60-second Interview

Prof. Kevin Edwards, Chair in Geosciences, University of Aberdeen

You are well known as an environmental archaeologist and have made a huge contribution to our understanding of environmental change throughout Scotland's past. What originally drew you to environmental archaeology?

I was studying Quaternary Science as part of my Geography degree at St Andrews University and we were taken to a peat bog in Fife where we removed a long vertical core of peat and underlying clays. The distinctive bands of material were clearly visible and we were told that the clays were part of a water-lain glacial deposit, and the peat represented the slow accumulation and break-down of vegetation which had grown on the bog through the postglacial up to the present. The fact that so much information could be gained from what was, essentially, a column of soggy earth, fascinated me – it was a time capsule in front of our eyes.

I learned that such evidence of environmental change could be dated using radiocarbon for instance, and that comparisons could be made with archaeological evidence in which I already had an interest. This developed into a fascination with human-environment interactions through prehistory. I wondered to what extent it was possible to detect people, and their activities, in the distant past, through the evidence being investigated by environmental scientists. In essence, this is the basis of environmental archaeology – the study of people along with remains of associated plants, animal bones, soils, insects and anything else that can assist us in such investigations.

'Environmental Archaeology' is a broad field; which areas interest you in particular?

Pollen analysis is my particular area of interest, that is, the study of pollen grains preserved in peat, lake muds and other deposits including the soils of archaeological sites. As plants have unique, recognisable pollen grains it is possible to determine which plants were growing in an area by studying the pollen preserved in suitably accumulating strata. Knowing which plants grew in a place, in turn, tells us about local environmental conditions, such as soils and climate. The changing patterns of, say, woodland, herbaceous and agricultural pollen types upwards through a core enable us to reconstruct both the environmental and human influences upon the local vegetation at a site. One might see cold arctic floras giving way to the spread of trees as conditions warmed and soils developed, followed by woodland removal for crop and pasture growth, and then the spread of peat as soils deteriorated and the climate became wetter and cooler, and so on. The pollen provides us with 'proxy' evidence, where the preserved physical characteristics of the past replace the direct presence of the original. Interpreting the pollen profile is like having access to a Rosetta Stone and a time machine. Elegant and mind-blowing at the same time!

What pollen-analytical findings from Scotland have excited you most?

I have worked a lot in the Western and Northern Isles where there is good pollen evidence for heathland expansion and woodland clearance, including the use of burning, in the Mesolithic. This was known long before there was any archaeological evidence for human settlement in either area so early in prehistory. We now have archaeological evidence for Mesolithic people in Harris and in Shetland, and the environmental record was a good sign-post for their presence, challenging the archaeologist to find the confirmatory evidence for hunter-gatherers.

A less dramatic example comes from Aberdeenshire and Fife, where there has been a series of studies involving integrated pollen, sediments and radiocarbon chronologies. In these areas the palaeoecological record shows strong patterns of woodland reduction, cereal cultivation and accompanying landscape damage. In some instances, the environmental disturbances, such as soil erosion and the creation of lowered biodiversity over the last two centuries, can be as great as that over all of prehistory put together.

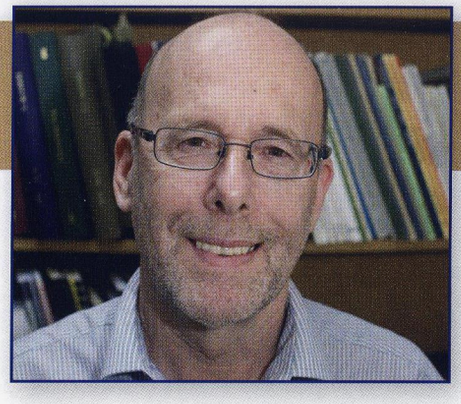
You have spent much of the last decade working in the North Atlantic region. What was the rationale for this new area of interest?

I was interested in the Vikings and the pristine areas of the North Atlantic, such as the Faroes, Iceland and Greenland, as an analogue for the early Holocene and the Mesolithic in Scotland. I wondered what the evidence from these areas could tell us about the impact of early peoples on a previously untouched land. However, I soon became interested in the North Atlantic area and the Norse in their own right. I was involved in producing highly detailed evidence from pollen, insects, soils, dating and climate change, providing approaches for potential applications elsewhere, including Scotland. If we can understand the 'clues' left by the first settlers in the North Atlantic, we can look for similar ones in Mesolithic Scotland.

Can you explain how environmental studies help us study climate change, and does archaeology have a role to play in this?

Apart from pollen, plants reflect the climatic conditions necessary for vegetation growth and we also have entities such as tree rings, beetles, chironomids (non-biting midges), molluscs, sediments, ice cores and geomorphic features such as raised beaches which can all be used to assess climate change. Many of these proxy indicators are of a generalised nature, showing change over long or short time-scales. They are often 'off-site', as peat bogs and lakes are not necessarily the locations of past settlements. Archaeology has the benefit of giving lots of evidence at local scales, albeit for constrained time periods. There can be attendant problems – such as frequent hiatuses, when a site was not occupied, or in circumstances where no evidence was preserved. The benefit can be that we are dealing with the climatic and wider environmental context for human activity more directly than for more distant locations.

The difficulties of handling jumbles of sites and strata, and site taphonomy (factors affecting the preservation of materials such as bone, seeds and artefacts), present huge challenges. We get a lot further by combining both archaeological and environmental information, as the archaeological evidence shows how people and their lives have changed, while the off-site environmental evidence reflects more extensive environmental influences. Some examples of modifications to human activity brought about by climate change in prehistory include the movement of settlement downhill in the Bronze and Iron Ages; crop changes from wheat to barley or oats; soil deterioration and peat spread. What we



can't be sure about is the degree to which such environmental changes have exercised primary control over people's behaviour, either socially or economically. This remains an ever-present challenge, and inter-disciplinary approaches to research, where we integrate fully all the environmental evidence available to us, is likely to be the most fruitful way of tackling such questions.

What is most exciting about the future? Are major advances on the horizon and is archaeology likely to be a big player in future research?

I think more detailed climate evidence will come from tree-rings and other proxies, and that archaeological sites, especially waterlogged ones, which are fantastic for the preservation of evidence, can assist in providing such data. Isotope and related chemical information will furnish climate evidence as well as economic data in the sense of diet, and the geographical origins of people and animals. The findings from DNA – the genetic content of people, animals, plants and even pollen and sediments – will continue to amaze us, especially with regard to human, animal and plant dispersals.

Something the public doesn't often see is the sophisticated handling, statistical manipulation and computer modelling of very large data sets at scales from small regions to the continental or even global. These data sets will increasingly provide a context for past human activities and archaeology. As our knowledge base increases, then the study of environmental issues, as well as the study of archaeology, will draw upon this large body of evidence, as well as continuing to contribute valuably to it in terms of both past processes and future predictions. Whether environmental scientists, archaeologists, or anyone else can do anything to mitigate environmental effects or to change human behaviour, is, of course, another question!