***That's Wild* Season 2**
The Art of Science | Natural History Illustrations from 19th Century Singapore

Elliott: Hi everyone, welcome to *That's Wild*, a podcast series brought to you by the National Parks Board. I'm Elliott, and I'll be your host for this series, where we'll be talking to special guests from the nature community about topics surrounding biodiversity conservation in our City in Nature. In today's episode, we'll be talking about natural history illustrations, and specifically those that depict the landscapes and biodiversity of Singapore in the 19th century.

When we normally think about scientific research, what usually comes to mind is people in lab coats, doing molecular research or dissecting specimens in a lab. We don't normally think about natural history, it's not at the top of the list, but it is just as important to scientific research and we're going to explore this through today's podcast by looking at very interesting natural history illustrations. And today we've invited Michele and Kathy down to talk to us about this.

Kathy: Hi, I'm Kathy. I'm from the Lee Kong Chian Natural History Museum. I work as an oral historian there in the Biodiversity Histories team, and the oral history I do is about the museum's institutional history. But apart from that, I also look at the older history of Singapore's biodiversity. I look at writings, illustrations, photos — older material about what Singapore used to look like.

Michele: Hello, I'm Michele. I work at the Singapore Botanic Gardens, where I am a botanist, and I curate exhibitions of botanical art at the Botanical Art Gallery. And because of this, I get access to wonderful illustrations, which I use for my exhibitions, most of which are made in Singapore in the 19th century.

Elliott: Nice. To kick off the podcast, what is a natural history illustration? Maybe you could just give a one-liner?

Michele: I think a one-liner is a bit difficult.

Elliott: Maybe more than one line is fine too.

Michele: Well, I think natural history illustrations are anything where living organisms or natural sceneries are depicted and can tell us some information about those environments of the past and help us guide the present kind of research.

Kathy: Yeah, I think when I think of natural history illustrations, the one thing that also comes to mind is scientific illustration.

The most typical one I would think of is, you know, like a plain background, and then there's an animal or a plant drawn really nicely and very intricately. And that is, I guess, the most scientific kind of natural history illustration. But I think when we look at other kinds of art, like landscapes, or even still life paintings, could those also be natural history?

Michele: I think so. I think ideally, illustrations should be born for the purpose of illustrating. Work with a scientist to try to figure out the correct way to illustrate the organism or the scenery that is being depicted.

But I think many illustrations were not born that way, they were done to make books prettier for the purpose of making them sell more, for example. But nonetheless, they might be the only evidence that we have of a certain location that now might be lost to development or global warming or who knows what… Or simply has changed quite a lot over the centuries. And so I believe that we may not be absolutely sure how truthful that representation is, but it might be the only image we have of that location at that period of time. So it might still have some use in natural history research.

Kathy: I'm also thinking about how, I guess, now we have photography, right, which is such a good way of capturing something in an instant, and is what you could say is objective. But then before photography, drawing or painting was the only way to document visual information. So a natural history illustration is also a way of preserving that kind of knowledge and sharing that, maybe distributing it and showing people who can't see the landscape or organism on their own.

Elliott: Right. Yeah, I think that that makes a lot of sense. When we think about natural history illustrations or scientific illustrations, you tend to think that it would be very simple or very practical, right, just highlighting the parts that are of interest to scientists. But as Michele mentioned, some of them can be very aesthetic. And I see you guys have brought some prints as well as some books, so maybe we can have a look at those first.

Kathy: So, what I have here is an illustration of Shore Pit Viper from this book called *Illustrations of Indian Zoology* from 1832 and this was published in London by a British zoologist named John Edward Gray with material from the collection of Major General Thomas Hardwicke. This viper can still be found in places like Sungei Buloh and Pasir Ris mangroves. So this was one of the earliest depictions of a snake from Singapore.

Elliott: Wow, that's really cool. And it was made in Singapore or...?

Kathy: I think the paintings were done by, quite a lot were done by Indian artists, but they were not credited.

Elliott: Right. Yeah, I think that's a pretty common theme in a lot of these early drawings, right? Local people were commissioned to make these illustrations on behalf of colonial officials or administrators or sometimes visitors to a particular place. And, you know, a lot of times people think that the people that these collections were named after actually drew these drawings, but often it's not the case, right?

