



FEATURE

On the importance of sycamore seedlings and other lessons learned along the way: a conversation with Dr. Ian Edwards

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On the importance of sycamore seedlings and other lessons learned along the way: a conversation with Dr. Ian Edwards

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Transcribed by Dr. Beth Cross, University of the West of Scotland

Biographical Note: *Ian is an ecologist and environmental educator with a deep, long-standing interest in the regeneration of habitats, ecosystems and communities. He has worked on projects in Australia, Africa, Arabia and the Far East but is currently living in the heart of the regenerating, post-industrial landscape of Midlothian. He divides his time between writing, making and teaching. He is also a trustee of several environmental charities and a forest school leader.*



Stories and nature have been important aspects of his life for as long as he can remember.

Interviewer's Note: *I conducted this just beside Ian's garden which in miniature is the best of what always took me to the Botanic—where Ian developed and directed the education programme for twenty years. All the way through the conversation, the birds gave voice to the biodiversity well and thriving where he has had a hand. I wish I could have transcribed the bird song as it was such an important companion to what Ian shared. Many things Ian says may surprise. What I came away with was an appreciation of how much I learned through his storytelling—a growing understanding of the important points he makes were woven in and around them, making it possible for me to glimpse in some way some of how he has learned from the storytelling he has encountered through his life.*

Beth. So the issue is about environmental education, I was reading Robin Wall Kimmerer, when my colleagues at Aberdeen asked me to help us put this together. So it's really kind of asking some of these questions: is our environmental education fit for purpose? What direction is it moving? And where do people learn about how to do it in a way that's more sustainable? What are the resources to do that? And I suddenly thought I know someone with a lot of practical experience in environmental education. You were telling me about [The Big Picnic](#) project as part of your work leading the education programme at the Royal Botanical Gardens at Edinburgh as we were getting settled. So please say more about that project and then maybe we can talk about some other things.

Ian: The Big Picnic was Horizon 2020, European Commission project, and I led the Edinburgh end. There were other groups in other countries, including Uganda, but mostly in different parts of Europe and at the very beginning, one of the things that they did was, take us on a co-creation course at Waag Institute in Amsterdam. Because I was very busy and because I'm always very sceptical about these things, I went along quite reluctantly, I will admit, not expecting to get anything from it that I didn't already know, but it changed my entire outlook. I just wish that this had been the first thing I did at the Botanic gardens and not the last thing!

But now I am able to use it in the work that I'm doing as a trustee of an outdoor centre because it makes sense to me that everybody in the room is an expert. That's where you start: the gardener is an expert and so is the cook who works in the kitchens, cooking vegetables; and the instructors that work with the young people, the administrative staff, the fundraiser, they're all experts in their own area. So you basically sit in a room with experts, which is great and you're the facilitator. With the simple task that we wanted the grounds at Wiston to be fully used by all the user groups that go there. But we also wanted to leave the estate in a better condition, than where we found it.

Markers of that will be that it is more bio-diverse, that it would have more animals, plants and fungi than it did when we started, that they would take up a bigger part of the entire estate and that at the same time that we were connecting people with nature. We were looking at all the different spaces, in terms of the opportunity they had to connect people with nature. So, if you remember from your many visits to Wiston, there's a camping field, which is mowed every week in summer, just to keep it flat grass. It's a massive area but just the simple act of ceasing to mow an area around the edge is both reducing the cost to the charity and it's increasing the biodiversity. There's no quicker way of getting biodiversity into somewhere than to stop mowing the grass. Except possibly not using Roundup which we also stopped using as well. It's used almost everywhere, but there's no place in a site dedicated to environmental education for a toxic substance like Roundup.

There are two approaches, you can either go into a room and tell the ground staff that you're no longer using Roundup, or you can use this co-creation idea where you're all discussing management of the grounds and the subject of Roundup comes up and together you can all agree that-- because you can see the bigger picture and can see how to use the expertise in the room—you can decide that you don't need to use it. The groundsman who's currently using the Roundup will probably also have the best idea for doing without it. And that was the case. Now we are using more bark chips as mulch and don't need the weedkiller.

