



BRITISH NATURALISTS' ASSOCIATION

The History of Hooper's Hedgerow Hypothesis

Dr. Max Hooper

*A lecture given when Dr. Hooper was presented with Peter Scott Memorial Award 2004
at Hallsannery Field Centre, Bideford, Devon.*

I'm not sure I can adequately convey my thoughts and feelings on the honour you have done me. I am honoured - make no mistake about it and I know what it is for - it's for the 'Hedges' work.

After all if you type 'Max Hooper' into a Google search you will get, as well as a couple of Australians (one a politician recently dead; the other a Champion Croquet player) about 20 or 30 hits on hedges and all referring to what I did nearly 40 years ago.

And that's part of my feelings at this moment-it was a long time ago !!

More important still is that I stumbled into hedgerow work entirely by accident. I have the feeling, therefore, that I cannot truly claim the credit. Of course once the hedgerow work had set me thinking about time and space as possible ecological factors, I feel I can claim some credit for things that followed.

For example I'm very proud of an entirely theoretical paper published in 1970 called '*The Size and Surroundings of Nature Reserves*' which drew attention to the effects of area and isolation on species diversity. But even here I have to admit a debt to others. Real data was some time in the accumulation and I had to grab some of Norman Moore's on birds to demonstrate that the effects I had predicted, about the distribution of reserves in space, actually had reality.

By this time (1974) 30 years ago I had realized that time and space really were quite important and, as much to clarify my own ideas, I tried writing four books

Nature Day and Night - which is about diurnal rhythms

Nature through the Seasons-about photoperiodism, migration etc

Nature through the Years - mainly plant succession

Nature through the Centuries - about evolution

Only the first two were published - by Penguin Books-- and had some success, translated into Dutch and Japanese and they are still appearing in the second hand booksellers lists. But again I must share credit: there are splendid illustrations and a co author, Richard Adams.

The work on size and separation of habitat patches was of great practical use in planning appeals--- is the new road going to cut the SSSI into two smaller pieces? Can the important organisms on this site cross a dual carriageway? Would it be better to cut off a small corner so as to leave at least one largish area? But by this time there were many others looking at species-area relationships, isolation and corridors.

While I might have put together some evidence on birds and plants in woods others were working on insects, small mammals and so forth - and they were developing the theory further. I applied the theory to EIA, to roads: Newbury ByPass, Channel Tunnel Link, -- to reservoirs: Somerset Levels, Oxford & Cotswold Water Park.

But what you want to know about, naturally, is Hooper's Hedgerow History Hypothesis

$$\text{Age of the hedge} = \text{no. of spp.} \times 100$$

This is what captured the public imagination, so it's what I'm known for but it was all by accident!!

You see I'm very lazy, as my wife would attest. I trained as a cytologist/geneticist and I never expected to do anything more energetic than transferring pollen to stigma with a paint brush, or to spend my days peering down a microscope -sitting down indoors at a laboratory bench, not wandering around in the cold and wet outdoors. That is what my first two jobs allowed me to do. Then I met a girl, wanted to get married, so needed a job that paid a bit more.

I got such a job with the Nature Conservancy at their new Research Station at Monks Wood --to study the effects of pesticides on cell division, chromosome breakage, mutation and so forth. I very rapidly found that, yes, many of these chemicals were cytological poisons but only at dose rates far higher than would be found in the field, unless a farmer poured the concentrate onto his fields. This dosage problem meant I was out of a job.

Others in the Toxic Chemical team were being more successful - you may for example remember the story of organochlorines & eggshell thinning. But the Ministry of Agriculture Fisheries & Food (MAFF), the National Farmers Union (NFU) and the Association of Manufacturers of Agricultural Chemicals were not impressed -they, quite rightly, said that other things were going on in the countryside --all the losses in wildlife might not be caused by pesticides, what about-ploughing up of pasture, draining, or the grubbing up of hedges? So Norman Moore, the head of the Toxic Chemical group at Monks Wood, who had the job of getting our research across to government and its advisory committees, said to me "go and look at hedges".



Hedge trees. *Photo: Dr. M. Hooper*



Straw burn. *Photo: Dr. M. Hooper*

The first question was, obviously, what was the rate of destruction? This was easy to answer-and I could do it indoors, sitting down. You see the RAF trained its photo-reconnaissance people by telling them to fly over, and photograph, England and every few years had to train some more. So there were photos taken in 1946-7, 1953, 1963 etc for most of the country (a few places were obscured by cloud). And then the Ministry of Housing & Local Government (MHLG) kept all these photos for their own, planning, purposes. I took a table of random numbers, read them as Ordnance survey grid co-ordinates and borrowed the photos from the MHLG. I found that we were losing 10,000 miles a year in the 60s, which was the peak rate.