Kathy: Yeah, and I think what's interesting about this one also is that we have the actual specimen that is currently in the collections of the Natural History Museum in London, so I guess this is one of the cases where we can look at the illustration and look at that alongside the actual specimen, which is a lot more shrivelled up. I think because it was kept in a bottle, the skin is kind of wrinkled and the specimen itself is contorted. And so in this way, it's not as beautiful.

Elliott: The drawing kind of brings it to life, right? Yeah. So that was, I guess the purpose of drawings in the past is really, it's based on dead specimens, right? But it's really meant to portray the animal as it was living.

Elliott: I see that you brought another print for us to have a look?

Kathy: So here I have a woodblock print of the Singapore Botanic Gardens. This was done in 1889 by the Japanese artist Kubota Beisen. Beisen was an artist who visited Singapore as one of the stops on his way from Japan to Paris, and he made illustrations of different scenes and sights that he saw along the way at all these different ports, and Singapore happens to be one of them.

And all these were compiled and published as an album of woodblock prints. So what we have here is a two-page landscape spread of what we believe to be the Botanic Gardens. And everything is very green. We see a path, we see what might be a lake, we see what might be palm trees or banana trees and a lot of other plants. So it's not as easy to identify the plants here because they're all done in a more quick-sketch kind of style.

Michele: I think this goes back to our discussion of what is natural history. And I think the snake illustration that you showed is an illustration. It's really meant to capture, as truthfully as possible, the nature of the animal. While here, I believe, Beisen was an artist, and he was also coming from a very different artistic tradition. He was coming from an Eastern Asian artistic tradition. And so I believe that capturing the true nature of something, for him, was probably not capturing it precisely as it is, but making it as beautiful as possible. And also potentially including different elements in one picture.

Kathy: Yeah, I think this was also something that my team was discussing as we were working on this for a book that the museum did. We were trying to find old photos of the Botanic Gardens that could match up to what Beisen drew, but there were bits and pieces where we were thinking like, oh, this could be the Swan Lake or like, oh were these trees the Nibong palms? But why were they drawn out of the water instead of in the lake?

And perhaps all of this is also because of the process which Beisen used for assembling these pictures together. So what we were able to find out was that he would also do these quick sketches while he was travelling and after that he would go back and rework these sketches. So perhaps this is where the artistic liberty comes in as well?

Michele: Yeah, I think his goal was not true accuracy. So in a way he made this scene very, to me at least, very beautiful, very calming. So it's a great advertisement for the Botanic Gardens at that point.

Elliott: And let’s have a look at Michele’s.

Michele: Yes, so what I brought is a scenery of Singapore, this was originally a lithographic reproduction, so it was meant for a book of prints. And it was done by Ransonnet, who was an Austrian diplomat and also a naturalist. He travelled to Singapore in the 1860s, 1869 precisely. He stayed in Singapore for quite a long time and he depicted quite a number of natural sceneries of Singapore. This was a time when photography was already available, but it was pretty expensive to take photographs, and people were usually taking photographs of the city or portraits of people. So what Ransonnet did was to take sketches as he was travelling through Singapore. I believe he was taking extremely accurate sketches and then when he went back to Vienna, he made himself the lithographic illustration.

So instead of using a printer, he was actually making the drawings, transferred them onto the lithographic stone himself, and then a printing office was of course doing the mass printing for the publication. So this way he had full control of the production.

The image that I brought is a scenery of Changi back then, which was a swamp forest, and what we see is a bit of a swampy water in the foreground with some floating plants. We see some plants that grow in the water or just by the water, so plants that are adapted to having roots in the water, in a very wet environment. There is also a fallen tree with a person walking over it.

This, I guess, is to make it slightly more picturesque. It was quite common in the 19th century to include these kinds of elements. But quite extraordinary to me is the forest in the background because there are some very tall, mature trees. So it looks like it's a primary forest, a forest that has been there for hundreds of years. And this is extremely different from what Changi looks like now.

Elliott: I think when people think about Changi now, it's the beach and the airport, right? People don't really think about swamp forests. There are very few patches of swamp forest left in Singapore, right?

Michele: Yeah, and this being a completely natural scene, it is very difficult to figure out if it's a fully truthful representation or not. At Botanic Gardens, we have photographs from that period, so we can have an idea of how truthful Beisen’s work was, but in this case, there is no comparison.

