George: Okay, let's talk about Freud. So, it's the year 1876. Freud is a young man. He is yet to become the great father of psychoanalysis that we know now. In fact, psychoanalysis hasn't even been born. That kind of grew out of biology. So at this time, Freud is studying biology and he goes to a seaside town in Italy called Trieste, a small seaside town, and he spends four months studying eels, obsessively dissecting them. He dissects like over 400 eels. He goes down to the market every morning, buys dozens of eels from the fishermen, and then literally all day, every day, dissects them obsessively. And the reason he was doing this is because at this time, and centuries before, one of the great remaining mysteries of science was the eel question.

Underscore music swells - a violin plays a beautiful melody.

So eels, they have a really interesting life cycle. And in this life cycle, they transform so completely, four times. And their transformation is so so distinct that scientists hadn't realised that this was the same animal. They thought it was four different species. So they were studying eels at one stage in their life cycle, the third stage and were completely unable to find any sexual characteristics. No testes, no ovaries, no eggs, no sperm. Nothing that adhered to their idea of sex and procreation. So there were all these theories about this divine reproduction. You know, how were eels reproducing when they didn't have any ovaries or sperm?

So Freud set out to answer the eel question. And he couldn't. He spent four months dissecting eels. Hundreds, hundreds and hundreds of eels died for this man to publish inconclusive results. Now he did find one eel who had one ball. And, um… It seems that he found that and then decided to lay down his scalpel and put it to rest. You know, his idea of sexual reproduction had been confirmed. This eel is a male. It has a ball. Everybody can rest. The eel question has been solved.

Underscore music fades to an end

Brid: Yeah, well, they didn't... They also haunt Aristotle as well.

George: Yeah, yeah, yeah, yeah.

Brid: There's, like, this kind of legacy for, like, thousands of years of people, of men.

George: Men, all of them, men.

Brid: Men being, like… What are you?

George: Why? I can't... I can't define you. You don't fit my expectations. Yeah.

George (voice over): Hi, I'm George and that's my friend Brid. We're both trans and we've both become a bit obsessed with eels.

George: For genuinely hundreds of years, scientists thought that when a horse's hair from their tail fell in the water, it would become an eel. Like, that was more logical to these scientists than them just, like, having a different sexual biology than them. Like, these cis straight men could not fathom the concept of an animal that, like, didn't fit their binaries. They just couldn't piece it together, which just shows how, like limited in our imaginations we've been for for and are and and also shows that yeah like biology is not as easily categorised as we think and even you know as someone who's you know i do have sex organs i'm not gonna i'm not gonna claim to be like a sexless eel but like but the fact that like we've let ourselves be told what those mean about us by people who only - who can only fathom things that they know and that they understand and so often that is like restricted by their biases and so often they are people who are not trans or even who are not women or and like so they're viewing things through such a specific lens. So the initial thing is that eels just like absolutely shatter that lens they're just like no you can't everything you hold to be true it does not work here you can't you can't define me that way and that's amazing. And the fact that that like just stumped so many people for so long. And then they had to start using their imaginations. And then they're like mythologizing and coming up with all these like really quite beautiful theories for how eels came to be. And it's like, let's give ourselves a bit of that grace, you know like let's let ourselves use our imaginations for our own identities as well. And I know very little about Freud, but I do know that he was obsessed with castration and penis envy and had like - almost all of his theories seem to stem from this obsession with people not having penises or wanting penises or yeah I just I think maybe it came from the eels like it doesn't that cannot be a coincidence he dissected 400 eels looking for their balls and then got obsessed with castration I mean the man's unwell…

Brid: But I think it's also, like, that thing about he just couldn't cope with the unknown.

George: He just absolutely couldn't. Was so, like, embarrassed by it.

Brid: Yeah.

George: So embarrassed that he deleted four months of work.

Brid: Yeah.

George: And, like, which is amazing to me because I think surely the, like, discovery of something unknowable is so much more interesting than finding the answer.

Brid: Yeah, but there's just so much ego in that, isn't there? Because he was like, I would rather nobody knows that I couldn't work out what this was than my four months of work and the discoveries I made be contributing to the collective knowledge.

George: Yeah. 400 eels had to be cut open for that man.

Atmospheric underscore music fades in

Matt: You know, if someone sort of starts to talk very definitively about eels, you can guarantee that they're either a chancer or have an ego because invariably you can't be definitive about these things. And you have to be ready to be proved wrong as well. And, you know, there's lots of people that aren't good with being proven wrong.

My name is Matt Gollock. I am the programme lead for Aquatic Species and Policy here at ZSL in London.

Underscore music fades out

It's very easy to be an expert in eels because the answer to most things is I don't know. Arguably, I mean I'm always a bit hesitant about the word expert, but arguably I could be considered an eel expert. You've asked me a lot of things that I don't know the answer to, so I can wax lyrical about things, but I think it's a good lesson in humility that you can't know everything, and that's partly why I like them. I think they sort of, you know, it's almost like they're taking the piss out of us. It's just like, we're not telling. They've got all these secrets, and we'll never learn half of them. So yeah, it's, I mean, like, you know, some fish, it's too easy. You know, it's like, things like salmon and trout I just got no time for them at all it's like oh come on and I mean you know they're actually relative they're sort of well they're quite enigmatic in their way but they're so like you just have to look at them funny and they die and I think you know part of you know just how did how did they get this ridiculous life cycle but it's also like how do they complete it you know the thought of like what they go through

Mysterious, dramatic underscore

Brid: Should we do some talking about like the madness of eels?

