NEW WAYS OF SEEING
Episode 4: CYBERNETIC FORESTS
BBC Radio 4, Wednesday 8ᵗʰ May 2019

> **Now on BBC Radio 4: 'NEW WAYS OF SEEING', with the artist James Bridle. His series builds on themes from 'Ways of Seeing', a landmark 1970s TV series and book, in which the writer John Berger revealed how images – from paintings to photographs – can influence our perceptions of society, and of ourselves. This week, James Bridle focuses on machines and the environment.**

0'00"

MUSIC: Prélude et Mazurka, from "Coppélia" – composed by Léo Delibes

[Richard Brautigan archive recording]
I like to think (and
the sooner the better!)
of a cybernetic meadow
where mammals and computers
live together in mutually
programming harmony
like pure water
touching clear sky.

I like to think
(right now, please!)
of a cybernetic forest
filled with pines and electronics
where deer stroll peacefully
past computers
as if they were flowers
with spinning blossoms.

I like to think
(it has to be!)
of a cybernetic ecology
where we are free of our labors
and joined back to nature,
returned to our mammal
brothers and sisters,
and all watched over
by machines of loving grace.

In 1967, the poet Richard Brautigan imagined what it would be like if nature and technology could be brought into harmony with one another. He called for a 'cybernetic ecology', where people, animals, and computers live together in a state of common care and cooperation. Yet, more than fifty years later, that still seems out of reach.

MUSIC: Outside The Glitch – Void Permute

I'm James Bridle – I'm a writer, artist, and technologist. I also think it's possible for humans, computers, and animals, to live in mutually programming harmony. In this series I'm exploring how digital technologies change the way we see the world, and I'm meeting artists who use these "new ways of seeing" to try and change the world itself.

In Berlin, two such artists – Paul Seidler and Max Hampshire – have been attempting to make Brautigan's cybernetic forest a reality:

1'45"

JAMES [on location]: We're here at a co-working space in Berlin, with a huge glass window that looks out on to the street, and just inside there's this immense rack of plants! Steel racking with neon lights, I think there's about 100 plants here, which are doing pretty well. And it's quite an impressive sight. But also quite out of place, because it's a hugely modern space, clean white tiles, strip lighting… so it's an incongruous sight to see this kind of life bursting forth… so, what am I looking at here?

PAUL SEIDLER: It's an installation called "Flowertokens" – it's a web interface, various computers, and this kind of flower rack –and every ten minutes a camera takes a photo of the whole rack, and basically analysing each flower individually. So it can determine the growth of the flower, and also whether it's blooming or not… and then this whole information gets saved on a distributed ledger, so basically gets attached to a token, which is a kind of building block in a decentralised system, you could say.

MAX HAMPSHIRE: The web interface allows people to buy or sell the flowers, and the tokens that represent them, as well as check in on the status of their flower. And within the project we've built things in to see how people react to this kind of free marketplace attached to a flower rack… if the flower that someone owns blooms, then some of the shares are skimmed off the top and put into a "blooming pool"……

MUSIC: Jan Jelinek and Asuna – How a Spiral Works

If this all sounds a bit complicated… well, it is. Max and Paul are trying to take the underlying software of the blockchain – the technology which powers Bitcoin – and apply it to nature. The idea is that if money and legal agreements can be encoded into software, then one day those

assets could be transferred to the natural world – to be owned not by people, not by a company, but by nature itself. The end result would be a "cybernetic forest" that could buy itself more land, or pay humans to care for it. It might even sell bits of itself – sustainably, of course.

The "Flowertokens" experiment is a first step in taking some radical ideas from the cutting edge of technology, and putting them in the service of the environment.

Of course, there are problems with this. One is that computer systems draw a huge amount of energy. Already, it's estimated that computer use around the world is responsible for more greenhouse gas emissions than the entire airline industry. If energy-intensive processes like bitcoin mining keep expanding, that's only going to get worse.

Julian Oliver, who's an artist and what he describes as a 'critical engineer', has been addressing this problem – by directly confronting the relationship between technology and the environment:

JULIAN OLIVER: It all began, 2013 I first conceived of it, when I was reading about cryptocurrency mining, and the energy footprint of it. And the more I read, the more it became perfectly clear that if this took off it would have a tremendous energy footprint. Therefore, carbon footprint. And I wrote a note in my journal, simply detailing the proposition – would it not be possible to, as a prototype, mine cryptocurrency directly from wind energy? But it was only later that I realised that I could harvest energy directly from a symptom of climate change – wind gusts and storms – and then use that as a potential energy for mining crypto currency, that could then be directly deposited into the bank accounts of climate change research NGOs.