Inevitably, trees fall down and the best thing you can do with the tree if it blows down is to leave it where it is so that it rots away and contributes habitat and nutrients to the ground. But if it's over a path, you need to remove it and then put it through a chipper, so that you can put the chips on the path. Then you don't have to use weedkiller on path and therefore you've kept the whole thing flowing within the estate. This is the kind of thinking that's been going on and so far, everybody's on board. I am used to going in telling people what we're doing and expecting them to follow rather than being the facilitator and getting them to come up with solutions. For this new approach I must be humble enough to accept that my

solutions may not be the best ones but my co-creators are not just being called experts, they genuinely are experts, and therefore they may well come up with the best solutions.

I don't know if you remember, I cut my teeth in Malawi in Africa. I was in my early 20s, so I hope I can be excused my ignorance, but in those days we were plagued by the expert who came out from the UK or Europe for two weeks and used most of our petrol as we drove around the place. They asked very few questions but because they were getting such fat fees for doing this they felt obliged to give us lots and lots of 'useful' advice. Some of which was totally pointless and sometimes even counter-productive. They never spoke to the guys who worked in the nursery or out in the woods who actually had a lot of experience. There are several lessons I learned when I realised that actually the experts were the uneducated, in the sense of formal education, but very knowledgeable Africans, who've inherited wisdom or knowledge from their parents and grandparents rather than the educated experts from FAO or wherever who were trying to transfer ideas from other places to a different culture and a different environment.

The soils in Africa are very old and very lacking in nutrients. Soils in other parts of the world, like, Indonesia are younger and richer. So ideas that you've seen working in one part of the world don't necessarily work in another: you can't just go around transferring ideas, it's better to look at what's been done there already and see if that can be adapted. Because, if it has stood the test of time then it's likely to be working well. But I still didn't learn the important lesson of getting everyone in a room, which is the most obvious one till far too late.

Beth: When I was coming up from the train station, the one question I thought that I wanted to ask you was, when did you start learning from the environment? what, what contributed to that happening? Any memories, experiences that you still think are really valuable about how you've gone about helping others learn from the environment that you would like to share?

Ian: You know, I'm an avid reader and I love book learning and internet learning, but being thrown into a position in my early 20s, where essentially I was responsible for about 9% of a small African country with no tropical experience, no library, no previous research, and obviously no internet or computers, basically you're on your own. Together with my crew we would go off to remote places and when there was nothing much happening they would go off and start digging up herbs, and scraping the bark off of trees and pulling flowers and fruits off the trees. Because I was curious I just asked them what they were doing and they would explain: their wife was sick and they were getting her medicine; that this was something to add to their stew in the evening; or that this was an important spice they could sell this in the market... I started just gathering information in my notebooks about how people use the plants, not really with any intention of using it in any way but just because I was curious. It took a long time to realise there was a connection between that and the way that the forest had survived. What they were doing wasn't just harvesting or nibbling away at the edges, it was actually fundamentally changing how their habitat worked because they would manage it in such a way that the things that they were looking for were available. African mountains usually have forest on the very top but below that are plateau grasslands. Europeans are sometimes confused as to why Africans will climb up the

mountains and set fire to the grasslands every year but there were very good reasons for that- there were things they wanted in the grasslands and shrubby edge to the forest, which are the richest area. They were actually managing the landscape but it wasn't management that we would recognise in Europe. We haven't managed forest of Europe's since Neolithic times. Using fire as a management tool (apart from grouse moors), is rare in Europe but widespread in other places, including in Africa. Up on the grasslands there would be people with torches setting fire to the grass and then behind that, there would be a row of small boys with spiked sticks. When they saw a hole in the grass they would thrust the stick into the hole and pull out the skewered rodent that had been cooked in the flames. It was using every bit of space; even though nobody wanted to live on the mountain because it's cold and misty and just not attractive for living it had its place within the calendar, every year people visited and while it remained within the local economy, the balance remained and the landscape probably hadn't changed significantly for a long time.

