FORESTS AND PEOPLE IN IRELAND'S STONE AGE

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Abstract

The impact of human activity as the dominant factor in explanations of woodland change is examined mainly in the prehistoric period. The human woodland experience is considered from an archaeological perspective from Mesolithic times onwards. The practical problems of the initial colonising of an island with an ecosystem unknown on the mainland from where the colonisers originated is examined and the impact of the forest on human settlement for the initial four thousand years of settlement is indicated. In the subsequent prehistoric periods the main issue considered is the anthropogenic impact put forward as the explanation for specific and general forest species decline and recovery. The fact that forest decline and recovery seen in many pollen diagrams coincides with clearly identified human settlement leads to the anthropogenic interpretation implicit in the term "landnam". The possibility that cause and effect may have to be reversed in some cases, i.e. that forest change led to human occupation rather than the explanation that human impact led to forest decline will be considered in the light of research in Co. Mayo.

Main text

The relationship of people to the forests of Ireland is one, which is well recorded, in our written history. For the prehistoric period the relationship is established in a more indirect way and often as a result of collaboration between a number of disciplines involved in studying the past. Indirectly, we can study the human connection with the forest by the surviving evidence for exploitation of the resources of the forest both faunal and floral. In the earliest prehistoric period in Ireland, as on other contemporary European sites the frequent survival of hazelnut shells as food debris is not necessarily an indicator of the dominant importance of this source of nutrition. It could be seen as an indicator of the likely exploitation of a whole range of forest food, which could not have survived in the same way as charred hazelnut shells can. While wood will not normally survive from this time, evidence for the use of wood in structures can be found in the survival of postholes. In the later Stone Age, tools used for woodworking, in particular the enormous quantity and sophisticated manufacture and trading enterprises associated with artefacts such as polished stone axes do show the importance of forests and wood in the Neolithic.

This paper raises some new questions about the human relationship with the forest during the Irish Stone Age covering the two periods, Mesolithic and Neolithic, a time span of about six thousand years ending at about 2500 BC. The main issue raised for the Mesolithic period is the likely problem faced by the earliest settlers to come to Ireland. The well recorded impoverished flora and fauna of Ireland is often contrasted with the greater range of species found on the adjacent island but which in turn is relatively impoverished compared to mainland Europe. But to view Ireland thus is to miss the much great differences between the two islands in both their natural and human histories.

The present island of Britain is less than nine thousand years old (Coles, 1998). Prior to that, on numerous occasions, the land mass was part of a peninsula of Europe joined along a broad front from Yorkshire to Denmark and form west of Dover to west of Calais (White & Schreeve, 2000). Towards the end of the last ice age as the ice retreated northwards, forests that had survived in the southern Europe expanded

northwards and with them the forest animals and human populations of hunter-gatherers who exploited the resources of those forests. The man/animal relationship of predator/prey, which occurred on the pensinsula of 'Britain', was merely a continuation of the same relationship which would have existed for tens of thousands of years further south in Europe. Other than for those in the immediate vicinity of the south-eastern coast, the final severing of the land bridge, which created the island of Britain, would have had no observable significance. Slower colonising flora would continue to extend northwards and would now be blocked by the English Channel but in terms of forest colonising, the main tree species had expanded onto the peninsula of 'Britain' before the land bridge did have an unexpected impact in the way in which it seemed to sever connections between human populations on both sides of the Channel. We know from evidence from sites such as Star Carr (Clark, 1954) in Yorkshire and from the presence of Mesolithic remains on off-shore islands off Britain's west coast (Mithen, 1999) that communities of Mesolithic hunter/gatherers had a knowledge of navigation at his time, yet the newly formed Channel seems to have created an impassable barrier to human contact for well over a millennium (Jacobi, 1976).

The hunter/gatherers of the forests who expanded with the forests and their animals northwards onto the peninsula of 'Britain' would have encountered an indigenous population descended from Palaeolithic populations. Evidence of Palaeolithic population groups which spread onto the peninsula of 'Britain' extend back to Lower Palaeolithic times of over half a million years (White & Schreeve, 2000). At periods during the depths of the various glacial periods much of the peninsula of 'Britain' was covered by ice and would have been uninhabited. The tens of thousands of Palaeolithic artefacts found for example in the Thames gravels, give some idea of the great antiquity of intermittent human settlement on what at present is the recent and ephemeral island of Britain.