But just looking at the plants, the plants are all quite… at least the ones that are detailed enough, they are fairly truthfully depicted, and they can be identified to genus level and some of them even to species. So I believe that Ransonnet, even though he was not a trained botanist, he was still very observant of all the details and capturing as much as he could in his drawings.

You can still see something like this, the forest at least, in Bukit Timah. Not the swampy area, the swampy area you would need to go to Nee Soon for example.

And well, in a way, I think this is very important for Singapore's natural history because we don't have a lot of this kind of images from so early on of Singapore's forests. Bearing in mind that this is a time where a lot of the forest was already destroyed, already developed into either housing or plantations.

So probably Changi still had a little bit of forest. But it was perhaps also fairly accessible by Ransonnet because the area nearby were already plantations.

Elliott: I think there's a misconception that a lot of the deforestation happened after independence, but actually a lot of it was happening even before the British came to Singapore. Yeah, so a lot of it was for, if I'm not wrong, gambir, pepper, and I guess other types of cash crops.

Michele: Yes. Gambir was one of the early ones, pepper also. Once the land was not fertile anymore, they were planting, for example, pineapple, fairly early on. And this is before all the famous rubber and oil palm and all the modern crops.

Elliott: You have another one for us?

Michele: Yes, the other image I brought is, instead, a more typical botanical illustration. So this one is the typical sort of A3-sized white paper with a single plant in the middle. And over here we have three green heart-shaped leaves with a short stalk that goes to the ground, and the ground is sort of depicted as a little brown pebbly mess.

And then in front of it, there is one single plant with four stalks coming up and with what looks like almost drying out flowers. So something a little bit mysterious. Because it looks like — why an artist would depict a plant with the flowers already more or less fading? And this illustration was done by James de Alwis who was the first botanical artist employed in Singapore Botanic Gardens.

He was employed by Henry Nicholas Ridley, the first director. So Ridley came in 1888 to Singapore and by 1890 he had already employed James de Alwis, who was coming from Sri Lanka. He was part of a family of natural history artists in Sri Lanka. And by 1891, he had already painted this orchid, which was native to Singapore.

And so this painting stayed in the Botanic Gardens' collection for more than a century with the wrong name. A colleague of mine a few years ago found this plant alive again in the nature reserves in Singapore and realised that it was actually a new species. And so, here I have with me the publication published in 2020, where this colleague together with other colleagues described this species as *Nervillia singaporensis*, naming it after Singapore. And it's a species that so far is only known from Singapore. And well, Ridley had already got it painted by James de Alwis more than a century ago and probably didn't quite realise that this was a distinct species at that point. But he was working on many things, so we can't fault him.

Elliott: And it grows on the ground?

Michele: It grows on the ground. Many orchids grow on trees, they are called epiphytes, but this one is one of the few that, in the tropics, grows on the ground, and those wilted-looking flowers are actually not quite wilted. They are very small flowers and they tend to not open fully. They're not really closed, but the petals don't split up very much. So they don't have the kind of fully open flower look. So this is a fairly accurate depiction.

Elliott: And you mentioned they've only recently found it, where was it?

Michele: It was recently found, I believe, in Bukit Timah and also in other areas between Central Nature Reserves. In a way, you know, plants don't need to be discovered. They've been there for a very long time. It's just that for us, it's important to give them names. So rather than discovering them, we name species. Because if a species doesn't have a name, you cannot conserve it unless you know it.

Kathy: Because you can't talk about it if you can't refer to it by a name, right?

Michele: Yes, a name is a convention, to have one name for one organism. It's not as simple as this, but ideally, that's how it is. And so you can tell, okay, this organism is only known from this location, and so we need to protect that location, or maybe it's a very widespread species, so it may not be under any kind of threats, and so on. It's quite remarkable that in Singapore, which is one of the most highly botanically well-known countries in the world, it has the highest densities of plant collections in the world, there are still species which do not have a name yet.

And it's only by comparing species with each other that allows you to figure out if what you have at hand is new or is already, for example, described from a neighbouring country from Peninsular Malaysia or Sumatra and so on. So my colleagues did a lot of research trying to figure out the other species growing in the region, and they discovered that this one was different from all the other ones.

