Invasion ecology

This publication brings together conversations that took place in the summer of 2024 with artist Yan Wang Preston and theorist Banu Subramaniam. These discussions took the form of online public webinars, and are brought together here with stills from the source material of my 4-channel video installation, *Invasion Ecology*, which was first presented around the same time on Dartmoor at Southcombe Barn, Widecombe-in-the-Moor, as part of the group exhibition, also called Invasion Ecology. It was curated by Vashti Cassinelli and Jelena Sofronijevic and featured work by Ingrid Pollard, Hanna Tuulikki, Iman Datoo, Fern Leigh Albert and Ashanti Hare as well as myself. The conversations, like the works, reflect a collective fascination with the language of native and invasive species that has become so ubiquitous as a way of describing what is happening in our gardens—and far beyond.

Ashish Ghadiali

Yan Wang Preston is a visual artist interested in landscape representation, identity, migration, and the environment. With photography as her primary medium, her solo, collaborative, and participatory projects employ still and moving images, sound, performance, installation, and the artist book to explore complex ideas from multiple angles. She was born in Henan Province in China in 1976, to a family of medical doctors. She gained her BSc in Clinical Medicine at Fudan University, Shanghai, in 1999 and subsequently qualified as an anaesthetist. In 2005 she emigrated to the UK in 2005 and changed her career to photography. In 2009 she gained an MA in Visual Arts from Leeds Beckett University. In 2018 she was awarded a PhD in Photography by the University of Plymouth. Alongside her artistic career, she lectures at the University of Huddersfield. She lives in West Yorkshire with her husband and daughter.

A conversation with Yan Wang Preston

Yan Wang Preston I've got loads of questions for you. First of all, who are you?

Ashish Ghadiali Okay, my name is Ashish Ghadiali, and I'm the director of Radical Ecology.

YWP And what is Radical Ecology?

AG Radical Ecology is an organisation that I co-founded in December 2021. We work across art, research and policy. I mean, that's all the boilerplate stuff. Before that, I was a filmmaker and a climate justice activist.

In my activism, I was part of a collective called Wretched of the Earth, like the Fanon book. In 2019, we wrote an open letter to Extinction Rebellion in which we laid out a critique of what we think of as white environmentalism. And essentially laid out a manifesto for climate justice, which captured the zeitgeist. We were just a ragtag bunch of activists, grassroots, you know. And then the inbox suddenly got very busy with lots of invitations from different kinds of people, organisations, activists, but also, policy makers, funders, arts institutions.

Then I ended up leading the political strategy for the COP26 civil society coalition. Suddenly we were very busy. So it went from just being a thing that I did on the side to most of my time being spent going out and doing advocacy around climate justice,

doing political education around climate justice. And that also led to situations where I was teaching funders about climate justice, but also going in and delivering interventions in institutions.

And it also led to a situation where I ended up becoming part of the committee that was organising civil society actions in the run up to COP26. So I guess it was through that cauldron of activity that some funders started asking me for advice about what to do on climate justice and then said, actually, what's the project you want to do?

So it was an organisation that emerged out of activism or through some sort of dialogue between activism and all of these other sectors. And as I say, I had a practice as a filmmaker, but then I guess it became central to my theory of change, that you can't really tackle the climate crisis or the environmental crisis except really through art, because essentially the climate crisis is the manifestation, the outcome of a system of thought and culture and practice, you know, hundreds of years of empire.

And so you get to say a COP negotiation and a lot of the outcome is already determined. You're just arguing over a small degree of possible movement.

But really, the question for us is, how do you create a new world? How do you create that new system? And, as I say, I think that's something artists and writers initiate, actually. I think that I was thinking at the time, in around 2020, a lot about the Harlem Renaissance and like the kind of continuation, the kind of long evolution from, say, the abolition of slavery and through to the Great Migration, the emergence of these literary and artistic movements.

But then how those ideas then travel through and become political structures, you know, become decolonial political movements, becomes the emergence in the 1950s and 1960s of a kind of new international economic order. So, like, I guess I was interested in that question, you know, like in those years, 2020,

2021. I guess I experienced a world of international diplomacy a little closer than I had previously. And it made me think of art.

YWP I'm really glad I asked you all that.

AG Yan Wang Preston has decided to flip it around and ask me questions.

YWP I'm very curious. Can I go back further? How do you even get into activism?

AG I don't know, I guess I was always an activist. Even as a teenager at school, I feel like there was always, in my mind, kind of a split between the structures of power and what I believed was the truth, and that it was really important to always battle. You're always in a context where you're somehow constrained, and you have to push on that. You have to push for truth. You have to express your truth. You have to, like, create change in the spirit of your truth... So, by the time I left school... within months of leaving school—it was just before the publication of the Stephen Lawrence Inquiry about institutional racism in the UK—and within weeks I was in protests and kind of organising, doing interviews with people, victims and families of victims of state violence. And I guess I was always just active in solidarity.

YWP It sounds like you always were aware that something's not right in the power structure. And you also believed that you could help changing it.

AG Yeah, I think that's probably the formula. A lot of that, for me, was the experience of growing up as a racialised person in Derbyshire. I went to secondary school at a boarding school in Shropshire, so these were white, middle class environments. And I guess there was always the knowledge that racism exists and that you can't speak about it in all spaces, but it's there. And so I think the emergence of a kind of independent voice in me was always a voice that wanted to facilitate change around that.

YWP So when you mentioned that racial inequality and the climate crisis are connected, could you expand on that?

AG The Climate Justice 101 argument is that the planet is warming up at a fairly rapid rate. We're still emitting carbon, we're still increasing the rate of carbon emissions. And we have projections that show us that if that continues at its present rate, that these are really catastrophic scenarios.

But climate change is already happening. We're already at 1.1 to 1.2 degrees above pre-industrial temperatures. So if you went back to, say, the mid-19th century, we're already 1.1 degrees warmer than then. And that's creating disruptions and fractures, extreme weather. We're seeing hurricanes in the Caribbean right now. We've just had a terrible heat wave in India and Southeast Asia.

What we find with climate impact is that these impacts are actually worst where people are poorest. For example, in Gujarat, where my family's from, but where I've also been talking to people who work professionally around climate change, through the recent heat wave. If you have air conditioning there, then you're not going to die of extreme heat.