Archaeological excavations at sites such as Thatcham (Wymer, 1962) and Star Carr show that the full range of large forest herbivores found in Europe were hunted for food. The largest animal was the aurochs or wild bovine, much larger than our domesticated breeds and with a male weight approaching a tonne. The next largest was the elk, an animal of over a quarter of a tonne in weight, with a wide spread of antler. A solitary animal, more a browser than a grazier, it can bend light trunks of young trees to get at the leaves on the higher branches. The third large animal is the red deer, with males up to 300kg and with a high and wide spread of antler. Together with these three, two other animals, wild pig of 100 kg and the diminutive roe deer of about 25 kg made up the main source of meat for Mesolithic forest hunters throughout Europe including its north-western peninsula. As young juveniles, these animals may have been at risk from predators such as wolves but once they reached maturity until weakened by old age, sickness or injury, they had no other predator other than hunters.

Information on the composition of the ancient forests is largely reliant on the pollen record but while this can tell us much about proportions and content it can tell little about the physical make up of the actual forest. The archaeological evidence for the exploitation of the suite of large animals listed above does allow certain conclusions to be arrived at in relation to the nature of the forest environment. The presence of these large animals means that the forest had to be permeable. Grazing and browsing animals must have been able to move from one clearing to another. As forests closed in and animals were restricted to narrower paths the heavy animals must have poached the ground into well-trodden plant-free paths. The aurochs, elk, and red deer all stand taller and have greater body width than their human predators with the head room for the elk and red deer maintaining high open tunnel avenues even through the densest growth.

It has been suggested by Mellars (1976) that Mesolithic hunters deliberately fired the forest in places to increase its grazing capacity or to create grazing traps to lure the animals to, though one has to consider the probability that fires maintained on a permanent basis in a forest environment would inevitably lead to accidental firing of the forest on occasion. At any rate, clearings whether deliberate or otherwise and no matter how large would have to be accessed through forest if continuous forest covered the landscape. Because of the presence of these large animals within the forest, we can be certain that routes through the forest by open paths from one clearing to another had to be in existence.

From many points on the west coast of the peninsula of 'Britain', Mesolithic hunters looked across at the land to the west. From Scotland, the Antrim and Down coastline was less than 30 kilometres away. Further to the south in Wales, the Dublin and Wicklow mountains though a greater distance away, were clearly visible. But while mountains on the skyline may have looked not different to the skyline of the inner Hebrides to the north or the Pennines to the east, there the similarity ended. The single biggest influence on the very important flora and fauna of Ireland compared even to Britain is the fact that the land bridge between this terminal peninsula of 'Ireland' and 'Britain' was connected at the northernmost end. Because of this, flora and fauna that would have found Munster as fertile ground in which to thrive, had to migrate through the horseshoe peninsula of what is now the north of England and south of Scotland and enter 'Ireland' at its most northerly. During the depth of the last glacial period when sea level was more than one hundred metres lower than at present as a result of the quantity of water tied up in the ice caps, access to 'Ireland' would not have been as straightforward as access into the south of 'Britain'. The extending icecap, which was the cause of the lowering sea level, now covered Ulster and Scotland so that the ice-free parts of 'Ireland' to the south were still cut off from mainland Europe, a period which allowed many more species of plants and animals to migrate into the peninsula of 'Britain' with no possibility of reaching the island of Ireland.

The end result of the last glacial period is that Ireland has an impoverished flora and fauna relative to Britain and mainland Europe. In the forests, the absence of tilia meant that the composition of the forest was inevitably different. However, from a human perspective, the absence of forest animals was of much greater importance than was the absence of certain tree species. There is no evidence in Ireland that aurochs, elk or roe deer ever migrated onto this land. Red deer are recorded in Ireland in the late glacial period but appear to have died out and are not recorded again until the Neolithic (Woodman *et al*., 1997). If red deer was also absent from Ireland then the question must be asked; were the forests permeable for human movement? This would not have been a problem in the early stages of post glacial expansion of the trees but as stands in open terrain expanded and merged, the stage of full forest cover with open clearings would have made travel on land exceptionally difficult if not impossible. If red deer were not present in Ireland at this stage, then the tallest animals moving in the forest were pig and wolf.

Sometime around then thousand years ago the first humans came to the island of Ireland. Apart from the contrasting natural world which greeted them, as compared to their straying onto the peninsula of 'Britain', there was a major cultural difference between the two environments. The land of Britain onto which the forest hunters strayed, was a land inhabited for over half a million years. The marks of that habitation and of an existing indigenous people would be visible in many ways. Smoke from distant fires, the quenched embers of old fires, the butchered skeletal remains of prey, broken and transported branches for shelter, struck flint or fully formed artefacts, all of these clues to an existing human presence and past would have been obvious to the newcomers.