Elliott: Amazing.

Nature Nuggets (Recommendations segment)

Elliott: It's time for Nature Nuggets! In the spirit of our podcast title, *That's Wild*, we wanted to ask our guests to recommend something wild that they've come across or enjoyed and that you can check out yourself too.

Kathy: So my recommendation, well, I suppose it's something that a lot of people know about already, but my wild recommendation is Animal Crossing. I mean it's been out for a few years, but actually I think this game was what got me interested in nature, or it was where I learned how to identify insects, different fish, that kind of thing.

It was a very interesting starting point, I think, because I played it just wanting to play a game, right? But then I found that I was catching Man-faced Stink Bugs, I was catching seabass and a lot of different creatures. And in the game, it's to profit. But when you recognize that some of the creatures in the games are worth more than others, you're like, oh, I have to catch the Man-faced Stink Bug instead of a normal one because I can make more money.

But also then after playing the game for a while, because it came out during COVID, I remember I went to the Botanic Gardens – actually to go to the Botanical Art Gallery – and then on the way I saw and I was like … oh my god, this is the Man-faced Stink Bug from Animal Crossing!

Elliott: So you actually found it in real life?

Kathy: Yeah, and I think it was just like, you know when you read a lot about a celebrity then you see them in person. That was how it felt like. So my recommendation is Animal Crossing!

Elliott: And Michele, what's your recommendation?

Michele: My recommendation is, besides of course coming to the Botanical Art Gallery, is to go and explore other museums in Singapore, and instead of just focusing on the main subjects of the exhibitions, try to spot plants and animals within the collections. Many times they are in the background, or as objects surrounding the main subject of a painting, for example, plants and animals, which could be as interesting as the main subject. So I recommend to go and have an unconventional tour of exhibitions in Singapore.

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Elliott: My next question was, is the medium still relevant? So nowadays, you know, photography is so accessible and people can pick it up pretty quickly. Whereas I think drawing scientific illustrations, that's a much longer learning curve. So in your opinions, is it still a medium that should be practiced today and has a lot of relevance today?

Michele: Well, my answer is yes and no. So photography is essential when we go to the field and collect plants. We sometimes collect 30, 40, 50 different plant collections in a day. And the only way to quickly document at least the colours and the general shape and size of them – beyond making specimens – is to just snap some photos.

But that will not really leave any kind of deep impression in the mind, I believe. Sometimes I go back from fieldwork, I've collected four, five hundred different things, and I might remember ten of them. And then I need to go back to the photos and go like, “Oh, really? Did I collect that?” But if either a botanist or an illustrator makes an illustration, that's a lot of effort. And you really need to get to intimately know what you're working with – so you need to make a dissection, you need to measure things, double check your sketches and so on. And I believe that really allows you to get to know what you are working with really well, and so it would be fantastic if botanists had the time to do their own dissections and illustrations and so on.

But sometimes I have worked with artists, and the artist pointed out things that I didn't quite realise about the plant that I was working with. An artist said, oh, I've read your description of this plant, but now I've checked the measurements and this one is slightly bigger, this one is slightly smaller, and this led me to go back to my description, my notes and sometimes realise that I was wrong or just that I need to broaden my description, my measurements and so on.

And some botanists of the past really believed that they had to make their own illustrations to truthfully understand the species.

Kathy: Can I add something to that? So I think it's really interesting because what you just said was also like — because to describe a species you are really doing an observation, right, and then writing down everything that you see. And with the work of an artist, it's the same thing. It's just that they're transferring that visual information they receive into the drawing on paper.

There's a similarity in that they both demand very close observation. Even though we say that now, “oh yeah, we don't have to draw anymore because we have photography”, but the skills that are used for a drawing, the skills that are used for a description of a species, that's still the same.

Michele: Yeah, and it is a way of double-checking your work against somebody else's work, which is equally important. And yes, when we have live plant material and we can take photographs, we tend to use the photographs for illustrations. But many times, sadly, we don't have the plant material alive. We might only have very old herbarium specimens, for example, for Singapore, or sometimes we do identify unnamed species among old herbarium materials from places that are very remote, mostly out of Singapore. And it would be really difficult to go and try to re-collect those species. So many times we describe new species just based on old specimens.