Whereas if you were going to go out and do manual labour in order to support your family in conditions where there's not adequate access to clean water or shelter, these are the conditions in which the heat wave becomes fatal. And so that sort of plays out, you know, in contexts all around the world where we see that the impacts of poverty and global inequality actually really play out in terms of climate vulnerability. When we look back historically at the emergence of climate vulnerability, it's not something that has just happened accidentally.

The history of humanity has been shaped right now by hundreds of years of colonialism, European imperialism, of the construction of commodity passages, extraction from many parts of the world towards the global north. So as climate impacts now develop further, we find that actually the global north is much

more resilient to those hundreds of years of accumulated wealth, with infrastructures that make these places more resilient. For example, as a hurricane runs through Dominica, it can do enough damage to wipe out the nation's entire GDP.

Whereas the same extreme weather event might pass through New York, and whilst it might cause a lot of damage, that's, in a sense, worth a lot more money in dollars, actually the city will be back up and running within a week.

YWP I think I understand it now. While you were talking I was trying to respond to this, because I think for a long time, probably even now, I've never said I'm an activist. And I asked you where you started, when did you become aware? I think if I look back, really, who I am now and what I do and how I do things—all these are so deeply shaped by my own history.

You know, I was born and bred in China. And I think, similar to many people there, we don't believe that we can change things. You know, certainly, I didn't believe it until perhaps very recently, because over there, the political system is one in which normal people don't have voices.

And you don't really want to have a voice, you know. So I think I remember in 1989, I was not living in Beijing at the time, but I was watching the news on what's happening in Beijing at Tiananmen Square. I was 13 years old. My conclusion at the time, as a 13 year old girl was, don't get involved. I remember that moment very clearly. Don't get involved, keep your head down. You know, and so when I came out from China, I was already 29 years old, fully grown.

And I feel since then till now, I'm just slowly undoing what has been done to me. So, you know, you are probably the second person I have met, who has clearly said, I'm an activist. The other person I met two weeks ago.

And then this year, something else happened. I did a talk with Client Earth. And so they are two lawyers, you know, I'm an

artist. When someone in the audience asked, what do you do at Client Earth? The way they spoke about what we did, that was so passionate. They were completely convinced, you know, these people studied law, but they could have studied, they could have practiced other laws to be rich. But they chose to be activists, they are activists, you know, they are dedicating their lives to that. The moment I saw the conviction in their eyes, I was like, wow, they are not shouting slogans. They truly believe in the possibility of change for the better. So that's since April, only this year I started getting to really understand people like you.

My world is either the academics who are more interested, perhaps in the production of knowledge, but not, not necessarily making changes. An artist can be anything from someone who just makes, you know, soft porn pictures that call them art, to someone who actually really wants to make art as a form of propaganda. And I suppose that's kind of my quick response to what you've just said to me.

AG So where on that scale would you consider your own art—from soft porn to propaganda?

YWP Definitely not soft porn. I'm 70%. So if soft porn is zero, propaganda is 100. I think I'm only 60%. So completely not soft porn, not interested in that. I don't like propaganda either, because I know what that is like. I grew up in that.

AG So if you were a political party, you'd be centre right.

YWP What I mean is I'm very sympathetic towards activism. I want to have possible changes for the better. But I haven't got the courage to be loud. Rather than being loud in that way, I have spent my energy doing things around the edges by hoping that that could make a contribution.

AG How did you become an artist? When was that moment?

YWP It was just a gradual thing, because the first step was to

commit to photography. And that's when I came to the UK, I was trained in Chinese medicine...

AG ...my parents were both doctors as well...

YWP I became an anaesthetist. My job was to put people to sleep. So when I came to the UK—because I met someone—we were married in China—it's a big question, what would I do there?

And I was drawn to those mysterious, but very exciting things like photography because I saw some pictures in China, Ansel Adams type landscapes, Edward Weston-style still lifes and French humanists like Henri Cartier-Bresson—that was the decisive moment. These three things I saw in books, while I was in medical university, they took my breath away. My classmate asked me why is it so interesting? And I found it absurd that they didn't find it interesting.

Every person I knew, until I was 24 years old, was a doctor. That was my world, I didn't know anything else. So I did an MA in photography. And obviously, MA education here is very much on the critical and political side, in art, I obviously didn't know any of that, I just kind of plodded along really. Then I did the PhD. The PhD was a major transformation from just being plodding along to having actual awareness of what I was doing, what was the context of what I was doing.

AG So what happened? In that moment you're talking about... Ansel Adams, Cartier-Bresson and Edward Weston... What was it? What was going on for you?

YWP I just found it really beautiful. Edward Weston's dead trees and the pepper. I don't know why. At the time it's a beauty that attracted me. Obviously, now, if I look at Ansel Adams's *Storm in the Yosemite Valley*—it is such a colonial picture. Now I know it. But at the time I think, you know, it's a natural beauty, the purity, you know, all the things that these pictures are celebrated for and I was attracted by those things.

AG So then that became your pursuit. And it wasn't necessarily carried by any kind of critical reflection. It was just the action. It was just doing that itself. I just wish that for every human being. At some point in your life, you find the thing that carries you.

YWP Well, I suppose the wake up call from that kind of pure nature and beauty, visual beauty and all that was when I came to the UK, the north of England, around Manchester, and we started going rock climbing in quarries. I found that very strange. I didn't even know about the existence of quarries when I was living in China. You know, it's a very narrow way of living. Very narrow, very urban. Very human-centered. So when we started climbing quarries, I realised we've already traveled this. This land has already gone through several transformations by the time we went climbing on it.

You know, at first it was like we say the earth, you know, with rocks, rock formations created by geological movements and phenomena. And then it was blasted and the rocks were dug out to use for whatever reason, buildings, mills. And then obviously after that, there was a long time when everything was derelict. And somehow climbers started going. So it became a leisure ground. And there was a particular route we were doing. There was a big hole, deep underneath. And some people do fly tipping. You know, we see people lurking about with beer in their hands, you know, looking a little bit scary. And there's a shooting club. So I suddenly realized this little bit of the land. It's quite difficult to put one definition on it.

And that's when I realized the complexity in even just the so-called landscape. So that's the first moment of realizing this. And then obviously it took a very long time to unpack. And I'm still in the process of that.

AG What was your PhD?

YWP For my PhD, I went back to China. I photographed the

Yangtze River there every 100 kilometres. The river is 6,211 kilometres long.