Contrast then the arrival of the first people to arrive in Ireland, coming as they did as recently as ten thousand years ago. They did not stumble into here by wandering further north than usual in their hunt. The first to set foot on the island of Ireland had to do so as a deliberate act of navigation, of getting into a boat and setting out for the land across a stretch of water. As they approached the shore it may have looked similar to the shore they had left but arrival would have immediately made them aware of a difference. They had left a peninsula with half a million years of human history and they had now landed on a desert island. There were no embers, no smoke, no cut branches and no artefacts. Nor was there a landscape of known and remembered and named places and remembered routes from one named place to another. The total absence of a human presence or past must have seemed strange. Equally so must have been the reaction of animals and birds. The wild animals such as pig, wolf, fox or hare would never have seen a human before. Presumably they would have approached out of curiosity and from never before have to fear anything which was not in direct physical contact with them.

Two factors would have kept the newcomers close to the water's edge. The absence of a range of forest animals to hunt would leave people having to rely on plant food and on shell fish and ultimately on other fish. The impermeable nature of the forest would force people to use water as the main route for travel. This is exactly where one finds Irish Mesolithic sites, on the coast or beside rivers and lakes. This is in contrast to

Britain where many hunting camps are found high in the Penines where for example many of the sites are located above 500 metres. The emphasis on water resources and fishing is evident at the earliest known Mesolithic sites such as Mount Sandel (Woodman,1985) and Boora (Ryan,1980). The same emphasis on a fisher-gatherer economy continued into the Late Mesolithic where a particularly insular form of stone technology developed. While the emphasis on water resources is there from the beginning of the Mesolithic in Ireland it is only in the later stages of the Mesolithic elsewhere in Europe that the major shift from land to marine resources takes place. The Irish Mesolithic ended as it had begun four to five thousand years before with a clear emphasis on water-based resources and with no evidence that anything other than the forest margins near the water's edge was exploited during this period.

Around 4000BC or possibly even before this, new developments can be observed in the Irish record. An emphasis on land use begins to emerge in the botanical record. Three phenomena, namely the identification in the paleobotanical record, of pollen similar to cereal pollen, the differential decline of the pollen of elm and the more general decline of the pollen of trees followed by recovery are identified as anthropogenic and as such taken to be an indication of the beginnings of farming.

The first of these, the occurrence of cereal type pollen, I do not propose to deal with in this paper other than to observe that all occurrences of such pollen in pre-farming contexts should be fully noted, otherwise archaeologists and other non-specialists may attribute too much archaeological significance to the occurrence in a non anomalous context.

The second phenomenon is the differential decline of pollen of elm shortly after 4000 BC. From the discovery of elm leaves used as fodder on archaeological sites on mainland Europe and anthropological evidence for the lopping of elm branches as fodder it has been assumed by palaeobotanists that elm decline (often written as Elm Decline) is an unambiguous sign of the beginnings of farming. The close synchroneity of dates for observed elm decline in different parts of north-western Europe, left many archaeologists sceptical about the certainty of the anthropogenic origin of the phenomenon. Shortly before his death in 1978 the late Professor De Valera in his preface to the revised edition of 'Antiquities of the Irish Countryside' (O Riordain, 1979) suggested that the phenomenon might best be explained as a rampant disease similar to Dutch elm disease. While the view received little support at the time, there is now a general consensus that disease rather than human activity can best explain the phenomenon though some palaeobotanists still attribute special significance to the decline by continuing to designate it with capital letters.

Professor W. Groenman van Waateringe (1983) has proposed an alternative link between elm decline and the beginnings of farming by suggesting that the death of stands of elm as a result of disease would have profound effect on forest floor and under-storey vegetation wherever it occurred. In an otherwise closed forest with limited open space, stands of dead elm would offer a labour saving opportunity to animal herders or early cultivators of crops. This could explain the synchronous occurrence of archaeological evidence of farming communities and the elm decline but with a reversal of cause and effect. Instead of farming practices bringing about the decline of elm, the death of elm stands would have provided the conditions for the establishment of farming without the labour of felling or ring-barking the trees.