Julian Oliver connected a small wind turbine to a computer which generated bitcoin, and the money it makes is used to fund climate research. It's a beautiful image: the winds of ecological change being directed back into positive effort. It's also a way of taking a negative symptom of *technological* change, and reframing it as a moment in which we can better understand our planet's predicament.

Technology and climate change have this quality in common: they're both hard to see, and thus hard to understand, and to act on. Technology is often buried underground, or hidden in the cloud, or written down in code that only a few people understand. As a result, we don't often see the extent of the network, who's in power, or what their interests are.

Likewise, the operations of climate change happen at scales of time and geography that are barely possible for humans to apprehend. This tricks us into missing what's really going on, because we can only see what's happening right in front of us. What appears to be nice at the

local level, like a sunny day, can in reality be a sign of something going badly wrong at the global scale. So we can think of both technological agency and climate change as visual problems.

At the end of the nineteenth century, the Victorian art critic John Ruskin delivered a series of lectures about the climate. Ruskin had spent years observing the skies, and drawing pictures of clouds and weather systems. He believed that the sky itself was changing – that a new kind of weather was appearing.

He referenced paintings of the English landscape from the seventeenth and eighteenth centuries and explained how the sky in these images differed from what he'd observed. Today, many believe he was responding to the new phenomenon of air pollution from the factory chimneys being built across England: that he was seeing the first signs of the damage that the industrial revolution would do to the environment.

8'04"

In 1972, the critic John Berger's landmark series "Ways of Seeing" considered what looking at the art of the past could reveal…

JOHN BERGER: "…we see these paintings as nobody saw them before. If we discover why this is so we shall also discover something about ourselves and the situation in which we are living."

Today, looking at the art of the past can tell us something about the whole planet.

Susan Schuppli is an artist and researcher. She's worked with materials as diverse as nuclear contamination from Chernobyl, and archives of war crimes at the Hague. I met her at the Centre for Research Architecture, which she leads at Goldsmiths, University of London.

SUSAN SCHUPPLI: When I was working with these climate scientists in the Netherlands, they were very interested in 17th century Dutch landscape paintings – saying, look, we want to understand climactic conditions in this time – where do we go to for that kind of information? They were looking at paintings in particular, the paintings of Jacob van Ruisdael, because he produced over 600 paintings in one sort of small contained geographic area of the Netherlands. And, one could dispute the sort of accuracy of those paintings in terms of their depiction of atmospheric phenomena, cloud formations, etc… but what was really astonishing for me was the climate scientist looking at the art historical record as a kind of proxy for understanding something that they want to find out about the world. And they have to be very inventive about the sources that

they're going to go to for information. So, looking at these images for an entirely different kind of objective, I thought was incredible.

MUSIC: Tanya Tagaq – Hypothermia

In response to the global climate emergency, artists and scientists are exploring ways in which information is encoded not just into visual media, but into the stuff of the world itself. We can look beyond paintings, into other traces that mankind has left on history:

SUSAN: The work I'm trying to embark on now is looking at the Canadian ice core Archive, which is housed at the University of Alberta. And if you look at an ice core – it's an amazing object, that carries something like 40,000 years of climate history in some of these cores. And you see very clearly the birth of the Industrial Revolution – you know, different sort of striations and markings are archived by the ice.

To think of an ice core as a kind of photograph – a snapshot of 40,000 years of history – is to see the whole world as a kind of recording device, which we're only just beginning to appreciate. Like all new ways of seeing, it may be appreciated differently from different viewpoints.

AUDIO from Copenhagen climate change conference
"Climate change in the Arctic is particularly rapid……"

A few years ago, a group of Inuit people from the far north of Canada travelled to the Copenhagen climate change conference. They came with an important message: to tell the assembled scientists that the sun was setting in a different place. The effect was so pronounced that they had come to believe that the earth had tilted on its axis.

The scientists didn't believe what they had to say, because their measurements showed that the earth was where it had always been. As a result, they discounted the observations – the way of seeing – of the people who actually lived in the place they were studying. But as Susan Schuppli points out, this was a result of climate change itself:

SUSAN: There was a kind of antagonistic response to, not so much the claim, but the reason that was being mounted for the claim on the part of indigenous people, that the Earth might have tilted on its axis. So I thought, well, this is not a recourse to some sort of cosmological kind of understanding of what might have happened – no, it's an invocation of science. It also raised the question on who has the capacity and legitimacy to speak on behalf of science itself. In the end there was a perfectly rational scientific answer for why this sunlight was behaving differently in the Arctic, and that what indigenous people were seeing wasn't in fact flawed, it was actually accurate. It's a consequence of global warming, and the ways in which light is being bounced around differently in that part of the world.