The forests that I was looking after had a very valuable tree called Mulanje cedar, which is endemic to one mountain in Malawi, Mulanje Mountain, it's found nowhere else and it produces a beautiful scented timber that is termite resistant. It also carves really well so it was made into beautiful boxes, chests, and furniture. Traditionally this was traded locally but as soon as the country began to open up to tourism and export then harvesting was no longer sustainable. Even though the only way of harvesting the trees is to cut them down and then to cut them into planks in situ by digging a pit underneath where the tree had fallen and going down into that pit with a two handed saw. One guy would stand on top of the log with one end of the saw and the other one would be down in the pit getting covered in wood chips below and they would saw the tree vertically up and down into planks. Then the planks would be put on their heads and carried down the mountain track, yodelling on the way to make sure there was nobody coming up because with that weight on their head they can't stop for anybody, they basically have to run down the hill.

When I was there in the early 80s this was happening but well managed. Now Mulanje cedar is extinct as a mature tree on the mountain. To me this is almost unbelievable because there were whole forests of it and now it's extinct. Even though there are regulations in places to stop it because it's become a commodity that can be exchanged for cash and because it's become part of international trade, it has disappeared. Back then when I was responsible for protecting this iconic tree I had absolutely no idea that it would disappear within a few decades and once something has disappeared like that you can't return it. Mulanje cedar exists, they are trees in botanic gardens and arboreta around the world, so potentially you could grow seedlings and return them to where they came from originally. But we're talking about the loss of trees that were hundreds of years old. They will never be in a forest ecosystem again. Once you destroy the forest ecosystem it is extremely hard to recreate it. I'm not sure the best way of using resources is to try and recreate something that has disappeared entirely. There are some success stories but in general the world will have moved on meanwhile, so if there hasn't been forest there for several decades and we can't expect to see any new trees maturing for another few decades, then we're talking about a 50 plus year gap without forest. A 50 year gap during which we know the

temperature has risen by 1 to 1.5 degrees C, and where storms are more frequent, and dry spells in which forest fires are more prevalent.

One of the things that we have to accept is that we can only go forward, you can't go back. I'm a great believer in trying to accept time as something that's not linear but circular and with each turn of the circle it doesn't necessarily come around to exactly the place it's been before. We are stuck in linear thinking focusing only on temperature rising. Climate change will continue and we can't stop it. This has happened in the past and it'll probably happen again and so we've got to adapt. The best way of adapting is going to require us to be much more accepting of change. In my area, in conservation, people have been incredibly reluctant to accept change; conservation is very conservative. People see what's there at the moment and they want that to continue forever or they see what they believe was there in the past and they want to somehow reconstruct it. Very few conservationist think what could be there in the future in forty or fifty years' time?

The classic example, and this is something that I feel strongly about, is people's response to what are described as non-native alien plants. Every plant has arrived where it grows somehow and new plants are actually evolving all the time at a much more rapid rate than we tend to appreciate. So for me, it is of no importance that sycamore is a non-native tree (i.e. it was introduced to this country by humans) but you will find wildlife and conservation groups up and down the country in places like Roslin Glen cutting down or removing sycamore because they regard it as an invasive weed.

Beth: – Weren't you telling me the last time I was here that with ash die back sycamore actually provides host for lots of the surrounding flora and fauna that mean that that can be sustained by sycamore?

Ian: Yes. Out here you can see ash trees and some of them have a kind of a stag's head, that's ash die back and they've probably all got it. All the ash trees in the country will probably get ash die back and we are going to lose most of our ash trees. But the nearest ecological equivalent that we have is sycamore. Sycamore and ash share similar bark pH so many of the lichens that like to live on ash will transfer to sycamore. It has a sort of similar ecology; both have wind dispersed seeds, they both seed themselves and grow prolifically so I'm constantly pulling little tree seedlings out of the ground. I used to just put them on the compost but I now put them in a pot and I grow them on because we may find a space for them somewhere. Sycamore is important for all sorts of reasons, not the least of which is it's very tough and can withstand winds. If you're up somewhere in the Yorkshire Dales or the Scottish Borders and there's an isolated hill farm, you can bet your life that the farm buildings will be surrounded by a little grove of sycamore trees. It's so tough that it is one of the only trees that will grow in Lewis or the Northern Isles. We can predict that there are likely to be more severe storms in the future and that we're going to need these trees to protect other trees and buildings. So why are we spending resources, including volunteer time, which is an important valuable resource—on removing them?

