we find, in both countries, a decline in the birds of freshwater marshes, such as the bittern and the crane, but also that it would be greater in Scotland than in Denmark because even more of this habitat has been lost: both the bittern and the crane have been extinct in Scotland for two centuries or more, but both still breed in Denmark.

We would probably have expected birds of prey to decline sharply in both countries after about 1830 with the perfection of the modern shot-gun and its cartridge and the fashion for game preservation, and probably that there would be a limited recovery in the late twentieth century



as attitudes towards raptors changed. In Scotland the intervention of people was needed to reintroduce the goshawk, the red kite and the sea-eagle, but in Denmark they spread or reintroduced themselves. What seems peculiar to Scotland, though, is the continued, widespread and now illegal persecution of raptors by gamekeepers: this is a function of a long history of untrammelled power by landowners in Scotland, many of whom still consider themselves above the law in the management of their estates, while in Denmark they were long ago brought to heel.

One would expect birds of open country like the golden plover to do badly in Denmark once the heaths were enclosed. The severe decline since the eighteenth century of certain upland species in Scotland, like the ring ousel, needs more explanation: the open habitat is still there but now much degraded by overgrazing. It is intriguing, but mysterious, why both in Denmark and Scotland the woodcock was hardly known as a breeding bird before the nineteenth century, though it is quite common in both countries now. Other species that seem to have been long and firmly established in Denmark, such as the goosander and tree sparrow, probably also only arrived in Scotland in the nineteenth century: perhaps both they and the woodcock represent colonisation pushing from the east, like the collared dove in our own century. The spread of the goldcrest over much of Scotland dates from the late eighteenth century, half a century before its arrival in Denmark: this may be connected mainly to the differential spread of conifer plantations in the two countries. The starling appears always to have been common in Denmark, but in the late eighteenth century was absent from most of Scotland after having perhaps been more numerous earlier, before making a remarkable comeback in the first half of the nineteenth century and now being rapidly on the decline again. Species history of this sort is full of conundrums, but across Europe we would probably understand more about biodiversity change if we could properly correlate such individual stories.

When we come to insects, I confess myself largely baffled. The standard Scottish book on butterflies suggests decline this century for perhaps half a dozen species – small blue, northern brown argus, marsh fritillary, pearl-bordered fritillary and wall: some – orangetip and ringlet – are making up ground lost in the nineteenth century, perhaps as air pollution decreases. In Denmark, however, where the butterfly fauna is in any case considerably more varied, the majority of species are sharply contracting their range and several have become extinct. The evidence for dragonflies, though less clear, seems much the same. In

Denmark, with a comparatively rich fauna in both groups, many species which were formerly widespread have in recent times rapidly declined, and appear to have vanished from former sites. Some have become extinct. In Scotland, a more restricted fauna has apparently suffered less.

For both groups of insects, there is a greater similarity between the situation in Denmark and England than between Denmark and Scotland, and perhaps the explanation may be the same: habitat there is more fragmented than in Scotland, which still has large stretches of continuous semi-natural habitat in the uplands. The isolation of sites results in all the problems of island ecology where small populations are subject to inbreeding and are difficult or impossible to refresh genetically from outside. What we see happening to butterflies and dragonflies must be reflected in very many other invertebrate groups, if we knew enough about them.

Then there is the whole question of how species history can illuminate wider problems of modern concern, such as global warming. The collection of data to construct a time-series is recognised as of critical value as a monitoring device. While it is not reasonable to expect historians to be able to uncover much in the way of detailed time-series from earlier documentary sources, they can sometimes give an outline that goes back much further than our current anxiety over climate change. The immigration of southern species is obviously a case in point; it has been a feature of at least the past century and a half that some southern or south-eastern species of birds have been pushing north. The pochard, for example, arrived both in Scotland and in Denmark around 1850: the black-necked grebe bred first in Denmark in 1872, in Scotland in 1930; the golden oriole arrived in Denmark around 1850, the black redstart around 1870, the serin and the short-toed treecreeper around 1950 – none of these have yet colonised Scotland, though two have established themselves in England.

Among insects, the dragonfly *Aeshna mixta* is a good example of a species that has pushed north in Denmark since the beginning of the century, as indeed it has in England, but, again, not yet made it to Scotland. The best explanation of all these range expansions is recovery from the Little Ice Age, that period of cooling in European history that reached its nadir in the seventeenth century. Some of the invasions are evidently recolonisations – the golden oriole in Chaucer's day had a vernacular English name, the 'woodweal'. This is not to deny the reality of modern global warming, of course, merely to point out that envi-



ronmental history can show how it is superimposed upon another trend of rebound from a period of global cooling.

On the other hand, in the last half century Scotland has been colonised by small numbers of a group of characteristically northern Scandinavian birds, including redwing, wood sandpiper, purple sandpiper, Temminck's stint and goldeneye. One explanation here, especially since few of the colonists have shown much ability to spread and become numerous, apart from the goldeneye in Speyside, is that weather patterns on spring migration since the 1960's have led to more easterly winds in May (the so-called blocking anti-cyclone) which has deflected small numbers of Scandinavian birds in breeding condition into Scotland, where they have nested, in marginal habitat and only with limited success. The swings and roundabouts of species history certainly cannot be interpreted solely by a model of recent anthropogenic climate change.

## Conclusion

I hope I have done enough in this brief presentation to encourage you to agree that there are interesting questions in environmental history where a Danish/Scottish comparison is relevant. I am very aware of how much I have omitted by constraining myself to the last 400 years. Had I for example, gone back into the realm of prehistoric archaeology, of palynology and dendrochronology, we should have been here all morning. Both in that earlier time, and in the later period, with which I have been dealing, it is abundantly clear that there are areas where scholars in the two countries can work in parallel, perhaps even in partnership, to illuminate larger problems than we could solve if we worked in isolation.

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