This figure of 10,000 caused a tremendous fuss with MAFF who said only 1,000 miles of hedge were removed with grant aid. From the Nature Conservancy side whether MAFF financed it or the farmers just let a little straw burning get out of hand and into the hedge was neither here nor there. Hedges were going fast.

We next needed to know what did hedgerow removal (1,000 or 10,000 miles) mean for wildlife? For example how many birds nest in a mile's length of hedge? To find out we went birds' nesting like small boys, It wasn't just me, or even mainly me, looking for nests and counting them: Norman Moore, Brian Davis, John Parslow, & Ernie Pollard-the zoologists in the team, did most.

The results showed that pure hedges, only of elm or beech, were not very good and might have very few nests in them. Pure hawthorn was better but best of all was a big mixed hedge ---that is a hedge with a mixture of trees and shrubs in it.

Of course there was considerable variation, in particular it seemed that there were more nests if you counted them in a hedge with no other hedges nearby, and fewer in hedges surrounded by other hedges. It looked as if birds might be able to nest closer and closer together as the hedges were removed. Or to put it in more ecological terms is the limiting factor the food available in the adjacent field or overcrowding in the hedge? And does it change as hedges are removed? To cut this part short the answer is yes it does. If you start off with, say, 15 miles of hedge on a square mile of land and remove 5 miles of hedge the bird population will not change (unless you happen to remove the only mixed hedges and leave only pure elm

ones) but then remove another 2, 3 or 4 miles: somewhere about 8 miles per square mile the bird population begins to fall - competition for nesting sites begins to have an effect.

Another point to bear in mind is Parslow's observations of blackbirds' nests at Sacrewell Farm - he found they produced insufficient young to make good adult mortality --- therefore the population of blackbirds on this farm through time was dependent on immigration of the excess production of young birds from nearby woods -- and this was one of the triggers that led me into the '*Size and Surroundings*' ideas.

Back to the botany. Remember some hedges are better than others and these are the ones with a mixture of trees and shrubs in them. And you also need to know that in the hedgerow removal studies we found that even in the areas where most hedges went there were still some left. You might start with 15 miles of hedge on the farm and finish with only 2 or 3 miles, probably the farm boundary hedges which did not interfere with the operation of machinery in the fields. Farmers were willing to leave some hedges-how could the Nature Conservancy ensure they were good i.e. mixed hedges ?

Why are some hedges mixed, others pure? Does the answer lie in the soil? Remember many of our shrubs do like a high base status (wayfaring tree, spindle, field maple and privet for example). Or could it be management? Farmers assured us they always cut out some species like elder.

We rushed around the country counting trees and shrubs in 30 yard samples, on chalk soils, on clay soils, sandy soils, managed by clipping with reciprocating cutters, flails or cut and layed. But there were mixed hedges on chalk, clay and sand, managed by flails, cutter bars or cut and laid. The mixtures might differ-birch and gorse turned up on the sands but spindle and dogwood were only on calcareous soils.

Then Terry Wells drew my attention to Grose's *Flora of Wiltshire* which has in it some habitat studies. In particular Grose was interested in the difference between the chalk and clay soils so he lists the species in two hedges on chalk and two hedges on clay. He also said that one of each pair was ancient, going back to Saxon times and the other was more recent going back to the enclosure period.

His lists are full ones, he puts in trees, shrubs, climbers, herbs, grasses. I was interested in only the first two. I went through his lists crossing the rest out and there it was. In the old hedges I was left with 10 or 12 species and in the younger ones with only a couple! The 1 to 100, Hooper's law, came in a flash, in that moment. But only four hedges isn't enough evidence to convince everyone.

I had to get out in the field, into the wind and rain again, and interview dated hedges. But how do you date a hedge?

The foremost landscape historian at that time was the late W.G.Hoskins. He had just retired to Devon. He promised to date some hedges for me so my wife and I, and Johnny Lovell, my assistant, had a field trip to Devon to count shrubs in these 20 or 30 hedges he had dated. Two I remember well were Saxon boundaries not too far from here at Chelfam and Chumhill and they had the requisite dozen species in them, while hedges from the 1840s at Bratton Fleming had only one or two. I felt we could go into print and the first paper on Hooper's law was in the Devon Naturalists Trust Journal in December 1965.

We did more field work on dated hedges and by the time I wrote the first 8 chapters of the Hedges book we had 227 dated hedges. Enough to be sure that 70% of the variation in tree & shrub content of a hedge was explained by its age! Or Hooper's Law, one species for every hundred years, was at least a good rule of thumb. And I've been dining out on it ever since!

Dr. Max Hooper was working for the then Nature Conservancy at Monks Wood Research Station when he did the work on hedges. The New Naturalist volume '*Hedges*' was published just after the old Nature Conservancy was split into the Nature Conservancy Council and the Institute of Terrestrial Ecology. He subsequently became Head of Station at Monks Wood for the Institute of Terrestrial Ecology. Dr. M. Hooper delivering his lecture.