Volunteering is a really important aspect to environmental education. People will tell you that much of what they know about ecology is based on going out with conservation volunteers and the favourite tasks are removing sycamore and rhododendron seedlings. Everybody who has done that will believe passionately that rhododendron is public enemy number one. Huge amounts of chemical weedkiller are

used to treat it every year and a massive amount of disruption is caused by removing it. Rhododendron is never going to be eliminated and yet we're teaching people to hate something which is a feature in the landscape. I think it's really sad that people can't enjoy rhododendrons, sycamore trees or giant hogweed yet they all have a place within the new ecology. Whatever we think or do they will all eventually reach a balance.

Firstly, Rhododendron is a European species (although everybody seems to think it comes from the Himalayas. It doesn't; it comes from Spain and Portugal). Secondly, we know from fossil evidence before the last ice age it was also a native plant in Britain. The third thing is, if we had been joined to the mainland Europe for longer it would have found its own way across here, as lots of other things did. Larch, for example, never arrived before the land bridge was flooded, neither did the maples but they would have got here eventually. So rhododendron is not something that's been transported from the other side of the world, it's something that didn't quite get here because the sea formed between Britain and the rest of Europe, before it had a chance to cross.

Most of the rhododendron we've got here is young and we've kept it young by cutting it and keeping it in its juvenile state. If you want to see what rhododendrons are like when it's mature, the best thing you can do is go to the Appalachians. In North Carolina there are two very closely related species that occur in woodland and forest which are not dissimilar to forests we have in Scotland. The rhododendron grows as an understory adding another layer to the habitat. The more structurally diverse the habitat is the richer in species it's going to be. Bird surveys in this country have shown that woods that have an understory of rhododendron are richer in small songbirds like blackbirds and thrushes than woods without. After 50 or 80 years, the rhododendron begins to open up forming a bear patch in the centre of the bush. Now this is an ideal habitat for the establishment of new seedlings because it's protected to a certain extent from deer and other browsers- it's a sheltered environment which is perfect for regeneration. The next generation of trees will grow within the centre of the rhododendron bush and not outside it. Rhododendron has an important part to play in the ecology of forests in North America and undoubtedly, it would have here in previous interglacial periods. But we have very few evergreen undergrowth shrubs so this is a bit of our woodland ecology that is missing. One of the problems we have with tree regeneration is that everything is exposed to browsing. Everybody is very keen to blame deer for lack of regeneration but actually the real problem is that we often don't accept that we need this intermediate shrub stage. We think we can just go from open ground to forests, or even worse, from mature forests to mature forests with young trees. It doesn't work like that, it doesn't. This circular system means that when an old forest dies, then the undergrowth is going to become predominant and that this shrub layer is the nursery for the next generation of trees. When you've got a healthy shrub layer, beneath the tree layer, then you're more likely to get regeneration because it provides alternative foods for the browsing animals but also provides some protection. A lot of the shrubs like blackthorn, hawthorn and crab have got spines and will protect the growing trees from browsing without tree guards. So we're missing something in forest at the moment. People's ideal of what a forest used to look like is probably wood pasture like the old oaks at Dalkeith Country Park, but that's an artefact from the way we've created it. If you go to Dalkeith Country Park you'll see them chopping away the holly, but they're

removing the source of the next generation. They are convinced that holly is shading out young oak trees, but I disagree - the holly will provide the nursery for the next generation of oak trees.

Beth: I was really interested in what you were saying about your interest in restorative forestry, not just sustainable forestry but restorative. That seems tied to seeing time as cyclical, I'm not sure what that means. Could you help me see a little more about those things?