The third anthropogenic indicator in the pollen record is the more general decline of forest pollen to be replaced for a period by herbaceous pollen often coinciding with low levels of cereal-type pollen but with a subsequent recovery of arboreal pollen. This evidence, interpreted as 'landnam' or land taking was first thought to indicate a slash and burn form of semi-nomadic farming with onward movement after a short interval and the resultant recovery of the trees and therefore the arboreal pollen. Radiocarbon dating has shown however that the episodes represented by classic landnam phenomena are of much longer duration than was originally thought and periods of half a millennium or more may be represented by the entire episode. When the time period of the so-called landnam coincides with the dates for archaeological artefacts or monuments in the vicinity, the understandable inference is drawn that the decline of arboreal pollen and the rise of herbaceous pollen has been caused by farming activity. By reviewing the archaeological, palaeobotanical and radiocarbon evidence from North Mayo, it will be suggested that the Groenman van Waateringe explanation for the link between early farming and elm decline may also be an appropriate explanation for the landnam phenomenon in certain cases.

Two major programmes of archaeological research in North Mayo, one on megalithic tombs (De Valera & O Nuallain, 1964) and the other on pre-bog filed systems have indicated intensive settlement during the fourth millennium BC. This intensive settlement does not extend over the whole area because to the west of Belderrig, which is situated in the middle of the North Mayo coast, there is a major void in the archaeological record. This low-lying flat area is covered by deep bog and Radiocarbon dates for pine stumps preserved by the basal peat indicate bog growth by the seventh millennium BC, long before the beginning of farming in Ireland (Caulfield, 1983).

Palaeobotanical research carried out by K. Molloy and M. O'Connell (1995) on a deep core within Céide Fields identified a clearly defined 'landnam' phase where arboreal pollen dropped to low levels and grasses and other herbaceous pollen dominated. This in turn gave way to heather and a brief return to forest pollen before reverting to bogland species. The dates for the initiation of the tree pollen decline are uncertain but precede 3700 BC. The end of the phase dominated by grass pollen, which gives way to heather pollen, is more clearly defined between 3300 BC and 3200 BC. This is similar in date to settlement evidence dated on the site but dates in the immediate vicinity of the Behy megalithic tomb, which is located within the fields are some centuries earlier than this. The correspondence of archaeological and palaeobotanical dates for the 'landnam' phenomenon suggests that the decline in tree pollen is a reflection of the activity of farming communities clearing extensive tracts of pine forest and by building field boundaries, converting them into the open organised grasslands of the Céide Fields.

The certainty of the anthropogenic nature of the decline of arboreal pollen which the term 'landnam' implies is somewhat weakened by some results from a dating programme of pine stumps in and under the bog within or in the vicinity of the pre-bog field boundaries in North Mayo (Caulfield *et al.,* 1998). The dates for pine stumps growing in bog within Céide Fields are somewhat earlier than the pollen evidence for forest recovery and indicate that some of the fields must have been abandoned before 3300 BC. The most significant result from the dating of the pine stumps comes from Belderrig, seven kilometres west of the Céide Fields and from the Lacken area eight kilometres to the east. In Belderrig valley, on a low terrace just west of the Neolithic farm site, a pine stump with roots 45 cm above the mineral soil has been dated to circa 4500 BC, clearly predating the arrival of farming in the region. As the location is not in a low lying basin it suggests that peat formation is underway in the area just as had been assumed for the void in settlement to the west of Belderrig. To the east of Céide Fields on a plateau just west of Killala Bay, a pine stump in peat has been dated to circa 2600 BC. The roots of the stump are 1.4 metres above the mineral soil. Close by a second stump dated circa 3200 BC is 1.8 metres above the mineral soil. While the basal peat has not been dated at this location, it is highly unlikely that this depth of peat could have accumulated at this location in the time since the arrival of farming.

The indications emerging from these dates suggest that the early formation of bogland was not confined to the area west of Belderrig but was of much more widespread occurrence and predates the arrival of farming in the area. When the Belderrig and Lacken evidence for early peat formation is considered, the so-called 'landnam' within Céide Fields could be open to an alternative interpretation. If the pine forest was under stress and already beginning to disintegrate as bogland became established, the area could have provided inviting grazing land without the necessity for major forest clearance. Like Groenman's explanation for the coincidence of elm decline and the evidence for farming, the failure of forest due to natural causes such as climate change may have been the catalyst for the extensive spread of farming throughout the area rather than farmers being seen as the cause for even the temporary decline of forest.

It may well be that during the Irish Stone Age, the forest influenced human activity more than human activity affected the forest.

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