AG I was curious as to how *Mother River* emerged, because you were talking about those realisations around the landscape, essentially realising that pure nature wasn't pure, that it was complex and constructed. And then you embarked on this PhD, and that sent you back to China. And in that project, you photographed the Yangtze River every hundred kilometres. I want to understand what was driving that.

YWP I think basically while I was living here, mainly it was a binary set of impressions, shall we say, on the Yangtze River. The first set is all the very environmentally charged photographic projects that were very popular here [in the UK], not in China. At the time, for example, the Canadian photographer Edward Burtynsky went to China and photographed a lot of ruined towns. The towns were abandoned to give way to the dams on the Yangtze River. And this South African photographer, Nadav Kanda travelled on pretty much all the rivers. He generated pictures. Again, there was quite a negative environmental and political message in the pictures. That's one set.

The other set is what I had in mind of my mother river and my motherland, which is that grand and beautiful picture of the Yangtze River printed on our money. What I could not understand was why the pictures are so different from each other. I thought I needed to go and work this out myself. I think the project was far too big for me at the time. I barely did it. I just about did it. What I produced was still pretending to have that documentary authority that is embedded in the ideology of photography. And also the ideology of photography as mainly practiced as a Western and male media.

Yes, I'm a woman. But actually, my way of practicing was not that different, particularly if you consider I'm a Han woman. So

in China, we have many different ethnic groups and we have 56 ethnic minority groups and the one that's not the minority. I am from the dominant ethnic group. And by this time I was very much aware that at least one third of the river runs through the Tibetan region. And I'm this Han person who is going to say it's our mother river. It unites everything. So there were problems I could not address at the time. I'm still doing all sorts of smaller projects and I'm hoping to kind of nibble through the problems from different angles.

I'm really interested in that idea, because in a way, every project is a failure, right? You start off with a question and then you kind of realise... what a stupid question, or, how could I ever answer it? But then that then opens up... So what is that realisation that you're talking about in relation to your own identity, your own gaze, your own position? And the limit also of my own media, photography.

I'll show you one other project that I did in the UK. This time I'm working the other way around, because while I'm in China, it doesn't matter that I'm a woman, I am still from Han. I cannot think like a Tibetan. I can be very sympathetic, but I cannot. But over here, it's turned itself on the head because all of a sudden I found myself the minority. And I found myself the non-white minority. And that's really interesting.

So the project that I began during COVID was my attempt to make sense of this new position I found myself in as a foreigner, a non-white foreigner living in Britain.

So this is just a rhododendron bush I found by accident once on post-industrial land. And you can see it's got a natural heart—although it's not that natural because actually the love heart shape was mainly caused by sheep. They keep nibbling all the new branches on the bottom and they helped to trim the plant in this shape. The project is called *With Love from an Invader*.

While you're out walking in the woods there are all sorts of signs saying this is invasive and that's not native. So, you know,

for years I noticed these signs. I found it interesting where the two words non-native and invasive seem to be naturally paired. You know, it was always a little uncomfortable because I'm not native here. And so this was the little seed and slowly I picked up more things.

This was in *The Guardian*: 'A spectacular thug is out of control'. This is talking about the *Rhododendron ponticum*. I found the title disturbing. You know, this is a national platform talking about some 'spectacular thug' of a plant. How can you blame a plant with this kind of language? So, again, the feeling of being uncomfortable kept growing when I saw more and more things like this. And let's read this. Yeah, this was on the official website forestryandland.gov.scot. It's still on it now. Yeah, when they say they are trying to remove rhododendrons. You know, they say since then, we've been using chainsaws, herbicides, heavy machinery and considerable human muscle power in the battle against this 'unwelcome alien'.

Wow! And fifteen and a half million pounds. That's very scary to me. You know, language has power. This unwelcome alien.

So, again, for me, it needs to reach a tipping point when I kind of commit to actually doing a project. So the thing is, I had a very quick look already at what's going on with this rhododendron because I'm Chinese. Rhododendrons are native to China and we don't talk about them using this kind of language.

How did they even get here? Obviously I now know so much about the history of rhododendrons here. We're going backwards from *The Guardian* to this 1849 publication when rhododendrons were seen as the king of flowers. Every self-respecting rich person with a big garden needed to have a rhododendron or two—or a lot of them. Even now, if you go around, certainly in my area, every reasonably sized garden will have a rhododendron. So, you know, let's look at how he was portrayed. Joseph Hooker, he was the learned white man wearing a pair of glasses, sitting there with native women kneeling down in front of him, offering him the

rhododendrons. And this is how the rhododendrons got here.

And the way we talk about it here is from the position of that man in the middle. And when I look at this picture, I thought, am I that woman kneeling on the ground? I don't associate myself with him. I definitely associate myself with her.

Even the flowers—again, the history is disturbing. Going back further, to 1823, the famous horticulturist Henry Phillips had this line, 'the introduction of a useful or ornamental plant into our island is justly considered as one of the most important services that a person can render this country'.

So the plants have not changed, really, have they? They're just rhododendrons. But we have changed, our perception towards them has changed in this country. What happened? Around 2020, when we had COVID, I personally felt it.

I didn't catch COVID. But as a Chinese person living here, it was a very unsettling time. To watch what's going on in China, to read about the anti-Asian racism in the media, to see my own photographs being vandalized in Liverpool with what was written in early 2020, to also think that I don't know when I would be able to return to my homeland.

That was a very strange moment in my life. On 17th March 2020, a week before the UK national lockdown began, I made a decision to use my daily walk allowance to photograph that love-heart-shaped rhododendron, which I had already found two years ago on this exhausted post-industrial land. I just thought, I don't know what I'm doing, but I need to work this out.

I learned how to understand the change of attitudes towards 30 introduced species in Britain, and how we can learn from artistic investigation of a post-industrial site colonized by rhododendrons. So it's the most wanted plant here in both positive and negative ways. And I chose the site for a reason—because it's so desolate, caused by about 250 years of lime mining.

They flushed down the topsoil to reveal the lime underneath. Over time, the hill, the moors became this shape, and you can see

the rhododendrons. They were planted about 150 years ago when the local landlord decided to improve the land by changing it to a hunting estate. They planted *Rhododendron ponticum* to provide cover for the game.

So the love-heart-shaped bush grew there. The place is 17 minutes drive from my house. After I park up, it's a 22 minute walk. So the whole trip would take about two hours, each trip. Often I would spend more time there because I was exploring the land.