Ian: We think of things as starting with a seed growing and then ending with a tree dying. But you could just as easily begin with the tree dying. This year, we've had some exceptional gales and lost trees and the response to that has been really interesting: people have been getting really upset by the loss of these trees that have blown down, not accepting it's a natural phenomenon and a huge opportunity for the next generation of trees. If those older trees didn't get blown down, there wouldn't be any trees to replace them. I don't know if you've been looking at Natalie Taylor's Keeper of the Soils blog but they've just had this ceremony out at Tynninghame for a mature Scots pine plantation that was badly hit by the storms. There was a lot of wind throw there but I try and resist using the word damage because I don't think it was damaged at all, I think it was actually freeing the area up, creating a fantastic opportunity for nature to recolonize the area. I refuse to mourn those trees, I can only celebrate them. And as much as I love Natalie Taylor and Jonathan Baxter and all of these people, what they're doing is not based on science, it's not based on actually understanding ecology, it's an emotional thing. They see a tree falling over, it looks awful, you can't get away from that, it looks a mess. And our immediate urge when we see a mess is to try and tidy up. But it's a gift because those big trees if they're just left there, they will rot away and within weeks or months they'll be infected by fungi and colonised by specialist insects. Eventually they will rot down, release their nutrients and provide a nursery for the next generation of trees. It may not look pretty. People have yet to learn to love brambles. It will get covered in brambles and foxgloves and eventually, if they are left, it will become mixed woodland. It may not look much like what was there before, which was a conifer plantation, or before that which was probably an oak-ash-hazel broadleaved woodland. It might be something completely different. It might be dominated by buddleia or sycamore, I don't know what will come there, but something will regenerate that will be more diverse than what was there previously. I used the word mature conifer and I really was wrong because these aren't mature conifers. They are still adolescents, juvenile conifers. We cut trees down in this country routinely while they are quite young, usually between about 45 and 60 years, when they are regarded as commercially mature. But they're just babies.

I've stood in the incredible Camanah rainforest in Vancouver Island, under Sitka spruce trees that could be 1000 years old and are over 90 metres high. It's the most magnificent cathedral like trees that I've ever encountered. These are mature trees. So the problem with understanding the cyclical nature of forests is partly because we can't quite grapple with the idea that its going take a long time to get to the point when regeneration will occur naturally. We always want to get there more quickly and to capitalise on it. We can't accept that in nature things will happen like windblow, creating gaps and opportunities, and ultimately a much more diverse and mixed ecosystem. Because we're constantly thinking not just in our lifetimes, which are maybe 80 to 100 years, but, in our short active lifetime, the period that we're

managing this patch, and we see it all in terms of short term gains and not in terms of the bigger long-term picture.

I continue to be fascinated by what's arrived on its own. Extinction Rebellion, and the like, worry me because they focus so much on what we've lost and we hear so many times that we're in the sixth great extinction. But if you ask them to tell you what has actually become extinct during their lifetime then you probably get very few answers. Because most people actually don't know and assume that hundreds, thousands maybe millions of species have become extinct but they don't know what they are. You would think if it was that much of a problem we would actually know what we've lost. The second thing is that in Britain in our lifetime, let's say in the last 40-50 years, we've gained a lot more species than we've lost. We have more plant and animal species now in Britain than we did when I was a boy. This fact doesn't really tally with the idea of mass extinction.

Beth: How did we gain these? Can you explain -- because I'm one of these people who think we've lost more.

Ian: To give you an idea, when I was a boy, there were no sea eagles breeding in Britain. Now Sea Eagles successfully breed throughout Scotland and increasingly, in the rest of the UK. The reason for that is that they were already showing an interest in here and we helped establish them by bringing chicks from Norway. So that's one successful story but humans were involved, the situation was right. The beaver story is similar: there were no beavers before, we were initially responsible for bringing them, though now they're doing very well on their own.

There are some things that have come completely on their own, for example, the European crane, which is the most incredible bird. You'll know as a storyteller the traditional stories of the crane skin bag and the crane is such a part of our folklore. Yet we haven't had cranes in Britain for hundreds of years and now cranes have become established as a breeding bird again in Scotland and they're doing their wonderful courtships dances in Aberdeenshire. Nobody brought them; they just decided that the time was right. There's much less persecution than there was 50 years ago. Even though we're still very concerned about use of pesticides, the real killers like DDT have been banned and are no longer used here. We're still making them and exporting them to other parts of the world but that's another story. So the pressure is off a little bit for some things and that's meant they have recolonized. I was down at Tynninghame last week on the beach and saw several cattle egrets, two species of cattle and little egrets have recolonised Scotland. They're becoming very common. The populations of our native greylag geese has gone from a few thousand birds in the North-west of Scotland to an estimated 140,000 with many more geese staying throughout the year. Golden eyed ducks also stay throughout the year to breed now. That's things responding to a warmer climate: European animals and plants are moving north bit by bit. It's not necessarily a good thing or a bad thing but it's happening and it's inevitable that if you change the climate, you're going to get different species coming in but you won't necessarily lose all the old ones.