And the only way to have a beautiful illustration of it is to get an artist to interpret the specimen and so turn something that is fairly flat and brownish into, usually, a line drawing. So a pen and ink technical drawing which has all the features useful for identification. So in that case an artist is still extremely important if you want to get those species illustrated.

Kathy: From what I understand in zoology in the museum I work at, we also have line drawings being done, but mostly these are also being done by the scientists themselves.

And instead of being a whole representation of the organism, usually it's to highlight or show a specific part of the organism that may not be as easily visible in a direct photo of it. For example, if someone's working on crabs and looking at a new species, they might have to look at the reproductive organs of the crab. And this would happen under the microscope, so then the work of the scientist would be to draw that onto paper so that others reading the published paper can see that as well. And also, I think the other use for drawing in this day and age is when maybe, let's say we want to compare similar-looking species. Let's say, if I was looking at the Common Myna and the Javan Myna, and I wanted to tell you that, oh, they're different because the Common Myna has a bit of yellow around the eye, but the Javan Myna does not have that.

And then if I were to take pictures of these two types of mynas, the view might be quite different because they're animals and they move a lot. But then if I were doing a drawing, I would be able to show both of them with the same profile and show the different characteristics, and someone looking at this side-by-side comparison would be able to understand the difference immediately.

Elliott: Yeah, I think that's a very good point and I think there's a reason why, you know, the best bird guides, you know, the field guides are still drawn. Because photography depends on lighting, right? If you see a bird in bad light versus good light, it looks completely different.

So we've talked a lot about photography but I know, Kathy, you work on digitalisation, so I was wondering if you could shed a bit more light on that in the museum's work.

Kathy: The museum has a team called Signify, so they work on digitising Singapore specimens that are housed in collections overseas. Basically with their work, it's collecting a lot of historically significant specimens. these might be holotypes, which are the individuals of a species that define the name of the species. And also specimens that were collected by important people, maybe someone like Tweedie, who was the former director of the Raffles Museum.

And Signify, what they do is that they will take the specimen and lay it out nicely and then have a camera do stacking. So, what that does is capture the whole specimen – like every single part of it in very high quality, so that a researcher who wants to look at the specimen but is unable to travel down to the collection would still be able to zoom into this image online and compare characteristics.

Elliott: And is that publicly accessible, or is that just for researchers for now?

Kathy: So it's publicly accessible, and Signify has a website: signifynaturalhistory.sg

Elliott: Gotta check that out.

Kathy: Yeah. I think the other interesting thing is they also have a section where there are stories about some of the specimens that they've digitised. And one of the stories that I worked on, which actually I was just thinking about before this session today, was one on the International Fisheries Exhibition of 1883, I believe. So, with that one, there is a natural history illustration, or what we could consider a natural history illustration, where it's about two halves of a giant clam that were exhibited as part of that exhibition. And those two halves of the giant clam belong to, I think, Rose Oyster Warehouse. So, it's a British company, and now they are called Rose Restaurant which I believe is the oldest restaurant in London.

But the specimen is actually lost now, so that is the only remaining evidence that that creature actually existed. But then what's interesting is that because Signify has other specimens that were also exhibited at the Fisheries exhibition, then when we look at the illustrations together with the specimens, that kind of gives us a fuller picture of what was going on at that time.

Elliott: Right, and I guess it actually prolongs the life, so to say, of these drawings or illustrations or specimens right? Because they have a finite — or I guess digital things also have a finite lifetime, but things from the 1800s or illustrations from that period are likely to spoil much faster.

And for you, Michele, does the Botanic Gardens also do a bit of digitalisation, or is it something that you guys are looking into?

Michele: Yeah, the Botanic Gardens has a large collection of specimens, plant specimens. We have about 800,000 of them. And luckily they are quite flat and 2D. So in a way they're slightly easier to digitise than animal specimens. We have already digitised quite a lot of them and they've been put online. But those are all the type specimens, so those are special specimens which are tied to specific plant names. The rest of the collection is in the process of being digitised and it should be fully scanned over the next year or so, and then within a couple of years, all of it should be online.

Elliott: That's amazing. It's probably a pretty tedious process, right?