So I told myself on 17th March 2020, that I was going to photograph this bush every other day for a whole year, always at half an hour before sunset, because that's basically how much I can manage, as a way to create time and space to explore my own questions. I learned so much in this year from the walks, from the talks I encountered with people who I met there, and from all the books I read on a very colonial history of the rhododendron's introduction to this country. So everything I'm doing now really began from this period.

One of the biggest discoveries on the site was the discovery of animals. Because they say that rhododendrons are bad for ecology, and I thought, I'll just see what's going on there. Apart from the rhododendrons, what else can be found there? I bought two very cheap infrared motion sensitive cameras, 40 pounds each. I just started by randomly placing them inside the rhododendron bushes, and generally in that area of wasteland. And these are some highlights.

This one's inside the love-heart bush. This one's inside the badger bush. I call it badger bush, because the badger's always there. So the discovery of the animals completely changed the way I saw the land, because it really looked fairly ugly in a spectacular way. But obviously, that's based on how we define beauty.

And, over time, I realised, with the help of the cameras, that this rhododendron land is a home for so many creatures. And for

them, this is not a wasteland. It's not ugly. It's just where they live. So on land like this, it's a normal native, if there are these things. Native plants may find it quite hard to grow.

So these kind of rhododendrons typically can find areas. Ecologists call them disturbed land. Disturbed by whom? Obviously us. And so these rhododendrons here, my bold claim is, they are almost like a keystone species in this particular land, because they grow first from the ruins. They have the ability to grow. And then they form shade. They provide cover. And other lives will follow. So, my incomplete and amateurish field report after a year, we probably saw around 25 different animal types by the infrared camera on the ground. So not just wildlife.

You know, you have sheep, humans, mice, rabbits, hares, herons, foxes, badgers, pheasants, cats, small children, they are a different breed, aren't they? Squirrels, deer, magpies. And I also did sound recording, because I wanted to know more than what my own eyes can see in the land. By this time, I was very much aware of the limits of photography and the photographer.

The sound recorder captured so many different sounds. I used Merlin bird ID. Again, this is an amateurish app. to re-listen to my recording. We identified at least 45 bird species. So I don't agree that this is bad for ecology. I can say this because I spend a lot of time there.

I have data, you know. So this is my exhibition installation at the Royal Botanic Garden, Edinburgh. And in the information room, they literally quoted me. I always thought as an artist, we don't have this kind of authority, you know, to compete with scientists. But anyway, I was bold enough that time to say what I just said. I think in these kinds of areas, they are almost like a keystone species.

And they used my line there. I found it really touching because they didn't throw scientific authority at me. And I remember when I went to do the talk, someone said to me, the work can be quite controversial here.

I said, why? Because rhododendrons are the number one public enemy in Scotland. And I said, I have data. They said, precisely.

We did the talk at the National Galleries of Scotland. We had a panel of botanists, artists, filmmakers, and the first question asked by the audience was, can you tell me how to get rid of them? So changing opinions there has got a long way to go.

We made a soundscape as well. I worked with a composer. 182 walks later I came to an understanding of this term called 'recombinant ecologies'. It's a belief, where there's a type of ecology or habitat that's experienced by all sorts of species, that there is no hierarchy separating the native from the non-native. They all make contributions.

And in that same way, I think societies like Britain are intercultural societies. You know, the experience you had growing up and the experience I had as a new migrant. If the society is more aware of the unquestioned hierarchies, where nativeness somehow is seen as superior, which it is not at all.

And society could be a lot more just. For me, environmental politics and identity politics are completely interwoven. It's almost like let's not talk about what's good ecology. Let's say what's a good home. For whom? And who gets to make that decision? So that's where I'm at. You can see a lot of materials on my website, including videos. And you can listen to the sound as well. I've made new work since then, a lot more targeted on gender and colonialism. This one's very much on ecology.

AG It's really clear that you truly did become an activist.

YWP Have I? I hope so. But, you know, that's what I'm saying. I do my work. I was hiding in the corner doing my walks. But, you know, I do hope that it will make positive contributions—like what you are trying to do.

Audience questions:

AG Sarah says, thank you both for wonderful presentations and sharings—beautiful projects. Like you, Yan, I struggle with the term *activist*, though others have called me that, but personally as an artist and sacred medicine practitioner I prefer the term catalyst. I wonder what you think of this word in relation to artistic practice and the imagination.

AG Catalyst, that's a really good term. I feel like if we connect our work with activism, then—it doesn't do that all the time—but it can function as a catalyst. I'm hoping that the work we do gives space, but also gives that necessary emotional response to want to change things.

AG David is wondering about the empirical repetition-type methods. When did this impulse arise?

YWP I have noticed a trend in my own practice. I photographed the Yangtze River every 100 kilometres. I followed the development of the trees in China in another project for seven years. I walked to the rhododendrons every other day. Every time I do this it's not quite conscious in a way that I'm not telling myself to be tortured. But I do believe that you need either a ritual or a discipline. You push yourself to a corner when you make work and you've set a lot of limitations and you need to put your body and your mind into a state you're not normally in. You don't normally do walks like this. You do dog walks, but not with the same mindset. So only when the body is really pushed out of its limits, it starts to notice things, it starts to think differently. And if we can phrase it more negatively, perhaps, you know, it's a lack of confidence in a way that I feel like I'm incapable of reaching the inside immediately. I need to make sure and I need time to do that. And repetition becomes a way of… It's a ritual, isn't it? And it's never quite a repetition because the walks, every one is different, different weather, different mental state..

AG David says organizing time and geography in a prearranged structure is very like science methods. And then the unexpected body disrupts.

YWP Yes, that is really interesting, because I was trained in medicine. And also I was taught in China, in our learning process, it's mainly about coping, remembering and repeating. So somehow it's still there. It's a compass.

Banu Subramaniam is professor of Women, Gender and Sexuality Studies at the University of Massachusetts Amherst. Originally trained as a plant evolutionary biologist, she writes about social and cultural aspects of science as they relate to experimental biology. She grew up in India and received a baccalaureate degree from Stella Maris College at the University of Madras before attending Duke University, where she studied evolutionary plant biology, receiving a PhD in evolutionary genetics. While completing her PhD, she also earned a graduate certificate in women's studies.