Hummingbird Hawk moths, which are spectacular insects that look like hummingbirds that are actually moths that fly during the day. I'm now seeing them in the garden, and they're creeping up every year a

little further north. On my bird feeder you'll see the nuthatch, a kind of woodpecker that used only occur in the very south of England, and it was quite rare. And now it's in my garden eating nuts every day. The number of new species that have arrived here, either on their own or because we've taken pressure off is phenomenal.

Why are we not celebrating that? It serves the interests of organisations like the RSPB, just to name one, to tell us all that here in Britain we're in a terrible state. We're the most nature deprived country in Europe and that we've all got to give to them so they can buy up reserves or recruit more. It may not be in their interest to tell us we're doing really well, this is great, we just need to keep going. That doesn't seem to be considered a good way of selling conservation. That's pretty cynical but I have to ask—what is the reason we are not doing more to celebrate success? Unless it's just part of human nature that what we want is doom and gloom stories?

Every three years, there's a publication called the State of Nature, which is a compilation of all the work that's been done by thousands of amateur naturalists and a few professionals that go out counting things. The facts that I'm telling you about, which populations have expanded and which decreased, is all there in the [State of Nature](#). But when the State of Nature is published the press release that goes with it just points out the negative. It only emphasises species that have declined or been lost and doesn't ever say much about those that have increased or new species we've gained. This is partly the way that the data is collected, because if there weren't any cranes 50 years ago, when the survey data starts, then nothing gets recorded. But also, I'm sure it is propaganda driven, because when you start to point out the imbalance in the report some people still won't accept that it's a more positive situation than we're telling people.

Beth: That might be the case for Britain, but overall there is a decline in species. I know in past conversations, that you've expressed quite a lot of concern for the state of the planet.

Ian: If the extinction crisis is as bad as it is made out to be then I should be able to reel off a whole lot of extinction stories. I've told you one, that of the Mulanje cedar which I know about and there are other similar stories around the world but there are lots of other big success stories too. The Appalachians, in North America, is the classic example. It was all farmland that was abandoned because of economic and environmental decline and then the forest recolonised. None of it is very old and most of Norway's forests too, certainly in the south of the country, are less than 100 years old. Nature has returned to many parts of the world and globally forests are expanding not contracting. One of the ways it's expanding is it's moving further north. Because of climate change the tree line is pushing forward in some places at quite a rapid rate. Not everywhere. Some areas, it's retreating. In some areas, it's standing still, but generally speaking, it's moving north.

A lot of former farmland has been abandoned. The classic case, that I've witnessed in places like Estonia and Latvia, is abandonment of collective farming after the collapse of the Soviet Union and the massive migration to the cities. Riga and Tallinn are full of young entrepreneurs who sit at computers and enjoy the city lifestyle. Meanwhile if you go to the east, most of the intensive farming has been completely abandoned. Areas that were formerly growing crops are now shrub or woodland and there

are bears, and wolves, and lynx. There are families of beavers living right up into the towns. The amount of rewilding that's going on totally naturally, all along the edge of the old Soviet Union, and in some places within the Russian state, is phenomenal. This is not just my casual observations this is satellite imagery. It is a fact that the forest is expanding.

There are some really concerted planting schemes in Africa and China where they are actively reforesting but most of the trees in the world weren't planted and that will always be the case. Most of the trees that grow in the world are naturally regenerated and forests can respond to change at a phenomenal rate.

Beth: So what do you think? It seems to me that you're constantly learning and willing to change your mind. How does that feed into how you teach others? Or how others might learn? And what do you think are the important lessons today?

Ian: That's really difficult, because I know I can become quite preachy and I don't want to put people off being active. With young people who are environmentally aware I try to give them the opportunity to do something practical.

Despair is a terrible thing and young minds can get really depressed if they feel that there's no hope and that we're doomed. I think the best way around that sometimes is to get them involved in something practical. The tree planting that I've done over the last few years with young people, a lot of that has been about giving them an opportunity to make a difference themselves -- to see that you can do something. Everything is reversible. We shouldn't despair we shouldn't give up.