George: The madness of eels. Yeah. Okay. So where to begin? They start as like eggs, essentially like lava, and they're born in the Sargasso Sea and then they migrate and then they bury themselves in mud next to a lake or a pond. They just keep eating and eating and eating and storing up all this energy. And they set off back to the Sargasso Sea and..

And then we don't know what happens. I read a thing that was like, it's probably a big orgy.

Pulsating drum beat kicks in

Matt: When I get asked this question, I'm never quite sure where to start because, I mean, it's a cycle, so you can pick any spot. But, I mean, you know, the obvious one is, I guess, where adults in the Sargasso Sea are breeding.

George: And they're born in the Sargasso Sea, all of the European and American eels.

Matt: But, I mean, even again, the idea that males and females actually meet up in this 2,000-kilometre squared area.

George: They only mate in the Bermuda Triangle.

Brid: Yeah.

Matt: It's almost like they're taking the piss out of us. It's just like, ha ha, we're not telling.

George: They have these four life stages. They start off as larvae. Larvae? Larvae?

Matt: A small larval stage of eels is called a leptocephalus.

Brid: They've got a special eel name.

Matt: And the reason it's called that is it's sort of got this leaf shape and it sort of uses that to sort of flutter through the ocean.

George: And then they migrate through the sea and at this point there's still salt water.

Matt: We know there is a big reliance on currents.

George: And then they get bigger, I guess?

Matt: When they sort of reach the continental shelf, they've effectively become what we call glass eels, which is the sort of classic eel-shaped, long and thin, but they're see-through. And these are sort of what move into rivers, into estuaries.

George: They eventually become freshwater eels. Like, it's crazy to change from saltwater to freshwater. That's like an entirely different biological system. Like, that's wild.

Matt: For them to be able to do that, I mean, like, honestly, they're hard as nails, those animals. They can just, they can live in such poor conditions.

George: They, like, swim over land and, like, bury themselves in mud next to, like, a lake or a pond.

Matt: Sometimes you look at a, you know, like a sort of dirty pond that, you know, guaranteed there's an eel in there.

George: or like a river bank or the Thames. Loads of different places they can live.

Matt: They do have a massive expanse. I think it's around about 50 countries that you find the European ale.

George: They just keep eating and eating and eating.

Matt: That could be anywhere from up in the Baltic and North Norway.

George: (echo) Eating and eating and eating and eating.

Matt: Morocco is sort of the lowest point.

George: (echo) Eating and eating and eating and eating.

Matt: Then right into the Mediterranean and Syria as well.

George: (echo) Eating and eating and storing up all this energy.

Matt: And once basically they find a spot that they like in fresh water, they will sort of bed in and basically feed.

George: And then they stay there for like sometimes eight months, sometimes 80 years.

Matt: It could be as little as a couple of years before they head back off. It could be like decades.

Underscore fades out

Brid: That is honestly one of my favourite parts because I think it's like, It’s not like all of the eels go and they're living in a river and then they take two years to become sexually mature and then something triggers in their bodies that are like, cool, time to go back to the Sargasso Sea. It's like each individual eel - some of them just decide to stay in that bodily state for a lot longer than others some of them are like oh I've been here a year I think it's time for me to go and breed and others are like no I'll be here for the next 20 years like that's just what I've decided to do

George: which is so queer as well like there's so I think the idea of them all like migrating back and some of them have, some of them have matured into their final version of themselves after a few years, and some of them they've taken forever. I mean, I was one of those that took forever, so I really relate to those guys. That kind of intergenerational queer time where you're like at different life stages at like completely different decades like you can have mates who are like 40 who are at the same stage of their life as their friends who are like 20 because they're starting again because they've come out as a new person, well not a new person but you know like a new version of themselves.

So this idea that an eel can just be like, I'm actually just going to wallow in the mud for 50 years. I'm not ready yet. Is it just like the sleepier ones stay longer? Until they've like fully developed, basically. They don't have like a, you know, two and a half kids by 35 rule. Like a lot of animals, you know, we're always told that these like rules are set for us by our biology and by like nature and how nature intends you to live your life. You know, a wife and a husband and two kids. Like, that's supposedly what nature intended, but, like, clearly not, because this guy's been living in the mud for 50 years with no sex organs. So, like... You know? How can we set any rules when this is happening?

Underscore music

Matt: I think what I would say is these, I mean, we as humans have created these -this is, you know, this is an elver and this is a yellow eel. At what point an elver turns into a yellow eel will probably be different depending on who you ask. So these things are sort of slightly arbitrary. But after a certain period, and again, there's lots of hypotheses as to why this is the case, they will become a sort of maturing form, which we call the silver eel.