A conversation with Banu Subramaniam

Ashish Ghadiali The programme that we're doing now around invasion ecology has really been inspired by you, Banu. You've been our muse—in that, as a group, myself and colleagues were together starting to question the language around native and invasive species. We had the good fortune to come across your article for *Pioneer Works*, 'Barbarians at the Gate'. And it was something that we started sharing with one another and with our wider network. It started to give us some structure for thinking through the questions that were arising for us.

Out of those questions and that discussion we've developed an exhibition and a performance that we toured around Devon and Cornwall, and we've been quite surprised to find that many people are holding the same questions. I think the structural pieces that you've put in place have been of the moment and very necessary. So there's a lot of gratitude for your work.

I think specifically the key thing was this book that was referenced in your article and also features in your first and third books, particularly *Ghost Stories for Darwin* and *Botany of Empire*, which essentially pointed us towards Charles Elton[1] as the father of invasion biology or invasion ecology. So how did you come to Elton? How did you come to this topic of invasion ecology?

Banu Subramaniam I came to it through biology. I had two colleagues and we were doing some experiments in California

looking at native and foreign plants and their soil communities. Did native plants do better in native soil than exotic plants? There are all these different theories about soil communities and plants. So we just wanted to test those.

And as I began to do that, I was looking at both the literature, popular and academic. I was really struck by the ways in which we talked about exotic species and foreign species—and that invasive species have to be foreign. You can't have a native invasive species. And it was also the time where I was going through my immigration process in the United States.

I had an Indian passport and I realised we use exactly the same language with plants as we do with humans, that you come in, you're an alien and then you can get naturalised. But you will never be a native, right? So you will never be an American born citizen. At best, you can be a naturalised citizen. And these are political categories. And then beginning to see how these were also times when there was a great deal of xenophobia in the United States. And the historians of biology argue that during periods of xenophobia in a country that xenophobia translates into germ panics or fear of invasive species.

So it becomes a cross-species, pan-species xenophobia. It was certainly what I was noticing. Then I started tracking how we talk about foreign plants and animals, how we talk about humans and seeing the remarkable similarities between them.

This is at the heart of this field that I've been part of—feminist science and technology studies. And at the heart of it is the argument that we have artificially divided the world into these binary categories of nature and culture. And so people who study biology only study biology, like I studied no history of biology or philosophy of biology when I was trained as a biologist.

In fact, thanks to the British, after 10th grade, I did not have courses in humanities or the social sciences at all. So when I came for a PhD in biology, I had no language of culture. It was all objective. You communicated and it was all meritocracy. And so I

sort of feel both my education and scientific culture in general precluded a language and a set of theories to understand what was happening in graduate school. And this is what I feel was the language that feminist studies, ethnic studies and queer studies gave me. And that is what allowed me to see what was happening in the culture of my department and the culture of science, and that it wasn't me. It was the culture.

And that gave me the tools to stay on in biology and finish my PhD. And so I continued. I'm very committed to the project of biology, about trying to describe the world, to understand what's happening. But I feel the tools of the biological sciences are insufficient. And so my work has really been about trying to figure out how do we bring theories and insights from the humanities and social sciences to understand the natural world. And there's a lot of talk in academia right now about interdisciplinary collaboration, but actually, they're very entrenched structures, as entrenched as the language that you're describing.

AG One of the things that really is remarkable about your literary output is how profoundly interdisciplinary it is. How you have actually moved from biology to women's studies. You've told us the story of why, but the question that now begs is how have you managed it?

BS The *how* is really difficult. And when we say interdisciplinary sciences, it's usually biochemistry, biophysics, right? It's within the sciences where there is a shared epistemology, a shared way of working and a shared analysis of how one does. And I think there's been some interdisciplinary work in conservation biology, in policy work around climate change, but those tend to be very positivist social sciences.

But to me, what I find very powerful in the work that I've read is that it is insufficient, that we need to actually understand where these categories come from. Why did this category of invasion biology come up? A hundred years ago, at least in the

United States, the US Department of Agriculture sent biologists across the world to bring interesting, funny looking, weird looking, economically important, beautiful plants back into the country. There's someone called David Fairchild, one individual who brought 120,000 species back into the United States. And so in part to understand how it is that we come from laissez-faire open borders to this moment where every weekend people give up their time to pull out invasive species, the bad species, from rivers or forests, that transition.

And that transition for me is really the history of immigration. It is the history of post-colonialism. That once colonial powers extracted the resources, independent movements were afoot. Then they closed their borders to new immigrants coming in, except if they are workers, if they can contribute to the economy in some way. And I'm struck by how many parallels there are between how we treat plants in terms of who is good.

Most of the plants we eat are foreign, but we are not about to say we don't want those foreign species we eat, yet we will talk about invasive species and foreign species as bad and all these other different kinds of contexts. I'm struck by those parallels between human, plant and animal. I think it has not gotten very much traction, at least in academia. Within biology, it's rare to have people who are not following the tradition of biology. But I find there's a great deal of interest among students, undergraduate students, graduate students, and even some junior faculty who are beginning to see the limits of what is possible within a biological education. But it's really difficult.

It's difficult to do the work. Who will hire you? Which department will hire you? Which is why I'm in a Women's and Gender Studies department, because it's already an interdisciplinary department. I made the argument that if you can have feminist anthropologists and feminist literary scholars, why not someone from the sciences? And University of Massachusetts, Amherst, where I was, said, yes, why not? So,

my case has always been that we need to figure out how to do field biology, laboratory biology within women's and gender studies, because it seems almost impossible to do it within biology departments. There are many individuals across the world who are very interested, who see these connections, who are supportive. But I don't think the institutional conditions exist yet.

AG I can hear it as well in the way that you're describing the subject, one of the things that we found is that we are also quite often going into this conversation saying, let's interrogate the language. There's something about the language. There's something about the parallels. But it's also really clear that when you're making your case that language is really only the jumping off point, that you are actually talking to ways in which we might understand biology itself differently or the world that we inhabit itself differently.

At the same time, when you describe it, you talk about it in terms of being language and parallel. I find myself doing it because I try to leave intact the kind of area where science is expert, and say, well, this bit of critical thinking is the bit that I can do. So how do you actually go about bringing that shift of thinking within science itself as opposed to it just being about semantics?