I was with a young person earlier this morning, helping them plant a wildlife garden in the back green. I just took a load of plants and some shrubs and things and gave a quick lesson on how to plant them. This 17 years old is going to volunteer with the seabird centre in the summer. That's great but what they'll probably do is take them out to Fidra, which is an island off North Berwick, and they'll remove the non-native tree mallow. It's entirely destructive activity. I didn't comment on this but I'd much rather that young people are taken tree planting or establish a tree nursery, which is something that everybody can do. Anybody that's got a square metre of ground can establish a nursery. Anybody can adopt a bit of their street so that it doesn't have to get sprayed. Those small things shouldn't be considered insignificant they can and do make a big difference.

Much insect life now occurs within the suburban areas on the fringe of cities. If you take a transect starting out in the middle of East Lothian along a straight line to Princes Street Gardens in the centre of Edinburgh, and measure the insects every kilometre what you'll find is that in those prairies of East Lothian, they'll be just a little blip where there's a hedge and then nothing because they're sprayed with chemicals 15 times a year and there's no way insects can survive that. Then you'll get to the edge of the city where there's the new housing estates and numbers starts to go up a little bit. Then you'll get into the more established gardens of the suburbs and suddenly you'll see it will just go shooting up because it's those allotments and gardens where all the insects are. Then when you get to Princes Street right in the city centre it will drop down to zero again.

So though there's little that I or the young person I met this morning can do about the intensive farming in East Lothian, politically, maybe, but not practically. But, we got to work on a little bit of shared back green which up until yesterday had one species in it, ryegrass, and today has got 25 or 30 species in it. That will become a nucleus for others species coming in naturally and hopefully in a few years' time, it'll be a little oasis within that space. I think that kind of practical action allows people not to feel disempowered, but to get their hands dirty and make a difference. To me, that is what education should be.

Beth: You were Director of Education at Botanics?

Ian: I had lots of different roles over the years but essentially I started the education programme and when I left a whole team of people were working in education and doing a fantastic job.

Beth: So how did your thinking about what you were doing change over that time?

Ian: There was a very successful programme in the 90s, called Living in the Rainforest. We built a Sarawak longhouse for the schools that came and every day we said 'Welcome to Borneo'. The children had their lessons and meals inside the longhouse, and they went out on expeditions into the rainforest. It was completely immersive, and what we were really emphasising was that the indigenous people were the guardians of the forest and they were our teachers.

We explained the forest was something you could use and we discussed scenarios about what we would harvest from it and then collect food and other things that were sustainable. Sustainability was at the heart of it. Regenerative thinking is the next step and something I have been thinking about a lot in the last few years.

I think that that is something which we can build into education. We need people to feel that sustainable education is not far enough. We need to think now about regenerating what we've got and making it better. You can take almost any kind of scenario and think of ways simply of improving it, just as you can look at any house and think of ways of making it more energy efficient. Or you can look at anybody's daily habits and they can reduce their carbon footprint. Look at any patch, anything the school ground, a back garden or a window box and you can think of ways of making it better than it was when you inherited it. I think that's the way education should be going.

Beth: I think that maybe one thing I've always associated you with, one of my earliest memories of you, is associated with a soundtrack of the rainforest at night. I think you left your tape recorder on overnight when you were in New Guinea. But I have also closely associated you with story. So in your saying that the best guardians are indigenous people, I just wonder how your experience with indigenous people and with story has been part of your understanding of education.

Ian: A lot of my early work after leaving Africa was in Indonesia, where I was living in quite remote places with tribal people who had almost no contact with the outside world. I was privileged to experience that because it won't exist in those places anymore. I had two young children at the time and felt very much in tune with families with younger children. One of the startling things that I remember about childcare in these preliterate societies, where there is not the option of going to school, is that all

education is done by parents, grandparents and siblings. There was no separation between what's education and what is play. A number of observations later became important to me. One was the fact that I never heard a baby cry and that might seem sort of strange because when you're a parent you know there's always some point when babies cry. The reason, of course, until it was ready the baby never left the comfort of the body of a parent and it wasn't just the mothers. The nice thing about the place that I was working was that the men too were involved in childcare. In a community of hunter gatherers, where men and women don't go off to the fields in the day, there seems to be a lot of leisure time, especially groups that eat sago because it is an easy food to get hold of. In the morning, up in the mountains, it would be quite chilly and the women would be inside at the fireplace cooking up porridge for breakfast, and the men would be outside trying to catch the early morning sun with the baby strapped to their tummy, chatting away, babies snoozing contentedly.