And that's them getting ready to go back to the ocean. Now, what gets them to the point where they're ready to make that change? We don't really know. Some people have suggested that maybe it's like, OK, I am now big enough. I have got enough storage to be able to do that. I mean, it could be the weather conditions are such that, you know, this is the right time to go. We know that when they actually leave the rivers, that's often influenced by things like moon phase and weather because they tend to go down in really bad weather.

Sounds of a storm in the background

Matt: Like it will be probably very dark because it's a new moon. It's very likely to be raining heavily because they like the flood water to come down. So the amount of

data we have on silver eels is very limited because it's such a rotter to actually get the data.

Brid: So basically they love to leave in the dead of the night, in the middle of a storm. It's very dramatic.

Matt: It’s very dramatic. Yeah, I think they might be goths.

Underscore music gets more dramatic - choral

George: They finally reach their final life stage and they set off to the Sargasso.

Matt: So yeah, they make this sort of nighttime dash out of the river into the ocean. The silver eels do go through sort of quite pronounced changes.

Geoge: They don't develop any sexual organs at all until this fourth stage of life, which for some of them is like, they're like over 50 years old.

Matt: They get much bigger eyes because they're travelling often in the depths of the ocean, and their physiology changes such that they're moving from freshwater to salt water and I think you know it's important to like if you took a freshwater fish and threw it into the ocean it wouldn't last very long eels are incredibly adaptable like that I mean that, that’s very physiologically stressful

George: and this journey can take like a year and a half but they don't eat like they just swim. And follow their imaginary map and they take up to a year and a half or like maybe longer. We don't know because they keep breaking their GPS trackers. They get back to the Sargasso Sea.

Matt: But how they get there, I mean...there's studies that indicate they might use magnetism. They may use underwater features, you know, like turn right at the seamount. Possibly things like currents or salinity fronts or temperature fronts, things like that. How that's imprinted in them, I have no idea because, you know, is that something that they're born with to know to go back there? I mean, again, you sort of answer one question and then you go 50 more.

Music ends

Brid: I think I'm really drawn in general in nature to things which feel there's like an intuitive knowledge or there's like instinct or there's ways of knowing that we as humans can't connect with or understand because there's so much about like the world and life and I guess, transness and queerness that I'm like, that just is what it is. And there is just like an internal knowledge there. And there's just like internal

instincts there that don't really make sense. Or you can't really explain when you're trying to break it down in notions of Western science, but that it's just there.

George: It just is. Yeah. And it's, and you can end up, especially as a trans person who's like always having to justify yourself. And like prove to people that you have considered all the things they think you haven't considered. Like, yes, I have thought about whether I'm just a misogynist. Like, yes, don't worry. I've thought about it. And you can lie awake for a million hours and you still won't necessarily have an answer. Because yeah, it is that thing of it's just, it just is. We don't have to understand something for it to be true. And yeah, there are forms of intelligence that we just like don't have or don't understand or maybe haven't accessed.

They change in so many ways and their whole body completely changes. Like, completely changes four times and it goes from being salt water to fresh water to, like, burrowed in the mud to, like, it has four completely separate lives. And the fact that that's one of the things that made scientists, like, unable to comprehend them, it gives me so much satisfaction because it's like-

They were just thinking purely in their own understandings of their own bodies. And so they couldn't wrap their head around this creature being one life form. They were like, no, that's obviously four different animals. And like, what a mundane way of thinking and what a huge thing that they'd missed. It's so amazing to me. And yeah, there's like obvious parallels with like transformation and life cycles with trans people. And like becoming like an un-recognisable form of yourself that's also like exactly the same in so many ways.

And yeah, that unknowable thing and like being unknowable to yourself is something that I've had to find like a great- It's taken me a really long time to just accept and be like, yeah, you just don't know. You won't know. You will never understand. And that's fine. You can accept something that you don't understand. We do it all the time.

Calm, reflective underscore

Matt: This is a species that is absolutely incredible. Most people on their first meeting will go "Ugh!" and that... I've got a very, very exaggerated injustice, intolerance and that just seems unjust to me that people look at these incredible animals and go "Ugh, I don't like it!"

I see that as my job to fix that. I'm not having that like, these are amazing, I'm going to do what I can. Even if you don't like them, I'm going to work with them.

I guess what I would say is that we're obviously talking about the European eel. The European is one of 16. The species we know most about, the American eel, the European eel and Japanese eel, are the ones that are harvested most and traded most and eaten most, in affluent western places for the most part. There are 13 other species of which we know a lot less. We know much less of a status about. There are some that we don't necessarily even know their full range and we don't necessarily know where they spawn. And they could be in similar trouble to the European eel, the American eel, the Japanese eel because they are all under threat. I do sort of try and push for us to do more on these other species because it's really important that you know if they're in similar trouble that we need to do something about it but because they're in less well resourced places often in the global south it makes it a lot harder. So you know in a sense there's an inequity there and you know the ones we know most about are in the places where rich people can buy them.

I keep saying we don't know much about the European eel we know a lot more about the European eel than most other eel species. And, you know, I think we need to be doing more to understand the other ones better as well.

Music swells and then ends