BS Sometimes when we say the problem is language, people take it to mean the problem is words. Very often when I give talks to biology audiences, some people will say I buy it—I understand what you're saying—tell me two other words I can use instead of 'native' and 'foreign'. And so then you have to make the point. The point is not the words 'native' and 'foreign'. The point is the categories. It's the thinking of what's here and what's there. And in part because this is, again, what the history of biology teaches.

Two years ago, someone did a study about foreign species across the globe and they found that if you look at the British Empire, the colonies of the British Empire had very similar flora

and fauna and it was different from the Spanish Empire. It was different from the Dutch Empire. So it's not as though native and foreign designations have been out there in any of our nature since time immemorial. It was framing produced by histories of colonialism.

So nature itself is a political construct. It has been shaped by the histories of colonialism and histories of slavery and what plants were moved around, which crops were plantation crops, which parts were not. I think in the majority of the world, there are four grains that are most commonly eaten. But there are so many varieties of grain. And some of it is because these were easy to grow. They were easy to control. They were easy to transport.

Similarly, the varieties of tomatoes we eat. You pick those varieties that are easy to transport versus fruit that will rot very quickly. So these histories have really shaped what it is we eat, what is in our gardens, what is in our backyard.

And so to talk about nature as though there's something there, a priority, seems wrong to me, given the history of biology. The way I want to go forward is using that history as our starting point rather than pretending there is a pure nature out there. That what existed before was pure nature. And we want to restore our current nature to that pre-nature, but it's a fantasy that there was a pure nature before. And so starting with the understanding that nature is something that is deeply inflected by human and human histories becomes a starting point to say, how do we create ecosystems that are diverse? I'm not suggesting and saying invasive species is xenophobic, that anything goes. But it becomes a starting point to understand these are all human constructions and that we need a different kind of imagination to construct a natural-cultural world.

AG It'd be great to talk through the three books that you've published on this thinking. Your first is *Ghost Stories for Darwin*. Would you like to outline your objectives when you set out to write that book?

BS I had read many books before, but I don't think I understood the power of a monograph. And in part because these were three projects I was working on, the question of women in science, the question of invasion biology, and the question of variation in Morning Glories, which was my dissertation. And as I was beginning to think of them together, I realized there was this thread. And the thread was that within my biological education, certainly as an evolutionary biologist, variation is key.

So variation is what natural selection works on. And within the cultural realm, it was diversity. And I always thought of these as very different objects until I was talking with a feminist friend, Mary Wire.

And most people ask what you're working on, and soon their eyes would glaze over and then we would move to talk about other things. But she said, no I really want to know what you're working on in your dissertation. And I explained I was working on Morning Glory flower colour variation: How is it that there are different coloured flowers and what kind of evolutionary forces maintain that variation? And she nodded and she said, oh, you work on diversity. I had never made that connection before. And so that really opened a bridge.

And then I began thinking, so why is it that variation or having diversity in a field is a problem that evolutionary biology needs to explain? And so I started reading on the history of biology. Now, it turned out that all the major theorists who I used in my dissertation that I studied in my evolutionary biology classes were all eugenicists. And in the history of eugenics this is not all the negative eugenics we think about today, where you want a population of brilliant people.

Their core debate was what kind of human population was the best population? How do we use the tools of science to create a better society? And there were some who argued that we want a society of Beethovens and Einsteins, only the brilliant people. And so we need to curb the reproduction of those whose gene

pool isn't so good. This is social Darwinism, right? We should allow only the best and the brightest to reproduce. But there were a different set of biologists who said variation is the key to evolution. We need genetic variation. So any population that's diverse, genetically, phenotypically, that is a better society. This was a core debate within biology, which was manifested through these theories I was using, but no one ever taught me eugenics in my biology classes. And so that little conversation I had with this colleague opened up a door for me to understand how theories of evolution in biology are related to the politics of feminism, to the politics of diversity. And so that became the through line of the three case studies of morning glory, flower colour variation, invasion biology, and the women in science question that the biological theories and social theories have historically always had a link between them.

AG Next, you turned your attention to the questions of science and civilization from an Indian context in *Holy Science*.

BS So this was a side project. I visit India every year or so and have watched Hindu nationalism growing. As an evolutionary biologist in the US, I'm very used to conservative forces, especially conservative religious forces being against evolution and science, and this construction that science and religion are polar opposites. We need the separation of church and state in the vision of secularism in the US. Indian secularism is very different. It is the equal support of all religions. With the rise of Hindu nationalism, it was being challenged.

And Hindu nationalists imagined and imagine India as a Hindu India, because all the other religions are seen as invaders or colonists who came in. But what fascinated me about the Hindu nationalists, they embrace science, they embrace technology, they embrace globalization, capitalism, neoliberalism. And so it was a very, very different kind of vision of a religion that they had.

And probably the best illustration is the story that many politicians have told, but certainly the prime minister of India right after he won election, he had just started a third term and he was inaugurating a hospital and he said, the fact that we have an elephant God, Ganesha, who is an elephant head on a human body, tells us there must have been a plastic surgeon way back. And so Hindu science was an elaborate science. There were plastic surgeons. There are others who produce babies without going through pregnancy and fertilization. There must have been genetic science.

And that really fascinated me. You could just say this is an elephant God. Gods can do anything, you know. But the fact that he invented a plastic surgeon, he invented scientists. And we see repeatedly this kind of scientizing of Indian mythology and giving it the scientific veneer. Saying, these chariots flew, you know, through the sky. Therefore, they knew about flying planes and they understood the aerodynamics of that. And they had genetic engineering. They had plastic surgery. We have the ten avatars. So that means they knew the theory of natural selection.

So every modern science is anticipated in these mythological stories. It was a very different kind of vision where science and religion were not separate. And so I use five case studies to explore the ways in which science and religion cohere.

And of course, I would argue—and I'm not the only one—that that's true in the West as well. It's just that we have created mythologies of how disciplines are produced. That we think science has nothing to do with religion.

So that's where that book came from and what that book got me to appreciate is how central colonialism is to theories of biology, to India, and to the theories of science. In a way it's the understanding from that book that allowed *Botany of Empire*, which brought together histories of colonialism with histories of biology. In that book I'm trying to make the argument that theories of botany come from theories of colonialism. Why do

we have male and female flowers? Why have we made them in a human image? Why do we have native and foreign plants? Why do we name plants in the ways that we do? So many theories of biology really come from those histories of colonialism. And asking the question is, if that is true and we want to imagine a different kind of biology, what might that look like? And again, unless one knows history, one does not realise where these theories come from. They did not just come from observing nature. It's not just good empirical science. Those histories shaped the histories of botany.