As the ice melts in the arctic, the light reflects off snow and water in different ways. Climate change means that – literally – we see the world differently:

SUSAN: it's not that simply we can see changes, we can see environmental changes, but the very means by which we're seeing, the light itself has different properties. And that light is the light that is entering into the eye. So, the very light by which we actually see is also entangled with climate change, or entangled with atmosphere pollutants. Because at the end of the day, the light that enters into the human eye is processed by the brain, and the light waves that enter into the eye are of a different nature.

If climate change is affecting how we see the world, it also has to change the way we think about it. It's not enough to say we can explain what indigenous people see, through science – we have to understand how different ways of seeing matter. One way of doing this, is by bringing a much wider range of people into science and technology, in the first place.

Kei Kreutler is one of the founders of the Open Space Observatory. It brings together a number of different initiatives making space science more accessible. One of these is SATNOGS, which started five years ago in Athens:

KEI KREUTLER: It's called "satellite network open ground station". And the idea with this is that you can build a little kind of hardware device. It looks like a tripod with a weather vane on top, and you can set one of these up on your roof or elsewhere, and it collects low earth orbit satellite data – so, telemetry data – and basically information about satellites that are overhead right now, relating to their battery health. But you can also access if the satellites' protocols are open access on meteorological data or other data that the satellites are sending back to Earth.

MUSIC: DJ Krush – Pretense

The key word here is "open". SATNOGS, and similar projects, mean that anyone around the world can build their own tools for connecting with satellites, and other scientific instruments – simply by downloading the software and schematics from the internet. Allowing everyone this kind of access – not just international space agencies, and big universities – can change the way we see the world… and the way we value it:

KEI: We've done broad sweeping damage to the planet as is, so, we really need tools to allow people to reanimate the ecology and environment that we live within… yeah. I think also, just encouraging more artists, encouraging more people not necessarily from a tech background, to be able to participate in the space, and to show that it's quite easy to be able to grasp some of these

concepts, and to give input directly from first day. So I see it as – not pedagogical or educational, but just an opening for people to be involved in the discussion, and to dive in from the start. Because on some level we're at a New Frontier, let's say, and no one fully knows exactly what's on the other side, and fully knows where they're headed. So everyone should participate! (laughs)

Reshaping our relationship with technology, and thus our relationship with the world, requires a very different way of thinking about it. For too long, we've thought about computers as machines for giving us answers, rather than tools for asking questions. As a result, we've ignored many of their effects – particularly the ones they have on our relationships with one another, and on the environment. But it doesn't have to be this way.

<mark>16'41"</mark>

TAEYOON CHOI: I have this dream that I don't wanna buy any more laptops in my life. Or phones. They're just designed to be discarded in a few years. I think it's just this disposable culture that we have, in Western society, that it's really hard to care for them – we don't care about our machines, we abuse them. But what if we were, like, these caretakers of our machines? I'm interested in "care" instead of "control". Because, code is essentially used to control other people, or databases, but care is about reciprocal relationships, based on interdependence. Care gives opportunity to think about different use of code, and I'm really excited when people just find this moment of care when working with technology.

Taeyoon Choi is an artist, an educator, and one of the co-founders of the School For Poetic Computation in New York. Its founders recognised that technology – which is supposed to connect us – was becoming something that distanced us from our imagination, and they wanted to address that. The School is situated in a building that has a rich history of artistic experimentation…

TAEYOON: …yeah, the building is called Westbeth Artists Community, a non-profit space for artists, but before that it was home for the Bell Labs – important figures in technology have worked here, such as Claude Shannon, who's known as the instigator of the information theory… and, for a few months in 1943, Alan Turing worked in this building, as part of the Bell Labs – he was working for the British military, I believe… It's been used as a factory for Western Electric before that. So, the history of telecommunication, and infrastructure, computing, and present day creativities, lives here in certain types of parallel. There were artists around here who were collaborating as part of E.A.T. – experiments in art and technology – which was a landmark organisation that brought engineers and artists together…

<mark>18'51"</mark>

MUSIC: Laurie Spiegel – Patchwork

Within the walls of this building – on Manhattan's west side, close to the High Line elevated park – engineers and artists continue to collaborate. Today, Taeyoon Choi and his students experiment with different ways of using computers – ways that are more in tune with art, and with beauty:

TAEYOON: A lot of the work the early pioneers were doing was free exploration. Like, free jazz of computing. Looking at how electrical signals could transform images or sound. Or information could become certain types of form. And that's something we still try to do – where we don't try to get the machine to do a thing for us, we try to collaborate with the machine, seeing what the machine wants to do, and finding a voice inside that.
People like to think computers are not human – very cold, and logical, and just dry. But the fact is, computers are built by humans. So, there's a lot of human constructs and imagination inside of computers. Such as, the way that abstraction and repetitions work… there's certain types of poetic form inside, and a poetic effect you can create with certain code. I don't think all coding is poetic – I think there's a lot of boring code, probably most of the code in the world is quite boring! – but, if you look at certain types of languages, either functional or esoteric, and these are artistic forms of code, we can find beauty and aesthetic inside those languages.