When they were toddlers, they were already given their first bows and arrows and they were getting their first nets to catch fish. They were going out with sling shots to practise their skills on birds, or catching fish and shrimps and contributing to the family food. From an early age there was no division between work and play.

In the tropics, it gets dark at six o'clock, all year round. And typically, in the mountains, it's quite cold. So inside the hut you'd have a fire roasting sweet potatoes and you'd be telling stories.

This is where my language skills let me down: I spoke enough Indonesian to get around but didn't speak any of the numerous languages that were spoken in the mountainous areas. Famously half the world's language are in the highlands of New Guinea and the surrounding islands. So I couldn't tell you what was being said but there was a lot of hilarity, and singing, and it was obvious just by observation that what was being talked about was events that happened during the day. If they had been hunting they'll be talking about that, or whatever happened during the day. I did discover some traditional stories and songs from those areas but much of the storytelling was anecdotal and you can see the expressions on people's faces and laughter and responses that these were good storytellers who evoked all kinds of emotions.

These two aspects together, the practical activity and the storytelling, combined with imagination and creativity, offer the most powerful education that you could possibly imagine. I've got two science degrees so I think I'm highly intelligent and well educated, but have been taken, literally, hand in hand into the forest by a 10 year old with incredible detailed ecological knowledge far better equipped for this world than my Western trained mind. The responses to questions like what is this? When do you harvest it? What do you get from it? How do you process it? What other animals come to feed on it when it's fruiting? How do you track those animals? Demonstrate these children knew about the seasons; about the interactions between things; about mutualism and exclusion. They had an incredible knowledge of ecology and yet couldn't read and write, had not been to school, hadn't had any contact with the outside world and they hadn't a clue what a computer was. How did they absorb this learning? I believe it is through this powerful combination of practical skills and storytelling.

These are things I'm still most passionate about. I still love to make stuff with my hands and show other people how to make things. That's why the forest school really feels the right place for me to be involved. I can now help young people to make whatever they want to make, using practical skills and their imagination.

If you're making something you're making it because you can create a story around it. The most popular things that children want to make is something that is associated with whatever role-play, story or scenario that's going on at the time. In the groups that I'm most involved in there's a lot of what we just described as free play when as leaders we just observe. It's not like school or youth groups where they are learning lessons or working on badges, it's about having fun and playing. When a child says,

“Can you make me a so and so because I need one?”

The response would be:

“No, but you can make it and I can help you.”

That's the way that we work. Occasionally, we might be around the fire and someone asks for a story, but I'm not really a storyteller like that. For me, our sessions in the woods should be about using their imagination and creativity to weave their own story. They're creating the story because they want to be in it. We've had some wonderful examples of storytelling.

There is one little girl, she's only six, who just sits by the fire and starts singing. She makes up these crazy, hauntingly beautiful songs. She just sits there singing away and in another world, and it's just lovely to listen to. That's a natural expression of the nature she inhabits. Sometimes as a guide you have just got to sit back and observe and then see the magic happen.

Beth: It's like in a biodiverse setting then, human diversity also has a chance.

Ian: One of the groups I work with has a very diverse catchment, a really mixed community. Taking kids out to the woods is a great leveller. At the forest schools children arrive every week. They can carry on when they get to the end of primary school, we just bring them back as young leaders, because you don't really want there ever to be an end. And you do see change although sometimes it does take a while. It can take a few months to get to that stage where they're comfortable playing freely and know that we trust them and that they can be confident enough to explore using their creative imagination. What they're learning is how to get on with each other, how to be more resilient, practical things like how to use tools. They're learning that when you're hungry you can actually cook something for yourself. You don't have to wait for that moment which is the eating time, we could just eat around the fire when we are hungry. I think that this is an amazing learning experience and I feel really privileged to have the opportunity to continue to be involved in education for life

Beth: Thank you for sharing so much of your time.