AG The theoretical intervention that runs through the books is very powerful. But one of the striking things about your methodology is that you're not just looking back. It's not just historical. There's also a kind of radical futurism that is running through the work. And particularly in *Holy Science* and *Botany of Empire*, we see speculative fiction surprisingly taking its place in your bag of tricks. Can you tell us what brought you to speculative fiction?

BS We often have science fiction. I'm also interested in fictional sciences, in trying to imagine a practice of—since it seems very difficult to do that in practice—at least beginning to play out through fiction. What might that kind of interdisciplinary science look like? And so in *Ghost Stories for Darwin*, I have a children's story, Singing the Morning Glory Blues, imagining three young girls in India who watch scientists and then grow up to develop this kind of interdisciplinary institute. In *Holy Science*, it is these avatar stories, and this is purely in the realm of speculative fiction, of playing out those stories at different levels.

So on the one hand, telling the history of what has happened on Earth, but then taking a longer view of the history of the planet and how the theories of biology have shaped our futures with climate change, extinctions, extraction of resources, droughts in one place, famine in the other. Why has the history

of science and technology produced these kinds of ends? So there's a speculative part that is imagining otherwise. And in the most recent book, I'm trying to develop manifestos and fiction that imagine what we might do.

Very often, especially from students, they understand that histories have shaped what we do, but what do we do now? To me, the question of what we do now has to be a bottom-up project. It has to be something we all talk about together, discuss together, build together. It can't be top-down. But at least I can offer some fictional suggestions. And this is one of the things that really interests me about your work with Radical Ecology, where it seems like you're doing something very similar there in trying to imagine anew. And I wondered if you could say a bit about that.

AG In terms of what you're saying, it comes from an activist perspective. I'd been doing a lot of work in the run-up to COP26 as a climate justice activist and organising in civil society in the run-up to that.

And I guess within that, a lot of the themes that you're talking about, this question of what is the trajectory that we're on and what is it embedded in, came to the fore. When you're interfacing with that whole intergovernmental process, what you experience is the impossibility of this system changing. One was a kind of critique of the status quo and then that question of where does another world come from? Where does that sort of future come from? That reflection still made me feel increasingly uneasy about a lot of the structures of 21st century activism, at least at that level, the way that it's kind of constituted in some way, commodified, it's another big cog in the machine. I would start to see mechanical thinking, the idea that impact is getting the media to write about you on that day or getting policymakers to move that little bit. None of it in itself constituted world making. So in some ways I was looking back at the Harlem

Renaissance as an example of where art and literature, the long evolution of political structures that starts in the imagination of artists and writers and wondering, what's the bit that then has to happen? The organising, the curation that actually starts to bring diverse imaginations together in ways that start to, over time, ripple as material impact.

BS So when I was talking about the difficulties of interdisciplinary work in the academy, is that true in the activist world as well?

AG Oh, no. I would say that that activism has been one of the great areas of movement in intersectional collaboration. But what you do then get is power dynamics replicating themselves. And so, in a sense, there's been a whole moment of interest in climate justice that emerged out of often entrenched movements for racial justice choosing to engage, or being sought out by, the movement for decarbonisation. That basis for intersectional collaboration does exist and has kind of grown, but it doesn't, in itself, dissolve the power dynamics that make one movement more powerful because of the power of the people who are in it than another movement.

BS Do you think there are more possibilities there? That maybe that's the place where we need to imagine and not academia?

AG The Radical Ecology answer is that it's a space between activism, academia and art in which we need to imagine. That's the space that we're cultivating. You know it's actually always a difficult space to hold. Because, you know, essentially people go to work in, you know, one thing or the other. And when you stand in the middle, you know, that can be interesting for a moment, but then everyone goes back to work.

So how do you actually turn that space that's holding the ground between thought, between expression and action? It's pretty fundamental to what makes us human, what makes

society meaningful, that space between. But in the academy, those kinds of interdisciplinary spaces are where I would argue there is the greatest growth now. So if you think of women's and gender sexuality studies, ethnic studies. These are all spaces that have brought people together from across the academy and they have spawned new fields.

So I wonder if something like that is possible across the spheres you're talking about. Within Radical Ecology or whatever you want to call it.

AG It's great to hear you saying that and very hopeful to hear you saying that about academia. The thing that I noticed is that actually we can get something going, but actually then where does it sit within a discipline like geography? I find that the focus of the thing that I'm trying to bring into that space is quite often being thrown, structurally, by the status quo.

I guess it's what we're doing, right? We are cultivating that space and making the case that it's important, you know, but it feels like doing something that's new. And it's often harder in some ways to do that. It's often harder to create something new than to work within existing structures. Equally, it's often hard to work within existing structures and you'll see the possibilities that are there if you started something new.

BS So I think that's the times that we're in, right? And I think part of the problem is that existing structures are too entrenched. Change is possible in little ways, but the radical possibilities seem difficult, except in theory.

AG But that's true at a micro level, right? The speculative thinking that you're doing about how we might do something differently actually plays out in all aspects of our private lives as well. Why do we live in houses? Why do we inhabit the family structure? We're constantly pulled back into the old, even that process of both imagining a new world and embodying it is not

an overnight process. It's a slow process. But then we see that at the macro level too. What on earth are we still doing extracting fossil fuels? It's madness. But actually, at a structural level, we just don't quite know how not to yet. So... after *Botany of Empire*, what comes next?

BS I think for me it is continuing on from that and really thinking of the reimagining territory. So how might we work on ecology, recognizing these histories of colonialism, recognizing there are extinctions and there is a lot of disequilibrium in what happens. I would argue that in part the invasive species problem is because of how much land we disturb. And when you disturb land, certain kinds of species do well in it.

And so bringing that thinking to imagine a different language, but still being able to do ecological work. Similarly, with respect to reproductive biology and plants, how can we throw away the language of male and female and the primacy of sexual reproduction? And it's not only the primacy of sexual reproduction. It's these old stories. That the males will sow their oats and females are nurturers and really invested in the egg and children is a story we take to all species, including plants.

How do we develop a different kind of reproductive biology? Similarly, in terms of so much of plant naming, it still has names of colonizers and kings and queens, because that's what the naturalists of those days did. And there's such a sense of alienation given that we all knew plants with different names.