20'30"

One of the technologies they work on here, is called the "distributed web". When the internet was first envisioned, back in the 1950s, it was believed it would spread across the whole world as a decentralising force, giving everyone an equal, democratic say in how the network operates. And while this is often how we think about the internet – in reality, it's not how it turned out. Instead, we got an internet that's highly centralised: where a few big companies and governments control how we all communicate.

The *distributed* web is an attempt to change this, by making and using software that *re*-distributes power and decision-making:

TAEYOON: If we think about the internet, there's Big 5 tech companies that govern most of the real estate of the internet. And we're always at the mercy of some Great Estate. We don't have access to technology, unless we pay for it. So, this limited access gives us subordinate relations to creation, and our data. So, this distributed web is forms of publishing, authoring, and creating peer-to-peer Network, where we are in correspondence with each other.

21'50"

MUSIC: Max Cooper – Hope

By putting us back into correspondence with one another, we don't just reanimate the possibilities of communication and imagination that underlaid the initial promise of the internet: we fundamentally reshape the network itself.

Even something as simple as choosing to use a peer-to-peer video chat – a technology which allows computers to connect to each other directly – instead of Skype, or Facetime – routes that conversation differently across the web. It avoids the servers of the big companies that already control most of the internet. Instead, it opens up direct connections between people. And in turn, that allows us to think differently about our individual and collective capacity for change.

Technology can make us all feel powerless. It tends to place more power in the hands of governments and large corporations. And all too often it's damaging to the environment. Under such conditions, the insistence on care, and the creation of tools to embody it, feels like a radical act indeed. But as the artists in this series have insisted, it's something we can all do:

DANJA VASILIEV: Technology is not going to save us, technology is not going to make everything cool again. It is, in fact, us understanding the technology, and being critical and suspicious about it, and realising that we should not be relying on technology – we should be relying on our common sense and the gut feeling. Any system we encounter, it's important to keep in mind that it will probably have the very same failures and defects built in as our society has.

OLIA LIALINA: It's unrealistic that we all become developers and improve the systems. But never forget, it is a system that's been designed by somebody, and it can be redesigned every moment, and it can be turned against you… yeah.

CONSTANT DULLAART: For me the responsibility as an artist is to investigate and circumvent these tools, and use these tools to do strange things, beautiful things, poetic and symbolic things, instead of just taking over that kind of standardised way of communicating.

24'25"

If we only think of technology as machines for doing things, rather than a way of seeing things differently, we miss out on many of the lessons it has to teach us.

I think it's fascinating that just at this moment of deep environmental change, the technological challenge we're most obsessed with is creating artificial intelligence – a whole new level of abstraction that not only distances us further from the planet, but might displace us entirely.

MUSIC: Hakon Stene – Holt

Because in the last few decades we've learned more and more about other kinds of intelligence in the world around us. We've given legal personhood to apes and elephants who display such intricate ways of thinking that they must be deserving of rights too. We're just starting to see the ways in which squids and octopuses, ant colonies and bacteria, display complex forms of behaviour that differ – and in some ways exceed – our own. Even trees, it turns out, communicate over long distances, coordinate their actions, and feed and care for one another.

What if, instead of replacing us, artificial intelligence is here to teach us how to engage with, think with, and care for intelligences other than our own? To challenge the anthropocentrism that has got us into this mess in the first place, and to suggest a way out of it.

This is the perhaps the greatest gift that our technologies can give us: a new way of seeing that reconnects us to the world around us.

<mark>26'27"</mark>

JOHN BERGER voice creeps in

In the original 'Ways of Seeing', John Berger explored how what we see is influenced by assumptions concerning beauty, truth, taste, class and gender.

MUSIC: 'New Ways of Seeing' theme

In this series, we've seen how many of those assumptions are now embedded, often invisibly, into the technologies that we use every day.

JOHN BERGER: "…but finally, what I've shown, and what I have said, must be judged against your own experience."

Berger also said that "We only see what we look at. To look is an act of choice." That's still the case today. We can choose the lens through which we see the world, and we can also craft new tools for seeing a different world. Our choice depends on how well we – all of us – understand our new technologies, and how much we're prepared to care, think, and rethink what it is that we want from them.

music fades

<mark>27'34" ENDS</mark>

'NEW WAYS OF SEEING' was written and presented by James Bridle. The series was produced, in Glasgow, by Steve Urquhart. It was a Reduced Listening production for BBC Radio 4 – and all four episodes are now available, on BBC Sounds.