Michele: It's a fairly complex process. The most complex bit is not necessarily the photography because that is pretty straightforward, but they're capturing all the data from the labels. Most of them are handwritten, and they have lots of numbers, dates, localities, which are quite difficult to read and transcribe correctly. But many herbaria have already digitised, or they are in the process of doing so. So we are quite lucky that we can already go hunt for Singapore specimens in other collections overseas and then compare with what we have.

Elliott: I think we've talked a lot about why it's important, right? How natural history is important to scientific research and also a bit about how it shapes our understanding of nature. But how about what we can learn from natural history? Can natural history inform our future and current conservation strategies? And can it really influence what our City in Nature would look like in the future?

Michele: Well, natural history is what gives us the base data of what is in a certain location, so any kind of historical biodiversity data derives from publications, old publications, specimens. And without that, we wouldn't know what has been lost and what is still there, for example. So plant specimens of the same species might be repeatedly collected from the same location, sometimes from the same individual even, over decades or even over centuries. In the Gardens, for example, we have plant specimens that were collected by Ridley from specific trees, and those trees are still there, and as they come into flower or fruit, we might, once in a while, still collect specimens. And it is truly evidence that that tree was there at one point, it was also flowering or fruiting at one specific point in one specific period of the year. So all of this information in Singapore from those 800,000 specimens, but worldwide from many, many tens of millions of specimens altogether gives us the great picture of plant biodiversity worldwide. And you can extract data, for example, for a single location, single islands, single countries. And then with these build checklists, and you can also figure out when something was last collected. And come up with conservation assessments of species.

Kathy: I think it's definitely the same for animals. And I'm just thinking again about the Shore Pit Viper that I showed at the start. I think also just from a more everyday kind of perspective, like being able to look at this drawing and say, hey, it's from the 1800s. And then being like if I went to Pasir Ris tomorrow, maybe I could still see that same species there. I think that's quite, for me, it's quite an amazing realisation, and it's like a more emotional kind of impact as well, right?

Like, to know that something has been around for so long, and maybe that makes people want to cherish it more? And also, I think the other thing about a lot of these old landscapes illustrations is that they allow us to imagine as well what a place was like in the past. Even if there are small inaccuracies, I think it's still something that could be quite inspiring to look at. There's no way that we could imagine Changi right now as it is, with all the runways and planes coming in and out every day, and then you'd be like, oh, but in the past, it was once a swamp forest.

Michele: I fully agree with you. I guess scientists get very excited with specimens, but the general public might not think the same. And having illustrations of those plants available, or sceneries or landscapes, of the animals, I think that's one way of making the public more aware. Because they will hopefully find it more attractive than, you know, a snake in a jar or a dry plant specimen stuck on a piece of paper. And so they will hopefully cherish the biodiversity we have a bit more. I think having all those illustrations and having them available for display and online, that's really the way to go to get the public more excited about biodiversity.

Kathy: Yeah, because even for myself, going to see botanical art, I find myself leaning in to look more closely at how the artist rendered the textures of the leaves or like, how did they get that gradient so beautiful. And I think that technical aspect as well, the skill is something that is also quite alluring, right?

Michele: Yeah, I think different people have different interests. Some might just like the, you know, pretty plant. Some might like the composition, some might like the choice of colours, and some might like the techniques.

Elliott: Yeah, art has a very special quality about it. In these days where photography's everywhere, art attracts a different group of people – and not just a different group of people, but I think it appeals to a lot more people now, just because of how much rarer it is. And, you know, besides photography, art might be a good outreach medium to teach people more about the natural world.

And talking about that, we encourage all our listeners to check out the Botanical Art Gallery at the Singapore Botanic Gardens, which is curated by Michele. You could also browse other natural history illustrations online on the Biodiversity Heritage Library website, or learn more about Singapore's natural history illustrations on roots.sg.

Yup, so that about wraps up our podcast. Thank you Michele and Kathy both for coming on the podcast.

Kathy: Thank you so much. It was so fun!

Michele: Thank you very much, Elliott. And thank you all, and please come and visit the Botanical Art Gallery.

Elliott: And thank you to all listeners for listening to this episode of *That's Wild*. You can tune in for more episodes on Spotify, Apple Podcasts and YouTube. If you like our content, don't forget to show your support by hitting the follow button and giving us a five-star rating.