And so to some extent, the study of botany becomes a study of alienation from the world that we know. How do we develop through naming a process that will bring more people into the world, understanding that what they know is also botany? Their observations of their gardens is also botany. How do we open that up? How do we stop things like what we call parachute science, where botanists still go to other parts of the world, take what they want, come back here, grind it up and publish a paper? How is

that any different than colonialism? COVID is a great example of viruses and bacteria that move across species.

They're moving DNA. Some people have suggested we need to understand the world more as a reticulated evolution rather than this linear vertical evolution story, so there are lots of really interesting ideas in biology that I'm interested in drawing from to tell the story about the world, tell the story of nature in much more diverse ways than we do. And there are a lot of people already doing it, as you are too.

AG So the critical apparatus, the process of interrogating history to understand how this happened, that stuff's now behind you. And you're moving towards actually starting to put new ideas on the table? That's very exciting!

BS There's a biologist at UMass called Dr Madaleine Bartlett, who's a corn plant developmental biologist. And we have written a paper together on rethinking reproductive biology and throwing away male and female—describing plant biology differently.

AG And the conversations around speculative fiction have inspired you to start writing a new piece called *The Leftovers*, which you shared with me in an early draft and which we're now delighted to be able to share here.

1 Charles Elton (1900–1991) was an English zoologist and animal ecologist. He is associated with the development of population and community ecology. After the Second World War, he became more concerned with the impact of invasive species on natural ecosystems. His 1958 book *The Ecology of Invasions by Animals and Plants* founded invasion ecology as a separate sub-discipline. It became the basis of the study of biological invasions.

Banu Subramaniam

The Leftovers

Lee stretched out in the morning sun, admiring the gorgeous sunrise in its shimmering colours and muted shades, alas thanks to the afterglow of climate change and pollution. Another day with new joys to savor, new sorrows to mourn. One constant comfort these days was to feel the universe humming along, indifferent to the ravages on planet Earth.

Today was the celebration of summer solstice. Solstício was a joyful event. All the neighboring circles came together to join the festivities and share in the food, music and dance. A mingling of cultures and counter-cultures, a smörgåsbord of temperaments, philosophies and ideologies. This was their bond, a loose alliance of those who have survived amongst the rubbles. They are the leftovers. They needed each other. They needed the many talents, ideas, theories, knowledge, skills, cultures, languages, all the sciences and the arts. The federation of circles was the culmination of decades of planetary change. As the planet endured the capricious and unpredictable fluctuations of the climate, more and more areas became inhospitable. Some areas were forever flooded, others rendered into dry, cracked and parched earth. Life and non-life on earth had to endure. Some organisms were adaptable, resilient to the changes. Others—its humans, as well as plants, animals, fungi, bacteria and viruses—moved. The most vulnerable species proved to be humans, ones that were dependent on the external world for food, water, air and shelter. As scarcity loomed, armed groups revolted against the rich elite

who hoarded wealth and lived in their gated bubble economies. In the aftermath of the violence, all humans were equal, at the mercy of the world. Money was worthless. What mattered were skills, the knowledge and experience to survive, to create, to build, make friends and build alliances. As it turned out, humans that survived were the refugees of the world, ones who had long ago fled their lands. Greedy nations refused to take them in and shunted them into refugee camps where they lived by their wits. They developed the skills for extreme living, life with little, even nothing. Those who shared knowledge, resources, and built alliances were the successful ones. These were the ancestors who rebuilt the world and re-peopled the planet. It was a second chance for humanity. They could not blow it again.

What was needed was a radical ecology. An ecology that was not about exploitation, short term profits and extractive logics but a radical ecology for the future that engaged with living and non-living world with respect and solidarity. Everyone and everything needed each other; each creature was precious in its own way. To survive, all had to learn to live together.

The leftovers formed a loose federation of circles. They shared knowledge and skills, they created exchanges when needed. A central principle of the federation is that their strength was founded on difference. They pledged to foster the multiplicity and plurality amongst them. They celebrated

newness, the unfamiliar, the unknown. Once a year they came together. This year, the celebrations would be amongst the Michham. Lee was its current Chief.

Lee's mind returned to the Michham circle as everyone took on their assigned roles. Some checked the tents to make sure everyone was ready for the guests. Others adorned and decked the grounds. They set up the stage and acoustics for the music. Others readied the games that would be played. But the most important and coveted person was Sherehe, the magical chef who was in charge of this evening's Zomsa, the gathering of old friends and new.

Sherehe's team gathered. The supplies were chopped and ready. The bread was kneaded and rising, ready for a fresh bake in the evening before the meal. The fruits were gathered and ready to be cut in the afternoon.

'Is everything ready?' Sherehe asked.

Devi, Ikram, Mila, Sasha, Chiyo and Roya the talented chefs were deep in preparation. They all nodded. Everything was on schedule for the evening festivities.

'We are still waiting on the pawpaws and the persimmons from the Assiminas. The Ramdanas are bringing the amaranth, Kalsetsi's, the candy. All others have sent supplies. We're ready!'

All that remained was picking the fresh herbs and spices that made food taste like home. Sherehe dispatched Anahera and Kofi into the herb gardens. But many herbs refused to grow in the

gardens. Like all the other circles, the Miccham had carefully cultivated spaces where these precious herbs and spices could grow. The Chimpa needed a hot and dry climate year-round, the Swichti needed humid, bright but cool temperatures, the Bimplis needed humid, but dark habitats. Across the land the Micchams had recreated these unique habitats. Sherehe motioned Ari, Maia and Jabari, the beloved flying robots that would bring back these ingredients. With a quick input of the information, they flew to collect the precious ingredients.

Sherehe beckoned Sher, Omari and Aria the porcine members of Michham to sniff out the fungal delicacies for the meal.

Adya, Abu, Emi, Hana, Minjun, Minh, Roya were the artists charged with presenting the dishes with creative flair. Food was not only for the body, but also for the senses, for the mind. They readied the preparations.

The coir mats were laid out. The banana leaves and leaf bowls placed in front. Everyone would sit together on the floor. After the meal the bovine members would scarf down the leaves laced with their delectable flavors. The worms and bacteria would finish the meal. Altogether a waste free celebration that fed the whole community.

Dancing to the music playing outside the kitchen, Shehere smiled.

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